

The Federal Democratic Republic of Ethiopia
Addis Ababa City Roads Authority

Project for Development of Road Maintenance Capacity of Addis Ababa City

Project Completion Report

Appendix 6: Monitoring Sheet

June 2019

Japan International Cooperation Agency

KATAHIRA & Engineers International
PADECO Co., Ltd.
PASCO CORPORATION

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TO CR of JICA Ethiopia OFFICE

PROJECT MONITORING SHEET

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City**Version of the Sheet: Ver.1 (Term: July 2015 - August, 2015)****Name: Mr. Hiroshi Honda****Title: Chief Advisor (CA)****Prepared on August 17, 2015, Submission Date: August 20,****I. Summary****1 Progress****1-1 Progress of Inputs**

- (1) The Ethiopian Side 1) **Counter personnel** were identified. The Project Manager was in the the position on August 10th after attending a JICA Training course in Japan; 2) Furnished **office space** was provided; 3) **Administrative and operational costs** were shouldered as required:
- (2) The Japanese Side 1) Total seven **JICA experts** were deployed as planned; 2) Preparatory study has been carried out for specification of **the Equipment to be provided by JICA**; 3) Office set-up were almost completed.

1-2 Progress of Activities

- (0) **Activities for the general issues:** 4 times of Kick-off meeting were held to obtain more understanding of the JICA project, to comprehend function of the concerned parties in and outside of ACCRA, and to arrange the 1st JCC. Participants from AACRA were the GM, the Technical Advisor, Mangers from Rd Transportation Construction & Maintenance M-Process^{#1}, Rd Design M-Process, and engineers from Asset Management S-Process^{#2}. The C/Ps and the experts visited the City Administration Office, Bureau of Road & Transportation (AA City), and the Office for the Road Fund to introduce and obtain their cooperation to the Project. (*1M-Process: Main Process, *2 S-Process: Sub-Process).
- (1) **Activities for OP1:** “1.1 Review of the implementation structure of AACRA for road maintenance” has been under the joint review of the C/Ps and the experts through discussions and site visits. The major findings are as follows: 1. No worker or inspector worn safety vest, 2. major resource of the maintenance work at the site was labor force. Due to the restricted time schedule, the 1st TAC was postponed till the end of August, 2015.
- (2) **Activities for OP2:** “2.1 Review the road maintenance cycle of AACRA” has been carried out jointly by the C/Ps and the experts with discussions and site visits. The major findings are as follows: 1. The length of road that an inspection team composed of 3 staff of Asset Management Process inspected a day was 2.5 km, 2. The inspection is carried out visually, 3. No inspector worn the

safety vest. Preliminary studies has been vigorously conducted for “2.2 Conduct road inspections” and “2.3 Develop AACRA road inventory (database)” thorough document review and discussions with the C/Ps. The Project will start the two activities in the full swing from October 2015.

(3) **Activities for OP3:** Actual maintenance works were observed through site visits. The major findings are: 1. quality of cold mix asphalt was questionable, 2. there is some places where the same maintenance work (overlay) has been carried out every year (structural improvement is required), 3 surface cutting method was not employed in the pothole repair.

1-3 Achievement of the Outputs

Not applicable yet during the first two months of the Project.

1-4 Achievement of the Project Purpose

Not applicable yet during the first two months of the Project.

1-5 Changes of Risks and Actions for Mitigation

As per the JICA Risk Management Check List, no risks have been observed during the first two months of the Project. Other events and issues that may become a risk to the Project were not recognized during this reporting period.

1-6 Progress of Actions undertaken by JICA

1-7 Progress of Actions undertaken by Gov. of Ethiopia

Not applicable yet during the first two months of the Project.

1-8 Other remarkable/considerable issues related/affect to the project

(such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs, etc.)

As for a project planned by the World Bank, the experts continues to collect information from AACRA staff and concerned organizations nevertheless actual progress was not heard so far.

2 Delay of Work Schedule and/or Problems (if any)

No delay was observed during the first two months of the Project and the 1st JCC was held in August 17th as planned by the Experts.

2-1 Detail

2-2 Cause

2-3 Action to be taken

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of Ethiopia, etc.)

3 Modification of the Project Implementation Plan

The Project proposed a modification of the PDM from that outlined in the RD(signed in April 2015) to better correspond the circumstances of the Project. This proposal was approved by the 1st JCC on August 17th, 2015 and reported to JICA Ethiopian Office and the JICA HQs at a later date. The PO was altered accordingly.

3-1 PO

3-2 Other modifications on detailed implementation plan

4 Preparation of Gov. of Ethiopian toward after completion of the Project

Not applicable yet during the first two months of the Project.

II. Project Monitoring Sheet I & II

See the attached.

Project Design Matrix

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Implementing Agency: Addis Ababa City Roads Authority (AACRA)

Target Group: Staff of Addis Ababa City Roads Authority (AACRA)


Period of Project: 10/Jul/2015 - 9/Jul/2018

Project Site: Addis Ababa City

Model Site: Pilot project sites are to be determined

Version 1

Revision Dated 8/Aug/2015

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal	Three years after the completion of the Project,				
The roads in Addis Ababa City are maintained in a sustainable way.	1. XX % of roads under AACRA is below the targeted roughness of YY%. 2. The length(km) of road under AACRA inspected by the standardised method is increased by XX % compared to 3 months before the project completion.	1. Road inventory in Addis Ababa City 2. Road inventory in Addis Ababa City			
Project Purpose	By 3 months before the completion of the Project,				
The management capacity of AACRA for road maintenance is enhanced.	1. The self-rating of AACRA staff on their management capacity for road maintenance exceeds XX % on the average. 2. Road maintenance works based on PDCA ¹ cycle established by the Project are executed by AACRA. 3. The assessment of AACRA's capacity to secure the budget for road maintenance exceeds XX% on the average.	1. Interview to AACRA management staff: Baseline and Annual interviews 2. The PDCA Checklist 3. Questionnaire survey/Interview to Addis Ababa City Administration and Road Funds Agency: Baseline and	1. Human resources necessary for the road maintenance are continuously assigned by AACRA. 2. Financial resources are allocated by the City Administration and Road Funds Agency in a sustainable manner.		
Outputs					
1. The implementation structure of AACRA for road maintenance is improved.	1-1. Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented to the 2nd JCC February 2016 1-2. Road map to act on the suggestions is prepared by April 2016, to be incorporated into the budget FY Jul/2016 - Jun/2017 if necessarily.	1-1. The complied suggestions, the Project meeting record 1-2. The Road Map, Minutes of JCC	The AACRA staff capacitated by the Project continue to work for their respective positions.		
2. The process for formulating road maintenance plans is established.	2-1. PDCA Checklist is developed by January 2016. 2-2. AACRA Annual road maintenance plan contains necessary items based on the PDCA checklist since the beginning of the 3rd project year. 2-3. The percentage of the implemented road maintenance works to all the maintenance works in the AACRA annual road maintenance plan exceeds XX% since the 3rd project year.	2-1. The developed PDCA checklist, JCC minutes 2-2. The PDCA Checklist, ACCRA annual road maintenance plan 2-3. The baseline data, AACRA annual road maintenance plan, AACRA annual report,			
3. The maintenance skills and knowledge of AACRA technical staff are improved.	3-1. The self-rating of AACRA technical staff on their maintenance skills and knowledge exceeds XX% on the average at 3 months before the project completion. 3-2. The ratio of preventive maintenance works to all the maintenance works is increased by XX % in the City compared to before the commencement of the Project at the beginning of the 3rd project year.	3-1. Test and questionnaire survey to AACRA technical staff: Baseline and Endline 3-2. The baseline data, AACRA annual report, AACRA annual road maintenance plan			
Activities	Inputs	Important Assumption			
1-1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	The Japanese Side 1. Experts • Chief Advisor/Road Maintenance • Road Maintenance Planning • Road Inspection • Maintenance Management System • Maintenance Design • Construction Supervision • Training Planning • Others as necessary	The Ethiopian Side 1. Personnel • Project Director • Project Manager • Counterpart personnel 2. Provision of the project office and facilities necessary for the project implementation 3. Traffic survey and pilot projects in Addis Ababa City 4. Administrative and operational expenses necessary for the project implementation • Electricity, water, communication, etc. • Local traveling costs and daily subsistence allowance (DSA) for counterpart personnel 5. Others as necessary	1. The turnover of AACRA staff does not profoundly affect the project activities. 2. Natural disasters, such as floods, do not profoundly affect the project activities.		
1-2 Convene Technical Advisory Committee (TAC)					
1-3 Prepare a training plan for AACRA Staff					
1-4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.					
1-5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	2. Training of counterpart personnel, including Project Director and Project Manager, in Japan and/or the Third Countries 3. Provision of machinery and equipment • Inspection Equipment • Maintenance Management System • Structural Investigation Equipment • Others		Pre-Conditions Understanding and cooperation on road maintenance in the City are obtained from the project stakeholders such as the City Administration, Addis Ababa City Road and Transport Bureau, Road Funds Agency, etc.		
1-6 Promote public relations (PR) activities on road maintenance in the City					
2-1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	4. Local expenses for the project activities as necessary				
2-2 Conduct road inspections in the City					
2-3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.					
2-4 Prepare and revise a medium-long-term road maintenance plan based on the above inventory data					
2-5 Prepare the annual road maintenance plan					
3-1 Select pilot projects for maintenance works from the annual road maintenance plan					
3-2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process					
3-3 Conduct the detailed investigations and design specifications of the pilot projects					
3-4 Assist AACRA to execute pilot projects					
3-5 Feedback the achievements and experiences of pilot projects into the next annual road maintenance plan					
3-6 Organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level.					
					
			<Issues and countermeasures>		

Project Monitoring Sheet II (Revision of the Plan of Operation)

Version 1

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Dated 5/Aug/2015

Inputs	1st EthFY												2nd EthFY												3rd EthFY												Monitoring				
	Plan	2015				2016				2017				2018				Remarks	Issue	Solution																					
Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III																								
Expert																																									
Chief Advisor/Road Maintenance	Plan																																								
Deputy Chief Advisor/ Road Maintenance/ Maintenance Management System	Plan																																								
Road Maintenance Plan	Plan																																								
Road Inspection (Site Survey)	Plan																																								
Road Inspection (Database)	Plan																																								
Road Maintenance Design	Plan																																								
Construction Supervision	Plan																																								
Training Plan	Plan																																								
Monitoring	Plan																																								
Equipment ▲: to be used for the Project Activities																																									
The Inspection Equipment	Plan																																								
Structural Investigation Equipment	Plan																																								
Maintenance Management System	Plan																																								
Training in Japan																																									
Training for Counterpart Personnel	Plan																																								
In-country/Third country Training																																									
Not Appreciable	Plan																																								
Actual																																									
Activities	Plan	20146				2017				2018				Responsible Organization		Achievements	Issue & Countermeasures																								
Sub-Activities	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	Japan			GOE																							
Output 1: The implementation structure of AACRA for road maintenance is improved.																																									
1.1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	Plan																																					JICA	AACRA		
Actual																																									
1.2 Convene Technical Advisory Committee (TAC)	Plan																																					JICA	AACRA		
Actual																																									
1.3 Prepare a training plan for AACRA Staff	Plan																																					JICA	AACRA		
Actual																																									
1.4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.	Plan																																					JICA	AACRA		
Actual																																									
1.5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	Plan																																					JICA	AACRA		
Actual																																									
1.6 Promote public relations (PR) activities on road maintenance in the City	Plan																																					JICA	AACRA		
Actual																																									
Output 2: The process for formulating road maintenance plans is established.																																									
2.1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	Plan																																					JICA	AACRA		
Actual																																									
2.2 Conduct road inspections in the City	Plan																																					JICA	AACRA		
Actual																																									
2.3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.	Plan																																					JICA	AACRA		
Actual																																									
2.4 Prepare and revise a medium/long-term road maintenance plan based on the above inventory data	Plan																																					JICA	AACRA		
Actual																																									
2.5 Prepare the annual road maintenance plan	Plan																																					JICA	AACRA		
Actual																																									
Output 3: The maintenance skills and knowledge of AACRA technical staff are improved.																																									
3.1 Select pilot projects for maintenance works from the annual road maintenance plan	Plan																																					JICA	AACRA		
Actual																																									
3.2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process	Plan																																					JICA	AACRA		
Actual																																									
3.3 Conduct the detailed investigations and design specifications of the pilot projects	Plan																																					JICA	AACRA		
Actual																																									
3.4 Assist AACRA to execute pilot projects	Plan																																					JICA	AACRA		
Actual																																									
3.5 Feedback the achievements and experiences of the pilot projects into the next annual road maintenance plan	Plan																																					JICA	AACRA		
Actual																																									
3.6 Organize a workshop/seminar of the pilot projects for ERA and road agencies at regional and municipal level	Plan																																					JICA	AACRA		
Actual																																									
Project Duration / Phasing	Plan																																								
Actual																																									
Monitoring Plan	Plan	20146				2017				2018				Remarks	Issue	Solution																									
Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III																												
Monitoring																																									
Joint Coordinating Committee	Plan																																								
Actual																																									
Set-up the Detailed Plan of Operation	Plan																																								
Actual																																									
Submission of Monitoring Sheet	Plan																																								
Actual																																									
Monitoring Mission from Japan	Plan																																								
Actual																																									
Joint Monitoring	Plan																																								
Actual																																									
Reports/Documents																																									
Project Work Plan	Plan																																								
Actual																																									
Project Completion Report	Plan																																								
Actual																																									
Public Relations																																									
Public relations (PR) activities on road maintenance in the City (Activities 1.6)	Plan																																								
Actual																																									

■ Activities with fixed period
 ■ Activities to be continuously conducted, or with tentative schedule

TO CR of JICA Ethiopia OFFICE**PROJECT MONITORING SHEET****Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City****Version of the Sheet: Version 2 (Term: September 2015 - February 2016)****Name: Mr. Hiroshi Honda****Title: Chief Advisor****Submission Date: 18th Feb. 2016****I. SUMMARY****1. PROGRESS**

1-1 PROGRESS OF INPUTS

1-1-1 The Japanese Side**(1) Experts**

In accordance with the amended contract agreed in January 2016 between JICA and Consultants, number of experts has increased into a total ten experts. Experts have been assigned since 10th July 2015, and at the end of February 2016, a total of nine experts have been assigned for a total of 18.7 Man/Month (hereinafter to be called as “MM”) out of the project total assignment of 72.5 MM (assignment in Ethiopia only).

(2) Training of Counterparts Personnel

Under the Project, two trainings in Japan are planned, and the first training in Japan will be conducted in September 2016 tentatively.

(3) Provision of Machinery and Equipment

At the 1st Joint Coordination Committee (hereinafter to be called as “JCC”) on 17th August 2015, specification of procurement Inspection Equipment (hereinafter to be called as “Pavement Condition Survey Vehicle”) was approved by Counterparts, and needs of inspection support system was confirmed. Through the discussion with JICA Headquarter, following changes were agreed; 1) Pavement Condition Survey Vehicle is to be procured directly by JICA, and the rest of equipment are to be procured by JICA Team. 2) Equipment and Machinery for Visual Inspection Supporting System is additionally procured, and 3) System for Maintenance Management System and Visual Inspection Supporting System are to be developed through the Project and transferred to Counterparts. At the 2nd Technical Advisory Committee (hereinafter to be called as “TAC”), JICA Team informed these changes to Counterparts, and Contract between JICA and Consultants was amended in January 2016. Five sets of smartphone for Visual Inspection Supporting System are procured and handed over to Counterparts at the 2nd JCC to be used for the project activities.

Table 1 List of Equipment and Machinery to be Procured

Equipment and Machinery	Component	Responsible agency for procurement	Expected procured date* (tentative)
Inspection Equipment (Pavement Condition Survey Vehicle)	<ul style="list-style-type: none"> 1 Vehicle Equipment (assembled to the vehicle). 	JICA	September 2016 as the earliest
Structural Testing Instrument	<ul style="list-style-type: none"> 1 set of instrument (to be specified through discussion) 	JICA Team	July 2017 as the earliest
Maintenance Management System	<ul style="list-style-type: none"> 1 set of Desktop Computer 1 GIS software 	JICA Team	October 2017 as the earliest
Visual Inspection Supporting System	<ul style="list-style-type: none"> 5 set of Smartphone 1 GIS software 	JICA Team	February 2016 (Smartphone only)

Note: "Expected procurement date" means Equipment and Machinery to be used for the project activities.

(4) Local Expenses for the Project Activities

Local expense has been utilised mainly for consultant cost, office equipment so far.

1-1-2 The Ethiopian Side

(1) Personnel

Project Manager was identified under Record of Discussion (hereinafter to be called as "R/D") and assigned in late August 2015. The rest of counterpart personnel will be selected through the progress of the Project. In November 2015, three personnel for inspection activity have been assigned, which have increased into total of nine personnel as of February 2016.

(2) Furnished Office Space and Facilities

Since the project commencement in July 2015, a project office (Room 317) has been allocated at Addis Ababa City Roads Authority (hereinafter to be called as "AACRA). Initially office furniture was installed for five experts, which increased for eight experts.

(3) Traffic Survey and Pilot Project in Addis Ababa City

To be added as the Project progresses.

(4) Administrative and Operational Expense

Expense agreed at R/D has been secured and handled by the Ethiopian Side.

1-2 PROGRESS OF ACTIVITIES

Project activities to achieve the project purpose under Work Plan were agreed at the 1st JCC. Project activities are summarised in below table. Progress of each activity is described accordingly in the following section.

Table 2 Outline of Project Activities

PROJECT PURPOSE: The Management capacity of AACRA for road maintenance is enhanced

Outputs	Activity no	Activities
Overall	Activity 0-1	Preparation, Updating and Review of Work Plan and Monitoring Sheet
	Activity 0-2	Baseline Survey and Performance Indicator

Outputs	Activity no	Activities
	Activity 0-3	JCC and TAC
Output 1: The implementation structure of AACRA for road maintenance is improved.	Activity 1-1	Review Implementation Structure of AACRA
	Activity 1-2	Convene TAC
	Activity 1-3	Prepare training Plan for AACRA Staff
	Activity 1-4	Conduct training for AACRA Staff
	Activity 1-5	Share Information among Parties and Organization Concerned
	Activity 1-6	Promote Public Relation
Output 2: The Process for formulating road maintenance plans is established	Activity 2-1	Review / Revised Road Maintenance cycle
	Activity 2-2	Conduct Road Inspection
	Activity 2-3	Develop and Update Road Inventory
	Activity 2-4	Prepare and Revise Mid and Long Term Road Maintenance Plan
	Activity 2-5	Prepare Annual Road Maintenance Plan
Output 3: The Maintenance skills and knowledge of AACRA Technical staff are improved	Activity 3-1	Select Pilot Project
	Activity 3-2	Share information of Pilot Project
	Activity 3-3	Conduct Detailed Investigation and Design Technical Specification
	Activity 3-4	Assist AACRA in Implementing Pilot Project
	Activity 3-5	Feedback from Implementation of Pilot Project
	Activity 3-6	Organize Workshop/Seminar of Pilot Project

1-2-1 ACTIVITIES FOR OVERALL

(1) ACTIVITY 0-1: Preparation, Updating and Review of Work Plan and Monitoring Sheet

1) Kick off Meetings

Kick off meeting was held on 15th July 2015 in order to 1) obtain more understanding of the JICA project, 2) comprehend function of the concerned parties in and outside of AACRA, and 3) arrange the 1st JCC. Participants from AACRA were the General Manager, the Technical Advisor, Managers from Road Transportation Construction and Maintenance Core Process (hereinafter to be called as “C&M”), Road Transport Design Core Process (hereinafter to be called as “RTD”), and engineers from Road Resource Registration Maintenance and Research Sub Process (hereinafter to be called as “RAM”).

Besides, Counterparts and JICA experts visited Addis Ababa City Road & Transportation Bureau, and Road Funds Agency to introduce and obtain their cooperation to the Project. JICA experts also visited the Embassy of Japan in Ethiopia to explain the Project and requested participation to JCC hold every six months.

2) Work Plan

Draft Work Plan was discussed with JICA Headquarter on 13th July 2015, and agreed at the 1st JCC held on 17th August 2015. Currently JICA Team is amending Work Plan according to the amended contract in January 2016.

3) Monitoring Sheets

Every six months, monitoring sheets are updated based on discussion with Counterparts, and submitted to JICA Ethiopia Office. Following shows the scheduled submission of monitoring sheet.

Table 3 Schedule of Monitoring Sheet Submission

Project Year	Version	Date
1st year (July 2015-June 2016)	Monitoring Sheet Version 1	Agreed and submitted on 20 th August, 2015
	Monitoring Sheet Version 2	Agreed on 18 th February, 2016
2nd year (July 2016-June 2017)	Monitoring Sheet Version 3	To be submitted in August 2016
	Monitoring Sheet Version 4	To be submitted in February 2017
	Monitoring Sheet Version 5	To be submitted in August 2017
3rd year (July 2017-June 2018)	Monitoring Sheet Version 6	To be submitted in February 2018

(2) ACTIVITY 0-2: Baseline Survey and Performance Indicator

Performance indicators, which are to evaluate the achievement level of the Project, are planned to be set within six months from the project commencement. JICA Team proposed to consult with City Council of Addis Ababa on performance indicators, however due to requiring an official letter from Mayor, consultation is not yet held. The issue was addressed to AACRA at the 2nd TAC, and AACRA agreed to communicate with Addis Ababa City Administration on this issue.

Considering the difficulty to consult with City Council of Addis Ababa, JICA Team has revised performance indicators on the project purpose and the output with Counterparts and consulted to JICA Ethiopia Office for approval prior to the 2nd JCC. At the 2nd JCC, proposed performance indicators were approved. Performance indicators are described in “1.3 Achievement of the Outputs” and “1.4 Achievement of the Project Purpose”. JICA Team is currently studying methodology for the baseline survey.

(3) ACTIVITY 0-3: Joint Coordination Committee (JCC) and Technical Advisory Committee (TAC)

Outline of JCC and TAC is summarised in Table 4. Member of JCC was set as agreed at R/D and assigned in September 2015, and member of TAC was assigned after the 1st JCC. Working Groups (hereinafter to be called as “WGs”) will be set up as required through the course of project.

Table 4 Outline of JCC and TAC

Committee	Members	Frequency	Function
Joint Coordinating Committee (JCC)	[Ethiopia Side] • AACRA Project Director • AACRA Project Manager of RAM • AACRA RTD • AACRA C&M • AACRA other related Department • Addis Ababa City Road and Transport bureau • Addis Ababa City Administration • Road Funds Agency [Japanese Side] • JICA Experts • JICA Ethiopia Office • Embassy of Japan in Ethiopia	Semi-Annually	Approve a work plan, review overall progress, conduct monitoring of the Project, and exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee (TAC)	[Ethiopia Side] • AACRA Project Director • AACRA Project Manager of RAM	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by Project Director, Project

Committee	Members	Frequency	Function
	<ul style="list-style-type: none"> • AACRA RTD • AACRA C&M • AACRA other related Department [Japanese Side] • JICA Experts 		Manager, Counterpart personnel, and JICA experts.

NOTE:

- Road Transportation Construction and Maintenance Core Process : C&M
- Road Transport Design Core Process :RTD
- Road Resource Registration Maintenance and Research Sub Process :RAM?

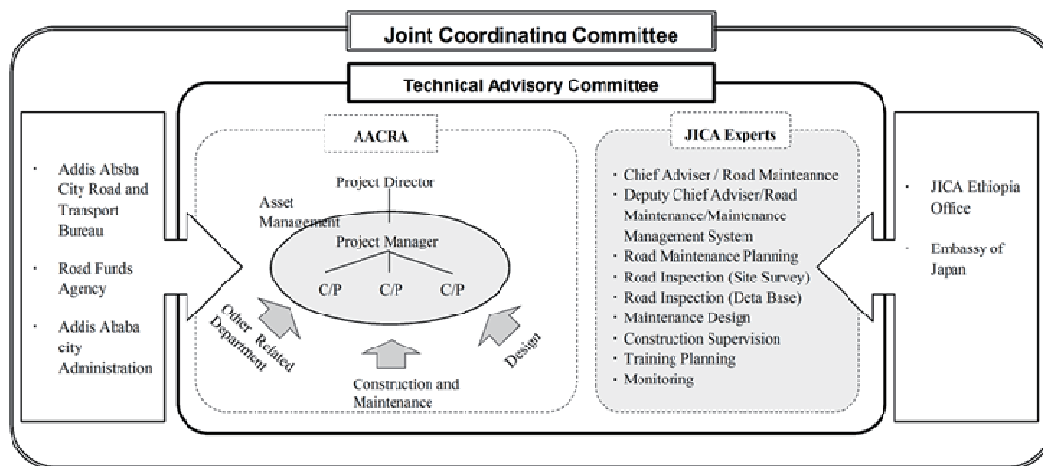


Figure 1 Structure of JCC and TAC

1) 1st JCC

The 1st JCC was held on 17th August 2015, chaired by the General Manager of AACRA, Eng. Fekadu Haile with total of 18 participants. At the meeting, revised PDM, monitoring sheet, and specification for procurement goods have been approved. In addition, following items were requested and agreed on 1) Review of exiting quality of road maintenance works carried out by supervision consultants, 2) Immediate process for procurement of Pavement Condition Survey Vehicle.

2) 2nd JCC

The 2nd JCC is held on 18th February 2016, with a total 23 participants. Progress of activities including, database preparation and inspection were informed, and smartphones for Visual Inspection Supporting System were handed over. The General Manager of AACRA pointed out following points.

- Drainage during rainy season to be incorporated considering a masterplan being developed by WB
- Procurement of Pavement Condition Survey Vehicle to be accelerated
- New system to be developed including road numbering system based on the existing mater plan, and road maintenance system like adopting Kyoto Model, with clear justification for replacing the existing system.

Table 5 JCC held during the Project (as of February 2016)

No.	Date	Participants
1 st	17th August, 2015	In total of 18 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
2 nd	18th February, 2016	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team

(4) ACTIVITY 0-4: Training in Japan

At the 1st TAC, JICA Team explained the outline of Training in Japan. Training will be conducted twice during the project period of three years. At 2nd JCC, the first training is proposed to be in August 2016.

(5) ACTIVITY 0-5: Project Completion Report

Project Completion Report is planned to be submitted in June 2018.

1-2-2 ACTIVITIES FOR OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is Improved**(1) ACTIVITY 1-1: Review Implementation Structure of AACRA**

Since July 2015, JICA Team have reviewed the implementation structure of AACRA for road maintenance with Counterparts through discussions, interviews, questionnaire survey and site visits. Finding are summarised as follows.

1) Role of Road Transport Design Core Process (RTD)

RTD is currently not included into the road maintenance cycle due to current road maintenance work being limited to patching and overlay. Considering this situation, at the 1st TAC, JICA Team advised AACRA that RTD needs to be involved for maintenance designing. (RTD will have a full-scale participation in this Project from the design stage of the pilot project.)

2) Preparation of Maintenance Plan by Road Resource Registration Maintenance and Research Sub Process (RAM) and Road Transportation Construction and Maintenance Core Process (C&M)

Maintenance Plan is currently provided by RAM and delivered to C&M. C&M carries out maintenance works according to the plan. As for the implementation order of the works, however, C&M may change considering the availability of resources. In case of an additional budget is required, C&M requests to RAM and RAM requests to City Council through Planning Department of AACRA. The communication between RAM and C&M has been improved. Review on the road maintenance cycle is further carried out under Activity 2-1.

3) Present Condition of Information Sharing and Information Required for Each Department

Development of the database to be shared with other departments has been started by RAM using the existing road survey data collected by RAM. In order to obtain and share a broader range of data, early procurement of Pavement Condition Survey Vehicle is expected eagerly.

4) Present Condition and Future Trend of Staff Allocation

In October 2015, JICA Team conducted a questionnaire survey to Human Resource Process on such as staff number, salary system, recruitment, and training. It has been informed that a shortage of staff number especially at RAM and quick turnover as well as difficulty of attracting candidates with competent knowledge and skill, and experience. With regards to the staff number of RAM, it has been increased since the beginning of the Project, however still insufficient. In terms of training, a dedicated department is allocated for training. Further needs and issue will be studied through the Project.

5) Responsibility Assignment for PDCA (Plan-Do-Check-Action) Cycle in AACRA

JICA Team could not find out any department or section responsible for the role of “Action” on PDCA cycle required for the further improvement.

(2) ACTIVITY 1-2: Convene TAC

TAC is organized monthly. As of today (The end of February 2016), two TAC were held as below.

Table 6 TAC during the Project (as of February 2016)

TAC	date	participants	Topic discussed
1 st	7 th Sep. 2015	In total of 13 JICA experts: 3/ AACRA: 10	<ul style="list-style-type: none"> • Progress of the Project • Challenges on road patrol • Strategic road and database setup • Inclusion of city administration
2 nd	27 th Oct. 2015	In total of 13 JICA experts: 5/ AACRA: 8	<ul style="list-style-type: none"> • Review on the last TAC • Method of road patrol, progress

1) 1st TAC

Due to the restricted time schedule, the 1st TAC was held on 7th September 2015. AACRA proposed to clarify the demarcation of C&M, Supervision consultant, and RAM through the progress of the Project. JICA Team also confirmed that drainage inspection and planning will be included.

2) 2nd TAC

During the discussion, JICA Team proposed following actions 1) Maintenance plan based on visual inspection data will be prepared by February 2016, 2) Temperature digital gauge will be procured from Japan, 3) Minimum length of road segment is to be confirmed, 4) Communication with City Administration will be improved, and 5) Kaizen workshop will be hold at the beginning of next year. So far, JICA Team provided a temperature digital gauge in February 2016.

(3) ACTIVITY 1-3: Prepare Training Plan for AACRA Staff

At the 1st TAC, JICA Team presented training policy on OJT, Training in Addis Ababa, and Training in Japan. Team is currently developing Training plan targeting RAM and will present to Counterparts by the end of February 2016.

(4) ACTIVITY 1-4: Conduct Training for AACRA Staff

So far, JICA Team conducted 1st workshop, 3 trainings on emergency patrolling, 1 training on Scheduled inspection, 2 trainings on Restructuring of road network, 1 training on Visual Inspection, and 1 training on Annual maintenance planning and budgeting.

Table 7 Training Implemented during the Project (as of February 2016)

Activity	Training	Content	Style	Time and Date	Speakers/Trainer	Participants
2-4	Road Maintenance System– Kyoto Model	<ul style="list-style-type: none"> • Review/Revised of Road Maintenance cycle (PDCA cycle), • Overview of Kyoto Mod • Road Inspection 	Workshop	20 th Sep. 2015 10:00- 11:30	JICA Team	In total of 16 participants including traffic engineers, data collectors, maintenance

Activity	Training	Content	Style	Time and Date	Speakers/ Trainer	Participants
		(Pavement Condition Survey Vehicle)				engineers, etc.
2-2	Emergency patrolling	Concept of emergency patrolling	Lecture	11 th Sep. 2015	JICA Team	Member of RAM
2-2	Emergency patrolling	How to carry out emergency patrolling	Lecture	14 th Sep., 2015 9 th Oct. 2015	JICA Team	Member of RAM
			OJT	15 th - 22 nd Sep., 2015	JICA Team	Member of RAM
2-2	Emergency patrolling	How to process geo-tagged photographs	Lecture	15 th Sep. 2015	JICA Team	Member of RAM
			OJT	16 th - 22 nd Sep., 2015	JICA Team	Member of RAM
2-2	Scheduled inspection	Introduction of inspection vehicle	Lecture	20 th Aug. 2015	JICA Team	Member of RAM
2-2	Visual Inspection	Visual inspection using mobile system	Lecture	16 th Feb. 2016	JICA Team	Member of RAM
2-3	Restructuring of road network	Concept of revised road network system (road numbering)	Lecture	29 th Oct./16 th Dec. 2015	JICA Team	Member of RAM
2-3	Restructuring of road network	Setup of revised road network	Lecture	29 th Oct./16 th Dec. 2015	JICA Team	Member of RAM
			OJT	16 th - 27 th Dec. 2015	JICA Team	Member of RAM
2-4/2-5	Annual maintenance planning & budgeting	Annual maintenance planning	Lecture	11 th Sep. 2015	JICA Team	Member of RAM

(5) ACTIVITY 1-5: Share Information among Parties and Organization Concerned

At the 1st TAC, JICA Team and Counterparts developed a draft communication system among RAM, C&M, and RTD. JICA Team will continue to study on communication system between RAM and C&M, as well as external parties concerned such as City Council of Addis Ababa and Road Fund Agency.

Table 8 Internal Communication System (draft)

Direction	Data (Contents)	Frequency
RAM → C&M	Annual Maintenance Plan (Prioritized section, work type, work quantities)	Annually (by June)
RAM → Planning	Annual Maintenance Plan	Annually (and after budgeting)
C&M → RAM	Repairing record (Location and volume of work which have been carried out)	Monthly
RAM → C&M	Emergency maintenance plan	Timely
C&M → RAM	Emergency maintenance record	Weekly
RAM → Most of departments	Progress evaluation (Feedback)	Quarterly
RAM → RTD	The section to be designed.	As required
RTD → C&M	Maintenance design	As required

NOTE:

- Road Transportation Construction and Maintenance Core Process : C&M
- Road Transport Design Core Process :RTD
- Road Resource Registration Maintenance and Research Sub Process :RAM'

(6) ACTIVITY 1-6: Promote Public Relation

At the 1st TAC, on purpose to promote understanding of public, professional, and relevant authorities of the Project and importance of road maintenance, JICA Team presented Public Relation Policy as 1) use variety of media to deliver messages to wider public, 2) establish bidirectional communication, and 3) conduct maintenance activities with public participation. Actual implementation will start from the second year of the Project.

1-2-3 ACTIVITIES FOR OUTPUT 2: The Process for Formulating Road Maintenance Plans is Established

(1) ACTIVITY 2-1: Review/Revise Road Maintenance Cycle

1) Review and Findings of Current Road Maintenance Cycle

Since August 2015, JICA Team have reviewed existing road maintenance cycle and workflow of AACRA jointly with the Counterparts through interviews and a workshop. Existing cycle is summarised in Figure 2 and findings so far are summarised in below. JICA Team will continue to review further.

- The workflow of “Check and Act” in the PDCA cycle was not yet established.
- The cycle for Mid/Long term is not implemented.
- Information sharing among each department related activities in PDCA cycle is inadequate.

PDCA	Work items	Responsibility	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	note
Check	Inspection	Scheduled Inspection													
	Daily Inspection	Asset Management	Daily Inspection (Visual) for Pavement and Drainage												3 data collectors 2 or 3 days /week Approx. 2.5 km / day
	Public Report / Urgent matter		Public Report / Urgent matter												
Act	Evaluation	Confirmation of repair records			Evaluation										
		Selection of Emphasis management segments													
		Selection of structural investigation segments													
	Maintenance Plan	Mid-and-Long Term													
		Annual Plan		Revise		Annual Plan Ver.1			Revise			Revise			
Plan	budget	Budget Plan													
		Budget Request				Budget Plan			Budget Request	Approved					
Do	Repair / Rehabilitation	Structural Investigation													
		Repair Design													
		Repair Construction (planned)				Repair (Overlay / Patching)						Repair (Overlay / Patching)			
		Repair Construction (emergency)				Repair (Overlay / Patching)						Repair (Overlay / Patching)			
		Repair data Preparation				Repair data Preparation						Repair data Preparation			

Figure 2 Existing Road Maintenance Cycle

2) Ideal and Feasible Road Maintenance Cycle Framework

Based on the review, JICA Team, through a series of discussions and a workshop with AACRA, formulated ideal Road Maintenance Cycle (version 1) as shown on Figure 3 adopting PDCA cycle and incorporating Road Maintenance Management System, Pavement Condition Survey Vehicle, Visual Inspection Supporting System to be procured to AACRA through the Project. The version will be updated through the project progress and continuous discussions with Counterparts.

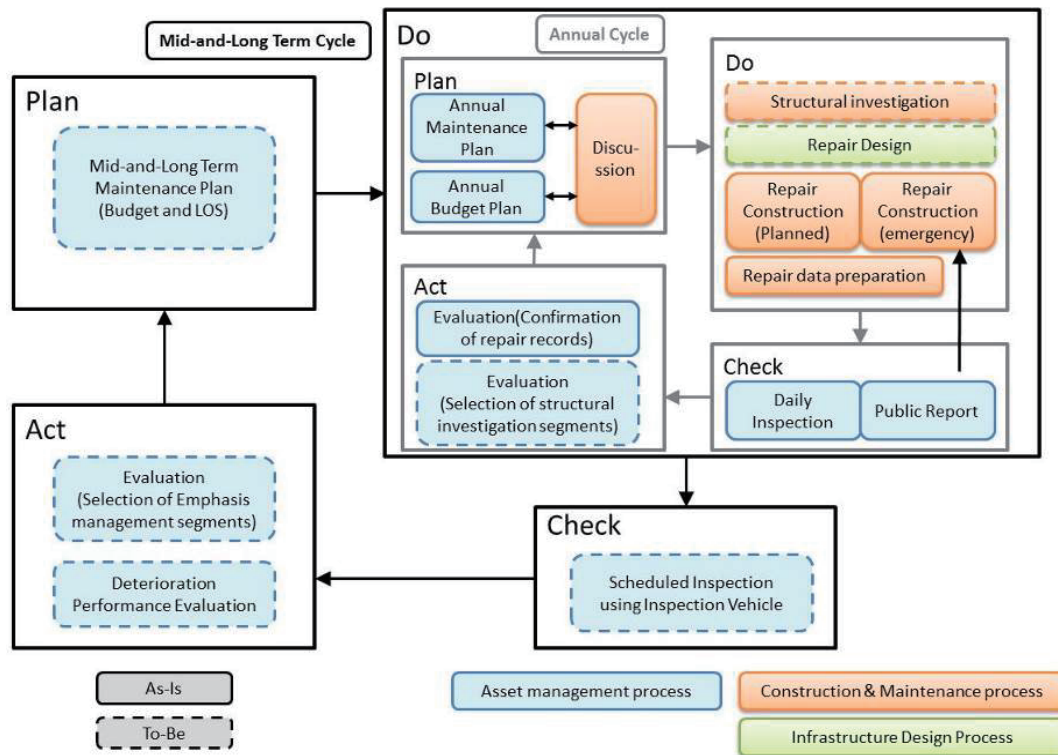


Figure 3 Ideal Road Maintenance Cycle (version 1)

3) PDCA Checklist

In order to monitor road maintenance works based on the PDCA cycle is implemented properly by AACRA and to examine further improvements, JICA Team with AACRA had developed PDCA checklist (version 1) containing check items and evaluation indexes. The checklist was presented at the 2nd JCC, and will be updated as required according to the future discussions.

(2) ACTIVITY 2-2: Conduct Road Inspection

1) Review and Challenges of Road Inspection

On 12th August 2015, JICA Team conducted a field survey to understand issues and problems on routine road maintenance inspection and data management. Findings are summarised as follows.

- Daily inspection and data management
 - Currently visual inspection is carried out by 3 people covering 2.5 km/day.
 - Safety vests and helmets are not equipped during daily inspections.
 - Road damages are recorded only to paper inspection forms.
 - Inspection records are stored as-is, in paper inspection form.

● Data management and information system

- Inspection results have not been made into a database.
- Evaluation unit of the road maintenance management system installed in 2003 (Old System) is short as 25 m and data management is complex.
- The system itself is old and is not currently being used.

2) Hierarchical Inspection Scheme

At the 1st TAC, JICA Team presented about 1) problems of the current situation, 2) the importance of survey using equipment and machinery, 3) data items to be collected by Pavement Condition Survey Vehicle, 4) draft Hierarchical Inspection Scheme, and 5) proposed inspection method, specification, and analysis. The proposal has been approved by Counterparts.

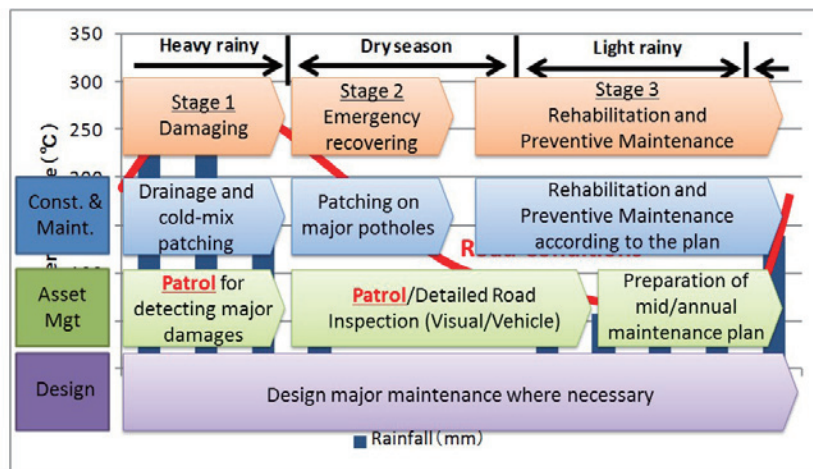


Figure 4 Hierarchical Inspection Scheme (draft)

3) Emergency Patrol and Recovery

At the 1st JCC, issue on reduction of service level due to many potholes after rainy season was also raised, and at the 2nd TAC, JICA Team introduced Emergency Patrol to detect significant pavement damage in the city for emergency recovering, especially after rainy season. Following the meeting, RAM has carried out emergency patrols to collect basic information such as taking photos of section requires detailed inspection. Accordingly, C&M has conducted emergency recovery repairs. Proposed methodology of emergency patrol is as follows.

Table 9 Proposed Emergency Patrol Methodology (draft)

Item	Description
Period	Heavy rainy season (Jul – Sep) and through the year
Team	2 data collector with 1 vehicle per team or more
Expected pace	30 km/day-team (3 teams for 1 months for paved)
Target damage	Significant damages which degrade the minimum service level (e.g. pothole in center of carriageway)
Objective road	All paved road from higher hierarchy sections
Outputs	Location of the damages Photos (Both distant and close-up views)

4) Development of Visual Inspection Supporting System

At the 1st JCC, JICA Team confirmed the needs of inspection support in order to respond efficiently to public demand on road maintenance. Thus JICA added the procurement and development of Visual Inspection Supporting System into the project activity. The system is composed of a) Field Reporting System and b) Visual Inspection Data Management Systems.

a. Field Reporting System

This system allows data collectors to collect data of road damages, photos and GPS coordinate on site, and allow to send to office via email.

b. Visual Inspection Data Management System

The system is to accumulate archived data received via email from the site into desktop using GIS, and allow to display the inspection record on map.

JICA Team has developed Visual Inspection Supporting System (version 1), smartphone application, and desktop computer GIS data management application, and will conduct OJTs using the system. 5 set of smartphone are procured and handed over to Counterparts to be used for the project activities at the 2nd JCC. The system will be upgraded and customized to apply demands of AACRA according to the future discussions with AACRA.

(3) ACTIVITY 2-3: Develop and Update Road Inventory

1) Review of Road Inventory Information

JICA Team reviewed existing road inventory data and found that AACRA manages road network data as Master Plan Road Network Data in MS Excel format and updates annually. Network Data is composed from mainly seven data items of Road No, Road Name, Type, Width, Length, Carriageway Type, and Others. Through the review and discussions with Counterparts, challenges for road inventory database have been identified as below.

- Connectivity between inventory table and road network map
- Random numbering
- Definition of road section is not clear
- Direction from start to end point is inconsistent

2) Road Network Classification

At the 1st TAC, insufficiency of current road classes (SS, PAS, RR and CS) to prioritise roads for road maintenance works were discussed. At the 2nd TAC, Counterparts pointed out a problem on the limitation of road maintenance budget and needs of clarifying sites for road inspection and repair construction works and conducting works at a concentrated area. Based on these meetings, JICA Team proposed following five road classification at the 2nd TAC, which weigh higher prioritization to strategic roads.

Table 10 Road Class and Definitions (proposed)

Class name	Definitions
Strategic roads	Road's with High traffic volume and which have more political & social impacts (PAS,SAS,CS,LS,RR)
Major Arterial	PAS
Sub Arterial	SAS
Collector streets	CS
Local streets	LS

3) Framework of Road Inventory Database System

JICA Team, through discussions with RAM, developed the process for restructuring inventory data using existing data and information at AACRA, and also developed basic policies on the compatibility and customization of Road Inventory Database System with Maintenance Management System and Pavement Condition Survey Vehicle to meet the actual needs of AACRA. The proposed process and definition were approved at the 2nd TAC.

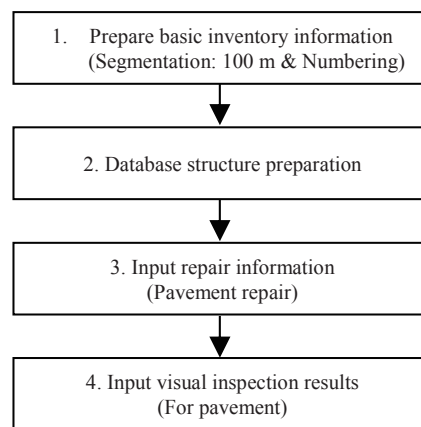


Figure 5 Database Setup Process

Table 11 Proposed Definition of Route, Section, and Segment

Unit	Definition	Objectives
Route	An entire road which continues without turning left or right with the same road class (i.e. PAS, SAS, Ring Road: RR)	To indicate unit of road for inspecting/maintaining continuously
Section	A road between intersections connecting to RR, PAS and/or SAS within a route	To visually understand locations from intersections
Segment	A road which a section is divided into every 100 m or less	The minimum unit of road. Store the most of information.

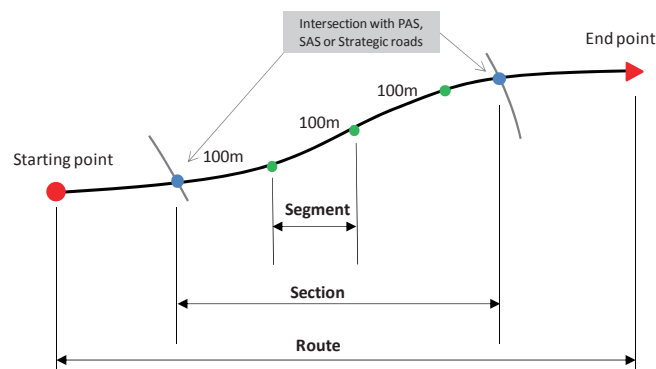


Figure 6 Basic Concept for Setup of Road Inventory Proposed

4) Establishment of Road Inventory Database System

From November 2015 after 2nd TAC, restructuring of road inventory of AACRA has been started by the lead of RAM defining data items (e.g. road numbering, road naming, and setting start/end points) and inputting data of asphalt roads in order of Strategic Roads>Major Arterial>Sub Arterial>Collector Street>Local Street. After the completion of inventory data, repair history and result of routine inspection data will be inputted to the database. Due to absence of repair history, available data since the date of commencing data input was inputted. Inspection data on pavement damage and update of inventory was inputted using data recorded on inspection sheet.

(4) ACTIVITY 2-4: Prepare and Revise Mid and Long Term Road Maintenance Plan**1) Develop Road Maintenance Management System**

JICA Team will procure equipment for Road Maintenance Management System and develop the system to meet the needs of AACRA. JICA Team has introduced to counterpart on the system functions as following;

a. Data input

- Import of data collected by Pavement Condition Survey Vehicle
- Data input of repair history
- Data input of other required data for road maintenance planning

b. Data analysis

- Deterioration model
- Budget simulation model

c. Formulation of plan

- Mid/Long term planning
- Annual planning

d. Display and sharing of information

- GIS based road information display
- Front view image data

2) Formulation of Mid/Long Term Road Maintenance Plan

The first Mid/Long Term Road Maintenance Plan will be drafted by the end of second year of the project term.

(5) ACTIVITY 2-5: Prepare Annual Road Maintenance Plan

Annual Road Maintenance Plan will be prepared prior to the draft of Mid/Long Term Road Maintenance Plan. The activity will commence in June 2016 so that the plan is utilised for AACRA maintenance planning for next year.

1-2-4 ACTIVITIES FOR OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

(1) ACTIVITY 3-1: Select Pilot Project

1) Site Survey

On 13th October 2015, JICA Team conducted a field survey to understand issues and problems on road maintenance works. The major findings are: 1) Quality of cold mix asphalt was questionable, 2) the same maintenance work (overlay) has been carried out at some places every year (structural improvement is required), 3) Surface cutting method was not employed in the pothole repair.

(2) ACTIVITY 3-2: Share Information of Pilot Project

To be added as the Project progresses.

(3) ACTIVITY 3-3: Conduct Detailed Investigation and Design Technical Specification

To be added as the Project progresses.

(4) ACTIVITY 3-4: Assist AACRA in Implementing Pilot Project

To be added as the Project progresses.

(5) ACTIVITY 3-5: Feedback from Implementation of Pilot Project

To be added as the Project progresses.

(6) ACTIVITY 3-6: Organize Workshop/Seminar of Pilot Project

To be added as the Project progresses.

1-2-5 TECHNICAL OUTPUT

Following technical outputs are planned to be developed under the Project and submitted at the end of the project term.

Table 12 List of Technical Output

Output	Status	Note
1. Medium/Long Term Road Maintenance Plan		
2. Annual Road Maintenance Plan		
3. Road Maintenance Management System		
4. PDCA Checklist	In progress	
5. Manual and Guideline on Road Maintenance Management System	To be develop at the 3rd year (July 2017-June 2018)	
6. Updated Existing Standard, Specification, Manuals		To be prepared as required
7. Training Materials	In progress	To be prepared as required

1-3 ACHIEVEMENT OF THE OUTPUTS

(1) OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is Improved.

Verifiable Indicator	Achievement Level
1-1 Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 2017.	<u>In Progress</u> JICA Team has proposed suggestions at TACs and pointed out that the PDCA Cycle system does not function well, but further review and discussion are required.
1-2 Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August 2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily.	
1-3 More than XX% of the requested budget on the basis of Annual Road Maintenance Plan is allocated from the 3rd project year.	Budget from Road Fund is almost fixed every year. Total budget depends on the budget from City Council. In order to obtain budget more from City Council, the presentation to and negotiation with City Council is important. The further discussion and trial in the second year is required to fix the target value.
1-4 Trainings on road maintenance is conducted targeting AACRA staff	<u>In Progress</u> At the present (February 2015), 1 workshop, 8 trainings on Activity 2-2, 2-3, 2-4, 2-5 in combination of lecture and OJT have been conducted.
1-5 Public understanding and cooperation on road maintenance is enhanced.	

(2) OUTPUT 2: The Process for Formulating Road Maintenance Plans is Established.

Verifiable Indicator	Achievement Level
2-1 PDCA Checklist is developed by January 2016.	<u>In Progress</u> Currently checklist is under development.
2-2 AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year.	
2-3 AACRA Annual and Mid/Long term Road Maintenance Plan are formulated in consideration of Life Cycle Cost on Road.	

(3) OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are Improved.

Verifiable Indicator	Achievement Level
3-1 Training on road maintenance skills and knowledge on targeting AACRA technical staff are conducted.	
3-2 Number of preventive maintenance works executed are increased through the implementation of the Project.	

1-4 ACHIEVEMENT OF THE PROJECT PURPOSE

PROJECT PURPOSE: The management capacity of AACRA for road maintenance is enhanced.

Verifiable Indicator (By 3 months before the completion of the Project,)	Achievement Level
1 AACRA's capacity to secure the budget for road maintenance is enhanced.	Methodology for base line survey is currently under consideration.
2 Road maintenance works based on PDCA cycle established by the Project are executed by AACRA.	
3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in the AACRA Annual Road Maintenance Plan exceeds XX% from the 3rd project year.	According to the information from Asphalt Maintenance Case-team in C&M, in this year (2015-2016), the amount of maintenance works actually implemented will exceed the original plan.

1-5 CHANGES OF RISKS AND ACTIONS FOR MITIGATION

(1) Term July 2015 to August 2015

As per the JICA Risk Management Check List, no risk was observed during the first two months of the Project. Other events and issues that may become a risk to the Project were not recognized during this reporting period.

(2) Term September 2015 to February 2016

As mentioned at “1-1-2 (3) Provision of Machinery and Equipment”, procurement of Pavement Condition Survey Vehicle is expected to delay, Hence, Activity 2-2, 2-3, 2-4, and 2-5 are expected to be delay and JICA Team will take necessary actions as mentioned at “2.3 Action to be taken“ including postponing experts assignment.

1-6 PROGRESS OF ACTIONS UNDERTAKEN BY JICA

After the amendment of contract was signed between JICA and consultants in January 2016, JICA is now preparing for procuring Pavement Condition Survey Vehicle.

1-7 PROGRESS OF ACTIONS UNDERTAKEN BY GOV. OF ETHIOPIA

Thanks to the good cooperation and enthusiasm of Counterparts to the project, activities runs very smoothly and efficiently so far. Continuous involvement and support of Counterparts is very much appreciated for successful technical transfer of project output.

1-8 OTHER REMARKABLE/CONSIDERABLE ISSUES RELATED/AFFECT TO THE PROJECT

(Such as other JICA's projects, activities of Counterparts, other donors, private sectors, NGOs, etc.)

As for a project planned by the World Bank, experts continues to collect information from AACRA staff and concerned organizations, nevertheless actual progress has not been heard so far.

2. DELAY OF WORK SCHEDULE AND/OR PROBLEMS (IF ANY)

2-1 DETAIL

(1) Term July 2015 to August 2015

No delay was observed during the first two months of the Project and the 1st JCC was held on 17th August 2015 as planned by JICA experts.

(2) Term September 2015 to February 2016

Procurement of Pavement Condition Survey Vehicle is under the progress, and will be delivered in September 2016 as the earliest. This is nine months delay from the original schedule, and as consequence, Activity 2-2, 2-3, 2-4, and 2-5 are expected to be delay.

2-2 CAUSE

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

Due to need of amendment of contract for changing procurement owner of Pavement Condition Survey Vehicle to JICA, actual procedure has been delayed.

2-3 ACTION TO BE TAKEN

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

JICA Headquarter is currently proceeding the procurement of Pavement Condition Survey Vehicle as a priority issue, so that the vehicle can arrive as earliest as possible to conduct activities proposed under the Project. Meanwhile, JICA Team will provide necessary support for procurement as required, at the same time, conduct following actions.

- Reschedule assignment of JICA experts, considering the feasible delivery schedule of the Pavement Condition Survey Vehicle.
- Provide training on relevant activities
- Develop Road Maintenance Management System using existing data
- Formulate plans not requiring Pavement Condition Survey Vehicle

2-4 ROLES OF RESPONSIBLE PERSONS/ORGANIZATION (JICA, GOV. OF ETHIOPIA, ETC.)

- Procurement of Pavement Condition Survey Vehicle (Equipment to be assembled): JICA Headquarter
- Procurement of Pavement Condition Survey Vehicle (Vehicle): JICA Ethiopia Office

3. MODIFICATION OF PROJECT IMPLEMENTATION PLAN

3-1 MODIFICATION OF PDM AND PO

(1) Version 1

The Project proposed a modification of PDM from that outlined in R/D (signed in April 2015) to better correspond the circumstances of the Project. This proposal was approved by the 1st JCC on 17th August 2015 and reported to JICA Ethiopia Office and JICA Headquarter at a later date. PO was altered accordingly.

(2) Version 2

PDM was updated for 1) verification indicator, 2) addition of activity “ Development of Visual Inspection Supporting System” into Activity 2-2, 3) addition of activity “Develop Road Maintenance Management System” into Activity 2-4, 4) Experts of Japanese side, 5) extra item for provision of machinery and equipment in accordance with the contract amended in January 2016. PO was also altered accordingly. The modification was informed to JICA Ethiopia Office prior to the 2nd JCC, and approved at the 2nd JCC.

3-2 OTHER MODIFICATIONS ON DETAILED IMPLEMENTATION PLAN

(1) Version 1

No other modification made for version 1.

(2) Version 2

Total experts assignment for Ethiopia has increased 0.5 MM which in total 72.50 MM.

4. PREPARATION OF GOV. OF ETHIOPIA TOWARD AFTER COMPLETION OF THE PROJECT

To be added as the Project progresses.

II. PROJECT MONITORING SHEET I & II

See the attached.

Project Monitoring Sheet I(Revision of the Project Design Matrix)

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Implementing Agency: Addis Ababa City Roads Authority (AACRA)

Target Group: Staff of Addis Ababa City Roads Authority (AACRA)


Period of Project: 10/Jul/2015 - 9/Jul/2018

Project Site: Addis Ababa City

Model Site: Pilot project sites are to be determined

Version 2

Dated 18th Feb,2016

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal The roads in Addis Ababa City are maintained in a sustainable way.	Three years after the completion of the Project, 1. XX % of roads under AACRA is below the targeted roughness of YY%. 2. The length(km) of road under AACRA inspected by the standardized method is increased by XX % compared to 3 months before the project completion.	1. Road inventory in Addis Ababa City 2. Road inventory in Addis Ababa City			
Project Purpose The management capacity of AACRA for road maintenance is enhanced.	By 3 months before the completion of the Project, 1. AACRA's capacity to secure the budget for road maintenance is enhanced. 2. Road maintenance works based on PDCA ⁺ cycle established by the Project are executed by AACRA. 3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in AACRA Annual Road Maintenance Plan, exceeds XX% since the 3rd project year.	1. Interview to Addis Ababa City Administration and Road Funds Agency: Baseline and Endline data 2. The PDCA Checklist 3 The baseline data, AACRA Annual Road Maintenance Plan, AACRA annual report,	1. Human resources necessary for the road maintenance are continuously assigned by AACRA. 2. Financial resources are allocated by the City Administration and Road Funds Agency in a sustainable manner.		
Outputs 1. The implementation structure of AACRA for road maintenance is improved.	1-1. Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 2017. 1-2. Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August 2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily. 1-3. More than XX% of the requested budget on the basis of Annual Road Maintenance Plan are allocated since the 3rd project year. 1-4 Trainings on road maintenance is conducted targeting AACRA staff 1-5 Public understanding and cooperation on road maintenance is enhanced.	1-1. The complied suggestions, the Project meeting record 1-2. The Road Map, Minutes of JCC 1-3. The baseline Data, AACRA annual report 1-4. Training Record 1-5. PR outputs	The AACRA staff capacitated by the Project continue to work for their respective positions.	In progress	
2. The process for formulating road maintenance plans is established.	2-1. PDCA Checklist is developed by January 2016. 2-2. AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year. 2-3. AACRA Annual and Mid/Long term road maintenance plan are formulated in consideration of Life Cycle Cost on Road	2-1. The developed PDCA checklist, JCC minutes 2-2 The PDCA Checklist, ACCRA Annual and Mid/Long term road maintenance plan, Road Maintenance Management System 2-3 AACRA annual report, Maintenance Historical Record		In progress	
3. The maintenance skills and knowledge of AACRA technical staff are improved.	3-1. Training road maintenance skills and knowledge targeting AACRA technical staff are conducted. 3-2. Number of preventive maintenance works executed are increased through the implementation of the project.	3-1 Training Record 3-2. The baseline data, AACRA annual report, AACRA Annual Road Maintenance Plan			
Activities	Inputs	Important Assumption			
1-1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement 1-2 Convene Technical Advisory Committee (TAC) 1-3 Prepare a training plan for AACRA Staff 1-4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc. 1-5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance 1-6 Promote public relations (PR) activities on road maintenance in the City 2-1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed 2-2 Conduct road inspections in the City 2-3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc. 2-4 Prepare and revise Medium/Long term Road Maintenance Plan using Road Maintenance Management System developed under the project. 2-5 Prepare Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project. 3-1 Select pilot projects for maintenance works based on the Annual Road Maintenance Plan formulated under the Project 3-2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process 3-3 Conduct the detailed investigations and design specifications of the pilot projects 3-4 Assist AACRA to execute pilot projects 3-5 Feedback achievements and experiences of pilot projects into the next Annual Road Maintenance Plan 3-6 Organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level	The Japanese Side 1. Experts • Chief Advisor/Road Maintenance • Road Maintenance Planning • Road Inspection (Site Survey) • Road Inspection (Database) • Maintenance Management System • Maintenance Design • Construction Supervision • Training Planning • Monitoring • System Development • Others as necessary 2. Training of counterpart personnel, including Project Director and Project Manager, in Japan and/or the Third Countries 3. Provision of machinery and equipment • Inspection Equipment(Pavement Condition Survey Vehicle) • Maintenance Management System • Visual Inspection Supporting System • Structural Investigation Equipment • Others 4. Local expenses for the project activities as necessary	The Ethiopian Side 1. Personnel • Project Director • Project Manager • Counterpart personnel 2. Provision of the project office and facilities necessary for the project implementation 3. Traffic survey and pilot projects in Addis Ababa City 4. Administrative and operational expenses necessary for the project implementation • Electricity, water, communication, etc. • Local traveling costs and daily subsistence allowance (DSA) for counterpart personnel 5. Others as necessary	1. The turnover of AACRA staff does not profoundly affect the project activities. 2. Natural disasters, such as floods, do not profoundly affect the project activities. Pre-Conditions Understanding and cooperation on road maintenance in the City are obtained from the project stakeholders such as the City Administration, Addis Ababa City Road and Transport Bureau, Road Funds Agency, etc.		
					
			<Issues and countermeasures>		

Project Monitoring Sheet II (Revision of the Plan of Operation)

Version 2

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Dated 18th Feb. 2016

Inputs	1st EthFY												2nd EthFY				3rd EthFY				Remarks	Monitoring	
	Plan	2015				2016				2017				2018				Issue	Solution				
	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III									
Expert																							
Chief Advisor/Road Maintenance	Plan																						
Deputy Chief Advisor/ Road Maintenance/ Maintenance Management System	Plan																						
Road Maintenance Plan	Plan																						
Road Inspection (Site Survey)	Plan																						
Road Inspection (Database)	Plan																						
Road Maintenance Design	Plan																						
Construction Supervision	Plan																						
Training Plan	Plan																						
Monitoring	Plan																						
System Development	Plan																						
Equipment *: to be used for the Project Activities																							
Inspection Equipment (Pavement Condition Survey Vehicle)	Plan																						
Structural Investigation Equipment	Plan																						
Maintenance Management System	Plan																						
Visula Inspection Supporting System	Plan																						
Training in Japan																							
Training for Counterpart Personnel	Plan																						
	Actual																						
Activities	Plan	2015				2016				2017				2018				Responsible Organization	Achievements	Issue & Countermeasures			
Sub-Activities	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	Japan	GOE							
Output 1: The implementation structure of AACRA for road maintenance is improved.																							
1.1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	Plan														JICA	AACRA	In progress						
1.2 Convene Technical Advisory Committee (TAC)	Plan														JICA	AACRA	2 TACs conducted						
1.3 Prepare a training plan for AACRA Staff	Plan														JICA	AACRA	Under development (to be prepared by the end of February)						
1.4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.	Plan														JICA	AACRA	1 workshop, 8 trainings on Act. 2-2, 2-3, 2-4, 2-5 were conducted.						
1.5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	Plan														JICA	AACRA	Internal communication flow has been proposed						
1.6 Promote public relations (PR) activities on road maintenance in the City	Plan														JICA	AACRA							
Output 2: The process for formulating road maintenance plans is established.																							
2.1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	Plan														JICA	AACRA	Review is in progress. Draft PDCA Checklist is prepared.						
2.2 Conduct road inspections in the City	Plan														JICA	AACRA	Emergency patrol has been conducted, Inspection Support System is under process	Due to delay of inspection equipment procurement, activity is expected to delay. Provide training, reschedule expert assignment					
2.3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.	Plan														JICA	AACRA	Inventory data is currently inputted.	Due to delay of inspection equipment procurement, activity is expected to delay. Provide training, reschedule expert assignment					
2.4 Prepare and revise Medium/Long term Road Maintenance Plan based on the above inventory data	Plan														JICA	AACRA		Due to delay of inspection equipment procurement, activity is expected to delay. Formulate plans without inspection vehicle, reschedule expert assignment					
2.5 Prepare Annual Road Maintenance Plan	Plan														JICA	AACRA		Due to delay of inspection equipment procurement, activity is expected to delay. Formulate plans without inspection vehicle, reschedule expert assignment					
Output 3: The maintenance skills and knowledge of AACRA technical staff are improved.																							
3.1 Select pilot projects for maintenance works from the annual road maintenance plan	Plan														JICA	AACRA							
3.2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process	Plan														JICA	AACRA							
3.3 Conduct the detailed investigations and design specifications of the pilot projects	Plan														JICA	AACRA							
3.4 Assist AACRA to execute pilot projects	Plan														JICA	AACRA							
3.5 Feedback achievements and experiences of pilot projects into the next annual road maintenance plan	Plan														JICA	AACRA							
3.6 Organize a workshop/seminar of the pilot projects for ERA and road agencies at regional and municipal level	Plan														JICA	AACRA							
Project Duration / Phasing	Plan																						
	Actual																						
Monitoring Plan	Plan	2015				2016				2017				2018				Remarks	Issue	Solution			
	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III									
Monitoring																							
Joint Coordinating Committee	Plan																						
Set-up the Detailed Plan of Operation	Plan																						
Submission of Monitoring Sheet	Plan																						
Joint Monitoring	Plan																						
Reports/Documents																							
Project Work Plan	Plan																						
Project Completion Report	Plan																						
	Actual																						

■ Activities with fixed period
 □ Activities to be continuously conducted, or with tentative schedule

TO CR of JICA Ethiopia OFFICE**PROJECT MONITORING SHEET****Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City****Version of the Sheet: Version 3 (Term: March 2016 - September 2016)****Name: Mr. Hiroshi Honda****Title: Chief Advisor****Submission Date: 15th Sep. 2016****I. SUMMARY****1. PROGRESS**

The progress that has taken place in this term is as follows;

- Procurement of Road Inspection vehicle (vehicle only), Visual Inspection Supporting System
- 1st training in Japan(Activity 0-4)
- The 3rd and 4th TAC (Activity 1-2)
- 22 Lectures and 6 OJTs (Activity 1-4)
- Implementation of Visual Inspection using Visual Inspection Supporting System (Activity 2-2)
- Development of Road Inventory database of AACRA (Activity 2-3)
- Development of Mid and Long Term Road Maintenance Planning Procedure (Activity 2-4)
- Development of Annual Road Maintenance Planning Procedure (Activity 2-5)
- Starting of discussion on Selection of Pilot Project (Activity 3-1)
- Technical transfer for implementation of Pilot Project (Activity 3-4)

1-1 PROGRESS OF INPUTS

1-1-1 The Japanese Side**(1) Experts**

In accordance with the amended contract agreed in January 2016 between JICA and JICA Team, number of experts has increased into a total 10 experts. Experts have been assigned since July 10, 2015, and at the end of September 2016, all experts have been assigned for a total of 30.41 Man/Month (hereinafter to be called as “MM”) out of the project total assignment of 72.5 MM (assignment in Ethiopia only).

(2) Training of Counterparts Personnel

Under the Project, two trainings in Japan are planned. The first training in Japan was conducted from August 23 to September 6, 2016 and the Second training is tentatively planned for September 2017. Further details are described under ACTIVITY 0-4: Training in Japan.

(3) Provision of Machinery and Equipment

At the 1st Joint Coordination Committee meeting (hereinafter called as “JCC”) held on August 17, 2015, specification of Inspection Equipment (hereinafter called as “Pavement Condition Survey Vehicle”) was approved by Counterparts.

Under the amended contract with JICA in January 2016, the procurement responsibility has changed; 1) Pavement Condition Survey Vehicle is to be procured directly by JICA Ethiopia, and equipment will be procured by JICA headquarter. The rest of machinery and equipment are to be procured by JICA Team which are; 2) Structural Testing Instrument, and 3) Maintenance Management System and Visual Inspection Supporting System which are developed through the Project and transferred to Counterparts. At the 2nd Technical Advisory Committee meeting (hereinafter called “TAC”) held on October 27, 2015, JICA Team informed these changes to Counterparts.

So far, procurement of Visual Inspection Supporting system has completed in April 2016. Pavement Condition Survey Vehicle has arrived in April 2016, and related tax payment and application of number plate completed in May 2016. Currently the vehicle is kept at AACRA Garage. However the rest of equipment fit into the vehicle is expected to be procured in December 2016. Regards to the Structural Testing Instrument, specification will be discussed at the 3rd JCC.

Table 1 List of Equipment and Machinery to be procured

Equipment and Machinery	Component	Responsible agency for procurement	Original Planned procured date	Expected procured date* (tentative)	Remark
Inspection Equipment (Pavement Condition Survey Vehicle)	<ul style="list-style-type: none"> • 1 Vehicle • Equipment to be fitted on the vehicle 	JICA	Sep. 2016	Vehicle is procured and transferred to AACRA in May 2016. A part of equipment (PCs) are procured in Apr. 2016, however, other equipment are expected in Dec. 2016.	
Structural Testing Instrument	<ul style="list-style-type: none"> • 1 set of instrument • 	JICA Team	Jul. 2017		To be specified through discussion at the 3 rd JCC.
Maintenance Management System	<ul style="list-style-type: none"> • 1 set of Desktop Computer • 1 GIS software 	JICA Team	Apr. 2016	Arc GIS has been installed	Due to delay of Inspection Equipment, procurement is expected to Oct. 2017
Visual Inspection Supporting System	<ul style="list-style-type: none"> • 5 set of Smartphone • 1 GIS software 	JICA Team	Mar. 2016	Smartphone was procured in Feb. 2016, and GIS was installed in Apr. 2016.	Completed

Note: “Expected procurement date” means Equipment and Machinery to be used for the project activities.

(4) Local Expenses for the Project Activities

Local expense has been utilised mainly for consultant cost, office equipment so far.

1-1-2 The Ethiopian Side

(1) Personnel

Project Manager was identified under Record of Discussion (hereinafter to be called as “R/D”) and assigned in late August 2015. The rest of counterpart personnel will be selected through the progress of the Project. In November 2015, three personnel for inspection activity have been assigned, and further two more road and transport engineers are assigned in June 2016. In total 11 personnel are assigned as of September 2016.

(2) Furnished Office Space and Facilities

Since the project commencement in July 2015, a project office (Room 318) has been allocated at Addis

Ababa City Roads Authority (hereinafter to be called as “AACRA). Office furniture have been installed for eight experts.

(3) Traffic Survey and Pilot Project in Addis Ababa City

Currently, the first pilot project is planned. After the finalization of plan, pilot project and related traffic survey will be implemented by AACRA.

(4) Administrative and Operational Expense

Expense agreed at R/D has been secured and handled by the Ethiopian Side.

1-2 PROGRESS OF ACTIVITIES

Project activities to achieve the project purpose under Work Plan were agreed at the 1st JCC held on August 17, 2015. Project activities described in Project Design Matrix summarised in the Table 2 shown below. Progress of each activity is described accordingly in the sections that follow.

Table 2 Outline of Project Activities

PROJECT PURPOSE: The Management capacity of AACRA for road maintenance is enhanced

Outputs	Activity no	Activities
Overall	0-1	Preparation, Updating and Review of Work Plan and Monitoring Sheet
	0-2	Baseline Survey and Performance Indicator
	0-3	JCC and TAC meeting
	0-4	Training in Japan
	0-5	Project Completion Report
Output 1: The implementation structure of AACRA for road maintenance is improved.	1-1	Review Implementation Structure of AACRA, and compile suggestions for the structure improvement
	1-2	Convene TAC
	1-3	Prepare training Plan for AACRA Staff
	1-4	Conduct training for AACRA Staff for road maintenance; road inspection, maintenance planning, maintenance management system, etc.
	1-5	Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance
	1-6	Promote Public Relation activities on road maintenance in the City
Output 2: The Process for formulating road maintenance plans is established	2-1	Review the road maintenance cycle of AACRA, compile PDCA Checklist, and revise the checklist if needed.
	2-2	Conduct Road Inspection in the City
	2-3	Develop and Update the Road Inventory (database) of AACRA, including road condition, traffic volume, nit costs, etc.
	2-4	Prepare and revise Mid and Long Term Road Maintenance Plan using road Maintenance Management System developed under the Project
	2-5	Prepare and Revise Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project
Output 3: The Maintenance skills and knowledge of AACRA Technical staff are improved	3-1	Select Pilot Projects for maintenance work based on the Annual Road Maintenance Plan formulated under the Project
	3-2	Share information of Pilot Project between/within Road Asset Management Process and Constructional and maintenance Process
	3-3	Conduct the detailed Investigation and design specification of the pilot projects
	3-4	Assist AACRA to execute Implementing Pilot Project
	3-5	Feedback achievements and experience of pilot projects into the next annual road maintenance plan
	3-6	Organize Workshop/Seminar of Pilot Project for ERA and Road agencies at regional and municipal level

1-2-1 ACTIVITIES FOR OVERALL**(1) ACTIVITY 0-1: Preparation, Updating and Review of Work Plan and Monitoring Sheet****1) Kick off Meetings**

Kick off meeting was held on July 15, 2015 in order to 1) obtain more understanding of the JICA project, 2) comprehend function of the concerned parties in and outside of AACRA, and 3) arrange the 1st JCC. Participants from AACRA were the General Manager, the Technical Advisor, Managers from Road Transportation Construction and Maintenance Core Process (hereinafter called as “C&M”), Road Transport Design Core Process (hereinafter to be called as “RTD”), and engineers from Road Asset Registration Maintenance Planning Sub Process (hereinafter called as “RAM”).

Besides, Counterparts and JICA experts visited Addis Ababa City Road & Transportation Bureau, and Road Funds Agency to introduce and obtain their cooperation to the Project. JICA experts also visited the Embassy of Japan in Ethiopia.

2) Work Plan

The draft Work Plan was discussed with JICA Headquarter on July 13, 2015, and agreed at the 1st JCC held on August 17, 2015.

3) Monitoring Sheets

Every six months, monitoring sheets are updated based on discussion with Counterparts, and submitted to JICA Ethiopia Office. Following shows the scheduled submission of monitoring sheet.

Table 3 Schedule of Monitoring Sheet Submission

Project Year	Version	Date
1st year (July 2015-June 2016)	Monitoring Sheet Version 1	Agreed and submitted on August 20, 2015
	Monitoring Sheet Version 2	Agreed on February 18, 2016
2nd year (July 2016-June 2017)	Monitoring Sheet Version 3	To be submitted on September 15, 2016
	Monitoring Sheet Version 4	To be submitted in February 2017
	Monitoring Sheet Version 5	To be submitted in August 2017
3rd year (July 2017-June 2018)	Monitoring Sheet Version 6	To be submitted in February 2018

(2) ACTIVITY 0-2: Baseline Survey and Performance Indicator

Performance indicators (hereinafter called Objectively Verifiable Indicator), which are to evaluate the achievement level of the Project stated Project Design Matrix (hereinafter called PDM), are planned to be set within six months from the project commencement. Baseline survey has been conducted and JICA Team proposed to consult with City Council of Addis Ababa on performance indicators and means of verification on “Overall Goal” and “Project Purpose”, however due to requiring an official letter from Mayor, consultation is not yet held. The issue was addressed to AACRA at the 2nd TAC, and AACRA agreed to communicate with Addis Ababa City Administration on this issue.

Considering the difficulty to consult with City Council of Addis Ababa, JICA Team has revised the Indicator on “Project Purpose” and “Output” with Counterparts and consulted to JICA Ethiopia Office for approval

prior to the 2nd JCC. At the 2nd JCC, proposed indicators were approved. In September 2016, the JICA Team revised the indicator and means of verification based on the baseline survey. If the consultation with Addis Ababa City Administration took a longer time, alternative indicator and means may have to be discussed.

The indicators are described in “1.3 Achievement of the Outputs” and “1.4 Achievement of the Project Purpose”.

(3) ACTIVITY 0-3: Joint Coordination Committee (JCC) and Technical Advisory Committee (TAC)

Outline of JCC and TAC is summarised in Table 4. Member of JCC was set as agreed at R/D and assigned in September 2015, and member of TAC was assigned after the 1st JCC. Working Groups (hereinafter called as “WGs”) are set up as required through the course of project.

Table 4 Outline of JCC and TAC

Committee	Members		Frequency	Function
Joint Coordinating Committee (JCC)	[Ethiopia Side] • AACRA Project Director • AACRA Project Manager of RAM • AACRA RTD • AACRA C&M • AACRA other related Department • Addis Ababa City Road and Transport bureau • Addis Ababa City Administration • Road Funds Agency	[Japanese Side] • JICA Experts • JICA Ethiopia Office • Embassy of Japan in Ethiopia	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee (TAC)	[Ethiopia Side] • AACRA Project Director • AACRA Project Manager of RAM • AACRA RTD • AACRA C&M • AACRA other related Department	[Japanese Side] • JICA Experts	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by Project Director, Project Manager, Counterpart personnel, and JICA experts.

NOTE:

- Road Transportation Construction and Maintenance Core Process : C&M
- Road Transport Design Core Process :RTD
- Road Asset Registration Maintenance planning Sub Process: RAM

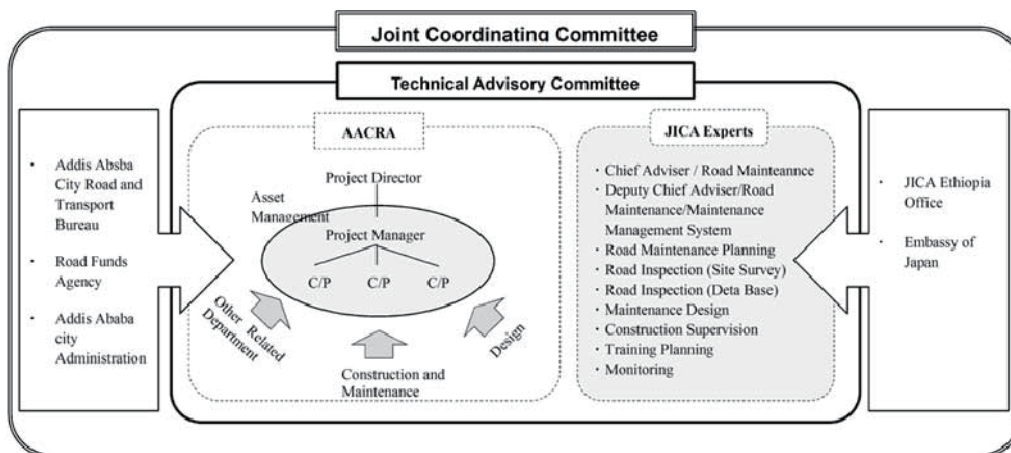


Figure 1 Structure of JCC and TAC

1) 1st JCC

The 1st JCC was held on August 17, 2015, chaired by the General Manager of AACRA, Eng. Fekadu

Haile with total of 18 participants. At the meeting, revised PDM, monitoring sheet, and specification for procurement goods were approved. In addition, following items were requested and agreed on 1) Review of exiting quality of road maintenance works carried out by supervision consultants, 2) Immediate process for procurement of Pavement Condition Survey Vehicle.

2) 2nd JCC

The 2nd JCC is held on February 18, 2016, with a total 23 participants. Progress of activities including database preparation and inspection were informed, and smartphones for Visual Inspection Supporting System were handed over. The General Manager of AACRA pointed out the following points; 1) Addis Ababa's Drainage during rainy season which affecting road condition will be studied under a project funded by World Bank (WB)¹, 2) Acceleration of Procurement of Pavement Condition Survey Vehicle, and 3) need of clear justification for replacing the existing system to new system to be developed under the Project (road numbering system, road maintenance system, etc.)

3) 3rd JCC: TO BE ADDED AFTER JCC

Table 5 JCC held during the Project (as of September 2016)

No.	Date	Participants
1 st	August 17, 2015	In total of 18 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
2 nd	February 18, 2016	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
3 rd	September 15, 2016 (tentative)	Participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team, Addis Ababa Road and Transport bureau, Road Fund.

(4) ACTIVITY 0-4: Training in Japan

At the 1st TAC, JICA Team explained the outline of Training in Japan. Training will be conducted twice during the project period of three years. The first training in Japan was conducted from August 23 to September 6, 2016, inviting 5 staff members from Road Asset Registration and Maintenance planning sub process of AACRA. Two of them are traffic engineers while the rest are Road Asset inspectors. The Second training is tentatively planned for September 2017. This training will focus on Construction and Maintenance core process of AACRA.

(5) ACTIVITY 0-5: Project Completion Report

Project Completion Report is planned to be submitted in June 2018.

1-2-2 ACTIVITIES FOR OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is improved

(1) ACTIVITY 1-1: Review Implementation Structure of AACRA, and Compile Suggestions for the Structure Improvement

Since July 2015, JICA Team have been reviewing the road maintenance implementation structure of AACRA with Counterparts through discussions, interviews, questionnaire survey and site visits. Based on

¹ The Project on drainage funded by WB has not been implemented yet as of September 2016.

the findings, some improvements have been proposed at TACs such as involvement of RTD to maintenance designing. Compiled suggestions will be proposed to AACRA at the third year of the Project.

(2) ACTIVITY 1-2: Convene Technical Advisory Committee (TAC)

To date (September 2016), four TAC meetings were held as shown in the table below. For further detail, please refer to Minuets of meetings.

Table 6 TAC during the Project (September 2016)

TAC	date	participants	Topic discussed	Action agreed/proposed
1 st	Sep. 7, 2015	In total of 13 JICA experts: 3 AACRA: 10	<ul style="list-style-type: none"> Progress of the Project Challenges on road patrol Strategic road and database setup Inclusion of city administration 	<ul style="list-style-type: none"> AACRA proposed to clarify the demarcation of C&M, Supervision consultant, and RAM through the progress of the Project. JICA Team confirmed that drainage inspection and planning will be included.
2 nd	Oct. 27, 2015	In total of 13 JICA experts: 5 AACRA: 8	<ul style="list-style-type: none"> Review of the last TAC Method of road patrol, progress 	<ul style="list-style-type: none"> Maintenance plan based on visual inspection data will be prepared by February 2016 Temperature digital gauge will be procured from Japan² Minimum length of road segment is to be confirmed, Communication with City Administration will be improved Lecture on Kaizen will be hold at the beginning of next year.
3 rd	Mar. 22, 2016	In total of 9 JICA experts: 3 AACRA: 6	<ul style="list-style-type: none"> Progress of the Project Network centre for Road Numbering Application of Road Management System for AACRA Customised Mobile Inspection System Training in Japan <p>Besides, Report on Application of the Road management System for Addis Ababa City Roads Authority was submitted.</p>	<ul style="list-style-type: none"> Adopt Leghar as centre of road network and will be report to GM. Local and Collector streets will be included in numbering of roads Set up and complete road inventory database and input inspection data will be conducted prior to the next TAC meeting
4 th	Jul. 15, 2016	In total of 12 JICA experts: 6 AACRA: 6	<ul style="list-style-type: none"> Progress of the Project Workshop for Selection of Design Pilot Project Structural Investigation Instruments Necessity of Road Maintenance Handbook 	<ul style="list-style-type: none"> Road Maintenance Handbook will be prepared Structural investigation instrument will be discussed later on. JCC to be hold one day between Sep. 13 and 15 2016.

(1) ACTIVITY 1-3: Prepare Training Plan for AACRA Staff

At the 1st TAC, JICA Team presented training policy on Training in Addis Ababa (OJT and Lecture) and Training in Japan. Lecture and OJT are conducted in combination, which approx. one lecture by JICA Team, followed by 2 weeks of OJT lead by AACRA staff aiming to develop theoretical and practical knowledge and skill on road maintenance, whereas training in Japan will provide training by experts in the field to gain knowledge and experience on advanced technologies.

Training Plan has been prepared in February 2016 and revised in August 2016, which summarises training courses (focusing on Activity 2-2, 2-3, 2-4, 2-5, 3-3,3-4 and 3-5), content covers, target trainees (mainly

² The temperature digital gauge was provided in February 2016.

RAM members), frequency etc. Besides training course, Workshop/Seminar will be provided targeting ERA and Road agencies, which addressed under Activity 3-6.

(2) ACTIVITY 1-4: Conduct Training for AACRA Staff for road maintenance; road inspection, maintenance planning, maintenance management system, etc.

Training Implementation schedule has been developed and JICA Team have conducting training accordingly. To date 22 lectures and 6 OJTs were conducted under the project as summarized in the table shown below.

1) Training for Activity 2-2: Conduct Road Inspections in the City

A series of trainings on the activity has been provided from August 2015 on periodic and emergency patrolling including operation of Visual Inspection Supporting System. However on collected data, Errors were found on distress and damage identification, method of measuring distresses, distress dimensions etc. Thus JICA Team have extended training on Inspection for further 6 months. Kaizen method was introduced to RAM staff by JICA expert which enable them to tackle their problems through consulting, discussion in groups and organizing regular meetings to schedule and use their resources effectively among themselves.

2) Training for Activity 2-3: Develop and Update the Road Inventory (database) of AACRA

Initial training on concept and setup of road network inventory have been offered. Further training will be provided in 2017.

3) Training for Activity 2-4 and 2-5: Prepare and revise short / medium / long term road maintenance plan

Trainings (6 lectures and 1 OJTs) on road maintenance planning have been offered. Trainees have so far improved their knowledge and skill sufficiently. Once the system is developed, further training will be provided.

4) Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification

In order to improve the capacity on road maintenance, 3 lectures were held. Trainees were very enthusiastic and further detail information has been requested.

Table 7 Training Implemented during the Project (as of September 2016)

Training Courses	Style	Date	Participants no.	
A: Training for Activity 2-2: Conduct Road Inspections in the City				
A1 Visual inspection (Emergency patrolling)	A1-1 Concept of emergency patrolling	Lecture	11 Sep. 2015	11 RAM members
	A1-2 How to carry out emergency patrolling	Lecture	14 Sep. 2015	11 RAM members
		OJT	9 Oct. 2015	11 RAM members
	A1-3 How to process geo-tagged photographs	Lecture	15-22 Sep. 2015	11 RAM members
		OJT	15 Sep. 2015	11 RAM members
A2 Visual inspection (Periodic inspection)	A2-1: Revision of Visual inspection	Lecture	16-22.Sep., 2015	11 RAM members
		Lecture	15,20,22 Jun. 2016	13 RAM members
	A2-2: Visual Inspection using mobile system	Lecture	17,23 Feb. 2016 8 Mar. 2016 8 Apr. 2016	11 RAM members
		OJT	3 Feb.2016 20 Mar. 2016	11 RAM members
A3 Scheduled inspection	A3-1: Introduction of inspection vehicle	Lecture	20 Aug.2015	11 RAM members
B: Activity 2-3 : Develop and Update the Road Inventory (database) of AACRA				

B1 Restructuring of road network	B1-1 Concept of revised road network system (road numbering)	Lecture	29 Oct. 2015	10 RAM Member
	B1-2 Setup of road network inventory	Lecture	16 Dec. 2015	10 RAM members
		OJT	16-27 Dec. 2015	10 RAM members
C Training for Activity 2-4 and 2-5: Prepare and revise short / medium / long term road maintenance plan				
C1 Road priority and service level	C1-1: Road priority and service level for AACRA	Lecture	19 May. 2016	11 RAM members
C2 Road Management System–Kyoto Model	C2-1: Introduction of Kyoto model	Lecture	20 Aug. 2015 11 Aug. 2016	11 RAM members
C4 Annual Maintenance Planning	C4-1 Annual Maintenance Planning	Lecture	11 Sep.2015 19 May 2016	3 RAM members
		OJT	6 May 2016	6 RAM members
D Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification				
D-1 Type of deterioration of pavement	D1-1 Type of damage maintenance	Lecture	2 Aug 2016 9 Aug. 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member
	D1-2 Repair method of Damage (construction method)	Lecture	19 Aug 2016	5 Member of RAM, 1 RTD, 1 C&M Member

(3) ACTIVITY 1-5: Share Information of road condition in the City with Road Funds Agency and the City Administrations to request budget for road maintenance

At the 1st TAC, JICA Team and Counterparts developed a draft internal communication system among RAM, C&M, and RTD. JICA Team will continue to study on communication system between RAM and C&M, as well as external parties concerned such as City Council of Addis Ababa and Road Fund Agency.

(4) ACTIVITY 1-6: Promote Public Relations

At the 1st TAC, on purpose to promote understanding of public, professional and relevant authorities of the Project and importance of road maintenance, JICA Team presented Public Relation Policy as 1) use variety of media to deliver messages to wider public, 2) establish bidirectional communication, and 3) conduct maintenance activities with public participation. In June 2016, under Activity 2 which focuses on Conducting Road Inspection, JICA Team prepared a leaflet for road inspection team that will help them explain their field activity to the community around their area of assignment.



Figure 2 Activity 2 Flyer

1-2-3 ACTIVITIES FOR OUTPUT 2: The Process for Formulating Road Maintenance Plans is established

(1) ACTIVITY 2-1: Review/Revise Road Maintenance Cycle of AACRA, compile the PDCA checklist and revise the checklist if necessary

1) Review and Findings of Current Road Maintenance Cycle

Since August 2015, JICA Team have been reviewing the existing road maintenance cycle and the workflow of AACRA jointly with the Counterparts through interviews and lectures.

2) Ideal and Feasible Road Maintenance Cycle Framework

Based on the review, a series of discussions and lectures with AACRA, JICA Team formulated the Ideal

Road Maintenance Cycle (version 1) adopting PDCA cycle and incorporating Road Maintenance Management System, Pavement Condition Survey Vehicle, Visual Inspection Supporting System which are procured to AACRA through the Project. The version will be updated through the project progress and continuous discussions with Counterparts.

3) PDCA Checklist

In order to monitor road maintenance works is implemented properly based on the PDCA cycle by AACRA and to examine further improvements, JICA Team with AACRA had developed the PDCA checklist (version 1) containing check items and evaluation indexes. The checklist was presented at the 2nd JCC, and will be updated as required according to the future discussions.

(2) ACTIVITY 2-2: Conduct Road Inspection in the City

1) Review and Challenges of Road Inspection

On August 12, 2015, JICA Team conducted a field survey to understand issues and problems on periodic inspection and data management and found that road inspection and data collection have been conducted insufficiently to be used for decision of maintenance implementation. Findings were reported at the 1st TAC.

2) Hierarchical Inspection Scheme

At the 1st TAC, JICA Team presented a draft Hierarchical Inspection Scheme of a) Visual inspection with Smartphone, b) Automatic Inspection using pavement inspection vehicles, c) Structural Investigation. The proposal has been approved by Counterparts.

Table 8 Hierarchical Inspection Scheme (draft)

Scheme		Measurement	Equipment	Target road	Inspection time	Frequency	Remark
Visual inspection	Periodic Inspection	Pothole, rutting, cracking, ravelling	Smartphone	Approx. 200 km (3.3 km/day)	Dec. – Mar.	As needed	Determine damage indicator, identify section for structural investigation
	Emergency Patrol & Inspection	Pothole, Major damage	Smartphone	scheduled	Sep.-Nov.	As needed	Identify light maintenance roads.
Automatic Inspection		IRI	Pavement Condition Survey Vehicle	All strategic and scheduled road. Approx. 500 km (50 km/day)	Nov.-Jan.	Scheduled	Identify roads to be visually inspected.
Structural Investigation		Structural defect	Structural investigation instruments	Depends on the result of inspection	Apr. – Jun.	Scheduled	Determine repair method

3) Development of Visual Inspection Supporting System

a. Development of the system

At the 1st JCC, JICA Team confirmed the needs of inspection support in order to respond efficiently to public demand on road maintenance. Thus JICA added the procurement and development of Visual Inspection Supporting System into the project activity under the amended contract in January 2016. The system is composed of a) Field Reporting System and b) Visual Inspection Data Management Systems.

The proposed functions of the system were presented and 5 smartphones have been procured and handed over to Counterparts at the 2nd JCC. JICA Team has installed ArcGIS to the desktop set up the Project office and developed Visual Inspection Supporting System (version 1) in April 2016. The system will be upgraded and customized as required to apply demands of AACRA.

b. Update of the system

JICA Team conducted a field survey to monitor actual pavement distress data collection activities and data management using the system. Some shortcomings were noted such as lack of safety measures, inadequate use of scales. Moreover, comments to improve Field Reporting System and interfaces of Visual Inspection Data Management Systems (ArcGIS database) were proposed and approved by RAM for action. In addition, pavement distresses common to Addis Ababa were closely looked at and grouping of distresses carried out to improve distress identification. This has resulted in more customized inspection system and review of the Field Reporter application interface in to version 2, currently under development.

4) Visual Inspection

a. Periodic Inspection

Inspection (paper based)

RAM organized two teams of four staff, each to conduct visual inspection. The inspection started in November 2015 and completed in May 2016. Within this period about 247 km of Roads (PAS, SAS, and RR) were inspected (of which 97% of roads is identified as Strategic) based on the new road numbering. It was learned that actual rate of inspection is 3.3 Km/day by two teams which is lesser than planned rate of 5 km/day. As confirmed also in the 2nd JCC meeting, the minimum section of road inspected is 100 m length. Data collected on papers is now input to Excel-based database.

Inspection using Visual Inspection Supporting System

From April 2016, RAM data collectors were trained on the job in how to utilize Visual Inspection Supporting System to collect data. Currently, the system is being used to collect data. Compared to the previous visual data collection process, this smartphone based system offers several advantages in terms of speed, accuracy, clarity, safety, error-minimization, and objective rather than subjective data collection.

b. Emergency Patrol and Inspection

At the 1st JCC, issue was raised on reduction of service level due to many potholes after rainy season, and at the 2nd TAC, JICA Team introduced Emergency Patrol to detect significant pavement damage in the city for emergency recovering, especially after rainy season, and the methodology was approved. Following the meeting, RAM has carried out emergency patrols to collect basic information such as taking photos of section requires detailed inspection, and accordingly C&M has conducted emergency recovery repairs. Proposed methodology of emergency patrol is as follows. Currently RAM is conducting Emergency Patrol from mid-August 2016.

Table 9 Proposed Emergency Patrol Methodology

Item	Description
Period	Heavy rainy season (Jul – Sep) and through the year
Team	2 data collector with 1 vehicle per team or more
Expected pace	30 km/day-team (3 teams for 1 months for paved)
Target damage	Significant damages which degrade the minimum service level (e.g. pothole in centre of carriageway)
Objective road	All paved road from higher hierarchy sections
Outputs	Location of the damages from Field Reporter Application which includes Photos (Both distant and close-up views), and data of distresses uploaded to GIS database

5) Automatic Inspection

a. Automatic Inspection

Data items to be collected by Pavement Condition Survey Vehicle were presented at the 1st TAC. The inspection will be conducted when the pavement condition survey vehicle is fully equipped. Currently the equipment for Pavement Condition Survey Vehicle is expected to be procured in December 2016, calibration in January 2017 and actual survey is expected to start from February 2017.

b. Preparation of Road Inspection and Data Processing Manual for Pavement Condition Survey

To be described as the Project progresses.

6) Structural Investigation

To be described as the Project progresses.

(3) ACTIVITY 2-3: Develop and Update Road Inventory (database) of AACRA, including road condition, traffic volume, and unit costs, etc.

1) Review of Road Inventory Data

JICA Team reviewed existing road inventory data and found that AACRA manages road network data as Master Plan Road Network Data in Microsoft Excel format and updates annually. Network Data is composed from mainly seven data items of Road No, Road Name, Type, Width, Length, Carriageway Type, and Others. Through the review and discussions with Counterparts, challenges for road inventory database have been identified as lack of connectivity between inventory table and road network map, random road numbering, unclear definition of road section, and inconsistent direction from start to end point.

2) Updating of Road Inventory Database System

a. Methodology to Update Road Inventory Database

JICA Team, through discussions with RAM, developed the steps for restructuring the existing inventory data to meet the actual needs of AACRA. The proposal was approved at the 2nd TAC.

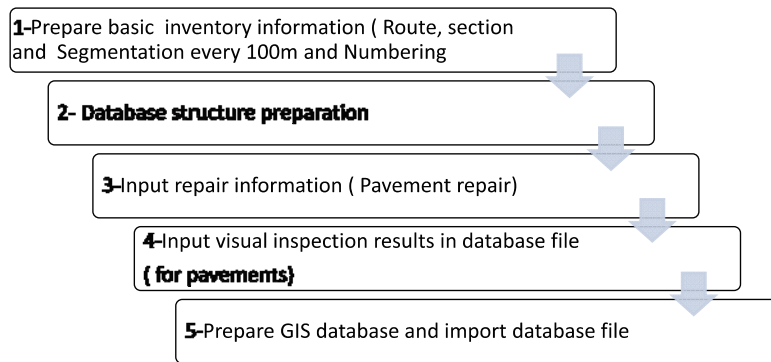


Figure 3 Database Setup Process

b. Step 1: Prepare Basic Inventory Information

Based on the findings, JICA Team has proposed following upgrading of the road network system including road classification and road numbering system, which will be the basis of road inventory database. The proposal has been approved, and based on the agreed road network system, the road inventory database will be developed.

Road Classification

At the 1st TAC, insufficiency of current road classes SAS, PAS, RR and Collector Streets (hereinafter referred as CS) to prioritise roads for road maintenance works were discussed. At the 2nd TAC, Counterparts pointed out a problem on the limitation of road maintenance budget, needs of clarifying sites for road inspection and repair construction works, and conducting works at a concentrated area. Based on these meetings, at the 2nd TAC, JICA Team proposed five road classification of a) Strategic roads, b) Major Arterial, c) Sub Arterial, d) Collector Streets, and e) Local Streets, which weigh higher prioritization to strategic roads.

Hierarchical Road Numbering Structure

At the 3rd TAC, JICA Team proposed Hierarchical Road Numbering Structure. The issue on the location of Network Centre was also discussed and agreed that Leghar (Train Station) to be the Road Network Centre following consultation with Addis Ababa City Planning Project Office on March 7, 2016, and same was approved on the 3rd TAC in June 2016.

a. Step 2: Road Inventory (Database) Structure Preparation

Database is structured by identifying each road in 3 main categories of 1) Road ID consisting 10 items (Existing status, Road class, Route, Direction, Section, Segment number, Length of the segment, Old road no, strategic road, road/street name), 2) Start and end point of road, and 3) Junction type. The structure was presented at the 2nd TAC and approved. From November 2015, restructuring of road inventory of AACRA has been started by the lead of RAM defining data items (e.g. road numbering, road naming, and setting start/end points).

Road ID										Name of Start/End points for Sections		Junction Type	
Status	Road Class	Route	Direction	Section	Segment	Length (m)	Road No. (Old)	Strategic Road	Road/Street Name	Start of section (Jct Name)	End of section (Jct Name)	Start (Jct.Type)	End (Jct.Type)
Existing	SAS1	S001	Down	1	1	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ
Existing	SAS1	S001	Down	1	2	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ

Figure 4 Database structure

b. Step 3: Input Repair Information

After the completion of the above inventory data, repair history and result of periodic inspection data will be inputted to the database. Due to the absence of repair history, available data since the date of commencing data input was inputted. Inspection data on pavement damage and update of inventory were inputted using data recorded on inspection sheet in June 2016.

c. Step 4: Input Visual Inspection Results

Inputting data of asphalt roads in order of Strategic Roads > Major Arterial > Sub Arterial conducted and completed in June 2016. The database created includes about 462 km of road length consisting PAS, SAS and RR class roads. Table 10 below shows length of each class of road in the inventory and corresponding length of road visually inspected by RAM from November 2015 to May 2016.

Table 10 Inspected Road length (m) from inventory database

Road Classification	Existing road length in database (m)	Road length inspected visually (m)
RR	36,946	36,946
PAS	280,203	181,796
SAS	144,910	54,068
Total	462,059	272,810

d. Step 5: Prepare GIS database and import database file

Route and sections identification from the AutoCAD road network and corresponding Excel inventory data preparation were completed for RR, PAS and SAS class roads in June 2016. Based on these data, maps of roads subdivided into route, section and 100 m length segments have been set up and Excel inventory data imported in to GIS database. Functionality of the system is being checked prior to starting importing relevant data.

3) Methodology for selection of emphasis management road segments and structural examination segments

To be added as the Project progresses.

(4) ACTIVITY 2-4: Prepare and Revise Mid and Long Term Road Maintenance Plan based on the above inventory data

1) Review of existing Road Management System

JICA Team has reviewed existing Road Management System (RMS) installed in 2003 by SMEC International Private Ltd. Consulting company, and it was found that the system is not functioning due to

1) turnover of trained staff, 2) complexity of the system, 3) needs of vast data to input requiring a huge amount of manpower.

2) Framework of Road Management System

JICA Team will procure equipment for Road Maintenance Management System and develop the system meeting the needs of AACRA. At the 3rd TAC, JICA Team has introduced to counterpart and agreed on the system requirements and system functions in association with relevant technologies, and Bespoke System with stochastic deterioration model comparing to the COTS system in its advantage on adoptability to requirements, institutionalization, customizability, cost, and upgradability.

3) Formulation of Mid/Long Term Road Maintenance Management Plan

a. Definition and type of maintenance plan

Proposed definition and type of Maintenance plans will be discussed with Counterparts in early 2017.

b. Methodology for formulating Road Maintenance Management Plan

Approach of maintenance planning has been presented and agreed at the 4th TAC.

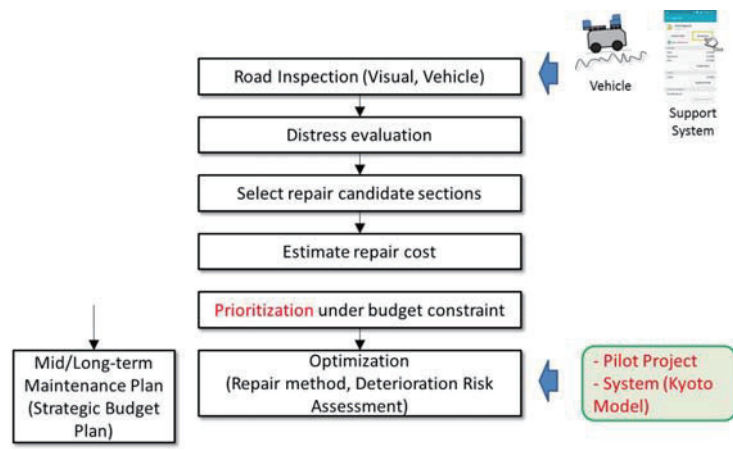


Figure 5 Approach of Mid / Long term Maintenance Planning

c. Formulation of Mid/Long Term Road Maintenance Management Plan

The first Mid/Long Term Road Maintenance Plan will be drafted by the end of second year of the project term.

4) Preparation of Manual and Guideline on Road Maintenance Management System

To be added as the Project progresses.

(5) ACTIVITY 2-5: Prepare Annual Road Maintenance Plan

1) Methodology for preparing annual maintenance planning

During the 4th TAC meeting in July 2016, JICA team presented the preparation procedure of Annual Maintenance Plan following the approach consisting of steps 1 to 6 and agreed.

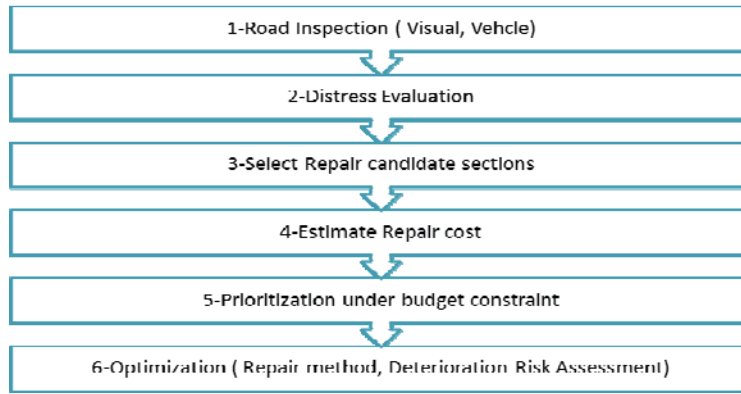


Figure 6 Procedure for Annual Maintenance planning

2) Step 1: Road Inspection : to be referred to Activity 2-2 and 2-3

3) Step 2: Distress Evaluation

Evaluation process (draft) as shown below has been developed to 1) Categorise the distress, 2) Develop Distress Indicators (draft) and 3) Evaluate the range of distress. The process was presented and agreed at the 3rd TAC. The preliminary distresses evaluation on road inspection data collected until May 2016 was conducted in June 2016.

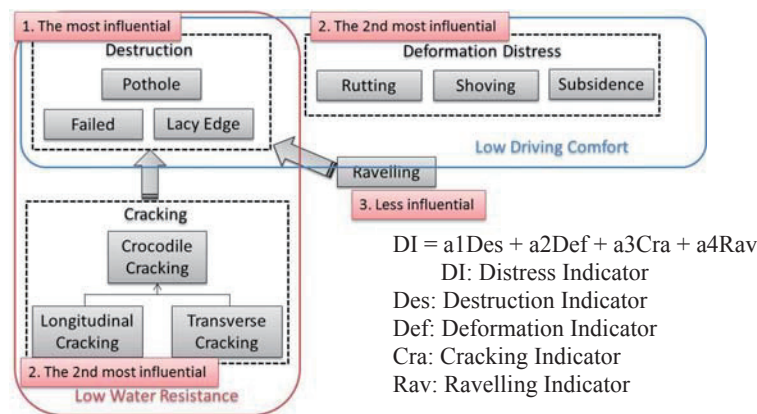


Figure 7 Distress Evaluation Process (DRAFT)

4) Step 3; Selection of candidate repair section

Two prioritization methods on selection of routes for repair has been presented at the 4th TAC. One idea is to prioritize routes for repair by Weighted Indexes which consider Traffic volume, accessibility to primary destinations, road class (RR, SAS, PAS, Strategic road) and others. The other is prioritization by Risk Matrix considers risk likelihood (damage level) and Road class to categorize sections by percentile as shown in the figure below. The discussion is still ongoing.

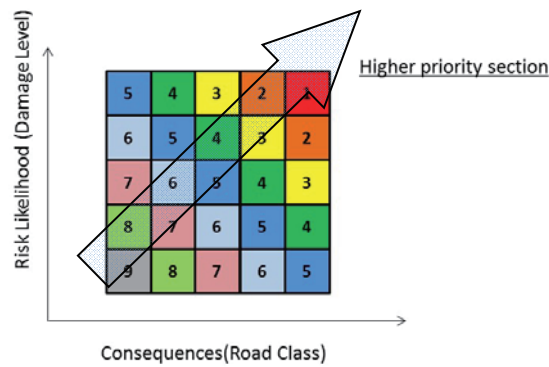


Figure 8 Prioritization by Risk Matrix (Draft)

5) Step 4; Estimate repair cost

To be described through the project progresses.

6) Formulation of Annual Road Maintenance Management Plan

Annual Road Maintenance Plan will be prepared prior to the draft of Mid/Long Term Road Maintenance Plan.

1-2-4 ACTIVITIES FOR OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

(1) ACTIVITY 3-1: Select Pilot Projects for maintenance work based on the Annual Road Maintenance Plan formulated under the Project

1) Site Survey

On October 13, 2015, JICA Team conducted a field survey to understand issues and problems on road maintenance works. The major findings are: 1) Quality of cold mix asphalt was questionable, 2) the same maintenance work (overlay) has been carried out at some places every year (structural improvement is required), 3) Surface cutting method was not employed in the pothole repair.

2) Select Pilot Project

Algorithm for Repair Work Selection has been presented at the 4th TAC. The policy for the selection of the first pilot project will be presented discussed at the 3rd JCC. After agreement on the selected pilot project, the joint site inspection visiting actual proposed sites with relevant units of AACRA which are asset management, construction, and JICA Team. The exact work place will be decided during site inspection.

(2) ACTIVITY 3-2: Share information of Pilot Project between/within Road Asset Management Process and Constructional and maintenance Process

After the pilot project is selected, information such as site location, work method, work volume, necessary equipment and material, man power and work schedule will be shared with relevant units of AACRA which are RAM, RTD, Quality Control Support Sub process (laboratory), C&M (construction, machinery, and asphalt plant).

(3) ACTIVITY 3-3: Conduct the detailed Investigation and design specification of the pilot projects

The first pilot project does not require detailed investigation and design. This activity will be carried out during the second pilot project.

(4) ACTIVITY 3-4: Assist AACRA to execute Implementing Pilot Project

Construction plan will be prepared by JICA Team and AACRA staff, and implemented by AACRA staff. In order to improve the capacity on road maintenance, technical transfer has been carried out. So far, 3 Lectures were held. Lecture on pilot project and instrument of structural investigation will be presented at the third JCC.

(5) ACTIVITY 3-5: Feedback achievements and experience of pilot projects into the next annual road maintenance plan

Work methods of pilot project will be utilised for annual maintenance planning prepared by asset management unit. To be described as the Project progresses.

(6) ACTIVITY 3-6: Organize Workshop/Seminar of Pilot Project for ERA and Road agencies at regional and municipal level

To be described as the Project progresses.

1-2-5 TECHNICAL OUTPUT

Following technical outputs are planned to be developed under the Project and submitted at the end of the project term.

Table 11 List of Technical Output

Output	Status	Note
1 Medium/Long Term Road Maintenance Plan		To be drafted by the end of second year of the project
2 Annual Road Maintenance Plan		To be prepared prior to the draft of Mid/Long Term Road Maintenance Plan
3 Road Maintenance Management System		
4 PDCA Checklist	Version 1 is prepared at February 2016	
5 Manual and Guideline on Road Maintenance Management System		To be develop at the 3rd year (July 2017-June 2018)
6 Updated Existing Standard, Specification, Manuals		To be prepared as required
7 Training Materials	On going	To be prepared as required

1-3 ACHIEVEMENT OF THE OUTPUTS**(1) OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is improved.**

Verifiable Indicator	Achievement Level
1-1 Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 2017.	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussion are required.
1-2 Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August	In Progress: Proposed improvement on internal communication institution has been

Verifiable Indicator	Achievement Level
2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily.	proposed by JICA Team. Further discussions are required for external communication and further strengthening of institution.
1-3 More than XX% of the requested budget on the basis of Annual Road Maintenance Plan is allocated from the 3rd project year.	In Progress: Baseline data is yet to be obtained
1-4 Trainings on road maintenance is conducted targeting AACRA staff	In Progress: As of September 2016, 22 lectures and 6 OJTs, and 1 st training in Japan was conducted.
1-5 Public understanding and cooperation on road maintenance is enhanced.	In Progress: Leaflet on Activity 2 was prepared and distributed.

(2) OUTPUT 2: The Process for Formulating Road Maintenance Plans is established.

Verifiable Indicator	Achievement Level
2-1 PDCA Checklist is developed by January 2016.	In Progress: Checklist version 1 is developed. Version will be updates as necessary through the operation.
2-2 AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year.	In Progress: Framework for Road Maintenance Management System and planning procedure were agreed. PDCA Checklist (ver.1) is developed.
2-3 AACRA Annual and Mid/Long term Road Maintenance Plan are formulated in consideration of Life Cycle Cost on Road.	In Progress: Approach and formulation process for road maintenance planning have been agreed.

(3) OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

Verifiable Indicator	Achievement Level
3-1 Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted.	In Progress: 3 trainings relevant to maintenance skill and knowledge were provided.
3-2 Number of preventive maintenance works executed are increased through the implementation of the Project.	

1-4 ACHIEVEMENT OF THE PROJECT PURPOSE

PROJECT PURPOSE: The management capacity of AACRA for road maintenance is enhanced.

Verifiable Indicator (By 3 months before the completion of the Project,)	Achievement Level
1 AACRA's capacity to secure the budget for road maintenance is enhanced.	In Progress: Baseline data from Addis Ababa City Administration and Road Funds agency is yet to be obtain.
2 Road maintenance works based on PDCA cycle established by the Project are executed by AACRA.	In Progress: PDCA Checklist (ver.1) is developed. Currently operation method in consideration to inspection equipment and maintenance management system is under discussion.
3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in the AACRA Annual Road Maintenance Plan exceeds XX% from the 3rd project year.	In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.

1-5 CHANGES OF RISKS AND ACTIONS FOR MITIGATION

(1) Term July 2015 to August 2015

As per the JICA Risk Management Check List, no risk was observed during the first two months of the Project. Other events and issues that may become a risk to the Project were not recognized during this reporting period.

(2) Term September 2015 to February 2016

As mentioned at “1-1-2 (3) Provision of Machinery and Equipment”, procurement of Pavement Condition Survey Vehicle was expected to delay, Hence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay and JICA Team took necessary actions as mentioned at “2.3 Action to be taken“ including postponing experts assignment.

(3) Term March 2016 to September 2016

As mentioned at “1-1-2 (3) Provision of Machinery and Equipment”, procurement of Pavement Condition Survey Vehicle is expected to further delay. The vehicle has arrived in April 2016, however equipment to be fitted into the vehicle is expected to arrive in December 2016 and able to use in the Project from February 2017. This delay is expected to impact on the progress of procurement (Development) of Maintenance Management System, and Activity 2-2, 2-3, 2-4, and 2-5.

1-6 PROGRESS OF ACTIONS UNDERTAKEN BY JICA

After the amendment of contract was signed between JICA and JICA Team in January 2016, with a great effort by JICA Ethiopia, Pavement Condition Survey Vehicle has been procured. Currently equipment for Pavement Condition Survey Vehicle is yet to be procured by JICA headquarter.

1-7 PROGRESS OF ACTIONS UNDERTAKEN BY GOV. OF ETHIOPIA

Thanks to the good cooperation and enthusiasm of Counterparts to the project, activities runs very smoothly and efficiently so far. Continuous involvement and support of Counterparts is very much appreciated for successful technical transfer of project output.

1-8 OTHER REMARKABLE/CONSIDERABLE ISSUES RELATED/AFFECT TO THE PROJECT

(Such as other JICA's projects, activities of Counterparts, other donors, private sectors, NGOs, etc.)

AACRA now has a project called “Consultancy service for the study of permanent naming and code of road and transport infrastructure assets of Addis Ababa” which is an asset management study project with a period of service of 5 months (Feb – Jun. 2016). Objective of the consultancy include but not limited to developing permanent names and codes for identified transport infrastructures in Addis Ababa. This project is initiated by Addis Ababa Transport Program and Monitoring Office (TPMO) under World Bank fund. RAM of AACRA has informed current numbering of Roads established by JICA Team to the concerned consultancy group.

2. DELAY OF WORK SCHEDULE AND/OR PROBLEMS (IF ANY)

2-1 DETAIL

(1) Term July 2015 to August 2015

No delay was observed during the first two months of the Project and the 1st JCC was held on 17th August 2015 as planned by JICA experts.

(2) Term September 2015 to February 2016

Procurement of Pavement Condition Survey Vehicle was under the progress, and expected to be delivered in September 2016 as the earliest. This was nine months delay from the original schedule, and as consequence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay.

(3) Term March 2016 to September 2016

Procurement of equipment for Pavement Condition Survey Vehicle is under the progress, and currently will be delivered in December 2016 as the earliest, and be able to use for survey from February 2017 as earliest. This is 12 months delay from the original schedule, and as consequence, Procurement (Development) of Maintenance Management System and Activity 2-2, 2-3, 2-4, and 2-5 are expected to be further delay.

2-2 CAUSE

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

Due to need of amendment of contract for changing procurement owner of Pavement Condition Survey Vehicle to JICA, actual procedure has been delayed.

(3) Term March 2016 to September 2016

Since the change on procurement owner in January 2016 as described in at “1-1-2 (3) Provision of Machinery and Equipment”, there was a further delay on procurement procedure for equipment for Pavement Condition Survey Vehicle at JICA headquarter. Tender notice was published in June 2016, tender was hold in July 2016, a contractor was selected in August 2016 and contracted with JICA headquarter.

2-3 ACTION TO BE TAKEN

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

JICA Headquarter preceded the procurement of Pavement Condition Survey Vehicle as a priority issue, so that the vehicle could arrive as earliest as possible to conduct activities proposed under the Project. Meanwhile, JICA Team provided necessary support for procurement as required, at the same time, conducted following actions; 1) Reschedule assignment of JICA experts, considering the feasible delivery

schedule of the Pavement Condition Survey Vehicle, 2) Provide training on relevant activities, 3) Develop Road Maintenance Management System using existing data, and 4) Formulate plans not requiring Pavement Condition Survey Vehicle.

(3) Term March 2016 to September 2016

The selected contractor is currently proceeding the procurement of equipment for Pavement Condition Survey Vehicle and JICA headquarter is providing the necessary supports for smooth delivery of procedure. At the same time, JICA Team is currently discussing the potential solution to make up this delay affecting data collection and resulting data quality requiring for road maintenance planning.

2-4 ROLES OF RESPONSIBLE PERSONS/ORGANIZATION (JICA, GOV. OF ETHIOPIA, ETC.)

- Procurement of Pavement Condition Survey Vehicle (Equipment to be assembled): JICA Headquarter
- Procurement of Pavement Condition Survey Vehicle (Vehicle): JICA Ethiopia Office

3. MODIFICATION OF PROJECT IMPLEMENTATION PLAN

3-1 MODIFICATION OF PDM AND PO

(1) Version 1

The Project proposed a modification of PDM from that outlined in R/D (signed in April 2015) to better correspond the circumstances of the Project. This proposal was approved by the 1st JCC on August 17, 2015 and reported to JICA Ethiopia Office and JICA Headquarter at a later date. PO was altered accordingly.

(2) Version 2

PDM was updated for 1) verification indicator, 2) addition of activity “ Development of Visual Inspection Supporting System” into Activity 2-2, 3) addition of activity “Develop Road Maintenance Management System” into Activity 2-4, 4) Experts of Japanese side, 5) extra item for provision of machinery and equipment in accordance with the contract amended in January 2016. PO was also altered accordingly. The modification was informed to JICA Ethiopia Office prior to the 2nd JCC, and approved at the 2nd JCC.

(3) Version 3 Draft

After the review of “Objective verifiable indicator” under activity 0-2, modification have been made on “Means of Verification”.

3-2 OTHER MODIFICATIONS ON DETAILED IMPLEMENTATION PLAN

(1) Version 1

No other modification made for version 1.

(2) Version 2

Total experts assignment for Ethiopia has increased 0.5 MM which in total 72.50 MM.

(3) Version 3

No other modification made for version 3.

**4. PREPARATION OF GOV. OF ETHIOPIA TOWARD AFTER
COMPLETION OF THE PROJECT**

To be added as the Project progresses.

II. PROJECT MONITORING SHEET I & II

See the attached.

Project Monitoring Sheet I (Revision of the Project Design Matrix)

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Implementing Agency: Addis Ababa City Roads Authority (AACRA)


Target Group: Staff of Addis Ababa City Roads Authority (AACRA)

Period of Project: 10/Jul/2015 - 9/Jul/2018

Project Site: Addis Ababa City

Model Site: Pilot project sites are to be determined

Version 3
 Dated 15th Sep.2016

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal The roads in Addis Ababa City are maintained in a sustainable way.	Three years after the completion of the Project, 1. XX % of roads under AACRA is below the targeted roughness of YY. 2.The length(km) of road under AACRA inspected by the standardized method is increased by XX % compared to 3 months before the project	1. Road inventory and Inspection Data in Addis Ababa City 2. Road inventory and Inspection Data in Addis Ababa City			
Project Purpose The management capacity of AACRA for road maintenance is enhanced.	By 3 months before the completion of the Project, 1. AACRA's capacity to secure the budget for road maintenance is enhanced. 2. Road maintenance works based on PDCA ¹ cycle established by the Project are executed by AACRA. 3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in AACRA Annual Road Maintenance Plan, exceeds XX% since the 3rd project year.	1. Interview to Addis Ababa City Administration and Road Funds Agency on Baseline and Endline data 2. Evaluation Result by PDCA Checklist 3 Baseline data (Maintenance record 2015-2016 and Road Maintenance Plan), AACRA Annual Road Maintenance Plan, AACRA Maintenance Historical Record	1.Human resources necessary for the road maintenance are continuously assigned by AACRA. 2.Financial resources are allocated by the City Administration and Road Funds Agency in a sustainable manner.	In Progress: Baseline data from Addis Ababa City Administration and Road Funds agency is yet to be obtain. In Progress: PDCA Checklist (ver.1) is developed. Currently operation method in consideration to inspection equipment and maintenance management system is under discussion. In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.	
Outputs 1. The implementation structure of AACRA for road maintenance is improved. 2. The process for formulating road maintenance plans is established. 3. The maintenance skills and knowledge of AACRA technical staff are improved.	1-1. Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 1-2. Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August 2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily. 1-3. More than XX% of the requested budget on the basis of Annual Road Maintenance Plan are allocated since the 3rd project year. 1-4 Trainings on road maintenance is conducted targeting AACRA staff 1-5 Public understanding and cooperation on road maintenance is enhanced. 2-1. PDCA Checklist is developed by January 2016. 2-2. AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year. 2-3.AACRA Annual and Mid/Long term road maintenance plan are formulated in consideration of Life Cycle Cost on Road 3-1. Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted. 3-2. Number of preventive maintenance works executed are increased through the implementation of the project.	1-1. Compiled suggestions, Project meeting record 1-2. The Road Map, Minutes of JCC 1-3.Baseline data(Requested and allocated budget on annual road maintenance plan 2015-2016), AACRA annual report (Budget Plan), AACRA Annual Road Maintenance Plan 1-4. Training Record 1-5. PR outputs 2-1. PDCA checklist, Minutes of JCC 2-2 PDCA Checklist, ACCRA Annual and Mid/Long term road maintenance plan, Road Maintenance Management System 2-3 ACCRA Annual and Mid/Long term road maintenance plan, AACRA Maintenance Historical Record 3-1 Training Record, Report on Pilot Project 3-2.Baseline data(Maintenance record 2015-2016), AACRA Maintenance History Record, AACRA Annual Road Maintenance Plan	The AACRA staff capacitated by the Project continue to work for their respective positions.	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussion are required. In Progress: Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for external communication and further strengthening of institution. In Progress: Baseline data is yet to be obtained In Progress: At of September 2016, 22 lectures and 6 OJTs., 1st training in Japan was conducted In Progress: Leaflet on Activity 2 was prepared and distributed. In Progress: Checklist version 1 is developed. Version will be updates as necessary through the operation. In Progress: Framework for Road Maintenance Management System and planning procedure were agreed. PDCA Checklist(ver.1) is developed. In Progress: Approach and formulation process for road maintenance planning have been agreed. In Progress: 3 trainings relevant to maintenance skill and knowledge were provided.	
Activities	Inputs	Important Assumption			
1-1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement 1-2 Convene Technical Advisory Committee (TAC) 1-3 Prepare a training plan for AACRA Staff 1-4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc. 1-5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance 1-6 Promote public relations (PR) activities on road maintenance in the City 2-1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed 2-2 Conduct road inspections in the City 2-3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc. 2-4 Prepare and revise Medium/Long term Road Maintenance Plan using Road Maintenance Management System developed under the project. 2-5 Prepare Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project. 3-1 Select pilot projects for maintenance works based on the Annual Road Maintenance Plan formulated under the Project 3-2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process 3-3 Conduct the detailed investigations and design specifications of the pilot projects 3-4 Assist AACRA to execute pilot projects 3-5 Feedback achievements and experiences of pilot projects into the next Annual Road Maintenance Plan 3-6 Organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level	The Japanese Side 1. Experts • Chief Advisor/Road Maintenance • Road Maintenance Planning • Road Inspection (Site Survey) •Road Inspection (Database) • Maintenance Management System • Maintenance Design • Construction Supervision • Training Planning • Monitoring • System Development • Others as necessary 2. Training of counterpart personnel, including Project Director and Project Manager, in Japan and/or the Third Countries 3. Provision of machinery and equipment • Inspection Equipment(Pavement Condition Survey Vehicle) • Maintenance Management System • Visual Inspection Supporting System • Structural Investigation Equipment • Others 4. Local expenses for the project activities as necessary	The Ethiopian Side 1. Personnel • Project Director • Project Manager • Counterpart personnel 2. Provision of the project office and facilities necessary for the project implementation 3. Traffic survey and pilot projects in Addis Ababa City 4. Administrative and operational expenses necessary for the project implementation • Electricity, water, communication, etc. • Local traveling costs and daily subsistence allowance (DSA) for counterpart personnel 5. Others as necessary	1. The turnover of AACRA staff does not profoundly affect the project activities. 2. Natural disasters, such as floods, do not profoundly affect the project activities. Pre-Conditions Understanding and cooperation on road maintenance in the City are obtained from the project stakeholders such as the City Administration, Addis Ababa City Road and Transport Bureau, Road Funds Agency, etc.		
					
		<Issues and countermeasures>			

Project Monitoring Sheet II (Revision of the Plan of Operation)

Version 3

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Dated 15th Sep. 2016

Inputs	Plan	1st EthFY				2nd EthFY				3rd EthFY				Remarks	Monitoring			
		2015		2016		2017		2018		Issue	Solution							
Expert	Actua	III	IV	I	II	III	IV	I	II	III	IV	I	II	III				
Chief Advisor/Road Maintenance	Plan																	
Deputy Chief Advisor/ Road Maintenance/ Maintenance Management System	Plan																	
Road Maintenance Plan	Plan																	
Road Inspection (Site Survey)	Plan														1MM of 2016 is held to meet the delay of inspection vehicle	Assignment needs to be rescheduled		
Road Inspection (Database)	Plan														1MM of 2016 is held to meet the delay of inspection vehicle	Assignment needs to be rescheduled		
Road Maintenance Design	Plan																	
Construction Supervision	Plan																	
Training Plan	Plan																	
Monitoring	Plan																	
System Development	Plan																	
Equipment ^A : to be used for the Project Activities	Plan																	
Inspection Equipment (Pavement Condition Survey Vehicle)	Plan														Vehicle has arrived. Equipment is expected in Dec. 2016	Enhance support for procurement		
Structural Investigation Equipment	Plan														Specification will be discussed in Sep. 2016.			
Maintenance Management System	Plan														Due to delay of inspection equipment, system is expected to be procured in Completed			
Visual Inspection Supporting System	Plan																	
Training in Japan	Plan																	
Training for Counterpart Personnel	Plan														1st Training in Japan was conducted			
Activities	Plan	2015		2016		2017		2018		Responsible Organization		Achievements		Issue & Countermeasures				
Sub-Activities	Actua	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	Japan	GOE		
Output 1: The implementation structure of AACRA for road maintenance is improved.																		
1.1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	Plan														JICA	AACRA	In progress	
1.2 Convene Technical Advisory Committee (TAC)	Plan														JICA	AACRA	4 TACs conducted	
1.3 Prepare a training plan for AACRA Staff	Plan														JICA	AACRA	Plan has developed and training implementing schedule develop accordingly.	
1.4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.	Plan														JICA	AACRA	22 lectures and 6 OJTs on Act. 2-2, 2-3, 2-4, 2-5 and 3-3, 1st training in Japan were conducted.	
1.5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	Plan														JICA	AACRA	Internal communication flow has been proposed	
1.6 Promote public relations (PR) activities on road maintenance in the City	Plan														JICA	AACRA	Leaflet on Activity 2 was prepared	
Output 2: The process for formulating road maintenance plans is established.																		
2.1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	Plan														JICA	AACRA	Review is in progress, PDCA Checklist (ver. 1) is prepared.	
2.2 Conduct road inspections in the City	Plan														JICA	AACRA	Visual Inspection Support System is developed. Visual Inspection have been conducted	Due to delay of equipment for inspection vehicle procurement, activity is expected to delay. Provide training, reschedule expert assignment.
2.3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.	Plan														JICA	AACRA	Input of inventory data has been completed	
2.4 Prepare and revise Medium/Long term Road Maintenance Plan based on the above inventory data	Plan														JICA	AACRA	Planning approach has been agreed	
2.5 Prepare Annual Road Maintenance Plan	Plan														JICA	AACRA	Planning procedure has been agreed	
Output 3: The maintenance skills and knowledge of AACRA technical staff are improved.																		
3.1 Select pilot projects for maintenance works from the annual road maintenance plan	Plan														JICA	AACRA	Pilot project will be selected in Sep 2016.	
3.2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process	Plan														JICA	AACRA		
3.3 Conduct the detailed investigations and design specifications of the pilot projects	Plan														JICA	AACRA	First pilot project does not require detail investigation nor design	
3.4 Assist AACRA to execute pilot projects	Plan														JICA	AACRA		
3.5 Feedback achievements and experiences of pilot projects into the next annual road maintenance plan	Plan														JICA	AACRA		
3.6 Organize a workshop/seminar of the pilot projects for ERA and road agencies at regional and municipal level	Plan														JICA	AACRA		
Project Duration / Phasing	Plan																	
Monitoring Plan	Plan	2015		2016		2017		2018		Remarks		Issue		Solution				
Monitoring	Actua	III	IV	I	II	III	IV	I	II	III	IV	I	II	III				
Joint Coordinating Committee	Plan																	
Set-up the Detailed Plan of Operation	Plan																	
Submission of Monitoring Sheet	Plan																	
Joint Monitoring	Plan																	
Reports/Documents	Plan																	
Project Work Plan	Plan																	
Project Completion Report	Plan																	

■ Activities with fixed period
 ■ Activities to be continuously conducted, or with tentative schedule

TO CR of JICA Ethiopia OFFICE**PROJECT MONITORING SHEET****Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City****Version of the Sheet: Version 4-A (Term: October 2016 – March 2017)****Name: Mr. Hiroshi Honda****Title: Chief Advisor****Submission Date: 5th April 2017****I. SUMMARY****1. PROGRESS**

The progress that has taken place in this term is as follows;

- Assembly of Pavement Condition Survey Vehicle (PCSV) and handover it to AACRA
- Training of PCSV and start of data collection through PCSV (Activity 2-2)
- The 5th and 6th TAC (Activity 1-2)
- 4 Lectures and 10 OJT (Activity 1-4)
- Implementation of Visual Inspection using Visual Inspection Supporting System (Activity 2-2)
- Development of Road Inventory database of AACRA (Activity 2-3)
- Selection of Pilot Project (Activity 3-1)
- Implementation of Pilot Project (Activity 3-4)

1-1 PROGRESS OF INPUTS

1-1-1 The Japanese Side**(1) Experts**

In accordance with the amended contract agreed in January 2016 between JICA and JICA Team, number of experts has increased into a total 10 experts. Experts have been assigned since July 10, 2015, and at the end of March 2017, all experts have been assigned for a total of 38.87 Man/Month (hereinafter to be called as “MM”) out of the project total assignment of 72.5 MM (assignment in Ethiopia only).

(2) Training of Counterparts Personnel

Under the Project, two trainings in Japan are planned. The first training in Japan was conducted from August 23 to September 6, 2016 and the Second training is tentatively planned in September 2017.

(3) Provision of Machinery and Equipment

At the 1st Joint Coordination Committee meeting (hereinafter called as “JCC”) held on August 17, 2015, specification of Inspection Equipment (hereinafter called as “Pavement Condition Survey Vehicle”) was approved by Counterparts.

Under the amended contract with JICA in January 2016, the procurement responsibility has changed; 1) Pavement Condition Survey Vehicle is to be procured directly by JICA Ethiopia, and equipment will be

procured by JICA headquarter. The rest of machinery and equipment are to be procured by JICA Team which are; 2) Structural Testing Instrument, and 3) Maintenance Management System and Visual Inspection Supporting System which are developed through the Project and transferred to Counterparts. At the 2nd Technical Advisory Committee meeting (hereinafter called “TAC”) held on October 27, 2015, JICA Team informed these changes to Counterparts.

So far, procurement of Visual Inspection Supporting system has completed in April 2016. Pavement Condition Survey Vehicle has arrived in April 2016, and related tax payment and application of number plate completed in May 2016. Currently the vehicle is kept at AACRA Garage. The rest of equipment fit into the vehicle has delivered to AACRA on 16th January, 2017 after 2 months Custom Clearance, the vehicle assembly has completed by the end of January, and the vehicle has been handed over to AACRA on 31st January, 2017. Regards to the Structural Testing Instrument, Dynamic Cone Penetrometer (hereinafter called DCP) has been selected in the 3rd JCC (held on 18th September, 2016) and it is expected that 2 sets of DCP with 1 (one) Asphalt Core Cutter will be procured by the end of June 2017.

Table 1 List of Equipment and Machinery to be procured

Equipment and Machinery	Component	Responsible agency for procurement	Original Planned procured date	Expected procured date* (tentative)	Remark
Inspection Equipment (Pavement Condition Survey Vehicle)	<ul style="list-style-type: none"> 1 Vehicle Equipment to be fitted on the vehicle 	JICA	Sep. 2016	Vehicle is procured and transferred to AACRA in May 2016. A part of equipment (PCs) are procured in Apr. 2016, however, other equipment is delivered to AACRA in January, 2017.	3 set of PCs have been procured in November, 2016 and kept in Consultant Office.
Structural Testing Instrument	<ul style="list-style-type: none"> 2 set of instrument 1 set of Asphalt Core Cutter 	JICA Team	Jul. 2017	Procurement will be started in Feb., 2017 and instruments will be delivered to AACRA by the end of May, 2017.	Considering the decentralization of the organization of maintenance office, 2 set of instruments is to be supplied.
Maintenance Management System	<ul style="list-style-type: none"> 1 set of Desktop Computer 1 GIS software 	JICA Team	Apr. 2016	Arc GIS has been installed Total system will be delivered to AACRA at least 3 months after the completion of assembly of the Pavement Condition Survey Vehicle.	The system should be completed by the end of September, 2017 (end of rainy season) to commence the full-scale road inspection in Oct., 2017.
Visual Inspection Supporting System	<ul style="list-style-type: none"> 5 set of Smartphone 1 GIS software 	JICA Team	Mar. 2016	Smartphone was procured in Feb. 2016, and GIS was installed in Apr. 2016.	Completed

Note: “Expected procurement date” means Equipment and Machinery to be used for the project activities.

(4) Local Expenses for the Project Activities

Local expense has been utilized for salary of national staff (Engineer and Accountant), office equipment, rent-a-car and other consumables so far.

1-1-2 The Ethiopian Side

(1) Personnel

Project Manager was identified under Record of Discussion (hereinafter to be called as “R/D”) and assigned in late August 2015. The rest of counterpart personnel will be selected through the progress of the Project. In November 2015, three personnel for inspection activity have been assigned, and further two more road and transport engineers are assigned in June 2016. In total 11 personnel are assigned as of September 2016. However, due to the reorganization of AACRA announced on 11th November, 2016, restructuring of the each department is underway and, therefore, the list of counterpart personnel may be revised.

(2) Furnished Office Space and Facilities

Since the project commencement in July 2015, a project office (Room 318) has been allocated at Addis Ababa City Roads Authority (hereinafter to be called as “AACRA). Office furniture have been installed for eight experts.

(3) Traffic Survey and Pilot Project in Addis Ababa City

Though the Ethiopian side committed to conduct the traffic survey for the selection of Pilot project in the PDM, AACRA has not taken any traffic survey data so far. Actually the location of Pilot project has been selected without any traffic survey data. Furthermore JICA team is obliged to provide Mid-and-long term maintenance plan without traffic data.

(4) Administrative and Operational Expense

Expense agreed at R/D has been secured and handled by the Ethiopian Side.

1-2 PROGRESS OF ACTIVITIES

Project activities to achieve the project purpose under Work Plan were agreed at the 1st JCC held on August 17, 2015. Project activities described in Project Design Matrix summarized in the Table 2 shown below. Progress of each activity is described accordingly in the sections that follow.

Table 2 Outline of Project Activities

PROJECT PURPOSE: The Management capacity of AACRA for road maintenance is enhanced

Outputs	Activity no	Activities
Overall	0-1	Preparation, Updating and Review of Work Plan and Monitoring Sheet
	0-2	Baseline Survey and Performance Indicator
	0-3	JCC and TAC meeting
	0-4	Training in Japan
	0-5	Project Completion Report
Output 1: The implementation structure of AACRA for road maintenance is improved.	1-1	Review Implementation Structure of AACRA, and compile suggestions for the structure improvement
	1-2	Convene TAC
	1-3	Prepare training Plan for AACRA Staff
	1-4	Conduct training for AACRA Staff for road maintenance; road inspection, maintenance planning, maintenance management system, etc.
	1-5	Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance
	1-6	Promote Public Relation activities on road maintenance in the City
Output 2: The Process for formulating road maintenance plans is established	2-1	Review the road maintenance cycle of AACRA, compile PDCA Checklist, and revise the checklist if needed.
	2-2	Conduct Road Inspection in the City
	2-3	Develop and Update the Road Inventory (database) of AACRA, including road condition, traffic volume, nit costs, etc.

Outputs	Activity no	Activities
	2-4	Prepare and revise Mid and Long Term Road Maintenance Plan using road Maintenance Management System developed under the Project
	2-5	Prepare and Revise Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project
Output 3: The Maintenance skills and knowledge of AACRA Technical staff are improved	3-1	Select Pilot Projects for maintenance work based on the Annual Road Maintenance Plan formulated under the Project
	3-2	Share information of Pilot Project between/within Road Asset Management Process and Constructional and maintenance Process
	3-3	Conduct the detailed Investigation and design specification of the pilot projects
	3-4	Assist AACRA to execute Implementing Pilot Project
	3-5	Feedback achievements and experience of pilot projects into the next annual road maintenance plan
	3-6	Organize Workshop/Seminar of Pilot Project for ERA and Road agencies at regional and municipal level

1-2-1 ACTIVITIES FOR OVERALL

(1) ACTIVITY 0-1: Preparation, Updating and Review of Work Plan and Monitoring Sheet

1) Kick off Meetings

Kick off meeting was held on July 15, 2015 in order to 1) obtain more understanding of the JICA project, 2) comprehend function of the concerned parties in and outside of AACRA, and 3) arrange the 1st JCC. Participants from AACRA were the General Manager, the Technical Advisor, Managers from Road Transportation Construction and Maintenance Core Process (hereinafter called as “C&M”), Road Transport Design Core Process (hereinafter to be called as “RTD”), and engineers from Road Asset Registration Maintenance Planning Sub Process (hereinafter called as “RAM”).

Besides, Counterparts and JICA experts visited Addis Ababa City Road & Transportation Bureau, and Road Funds Agency to introduce and obtain their cooperation to the Project. JICA experts also visited the Embassy of Japan in Ethiopia.

2) Work Plan

The draft Work Plan was discussed with JICA Headquarter on July 13, 2015, and agreed at the 1st JCC held on August 17, 2015. However, due to the delay of the procurement of the equipment installed on the RCSV, the overall work plan is obliged to be revised as attached this monitoring sheet (PM Form 3-3).

3) Monitoring Sheets

Every six months, monitoring sheets are updated based on discussion with Counterparts, and submitted to JICA Ethiopia Office. Following shows the scheduled submission of monitoring sheet.

Table 3 Schedule of Monitoring Sheet Submission

Project Year	Version	Date
1st year (July 2015-June 2016)	Monitoring Sheet Version 1	Agreed and submitted on August 20, 2015
	Monitoring Sheet Version 2	Agreed on February 18, 2016
2nd year (July 2016-June 2017)	Monitoring Sheet Version 3	Agreed and submitted on September 15, 2016
	Monitoring Sheet Version 4	Agreed and submitted on 27 th January 2017
	Monitoring Sheet Version 4-A	To be submitted on April 5 th 2017
3rd year	Monitoring Sheet Version 5	To be submitted in September 2017

(July 2017-June 2018)	Monitoring Sheet Version 6	To be submitted in February 2018
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(2) ACTIVITY 0-2: Baseline Survey and Performance Indicator

Performance indicators (hereinafter called Objectively Verifiable Indicator), which are to evaluate the achievement level of the Project stated Project Design Matrix (hereinafter called PDM), are planned to be set within six months from the project commencement. Baseline survey has been conducted and JICA Team proposed to consult with City Council of Addis Ababa on performance indicators and means of verification on “Overall Goal” and “Project Purpose”, however due to requiring an official letter from Mayor, consultation is not yet held. The issue was addressed to AACRA at the 2nd and 5th TAC, and AACRA agreed to communicate with Addis Ababa City Administration on this issue.

Considering the difficulty to consult with City Council of Addis Ababa, JICA Team has revised the Indicator on “Project Purpose” and “Output” with Counterparts and consulted to JICA Ethiopia Office for approval prior to the 2nd JCC. At the 2nd JCC, proposed indicators were approved. In September 2016, the JICA Team revised the indicator and means of verification based on the baseline survey. If the consultation with Addis Ababa City Administration took a longer time, alternative indicator and means may have to be discussed.

The indicators are described in “1.3 Achievement of the Outputs” and “1.4 Achievement of the Project Purpose”.

(3) ACTIVITY 0-3: Joint Coordination Committee (JCC) and Technical Advisory Committee (TAC)

Outline of JCC and TAC is summarized in Table 4. Member of JCC was set as agreed at R/D and assigned in September 2015, and member of TAC was assigned after the 1st JCC. Working Groups (hereinafter called as “WGs”) are set up as required through the course of project.

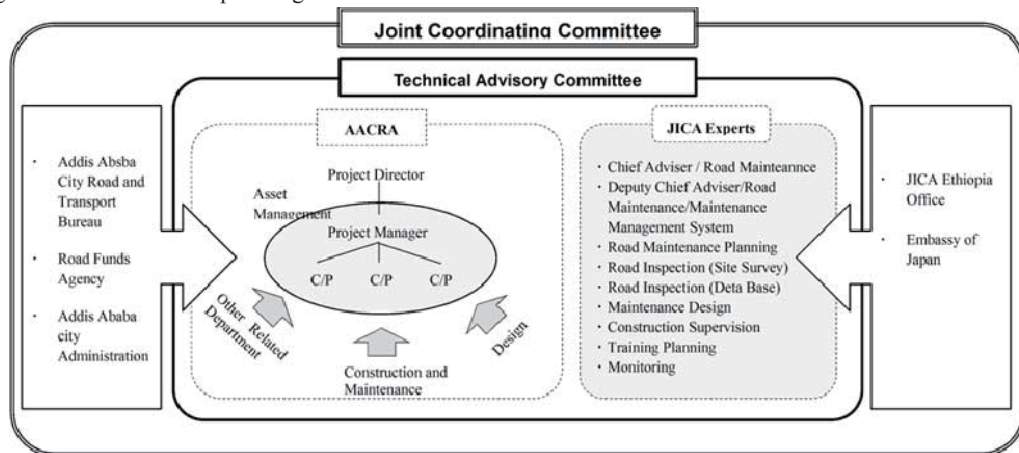
Table 4 Outline of JCC and TAC

Committee	Members		Frequency	Function
Joint Coordinating Committee (JCC)	[Ethiopia Side] <ul style="list-style-type: none"> • AACRA Project Director • AACRA Project Manager of RAM • AACRA RTD • AACRA C&M • AACRA other related Department • Addis Ababa City Road and Transport bureau • Addis Ababa City Administration • Road Funds Agency 	[Japanese Side] <ul style="list-style-type: none"> • JICA Experts • JICA Ethiopia Office • Embassy of Japan in Ethiopia 	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee (TAC)	[Ethiopia Side] <ul style="list-style-type: none"> • AACRA Project Director • AACRA Project Manager of RAM • AACRA RTD • AACRA C&M • AACRA other related 	[Japanese Side] <ul style="list-style-type: none"> • JICA Experts 	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by Project Director, Project Manager, Counterpart personnel, and JICA experts.

Committee	Members	Frequency	Function
	Department		

NOTE:

- Road Transportation Construction and Maintenance Core Process : C&M
- Road Transport Design Core Process :RTD
- Road Asset Registration Maintenance planning Sub Process: RAM



1) 1st JCC

The 1st JCC was held on August 17, 2015, chaired by the General Manager of AACRA, Eng. Fekadu Haile with total of 18 participants. At the meeting, revised PDM, monitoring sheet, and specification for procurement goods were approved. In addition, following items were requested and agreed on 1) Review of exiting quality of road maintenance works carried out by supervision consultants, 2) Immediate process for procurement of Pavement Condition Survey Vehicle.

2) 2nd JCC

The 2nd JCC is held on February 18, 2016, with a total 23 participants. Progress of activities including database preparation and inspection were informed, and smartphones for Visual Inspection Supporting System were handed over. The General Manager of AACRA pointed out the following points; 1) Addis Ababa’s Drainage during rainy season which affecting road condition will be studied under a project funded by World Bank (WB)¹, 2) Acceleration of Procurement of Pavement Condition Survey Vehicle, and 3) need of clear justification for replacing the existing system to new system to be developed under the Project (road numbering system, road maintenance system, etc.)

3) 3rd JCC

The 3rd JCC is held on September 15, 2016, chaired by Eng. Habtamu Tegegne, the General Director of AACRA newly appointed in August, 2016, with a total 20 participants. After the explanation of progress of each activity carried out by both counterpart and JICA Team, revision of PDM, selection pf Pilot project and 1st Training in Japan (conducted from end of Aug. to early Sep. 2016) were reported and discussed. After discussion, matters confirmed and agreed by JCC are (1) AACRA has serious concern about the delay of equipment supply into the Pavement Condition survey Vehicle, (2) AACRA has an intention to reorganize the its structure and request to JICA Team to adjust the work schedule considering the revised organization, (3) AACRA’s new management gives the first priority on the update of the road network in Addis Ababa and request JICA Team to accelerate activities such as

¹ The Project on drainage funded by WB has not been implemented yet as of September 2016.

Maintenance Plan and Pilot project., and (4) AACRA requests the supply of Instrument for Structural Test should be supplied on time in order not to further delay in the project.

In the clothing remarks, Eng. Habtamu Tegegne, GD of AACRA, mentioned that he was very pleased to hear the report of Training in Japan and hoped trainees committedly apply and contribute knowledge learnt, and serve as bridge between AACRA and JICA Team.

4) 4th JCC

The 4th JCC will be held on April 5, 2017, chaired by Eng. Habtamu Tegegne, the General Director of AACRA.

Table 5 JCC Held during the Project (as of January, 2017)

No.	Date	Participants
1 st	August 17, 2015	In total of 18 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
2 nd	February 18, 2016	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
3 rd	September 15, 2016	In total of 20 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.

(4) ACTIVITY 0-4: Training in Japan

At the 1st TAC, JICA Team explained the outline of Training in Japan. Training would be conducted twice during the project period of three years. The first training in Japan was conducted from August 23 to September 6, 2016, inviting 5 staff members from Road Asset Registration and Maintenance planning sub process of AACRA. Two of them are traffic engineers while the rest are Road Asset inspectors. The Second training is tentatively planned for September 2017. This training will focus on Construction and Maintenance core process of AACRA.

(5) ACTIVITY 0-5: Project Completion Report

Project Completion Report is planned to be submitted in June 2018.

1-2-2 ACTIVITIES FOR OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is improved

(1) ACTIVITY 1-1: Review Implementation Structure of AACRA, and Compile Suggestions for the Structure Improvement

Since July 2015, JICA Team have been reviewing the road maintenance implementation structure of AACRA with Counterparts through discussions, interviews, questionnaire survey and site visits. Based on the findings, some improvements have been proposed at TACs such as involvement of RTD to maintenance designing. Compiled suggestions will be proposed to AACRA at the third year of the Project.

In November, 2016 AACRA announced a new organization structure. Key changes or revisions in this new organization can be summarized as follows.

- ♦ 4 Deputy General Directors who are taking care of Engineering Regulatory, Support Service, Engineering Operation and Road Asset Management respectively are newly assigned under Director General of AACRA.
- ♦ Road Asset Management Division is divided into 5 regional Offices and Central Data Base Management Department.

Investigation and evaluation on the new organization will be carried out through careful observation for time being.

(2) ACTIVITY 1-2: Convene Technical Advisory Committee (TAC)

To date (January, 2017), 6 (six) TAC meetings were held as shown in the table below. For further detail, please refer to Minuets of meetings. (Note; Minutes of Meeting for 6th TAC will be prepared in due course.)

Table 6 TAC during the Project (January, 2017)

TAC	date	participants	Topic discussed	Action agreed/proposed
1 st	Sep. 7, 2015	In total of 13 JICA experts: 3 AACRA: 10	<ul style="list-style-type: none"> • Progress of the Project • Challenges on road patrol • Strategic road and database setup • Inclusion of city administration 	<ul style="list-style-type: none"> • AACRA proposed to clarify the demarcation of C&M, Supervision consultant, and RAM through the progress of the Project. • JICA Team confirmed that drainage inspection and planning will be included.
2 nd	Oct. 27, 2015	In total of 13 JICA experts: 5 AACRA: 8	<ul style="list-style-type: none"> • Review of the last TAC • Method of road patrol, progress 	<ul style="list-style-type: none"> • Maintenance plan based on visual inspection data will be prepared by February 2016 • Temperature digital gauge will be procured from Japan² • Minimum length of road segment is to be confirmed, • Communication with City Administration will be improved • Lecture on Kaizen will be hold at the beginning of next year.
3 rd	Mar. 22, 2016	In total of 9 JICA experts: 3 AACRA: 6	<ul style="list-style-type: none"> • Progress of the Project • Network centre for Road Numbering • Application of Road Management System for AACRA • Customised Mobile Inspection System • Training in Japan <p>Besides, Report on Application of the Road Management System for Addis Ababa City Roads Authority was submitted.</p>	<ul style="list-style-type: none"> • Adopt Leghar as centre of road network and will be report to GM. • Local and Collector streets will be included in numbering of roads • Set up and complete road inventory database and input inspection data will be conducted prior to the next TAC meeting
4 th	Jul. 15, 2016	In total of 12 JICA experts: 6 AACRA: 6	<ul style="list-style-type: none"> • Progress of the Project • Workshop for Selection of Design Pilot Project • Structural Investigation Instruments • Necessity of Road Maintenance Handbook 	<ul style="list-style-type: none"> • Road Maintenance Handbook will be prepared • Structural investigation instrument will be discussed later. • JCC to be hold one day between Sep. 13 and 15 2016.
5 th	Sep. 26, 2016	In total of 12 JICA experts: 3 AACRA 9	<ul style="list-style-type: none"> • Progress of the Project • Revision of some points of PDM which are pointed by Monitoring Expert. • Request AACRA to arrange a meeting 	<ul style="list-style-type: none"> • Proposal of the revision will be exchanged by both parties before the 4th JCC scheduled in March 2017 • AACRA committed to arrange the meeting with City Administration during next visit of

² The temperature digital gauge was provided in February 2016.

			with City Administration	Mr. Honda
6 th	January 27, 2016		<ul style="list-style-type: none"> • Progress of the Project • New organization structure of AACRA • Pavement Condition Survey Vehicle • Pilot Project 	<p>Note: Based on the new organization of AACRA, the chairperson of TAC is changed from Mr. Melaku (Technical Advisor) to Mr. Demelash (Deputy Director General – Road asset management).</p> <ul style="list-style-type: none"> • It will take time to complete the establishment of new AACRA organization. • It was informed that the PCSV was delivered to AACRA on January 16 and assembling would be completed by the end of January 2017.

(3) ACTIVITY 1-3: Prepare Training Plan for AACRA Staff

At the 1st TAC, JICA Team presented training policy on Training in Addis Ababa (OJT and Lecture) and Training in Japan. Lecture and OJT are conducted in combination, which approx. one lecture by JICA Team, followed by 2 weeks of OJT lead by AACRA staff aiming to develop theoretical and practical knowledge and skill on road maintenance, whereas training in Japan will provide training by experts in the field to gain knowledge and experience on advanced technologies.

Training Plan has been prepared in February 2016 and revised in August 2016, which summarises training courses (focusing on Activity 2-2, 2-3, 2-4, 2-5, 3-1,3-3,3-4 and 3-5), content covers, target trainees (mainly RAM members), frequency etc. Besides training course, Workshop/Seminar will be provided targeting ERA and Road agencies, which addressed under Activity 3-6.

(4) ACTIVITY 1-4: Conduct Training for AACRA Staff for Road Maintenance; Road Inspection, Maintenance Planning, Maintenance Management System, etc.

Training Implementation schedule has been developed and JICA Team have conducting training accordingly. To date 23 lectures and 15 OJTs were conducted under the project as summarized in the table shown below.

1) Training for Activity 2-2: Conduct Road Inspections in the City

A series of trainings on the activity has been provided from August 2015 on periodic and emergency patrolling including operation of Visual Inspection Supporting System. However on collected data, Errors were found on distress and damage identification, method of measuring distresses, distress dimensions etc. Thus JICA Team have extended training on Inspection for further 6 months. Kaizen method was introduced to RAM staff by JICA expert which enable them to tackle their problems through consulting, discussion in groups and organizing regular meetings to schedule and use their resources effectively among themselves. Full scale training for automatic inspection will be conducted from February, 2017 after assembly of Pavement Condition Survey Vehicle.

2) Training for Activity 2-3: Develop and Update the Road Inventory (database) of AACRA

Initial training on concept and setup of road network inventory have been offered. Further training will be provided in 2017. Full scale data collection will be conducted from February, 2017.

3) Training for Activity 2-4 and 2-5: Prepare and Revise Short / Medium / Long Term Road

Maintenance Plan

Trainings (6 lectures and 1 OJTs) on road maintenance planning have been offered. Trainees have so far improved their knowledge and skill sufficiently. Once the system is developed, further training will be provided.

4) Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification

In order to improve the capacity on road maintenance, 3 lectures were held. Trainees were very enthusiastic and further detail information has been requested.

5) Training for Activity 3-1: Selection of Pilot Project

Considering the scale, the damage severity and the expected repair method, the location and repair method of 1st Pilot Project was decided in Nov. 2016 through joint site investigation among JICA Team, Construction (Repair) Department and RAM.

Table 7 Training Implemented during the Project (as of March 2017)

Training Courses		Style	Date	Participants no.
A: Training for Activity 2-2: Conduct Road Inspections in the City				
A1 Visual inspection (Emergency patrolling)	A1-1 Concept of emergency patrolling	Lecture	11 Sep. 2015	11 RAM members
	A1-2 How to carry out emergency patrolling	Lecture	14 Sep. 2015 9 Oct. 2015	11 RAM members
		OJT	15-22 Sep. 2015	11 RAM members
	A1-3 How to process geo-tagged photographs	Lecture	15 Sep. 2015	11 RAM members
OJT		16-22 Sep., 2015	11 RAM members	
A2 Visual inspection (Periodic inspection)	A2-1: Revision of Visual inspection	Lecture	15,20,22 Jun. 2016	13 RAM members
	A2-2: Visual Inspection using mobile system	Lecture	17,23 Feb. 2016 8 Mar. 2016 8 Apr. 2016	11 RAM members
		OJT	3 Feb.2016 20 Mar. 2016	11 RAM members
A3 Scheduled inspection	A3-1: Introduction of inspection vehicle	Lecture	20 Aug.2015	11 RAM members
	A3-2 Revision of visual inspection	Lecture	15 Oct. 2016	12 RAM members
	A3-3 Training for operation of PCSV and analysis of the data.	Lecture	1 st Feb. 2017 – 13 th Feb. 2017 (9days)	20-25 RAM members (Morning)
	A3-4 Training for operation of PCSV and analysis of the data (Field work).	OJT	1 st Feb. 2017 – 13 th Feb. 2017 (9days)	20-25 RAM members (Afternoon)
B: Training for Activity 2-3 : Develop and Update the Road Inventory (database) of AACRA				
B1 Restructuring of road network	B1-1 Concept of revised road network system (road numbering)	Lecture	29 Oct. 2015	10 RAM Member
	B1-2 Setup of road network inventory	Lecture	16 Dec. 2015	10 RAM members
		OJT	16-27 Dec. 2015	10 RAM members
C Training for Activity 2-4 and 2-5: Prepare and revise short / medium / long term road maintenance plan				
C1 Road priority and service level	C1-1: Road priority and service level for AACRA	Lecture	19 May. 2016	11 RAM members
C2 Road Management System–Kyoto Model	C2-1: Introduction of Kyoto model	Lecture	20 Aug. 2015 11 Aug. 2016	11 RAM members
C4 Annual Maintenance Planning	C4-1 Annual Maintenance Planning	Lecture	11 Sep.2015 19 May 2016	3 RAM members
		OJT	6 May 2016	6 RAM members
D Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification				
D-1 Type of deterioration of pavement	D1-1 Type of damage maintenance	Lecture	2 Aug 2016 9 Aug. 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member

Training Courses		Style	Date	Participants no.
	D1-2 Repair method of Damage (construction method)	Lecture	19 Aug 2016	5 Member of RAM, 1 RTD, 1 C&M Member
D-2 Repair Method	D2-1 Selection of Repair Method	Lecture	15 Sep. 2016	In the 3rd JCC
D-3 Structural Instrument	D3-1 Selection of inspection instrument	Lecture	15 Sep. 2016	In the 3rd JCC
E Training for Activity 3-1: Selection of Pilot Location of Pilot Project				
E-1 Selection of Site	E1-1 Joint Site Investigation	OJT	28 Oct. 2016	2 from Construction, 2 from RAM
E-2 Repair Method	E2-1 Crack sealing and Safety Measures	OJT	23 Nov. 2016	Engineers and Site supervisors
			24 Nov. 2016	
	25 Nov. 2016			
	28 Nov. 2016			
	29 Nov. 2016			
	2 Dec. 2016			
	3 Dec. 2016			
	30 Nov. 2016			
	E2-3 Overlay		1 Dec. 2016	

(5) ACTIVITY 1-5: Share Information of road condition in the City with Road Funds Agency and the City Administrations to request budget for road maintenance

At the 1st TAC, JICA Team and Counterparts developed a draft internal communication system among RAM, C&M, and RTD. JICA Team will continue to study on communication system between RAM and C&M, as well as external parties concerned such as City Council of Addis Ababa and Road Fund Agency.

(6) ACTIVITY 1-6: Promote Public Relations

At the 1st TAC, on purpose to promote understanding of public, professional and relevant authorities of the Project and importance of road maintenance, JICA Team presented Public Relation Policy as 1) use variety of media to deliver messages to wider public, 2) establish bidirectional communication, and 3) conduct maintenance activities with public participation. In June 2016, under Activity 2 which focuses on Conducting Road Inspection, JICA Team prepared a leaflet for road inspection team that will help them explain their field activity to the community around their area of assignment.



Figure 2 Activity 2 Flyer

1-2-3 ACTIVITIES FOR OUTPUT 2: The Process for Formulating Road Maintenance Plans is Established

(1) ACTIVITY 2-1: Review/Revise Road Maintenance Cycle of AACRA, Compile the PDCA Checklist and Revise the Checklist If Necessary

1) Review and Findings of Current Road Maintenance Cycle

Since August 2015, JICA Team have been reviewing the existing road maintenance cycle and the workflow of AACRA jointly with the Counterparts through interviews and lectures.

2) Ideal and Feasible Road Maintenance Cycle Framework

Based on the review, a series of discussions and lectures with AACRA, JICA Team formulated the Ideal Road Maintenance Cycle (version 1) adopting PDCA cycle and incorporating Road Maintenance

Management System, Pavement Condition Survey Vehicle, Visual Inspection Supporting System which are procured to AACRA through the Project. The version will be updated through the project progress and continuous discussions with Counterparts.

3) PDCA Checklist

In order to monitor road maintenance works is implemented properly based on the PDCA cycle by AACRA and to examine further improvements, JICA Team with AACRA had developed the PDCA checklist (version 1) containing check items and evaluation indexes. The checklist was presented at the 2nd JCC, and will be updated as required according to the future discussions.

(2) ACTIVITY 2-2: Conduct Road Inspection in the City

1) Review and Challenges of Road Inspection

On August 12, 2015, JICA Team conducted a field survey to understand issues and problems on periodic inspection and data management and found that road inspection and data collection have been conducted insufficiently to be used for decision of maintenance implementation. Findings were reported at the 1st TAC.

2) Hierarchical Inspection Scheme

At the 1st TAC, JICA Team presented a draft Hierarchical Inspection Scheme of a) Visual inspection with Smartphone, b) Automatic Inspection using pavement inspection vehicles, c) Structural Investigation. The proposal has been approved by Counterparts.

Table 8 Hierarchical Inspection Scheme (draft)

Scheme		Measurement	Equipment	Target road	Inspection time	Frequency	Remark
Visual inspection	Periodic Inspection	Pothole, rutting, cracking, ravelling	Smartphone	Approx. 200 km (3.3 km/day)	Dec. – Mar.	As needed	Determine damage indicator, identify section for structural investigation
	Emergency Patrol & Inspection	Pothole, Major damage	Smartphone	scheduled	Sep.-Nov.	As needed	Identify light maintenance roads.
Automatic Inspection		IRI	Pavement Condition Survey Vehicle	All strategic and scheduled road. Approx. 500 km (50 km/day)	Nov.-Jan.	Scheduled	Identify roads to be visually inspected.
Structural Investigation		Structural defect	Structural investigation instruments	Depends on the result of inspection	Apr. – Jun.	Scheduled	Determine repair method

3) Development of Visual Inspection Supporting System

a. Development of the System

At the 1st JCC, JICA Team confirmed the needs of inspection support in order to respond efficiently to public demand on road maintenance. Thus JICA added the procurement and development of Visual Inspection Supporting System into the project activity under the amended contract in January 2016. The system is composed of a) Field Reporting System and b) Visual Inspection Data Management Systems. The proposed functions of the system were presented and 5 smartphones have been procured and handed over to Counterparts at the 2nd JCC. JICA Team has installed ArcGIS to the desktop set up

the Project office and developed Visual Inspection Supporting System (version 1) in April 2016. The system will be upgraded and customized as required to apply demands of AACRA.

b. Update of the System

JICA Team conducted a field survey to monitor actual pavement distress data collection activities and data management using the system. Some shortcomings were noted such as lack of safety measures, inadequate use of scales. Moreover, comments to improve Field Reporting System and interfaces of Visual Inspection Data Management Systems (ArcGIS database) were proposed and approved by RAM for action. In addition, pavement distresses common to Addis Ababa were closely looked at and grouping of distresses carried out to improve distress identification. This has resulted in more customized inspection system and review of the Field Reporter application interface in to version 2, currently under development.

4) Visual Inspection

a. Periodic Inspection

Inspection (paper based)

RAM organized two teams of four staff, each to conduct visual inspection. The inspection started in November 2015 and completed in May 2016. Within this period about 247 km of Roads (PAS, SAS, and RR) were inspected (of which 97% of roads is identified as Strategic) based on the new road numbering. It was learned that actual rate of inspection is 3.3 Km/day by two teams which is lesser than planned rate of 5 km/day. As confirmed also in the 2nd JCC meeting, the minimum section of road inspected is 100 m length. Data collected on papers is now input to Excel-based database. Due to the restructure of the AACRA organization announced in Nov. 2016, RAM has been obliged to decentralize its organization and , therefore, team member of inspection may be revised.

Inspection using Visual Inspection Supporting System

From April 2016, RAM data collectors were trained on the job in how to utilize Visual Inspection Supporting System to collect data. Currently, the system is being used to collect data. Compared to the previous visual data collection process, this smartphone based system offers several advantages in terms of speed, accuracy, clarity, safety, error-minimization, and objective rather than subjective data collection.

b. Emergency Patrol and Inspection

At the 1st JCC, issue was raised on reduction of service level due to many potholes after rainy season, and at the 2nd TAC, JICA Team introduced Emergency Patrol to detect significant pavement damage in the city for emergency recovering, especially after rainy season, and the methodology was approved. Following the meeting, RAM has carried out emergency patrols to collect basic information such as taking photos of section requires detailed inspection, and accordingly C&M has conducted emergency recovery repairs. Proposed methodology of emergency patrol is as follows. Currently RAM is conducting Emergency Patrol from mid-August 2016.

Table 9 Proposed Emergency Patrol Methodology

Item	Description
Period	Heavy rainy season (Jul – Sep) and through the year
Team	2 data collector with 1 vehicle per team or more
Expected pace	30 km/day-team (3 teams for 1 months for paved)
Target damage	Significant damages which degrade the minimum service level (e.g. pothole in centre of carriageway)
Objective road	All paved road from higher hierarchy sections
Outputs	Location of the damages from Field Reporter Application which includes Photos (Both distant and close-up views), and data of distresses uploaded to GIS database

5) Automatic Inspection

a. Automatic Inspection

Data items to be collected by Pavement Condition Survey Vehicle were presented at the 1st TAC. The PCSV was officially handed over to AACRA from JICA on 31st January, 2017. The equipment to be installed into the Pavement Condition Survey Vehicle (PCSV) was arrived at Vole Airport on 15th November, 2016 and it was delivered to AACRA on 16th January, 2017 after custom clearance. Assembly was carried out from 23 Jan. to 26 Jan., 2017 and the PCSV was officially handed over to AACRA from JICA on 31st January, 2017. The inspection was started from February 14, 2017 after 2 weeks for trial usage and training for vehicle operation conducted by JICA Team. will be conducted when the pavement condition survey vehicle is fully equipped. As mentioned previously, the procurement of the equipment for PCSV is delayed one year from original plan which was explained in the 1st JCC. How to cope with the delay is the most important issue of the Project.

b. Preparation of Road Inspection and Data Processing Manual for Pavement Condition Survey

To be described as the Project progresses.

6) Structural Investigation

In the 3rd JCC (Sep. 2016), JICA Team introduced list of prospective instruments and proposed Dynamic Cone Penetrometer (hereinafter called DCP) among then as the instrument to be selected and this proposal was approved by JCC. Based on the further consideration, however, the addition of an Asphalt Core Cutting Machine is recommended by JICA Team and the revised list of equipment (2 DCP and one Core Cutting Machine) has to be approved by 4th JCC.

(3) ACTIVITY 2-3: Develop and Update Road Inventory (database) of AACRA, including road condition, traffic volume, and unit costs, etc.

1) Review of Road Inventory Data

JICA Team reviewed existing road inventory data and found that AACRA manages road network data as Master Plan Road Network Data in Microsoft Excel format and updates annually. Network Data is composed from mainly seven data items of Road No, Road Name, Type, Width, Length, Carriageway Type, and Others. Through the review and discussions with Counterparts, challenges for road inventory database have been identified as lack of connectivity between inventory table and road network map, random road numbering, unclear definition of road section, and inconsistent direction from start to end point.

2) Updating of Road Inventory Database System

a. Methodology to Update Road Inventory Database

JICA Team, through discussions with RAM, developed the steps for restructuring the existing inventory data to meet the actual needs of AACRA. The proposal was approved at the 2nd TAC.

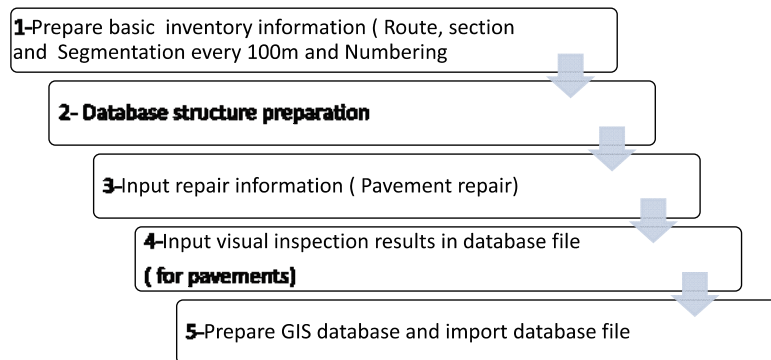


Figure 3 Database Setup Process

b. Step 1: Prepare Basic Inventory Information

Based on the findings, JICA Team has proposed following upgrading of the road network system including road classification and road numbering system, which will be the basis of road inventory database. The proposal has been approved, and based on the agreed road network system, the road inventory database will be developed.

Road Classification

At the 1st TAC, insufficiency of current road classes SAS, PAS, RR and Collector Streets (hereinafter referred as CS) to prioritise roads for road maintenance works were discussed. At the 2nd TAC, Counterparts pointed out a problem on the limitation of road maintenance budget, needs of clarifying sites for road inspection and repair construction works, and conducting works at a concentrated area. Based on these meetings, at the 2nd TAC, JICA Team proposed five road classification of a) Strategic roads, b) Major Arterial, c) Sub Arterial, d) Collector Streets, and e) Local Streets, which weigh higher prioritization to strategic roads.

Hierarchical Road Numbering Structure

At the 3rd TAC, JICA Team proposed Hierarchical Road Numbering Structure. The issue on the location of Network Centre was also discussed and agreed that Leghar (Train Station) to be the Road Network Centre following consultation with Addis Ababa City Planning Project Office on March 7, 2016, and the same was approved on the 3rd TAC in June 2016.

a. Step 2: Road Inventory (Database) Structure Preparation

Database is structured by identifying each road in 3 main categories of 1) Road ID consisting 10 items (Existing status, Road class, Route, Direction, Section, Segment number, Length of the segment, Old road no, strategic road, road/street name), 2) Start and end point of road, and 3) Junction type. The structure was presented at the 2nd TAC and approved. From November 2015, restructuring of road inventory of AACRA has been started by the lead of RAM defining data items (e.g. road numbering, road naming, and setting start/end points).

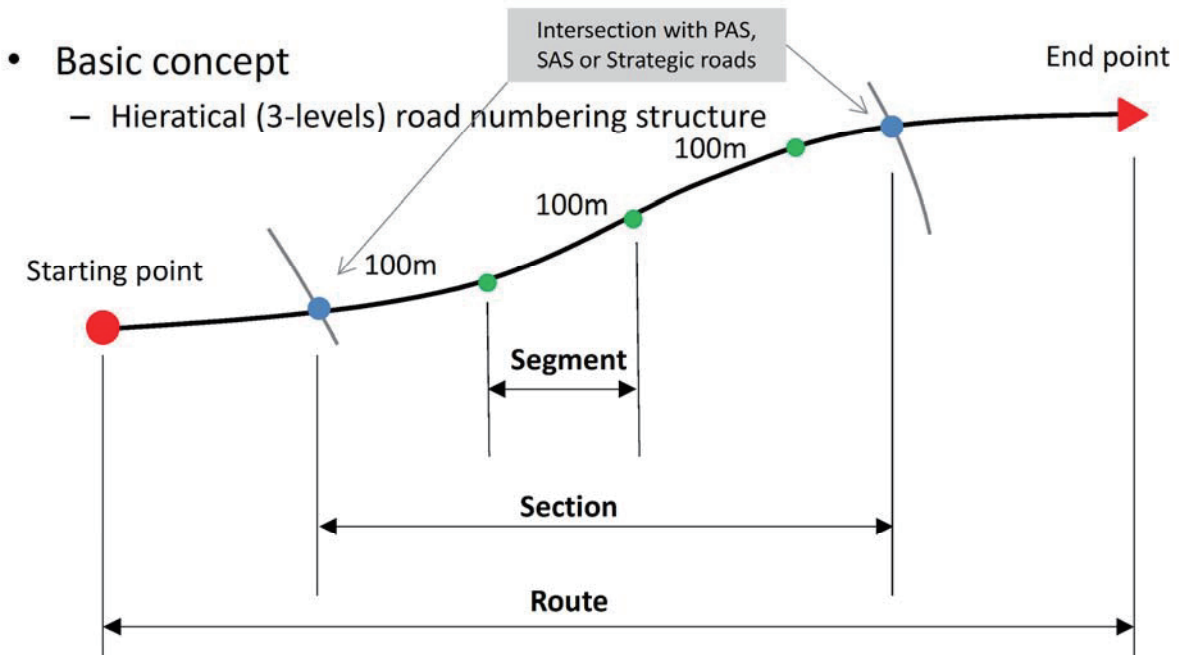


Figure 4 Hierarchical Road Numbering Structure

Road ID										Name of Start/End points for Sections		Junction Type	
Status	Road Class	Route	Direction	Section	Segment	Length (m)	Road No. (Old)	Strategic Road	Road/Street Name	Start of section (Jct Name)	End of section (Jct Name)	Start (Jct.Type)	End (Jct.Type)
Existing	SAS1	S001	Down	1	1	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ
Existing	SAS1	S001	Down	1	2	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ

Figure 5 Database Structure

b. Step 3: Input Repair Information

After the completion of the above inventory data, repair history and result of periodic inspection data will be inputted to the database. Due to the absence of repair history, available data since the date of commencing data input was inputted. Inspection data on pavement damage and update of inventory were inputted using data recorded on inspection sheet in June 2016.

c. Step 4: Input Visual Inspection Results

Inputting data of asphalt roads in order of Strategic Roads > Major Arterial > Sub Arterial conducted and completed in June 2016. The database created includes about 462 km of road length consisting PAS, SAS and RR class roads. Table 10 below shows length of each class of road in the inventory and corresponding length of road visually inspected by RAM from November 2015 to May 2016. As for the results of road inspection from Nov. 2016 to May, 2017 (dry season) will be reported in due course.

Table 10 Inspected Road Length (m) from Inventory Database

Road Classification	Existing road length in database (m)	Road length inspected visually (m)
RR	36,946	36,946
PAS	280,203	181,796
SAS	144,910	54,068
Total	462,059	272,810

d. Step 5: Prepare GIS Database and Import Database File

Route and sections identification from the AutoCAD road network and corresponding Excel inventory data preparation were completed for RR, PAS and SAS class roads in June 2016. Based on these data, maps of roads subdivided into route, section and 100 m length segments, as mentioned previously, have been set up and Excel inventory data imported in to GIS database. Functionality of the system is being checked prior to starting importing relevant data.

3) Methodology for Selection of Emphasis Management Road Segments and Structural Examination Segments

To be added as the Project progresses.

4) Traffic Volume

It is found that no data for the traffic volume have been collected in AACRA and, therefore, the priority of road repair for maintenance plan has to be decided without traffic volume.

(4) ACTIVITY 2-4: Prepare and Revise Mid and Long Term Road Maintenance Plan based on the above Inventory Data

1) Review of Existing Road Management System

JICA Team has reviewed existing Road Management System (RMS) installed in 2003 by SMEC International Private Ltd. Consulting company, and it was found that the system is not functioning due to 1) turnover of trained staff, 2) complexity of the system, 3) needs of vast data to input requiring a huge amount of manpower.

2) Framework of Road Management System

According to the revision of Contract (Jan., 2016) JICA Team procured ArcGIS (COTS System) which is the base system of Road Maintenance Management System (hereinafter called RMMS). Based on the ArcGIS, JICA Team will develop RMMS (Bespoke System) which meets the needs of AACRA. The prototype of RMMS will be completed within three to four months after the data collection has started through Pavement Condition Survey Vehicle. At the 3rd TAC, JICA Team has introduced to counterpart and agreed on the system requirements and system functions in association with relevant technologies, and Bespoke System with stochastic deterioration model comparing to the COTS system in its advantage on adoptability to requirements, institutionalization, customizability, cost, and upgradability.

3) Formulation of Mid/Long Term Road Maintenance Management Plan

a. Definition and Type of Maintenance Plan

It was expected that the definition and type of Maintenance plans would be proposed by JICA Team and discussed with Counterparts in early 2017, however, it should be postponed till Aug., 2017 after examination of the result of trial road conditioning survey by the Vehicle.

b. Methodology for formulating Road Maintenance Management Plan

Approach of maintenance planning has been presented and agreed at the 4th TAC.

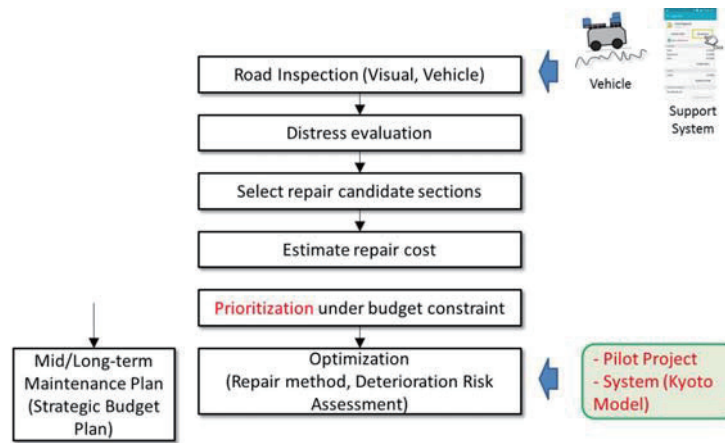


Figure 6 Approach of Mid / Long term Maintenance Planning

c. Formulation of Mid/Long Term Road Maintenance Management Plan

It was planned that the first Mid/Long Term Road Maintenance Plan would be drafted by the end of second year of the project term, however, due to the delay of the supply of the Pavement Condition Survey Vehicle it is obliged to postpone until the end of third year of the project term.

4) Preparation of Manual and Guideline on Road Maintenance Management System

To be added as the Project progresses.

(5) ACTIVITY 2-5: Prepare Annual Road Maintenance Plan

1) Methodology for preparing Annual Maintenance Planning

During the 4th TAC meeting in July 2016, JICA team presented the preparation procedure of Annual Maintenance Plan following the approach consisting of steps 1 to 6 and agreed.

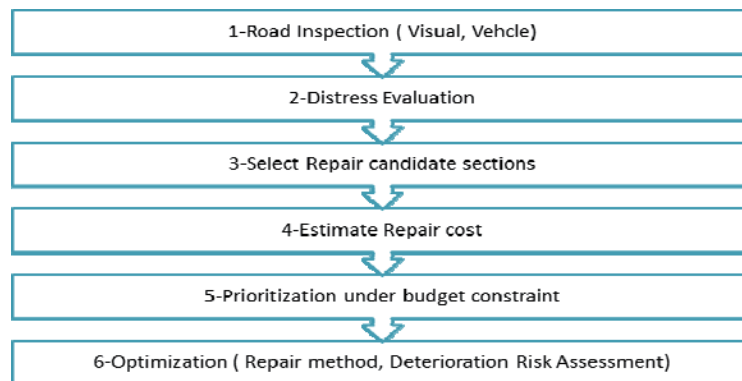


Figure 7 Procedure for Annual Maintenance planning

2) Step 1: Road Inspection : to be referred to Activity 2-2 and 2-3

3) Step 2: Distress Evaluation

Evaluation process (draft) as shown below has been developed to 1) Categorise the distress, 2) Develop Distress Indicators (draft) and 3) Evaluate the range of distress. The process was presented and agreed at the 3rd TAC. The preliminary distresses evaluation on road inspection data collected until May 2016 was conducted in June 2016.

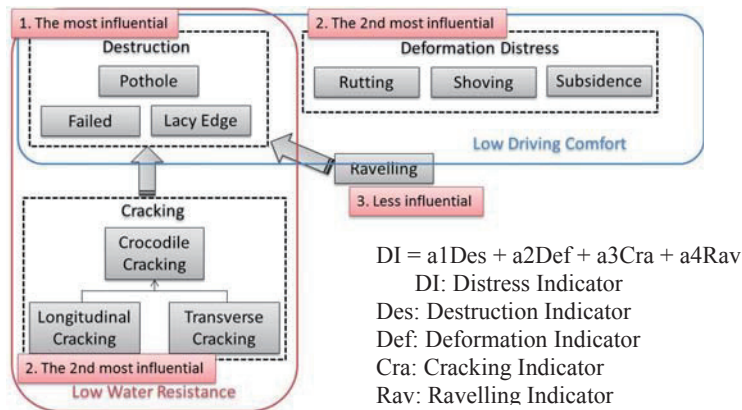


Figure 8 Distress Evaluation Process (DRAFT)

4) Step 3; Selection of Candidate Repair Section

Two prioritization methods on selection of routes for repair has been presented at the 4th TAC. One idea is to prioritize routes for repair by Weighted Indexes which consider Traffic volume, accessibility to primary destinations, road class (RR, SAS, PAS, Strategic road) and others. The other is prioritization by Risk Matrix considers risk likelihood (damage level) and Road class to categorize sections by percentile as shown in the figure below. The discussion is still ongoing.

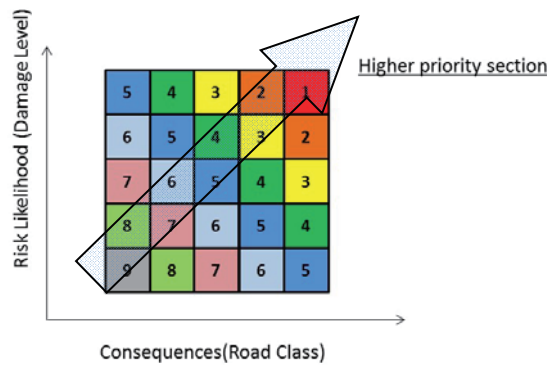


Figure 9 Prioritization by Risk Matrix (Draft)

5) Step 4; Estimate Repair Cost

Repair cost estimation will be updated based on the unit rate obtained from the implementation of Pilot Projects.

6) Formulation of Annual Road Maintenance Management Plan

It was planned that the 2nd year Annual Road Maintenance Plan would be prepared in the period from June and July, 2016 based on the data obtained from the trial operation of Pavement Condition Survey Vehicle, however, due to the delay of the supply of Vehicle, the first Annual Road Maintenance Plan will be prepared in the period from June and July, 2017. Mid/Long Term Road Maintenance Plan will be prepared during the period from December, 2017 to April, 2018 based on the results of first full-scale road condition survey by the Vehicle scheduled from Oct., 2017 to January, 2018.

1-2-4 ACTIVITIES FOR OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are Improved

(1) ACTIVITY 3-1: Select Pilot Projects for Maintenance Work based on the Annual Road

Maintenance Plan formulated under the Project

1) Site Survey

On October 13, 2015, JICA Team conducted a field survey to understand issues and problems on road maintenance works. The major findings are: 1) Quality of cold mix asphalt was questionable, 2) the same maintenance work (overlay) has been carried out at some places every year (structural improvement is required), 3) Surface cutting method was not employed in the pothole repair.

2) Select Pilot Project

Algorithm for Repair Work Selection has been presented at the 4th TAC. The policy for the selection of the first pilot project was presented and discussed at the 3rd JCC (refer to the handout of the 3rd JCC). Based on the discussion made in 3rd JCC, JICA Team prepared the first version of Implementation Plan of First Pilot Project on 28 Sep., 2016 (Revised on 1 Nov., 2016) and discussed with C&M and RAM. The joint site inspection for the first pilot project was carried out on 28 Oct., 2016 among JICA Team, C&M and RAM and following 4 (four) locations were selected as the first pilot project.

1. Road No. 69 PAS4 (New No. P002, S-14, S-1): Pothole, Crocodile Crack and Delamination (Raveling)
2. Road No.4 PAS3 (New No. P002, S-4, S-3) Pothole and Line Crack
3. Road No.4 PAS3 (New No. 002, S-1, S-3) Pothole and Line Crack
4. Road No.76 PAS3 (New No. P001, S-12, S-3) Pothole and Damaged Edge

As an example, the sketch of the damage of location No.1 is shown in Figure 10.

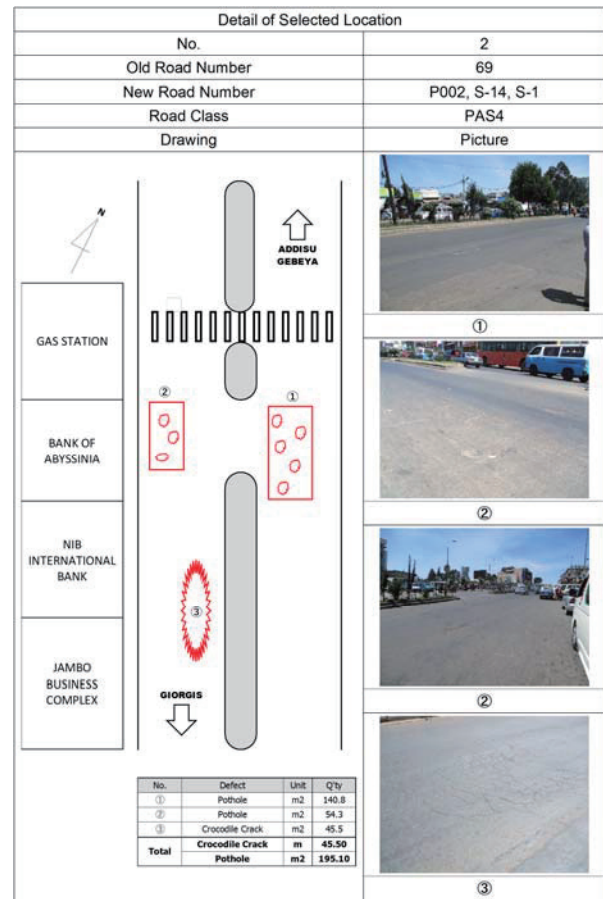


Figure 10 Sketch of Location No.1

(2) ACTIVITY 3-2: Share information of Pilot Project between/within Road Asset Management Process and Construction and Maintenance Process

After the pilot project is selected, information such as site location, work method, work volume, necessary equipment and material, man power and work schedule were shared with relevant units of AACRA which are RAM, RTD, Quality Control Support Sub process (laboratory), C&M (construction, machinery, and asphalt plant). Crack sealing work for all 4 locations has been started on 23 November, 2016. The work for the Pilot Project was suddenly suspended on 29 November, 2016 by senior

management of AACRA because higher priority was given to the road near AU of which conference is expected soon. The work for Pilot project will be re-started in late January, 2017.

(3) ACTIVITY 3-3: Conduct the detailed Investigation and Design Specification of the Pilot Projects

The first pilot project does not require detailed investigation and design. This activity will be carried out during the second pilot project.

(4) ACTIVITY 3-4: Assist AACRA to execute Implementing Pilot Project

Construction plan was prepared by JICA Team and AACRA staff, and implemented by AACRA staff. In order to improve the capacity on road maintenance, technical transfer has been carried out. So far, 5 Lectures and 10 OJT were held. Advice for the equipment which AACRA has to own in the near future in order to carry out proper and effective repair work is strongly requested to JICA Team by AACRA .

(5) ACTIVITY 3-5: Feedback Achievements and Experience of Pilot Projects into the Next Annual Road Maintenance Plan

Work methods of pilot project will be utilised for annual maintenance planning prepared by asset management unit. To be described as the Project progresses.

(6) ACTIVITY 3-6: Organize Workshop/Seminar of Pilot Project for ERA and Road Agencies at Regional and Municipal Level

To be described as the Project progresses.

1-2-5 TECHNICAL OUTPUT

Following technical outputs are planned to be developed under the Project and submitted at the end of the project term.

Table 11 List of Technical Output

	Output	Status	Note
1	Medium/Long Term Road Maintenance Plan		To be drafted by the end of third year of the project (1 year postponed due to the delayed supply of Survey Vehicle.)
2	Annual Road Maintenance Plan		To be prepared prior to the draft of Mid/Long Term Road Maintenance Plan
3	Road Maintenance Management System		
4	PDCA Checklist	Version 1 is prepared at February 2016	
5	Manual and Guideline on Road Maintenance Management System		To be develop at the 3rd year (July 2017-June 2018)
6	Updated Existing Standard, Specification, Manuals		To be prepared as required
7	Training Materials	On going	To be prepared as required

1-3 ACHIEVEMENT OF THE OUTPUTS

(1) OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is improved.

Verifiable Indicator	Achievement Level
1-1 Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 2017.	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussion are required.
1-2 Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August 2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily.	In Progress: Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for external communication and further strengthening of institution.
1-3 More than XX% of the requested budget on the basis of Annual Road Maintenance Plan is allocated from the 3rd project year.	In Progress: Baseline data is yet to be obtained
1-4 Trainings on road maintenance is conducted targeting AACRA staff	In Progress: As of January 2017, 23 lectures and 15 OJTs, and 1 st training in Japan was conducted.
1-5 Public understanding and cooperation on road maintenance is enhanced.	In Progress: Leaflet on Activity 2 was prepared and distributed.

(2) OUTPUT 2: The Process for Formulating Road Maintenance Plans is established.

Verifiable Indicator	Achievement Level
2-1 PDCA Checklist is developed by January 2016.	In Progress: Checklist version 1 is developed. Version will be updates as necessary through the operation.
2-2 AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year.	In Progress: Framework for Road Maintenance Management System and planning procedure were agreed. PDCA Checklist (ver.1) is developed. Due to the delayed supply of the Pavement Condition Survey Vehicle, both of the development of RMMS and Mid/Long Term Maintenance Plan are to be delayed accordingly.
2-3 AACRA Annual and Mid/Long term Road Maintenance Plan are formulated in consideration of Life Cycle Cost on Road.	In Progress: Approach and formulation process for road maintenance planning have been agreed.

(3) OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

Verifiable Indicator	Achievement Level
3-1 Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted.	In Progress: 5 lectures and 10 OJT relevant to maintenance skill and knowledge were conducted.
3-2 Number of preventive maintenance works executed are increased through the implementation of the Project.	Concept and importance of Preventive Maintenance should be shared first among all stake holders.

1-4 ACHIEVEMENT OF THE PROJECT PURPOSE

PROJECT PURPOSE: The Management Capacity of AACRA for Road Maintenance is enhanced.

Verifiable Indicator (By 3 months before the completion of the Project,)	Achievement Level
1 AACRA's capacity to secure the budget for road maintenance is enhanced.	In Progress: Baseline data from Addis Ababa City Administration and Road Funds agency is yet to be obtain.
2 Road maintenance works based on PDCA cycle established by the Project are executed by AACRA.	In Progress: PDCA Checklist (ver.1) is developed. Currently operation method in consideration to inspection equipment and maintenance management system is under discussion.
3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in the AACRA Annual Road Maintenance Plan exceeds XX% from the 3rd project year.	In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.

1-5 CHANGES OF RISKS AND ACTIONS FOR MITIGATION

(1) Term July 2015 to August 2015

As per the JICA Risk Management Check List, no risk was observed during the first two months of the Project. Other events and issues that may become a risk to the Project were not recognized during this reporting period.

(2) Term September 2015 to February 2016

As mentioned at “1-1-2 (3) Provision of Machinery and Equipment”, procurement of Pavement Condition Survey Vehicle was expected to delay, Hence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay and JICA Team took necessary actions as mentioned at “2.3 Action to be taken“ including postponing experts assignment.

(3) Term March 2016 to September 2016

As mentioned at “1-1-2 (3) Provision of Machinery and Equipment”, procurement of Pavement Condition Survey Vehicle is expected to further delay. The vehicle has arrived in April 2016, however equipment to be fitted into the vehicle is expected to arrive in December 2016 and able to use in the Project from February 2017. This delay is expected to impact on the progress of procurement (Development) of Maintenance Management System, and Activity 1-4, 2-2, 2-3, 2-4, and 2-5.

(4) Term October 2016 to January 2017

The Pavement Condition Survey Vehicle was delivered to AACRA on 16 January, 2017 around one year delay from the original schedule. Due to this delay, re-scheduling of the relevant activities and necessary measures to achieve the outputs required in the PDM including extension of overall project period have been proposed by JICA Team.

1-6 PROGRESS OF ACTIONS UNDERTAKEN BY JICA

After the amendment of contract was signed between JICA and JICA Team in January 2016, with a great effort by JICA Ethiopia, Pavement Condition Survey Vehicle has been procured in April 2016, however, the equipment to be installed into the Vehicle has just delivered to AACRA on 16 January, 2017 around 1 year delay from the original schedule. JICA is under consideration for the extension of the term of Project for further 10 months which has been proposed by JICA Team.

1-7 PROGRESS OF ACTIONS UNDERTAKEN BY GOV. OF ETHIOPIA

Thanks to the good cooperation and enthusiasm of Counterparts to the project, activities runs very smoothly and efficiently so far. Continuous involvement and support of Counterparts is very much appreciated for successful technical transfer of project output. Due to the re-structure of the AACRA announced in November, 2016, however, it is JICA Team's concern that some confusion may occur in each department and it will take time to return to the same service level as the level before the re-structuring.

1-8 OTHER REMARKABLE/CONSIDERABLE ISSUES RELATED/AFFECT TO THE PROJECT

(Such as other JICA's projects, activities of Counterparts, other donors, private sectors, NGOs, etc.)

AACRA now has a project called "Consultancy service for the study of permanent naming and code of road and transport infrastructure assets of Addis Ababa" which is an asset management study project with a period of service of 5 months (Feb – Jun. 2016). Objective of the consultancy include but not limited to developing permanent names and codes for identified transport infrastructures in Addis Ababa. This project is initiated by Addis Ababa Transport Program and Monitoring Office (TPMO) under World Bank fund. RAM of AACRA has informed current numbering of Roads established by JICA Team to the concerned consultancy group.

JICA Ethiopia advised JICA Team in Aug. 2016 to hold a seminar for introducing this Project to other stakeholders including ERA, RF, WB and Universities. JICA Team has basicall agreed and proposed to invite Professor Kobayashi, Kyoto Unibersist, to the seminar as the key lectuturer who is the leader in the development of 'Kyoto Model' which is the base frame of the RMMS to be developed. In order to obtain a formal approval on the seminar from JICA, JICA Team will submit proposal officially to JICA.

2. DELAY OF WORK SCHEDULE AND/OR PROBLEMS (IF ANY)

2-1 DETAIL

(1) Term July 2015 to August 2015

No delay was observed during the first two months of the Project and the 1st JCC was held on 17th August 2015 as planned by JICA experts.

(2) Term September 2015 to February 2016

Procurement of Pavement Condition Survey Vehicle was under the progress, and expected to be delivered in September 2016 as the earliest. This was nine months delay from the original schedule, and as consequence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay.

(3) Term March 2016 to September 2016

Procurement of equipment for Pavement Condition Survey Vehicle is under the progress, and currently will be delivered in December 2016 as the earliest, and be able to use for survey from February 2017 as earliest. This is 12 months delay from the original schedule, and as consequence, Procurement (Development) of Maintenance Management System and Activity 2-2, 2-3, 2-4, and 2-5 are expected to be further delay.

(4) Term Oct 2016 to January 2017

As mentioned previously, the Pavement Condition Survey Vehicle was delivered to AACRA on 16 January, 2017 around one year delay from the original schedule. Activities affected by the delay of Pavement Condition Survey Vehicle and the impact on the overall Project which will be caused by these activities' delay are summarized below.

Table 12 Effects on Activities and Impact on Project due to Vehicle's Delay

Act. No.	Activity	Effect by Delayed Vehicle	Impact on Project
1-4 (1)	Training for Inspection	Training Period for Vehicle shortened	Number of trained AACRA staff for vehicle decreased
1-4 (2)	Develop and Update thr Database in AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update impossible Number of trained AACRA staff decreased
1-4 (3)	Prepare and revise short /medium/.long term maintenance plan	Number of times for mid/long term m. plan is reduced from 2 to 1	Full-scale update impossible No revision of of midium/long term maintenance plan
2-2	Conduct road inspection	Number of times for full-scale data collection is reduced from 2 to 1	Number of trained AACRA staff and their quality are decreased
2-3	Develop and update Database of AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update is impossible
2-4	Prepare and revise mid/long term M. plan	Number of times for full-scale data collection is reduced from 2 to 1	It is not possible to revise mid/long term M. plan..
2-5	Prepare annual road M. plan	The first plan is delayed from June-July, 2016 to June-July, 2017	No serious impact will be expected.

In order to achieve output, to a maximum extent, required in the PDM, the JICA Team has rescheduled the relevant activities affected by the delay of Vehicle supply and has proposed JICA to extend the term of Project for further 10 (ten) months.

2-2 CAUSE

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

Due to need of amendment of contract for changing procurement owner of Pavement Condition Survey Vehicle to JICA, actual procedure has been delayed.

(3) Term March 2016 to September 2016

Since the change on procurement owner in January 2016 as described in at “1-1-2 (3) Provision of Machinery and Equipment”, there was a further delay on procurement procedure for equipment for Pavement Condition Survey Vehicle at JICA headquarter. Tender notice was published in June 2016, tender was hold in July 2016, a contractor was selected in August 2016 and contracted with JICA headquarter.

(4) Term October 2016 to March 2017

After manufacturing and shipping, the equipment for Pavement Condition Survey Vehicle arrived at Bole Airport , Addis Ababa, on 15 Nov. 2016 and was delivered to AACRA on 16 January 2017 after 2 months costum clearance. On 31st January 2017, the Pavement Condition Survey Vehicle was officially handed over to AACRA from JICA. Ahter 2 weeks training for trial usage and data analysis of the PCSV, the data collection was started by AACRA staff. Total delay in the equipment procurement from the original plan was 13 months.

2-3 ACTION TO BE TAKEN

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

JICA Headquarter preceded the procurement of Pavement Condition Survey Vehicle as a priority issue, so that the vehicle could arrive as earliest as possible to conduct activities proposed under the Project. Meanwhile, JICA Team provided necessary support for procurement as required, at the same time, conducted following actions; 1) Reschedule assignment of JICA experts, considering the feasible delivery schedule of the Pavement Condition Survey Vehicle, 2) Provide training on relevant activities, 3) Develop Road Maintenance Management System using existing data, and 4) Formulate plans not requiring Pavement Condition Survey Vehicle.

(3) Term March 2016 to September 2016

The selected contractor is currently proceeding the procurement of equipment for Pavement Condition Survey Vehicle and JICA headquarter is providing the necessary supports for smooth delivery of

procedure. At the same time, JICA Team is currently discussing the potential solution to make up this delay affecting data collection and resulting data quality requiring for road maintenance planning.

(4) Term October 2016 to January 2017

As described in 2-1 (4), several activities are affected by the delay of the Pavement Condition Survey Vehicle. Since the seasonal constraint, namely no field work in the rainy season, exists in Addis Ababa, to extend the term of Project is the sole solution in order to carry out all activities as planned, and JICA Team has started discussion with JICA regarding the possibility of the Project's term extension.

Meanwhile, JICA Team will take following measures in order to recover the delay even if only slightly.

- JICA Team will try to conduct highly concentrated lectures and training
- In order to keep AACRA staff the sense of tension, JICA Experts will decrease the duration of their each stay in Addis Ababa and increase the the number of their visit to Addis Ababa. (The total MM is unchanged.)

2-4 ROLES OF RESPONSIBLE PERSONS/ORGANIZATION (JICA, GOV. OF ETHIOPIA, ETC.)

- Procurement of Pavement Condition Survey Vehicle (Equipment to be assembled): JICA Headquarter
- Procurement of Pavement Condition Survey Vehicle (Vehicle): JICA Ethiopia Office

3. MODIFICATION OF PROJECT IMPLEMENTATION PLAN

3-1 MODIFICATION OF PDM AND PO

(1) Version 1

The Project proposed a modification of PDM from that outlined in R/D (signed in April 2015) to better correspond the circumstances of the Project. This proposal was approved by the 1st JCC on August 17, 2015 and reported to JICA Ethiopia Office and JICA Headquarter at a later date. PO was altered accordingly.

(2) Version 2

PDM was updated for 1) verification indicator, 2) addition of activity “Development of Visual Inspection Supporting System” into Activity 2-2, 3) addition of activity “Develop Road Maintenance Management System” into Activity 2-4, 4) Experts of Japanese side, 5) extra item for provision of machinery and equipment in accordance with the contract amended in January 2016. PO was also altered accordingly. The modification was informed to JICA Ethiopia Office prior to the 2nd JCC, and approved at the 2nd JCC.

(3) Version 3 Draft

After the review of “Objective verifiable indicator” under activity 0-2, modification have been made on “Means of Verification”.

(4) Version 4 Draft

Through the discussion in TAC 5 and agreement made in TAC 6 (January 27 2017; Detailed record of the 6th TAC is to be described in the next Monitoring Sheet Version 5). 80% is inserted into the target value of Objectively Variable Indicators for Project Purpose No. 3. With respect to other target values which have not been inserted any figure, all attendances to TAC 6 agreed that these values should be decided after observation actual figure for a while.

3-2 OTHER MODIFICATIONS ON DETAILED IMPLEMENTATION PLAN

(1) Version 1

No other modification made for version 1.

(2) Version 2

Total experts assignment for Ethiopia has increased 0.5 MM which in total 72.50 MM.

(3) Version 3

No other modification made for version 3.

(4) Version 4

No other modification made for version 4.

4. PREPARATION OF GOV. OF ETHIOPIA TOWARD AFTER COMPLETION OF THE PROJECT

To be added as the Project progresses.

II. PROJECT MONITORING SHEET I & II

See the attached.

Project Monitoring Sheet I (Revision of the Project Design Matrix)

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Version 4a
 Dated Apr.5th, 2017


Implementing Agency: Addis Ababa City Roads Authority (AACRA)

Target Group: Staff of Addis Ababa City Roads Authority (AACRA)

Period of Project: 10/Jul/2015 - 9/Jul/2018

Project Site: Addis Ababa City

Model Site: Pilot project sites are to be determined

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal The roads in Addis Ababa City are maintained in a sustainable way.	Three years after the completion of the Project, 1. XX % of roads under AACRA is below the targeted roughness of YY. 2.The length(km) of road under AACRA inspected by the standardized method is increased by XX % compared to 3 months before the project	1. Road inventory and Inspection Data in Addis Ababa City 2. Road inventory and Inspection Data in Addis Ababa City			
Project Purpose The management capacity of AACRA for road maintenance is enhanced.	By 3 months before the completion of the Project, 1. AACRA's capacity to secure the budget for road maintenance is enhanced. 2. Road maintenance works based on PDCA ¹ cycle established by the Project are executed by AACRA. 3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in AACRA Annual Road Maintenance Plan, exceeds 80% since the 3rd project year.	1. Interview to Addis Ababa City Administration and Road Funds Agency on Baseline and Endline data 2. Evaluation Result by PDCA Checklist 3 Baseline data (Maintenance record 2015-2016 and Road Maintenance Plan), AACRA Annual Road Maintenance Plan, AACRA Maintenance Historical Record	1.Human resources necessary for the road maintenance are continuously assigned by AACRA. 2.Financial resources are allocated by the City Administration and Road Funds Agency in a sustainable manner.	In Progress: Baseline data from Addis Ababa City Administration and Road Funds agency is yet to be obtain. In Progress: PDCA Checklist (ver.1) is developed. Currently operation method in consideration to inspection equipment and maintenance management system is under discussion. In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.	
Outputs 1. The implementation structure of AACRA for road maintenance is improved. 2. The process for formulating road maintenance plans is established. 3. The maintenance skills and knowledge of AACRA technical staff are improved.	1-1. Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 1-2. Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August 2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily. 1-3. More than XX% of the requested budget on the basis of Annual Road Maintenance Plan are allocated since the 3rd project year. 1-4 Trainings on road maintenance is conducted targeting AACRA staff 1-5 Public understanding and cooperation on road maintenance is enhanced. 2-1. PDCA Checklist is developed by January 2016. 2-2. AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year. 2-3.AACRA Annual and Mid/Long term road maintenance plan are formulated in consideration of Life Cycle Cost on Road 3-1. Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted. 3-2. Number of preventive maintenance works executed are increased through the implementation of the project.	1-1. Compiled suggestions, Project meeting record 1-2. The Road Map, Minutes of JCC 1-3.Baseline data(Requested and allocated budget on annual road maintenance plan 2015-2016), AACRA annual report (Budget Plan), AACRA Annual Road Maintenance Plan 1-4. Training Record 1-5. PR outputs 2-1. PDCA checklist, Minutes of JCC 2-2 PDCA Checklist, ACCRA Annual and Mid/Long term road maintenance plan, Road Maintenance Management System 2-3 ACCRA Annual and Mid/Long term road maintenance plan, AACRA Maintenance Historical Record 3-1 Training Record, Report on Pilot Project 3-2.Baseline data(Maintenance record 2015-2016), AACRA Maintenance History Record, AACRA Annual Road Maintenance Plan	The AACRA staff capacitated by the Project continue to work for their respective positions.	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussion are required. In Progress: Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for external communication and further strengthening of institution. In Progress: Baseline data is yet to be obtained In Progress: At of September 2016, 22 lectures and 6 OJTs., 1st training in Japan was conducted In Progress: Leaflet on Activity 2 was prepared and distributed. In Progress: Checklist version 1 is developed. Version will be updates as necessary through the operation. In Progress: Framework for Road Maintenance Management System and planning procedure were agreed. PDCA Checklist(ver.1) is developed. In Progress: Approach and formulation process for road maintenance planning have been agreed. In Progress: 3 trainings relevant to maintenance skill and knowledge were provided.	
Activities	Inputs	Important Assumption			
1-1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement 1-2 Convene Technical Advisory Committee (TAC) 1-3 Prepare a training plan for AACRA Staff 1-4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc. 1-5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance 1-6 Promote public relations (PR) activities on road maintenance in the City 2-1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed 2-2 Conduct road inspections in the City 2-3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc. 2-4 Prepare and revise Medium/Long term Road Maintenance Plan using Road Maintenance Management System developed under the project. 2-5 Prepare Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project. 3-1 Select pilot projects for maintenance works based on the Annual Road Maintenance Plan formulated under the Project 3-2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process 3-3 Conduct the detailed investigations and design specifications of the pilot projects 3-4 Assist AACRA to execute pilot projects 3-5 Feedback achievements and experiences of pilot projects into the next Annual Road Maintenance Plan 3-6 Organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level	The Japanese Side 1. Experts • Chief Advisor/Road Maintenance • Road Maintenance Planning • Road Inspection (Site Survey) • Road Inspection (Database) • Maintenance Management System • Maintenance Design • Construction Supervision • Training Planning • Monitoring • System Development • Others as necessary 2. Training of counterpart personnel, including Project Director and Project Manager, in Japan and/or the Third Countries 3. Provision of machinery and equipment • Inspection Equipment(Pavement Condition Survey Vehicle) • Maintenance Management System • Visual Inspection Supporting System • Structural Investigation Equipment • Others 4. Local expenses for the project activities as necessary	The Ethiopian Side 1. Personnel • Project Director • Project Manager • Counterpart personnel 2. Provision of the project office and facilities necessary for the project implementation 3. Traffic survey and pilot projects in Addis Ababa City 4. Administrative and operational expenses necessary for the project implementation • Electricity, water, communication, etc. • Local traveling costs and daily subsistence allowance (DSA) for counterpart personnel 5. Others as necessary	1. The turnover of AACRA staff does not profoundly affect the project activities. 2. Natural disasters, such as floods, do not profoundly affect the project activities. Pre-Conditions Understanding and cooperation on road maintenance in the City are obtained from the project stakeholders such as the City Administration, Addis Ababa City Road and Transport Bureau, Road Funds Agency, etc.		
				<Issues and countermeasures>	

Project Monitoring Sheet II (Revision of the Plan of Operation)

Version 4A

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Dated 5th Apr. 2017

Inputs	Plan	1st EthFY				2nd EthFY				3rd EthFY				Remarks	Monitoring		
		2015		2016		2017		2018		Issue	Solution						
Expert	Actua	III	IV	I	II	III	IV	I	II	III	IV	I	II	III			
Chief Advisor/Road Maintenance	Plan																
Deputy Chief Advisor/ Road Maintenance/ Maintenance Management System	Actua																
Road Maintenance Plan	Plan																
Road Inspection (Site Survey)	Actua																
Road Inspection (Database)	Plan																
Road Maintenance Design	Actua																
Construction Supervision	Plan																
Training Plan	Actua																
Monitoring	Plan																
System Development	Actua																
Equipment *: to be used for the Project Activities	Plan																
Inspection Equipment (Pavement Condition Survey Vehicle)	Actua																
Structural Investigation Equipment	Plan																
Maintenance Management System	Actua																
Visual Inspection Supporting System	Plan																
Training in Japan	Plan																
Training for Counterpart Personnel	Actua																
In-country/Third country Training	Plan																
Not Appreciable	Actua																

Activities	Plan	2015				2016				2017				2018			Responsibility Organization	Achievements	Issue & Countermeasures
Sub-Activities	Actua	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	Japan	GOE			
Output 1: The implementation structure of AACRA for road maintenance is improved.																			
1.1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	Plan															JICA	AACRA	In progress	
1.2 Convene Technical Advisory Committee (TAC)	Actua															JICA	AACRA	6 TACs conducted	
1.3 Prepare a training plan for AACRA Staff	Plan															JICA	AACRA	Plan has developed and training implementing schedule develop accordingly.	
1.4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.	Actua															JICA	AACRA	23 lectures and 15 OJTs on Act. 2-2, 2-3, 2-4, 2-5, 3-1 and 3-3, 1st training in Japan were conducted.	
1.5 Share information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	Plan															JICA	AACRA	Internal communication flow has been proposed	
1.6 Promote public relations (PR) activities on road maintenance in the City	Actua															JICA	AACRA	Leaflet on Activity 2 was prepared	
Output 2: The process for formulating road maintenance plans is established.																			
2.1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	Plan															JICA	AACRA	Review is in progress, PDCA Checklist (ver.1) is prepared.	
2.2 Conduct road inspections in the City	Actua															JICA	AACRA	Visual Inspection Support System is developed. Visual Inspection have been conducted	Due to delay in procurement of the equipment for inspection vehicle, relevant activities are expected to delay. Provide training, reschedule expert assignment.
2.3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.	Plan															JICA	AACRA	Input of inventory data has been completed	
2.4 Prepare and revise Medium/Long term Road Maintenance Plan based on the above inventory data	Actua															JICA	AACRA	Planning approach has been agreed	
2.5 Prepare Annual Road Maintenance Plan	Plan															JICA	AACRA	Planning procedure has been agreed	
Output 3: The maintenance skills and knowledge of AACRA technical staff are improved.																			
3.1 Select pilot projects for maintenance works from the annual road maintenance plan	Plan															JICA	AACRA	Pilot project will be selected in Sep 2016.	
3.2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process	Actua															JICA	AACRA	Implementation of first pilot project was started in Nov., 2016	
3.3 Conduct the detailed investigations and design specifications of the pilot projects	Plan															JICA	AACRA	First pilot project does not require detail investigation nor design	
3.4 Assist AACRA to execute pilot projects	Actua															JICA	AACRA		
3.5 Feedback achievements and experiences of pilot projects into the next annual road maintenance plan	Plan															JICA	AACRA		
3.6 Organize a workshop/seminar of the pilot projects for ERA and road agencies at regional and municipal level	Actua															JICA	AACRA		
Project Duration / Phasing																			
Plan																			
Actua																			

Monitoring Plan	Plan	2015				2016				2017				2018			Remarks	Issue	Solution
Monitoring	Actua	III	IV	I	II	III	IV	I	II	III	IV	I	II	III					
Joint Coordinating Committee	Plan																		
Set-up the Detailed Plan of Operation	Actua																		
Submission of Monitoring Sheet	Plan																		
Monitoring Mission from Japan	Actua																		
Joint Monitoring	Plan																		
Reports/Documents	Plan																		
Project Work Plan	Actua																		
Project Completion Report	Plan																		
	Actua																		

■ Activities with fixed period
 ■ Activities to be continuously conducted, or with tentative schedule

TO CR of JICA Ethiopia OFFICE

PROJECT MONITORING SHEET**Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City****Version of the Sheet: Version 5 (Term: April 2017 – September 2017)****Name: Mr. Hiroshi Honda****Title: Chief Advisor****Submission Date: 4th October 2017****I. SUMMARY****1. PROGRESS**

The progress that has taken place in this term is as follows;

- 2nd Training in Japan (Activity 0-4)
- 38 Lectures and 18 OJT (Activity 1-4)
- Implement Seminar on the Project for Development of Road Maintenance Capacity of Addis Ababa City (Activity 1-4)
- Procurement of Structural Testing Instrument (Activity 2-2)
- Development of Road Management System(Activity 2-2)

1-1 PROGRESS OF INPUTS**1-1-1 The Japanese Side****(1) Experts**

In accordance with the amended contract agreed in January 2016 between JICA and JICA Team, number of experts has increased into a total 10 experts. Experts have been assigned since July 10, 2015, and at the end of September 2017, all experts have been assigned for a total of 50.07 Man/Month (hereinafter to be called as “MM”) out of the project total assignment of 72.73 MM (assignment in Ethiopia only).

(2) Training of Counterparts Personnel

Under the Project, two trainings in Japan are planned. The first training in Japan was conducted from August 23 to September 6, 2016. The Second training was conducted from August 23, 2017 to September 6, 2017 for 16 days inviting 5 participants from AACRA.

(3) Provision of Machinery and Equipment

At the 1st Joint Coordination Committee meeting (hereinafter called as “JCC”) held on August 17, 2015, specification of Inspection Equipment, which is a Pavement Condition Survey Vehicle (hereinafter called as “PCSV”) was approved by Counterparts.

Under the amended contract with JICA in January 2016, the procurement responsibility changed; 1) PCSV was procured directly by JICA Ethiopia, and equipment was procured by JICA headquarter. The rest of machinery

and equipment were procured by JICA Team which are; 2) Structural Testing Instrument, and 3) Maintenance Management System and Visual Inspection Supporting System which are developed through the Project and transferred to Counterparts. At the 2nd Technical Advisory Committee meeting (hereinafter called “TAC”) held on October 27, 2015, JICA Team informed these changes to Counterparts.

So far, procurement of Visual Inspection Supporting System was completed in April 2016. Vehicle for the PCSV arrived in April 2016, and related tax payment and application of number plate completed in May 2016. The rest of equipment fit to be installed on the PCSV was delivered to AACRA on January 16, 2017 after two months of Custom Clearance. The PCSV assembly was completed at the end of January, and the PCSV was handed over to AACRA on 31st January, 2017. The equipment are currently stored at JICA Project office under AACRA to secure the equipment during the project.

With regards to the Structural Testing Instrument, Dynamic Cone Penetrometer (hereinafter called DCP) was proposed during the 3rd JCC meeting held on 18th September, 2016 and confirmed by AACRA after the discussions at the 4th JCC meeting. 2 sets of DCP with one Asphalt Core Cutter was procured by the end of June 2017 from Japan and arrived Addis Ababa on the 22nd July. After Customs clearance (completed on July 31st, 2017), it was delivered to AACRA in August 2017.

Table 1 List of Equipment and Machinery to be procured

Equipment and Machinery	Component	Responsible agency for procurement	Original Planned procured date	Expected procured date* (tentative)	Remark
Inspection Equipment (Pavement Condition Survey Vehicle)	<ul style="list-style-type: none"> • 1 Vehicle • Equipment to be fitted on the PCSV 	JICA	Sep. 2016	Vehicle was procured and transferred to AACRA in May 2016. A part of equipment (PCs) are procured in Apr. 2016, and the rest of equipment was delivered in January, 2017. PCSV assembly was completed at the end of January.	Completed on January 31, 2017.
Structural Testing Instrument	<ul style="list-style-type: none"> • 2 set of DCP • 1 set of Asphalt Core Cutter • 1 set of Diesel generator (3kw) 	JICA Team	Jul. 2017	Procurement will be started in Feb., 2017 and instruments delivered to AACRA by the end of July, 2017.	Considering the decentralization of the organization of maintenance office, 2 set of instruments is to be supplied. Actually, DCP and Asphalt cutter provided in August 2017.
Maintenance Management System	<ul style="list-style-type: none"> • 1 set of Desktop Computer • 1 GIS software 	JICA Team	Apr. 2016	Arc GIS was installed in April 2016. The whole system will be delivered to AACRA at least 3 months after the completion of assembly of PCSV (the end of September, 2017).	The full-scale road inspection will be conducted in Oct., 2017.
Visual Inspection Supporting System	<ul style="list-style-type: none"> • 5 set of Smartphone • 1 GIS software 	JICA Team	Mar. 2016	Smartphone was procured in Feb. 2016, and GIS was installed in Apr. 2016.	Completed

Note: “Expected procurement date” means Equipment and Machinery to be used for the project activities.

(4) Local Expenses for the Project Activities

Local expense has been utilized for salary of national staff (Engineer and Accountant), office equipment, rent-a-car, and other consumables so far.

1-1-2 The Ethiopian Side

(1) Personnel

Project Manager was identified under Record of Discussion (hereinafter to be called as “R/D”) and assigned in late August 2015. The rest of counterpart personnel will be selected through the progress of the Project. In November 2015, three personnel for inspection activity have been assigned, and further two more road and transport engineers are assigned in June 2016. In total 11 personnel are assigned as of September 2016.

(2) Furnished Office Space and Facilities

Since the project commencement in July 2015, a project office (Room 318) has been allocated at Addis Ababa City Roads Authority (hereinafter to be called as “AACRA”). Office furniture were installed for eight experts.

(3) Traffic Survey and Pilot Project in Addis Ababa City

Based on the baseline survey, AACRA has not taken any traffic survey data so far. After discussion with AACRA was agreed that the traffic survey will not conducted for the Project activities.

(4) Administrative and Operational Expense

Expense agreed at R/D has been secured and handled by the Ethiopian Side.

1-2 PROGRESS OF ACTIVITIES

The Project activities to achieve the project purpose under Work Plan were agreed at the 1st JCC held on August 17, 2015. The activities described in Project Design Matrix (hereinafter to be called as “PDM”) is summarized in the Table 2 shown below. Progress of each activity is described accordingly in the sections that follow.

Table 2 Outline of Project Activities

PROJECT PURPOSE: The Management capacity of AACRA for road maintenance is enhanced

Outputs	Act no.	Activities
Overall	0-1	Preparation, Updating and Review of Work Plan and Monitoring Sheet
	0-2	Baseline Survey and Performance Indicator
	0-3	JCC and TAC meeting
	0-4	Training in Japan
	0-5	Project Completion Report
Output 1: The implementation structure of AACRA for road maintenance is improved.	1-1	Review Implementation Structure of AACRA, and compile suggestions for the structure improvement
	1-2	Convene TAC
	1-3	Prepare training Plan for AACRA Staff
	1-4	Conduct training for AACRA Staff for road maintenance; road inspection, maintenance planning, maintenance management system, etc.
	1-5	Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance
	1-6	Promote Public Relation activities on road maintenance in the City
Output 2: The Process for formulating road maintenance plans is established	2-1	Review the road maintenance cycle of AACRA, compile PDCA Checklist, and revise the checklist if needed.
	2-2	Conduct Road Inspection in the City
	2-3	Develop and Update the Road Inventory (database) of AACRA, including road condition, traffic volume, nit costs, etc.
	2-4	Prepare and revise Mid and Long Term Road Maintenance Plan using road Maintenance Management System developed under the Project

Outputs	Act no.	Activities
	2-5	Prepare and Revise Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project
Output 3: The Maintenance skills and knowledge of AACRA Technical staff are improved	3-1	Select Pilot Projects for maintenance work based on the Annual Road Maintenance Plan formulated under the Project
	3-2	Share information of Pilot Project between/within Road Asset Management Process and Constructional and maintenance Process
	3-3	Conduct the detailed Investigation and design specification of the pilot projects
	3-4	Assist AACRA to execute Implementing Pilot Project
	3-5	Feedback achievements and experience of pilot projects into the next annual road maintenance plan
	3-6	Organize Workshop/Seminar of Pilot Project for ERA and Road agencies at regional and municipal level

1-2-1 ORGANIZATION STRUCTURE

Due to the reorganization of AACRA announced on 11th November, 2016, restructuring of the each department is underway, therefore, the list of counterpart personnel are revised. The old AACRA structure, new AACRA structure, and AACRA Engineering Stream, Road Asset Management are shown in Appendix. Thus the name of Department.

In this monitoring sheet, name of relevant division will be called using old name for activities up to the end of November 2016, and new names for activities after December 2016. In April 2017 during the 4th JCC, the new structure of AACRA was presented. Key changes or revisions in this new organization can be summarized as follows.

- ♦ 4 Deputy General Directors who are in charge of Engineering Regulatory, Support Service, Engineering Operation and Road Asset Management, are assigned under Director General of AACRA.
- ♦ Decentralization of Road Asset Management Division, dividing into 5 regional offices located in different parts of the city and a Central Data Base Management Department located at the head office of AACRA.

Table 3 Changing name of division related to the Project

Up to November 2016	After December 2016
Road Transportation Construction and Maintenance Core Process (C&M)	Own Force Road Maintenance Directorate (OFRMD)
Road Transport Design Core Process (RTD)	Road Construction Maintenance Design Review and Implementation Directorate (CMDRID)
Road Asset Registration Maintenance Planning Sub Process (RAM)	Road Asset Management and Databased Directorate (RAMDD)
-	5 no. of Regional Road Asset Management offices <ul style="list-style-type: none"> • Road Asset Management Central Addis Ababa region • Road Asset Management North Addis Ababa region • Road Asset Management South Addis Ababa region • Road Asset Management West Addis Ababa region • Road Asset Management East Addis Ababa region

1-2-2 ACTIVITIES FOR OVERALL

(1) **ACTIVITY 0-1** Preparation, Updating and Review of Work Plan and Monitoring Sheet

1) Kick off Meetings

Kick off meeting was held on July 15, 2015 in order to 1) obtain more understanding of the JICA project, 2) comprehend function of the concerned parties in and outside of AACRA, and 3) arrange the 1st JCC. Participants from AACRA were the General Manager, the Technical Advisor, Managers from Road Transportation Construction and Maintenance Core Process (C&M), Road Transport Design Core Process (RTD), and engineers from Road Asset Registration Maintenance Planning Sub Process (RAM).

Besides, Counterparts and JICA experts visited Addis Ababa City Road & Transportation Bureau, and Road Funds Agency to introduce and obtain their cooperation to the Project. JICA experts also visited the Embassy of Japan in Ethiopia.

2) Work Plan

The draft Work Plan was discussed with JICA Headquarter on July 13, 2015, and agreed at the 1st JCC held on August 17, 2015. However, due to the delay of the procurement of the equipment installed on the PCSV, the overall work plan is obliged to be revised as attached in the Project Monitoring Sheet II (PM Form 3-3).

3) Monitoring Sheets

Every six months, monitoring sheets are updated based on discussion with Counterparts, and submitted to JICA Ethiopia Office. Following shows the scheduled submission of monitoring sheet.

Table 4 Schedule of Monitoring Sheet Submission

Project Year	Version	Date
1st year (July 2015-June 2016)	Monitoring Sheet Version 1	Agreed and submitted on August 20, 2015
	Monitoring Sheet Version 2	Agreed on February 18, 2016
2nd year (July 2016-June 2017)	Monitoring Sheet Version 3	Agreed and submitted on September 15, 2016
	Monitoring Sheet Version 4	Agreed and submitted on 27 January, 2017
	Monitoring Sheet Version 4-A	Agreed and submitted on April 5, 2017
3rd year (July 2017-June 2018)	Monitoring Sheet Version 5	To be submitted on October 4, 2017
	Monitoring Sheet Version 6	To be submitted in February 2018

(2) **ACTIVITY 0-2** Baseline Survey and Performance Indicator

Performance indicators (hereinafter called “Objectively Verifiable Indicator”), which are to evaluate the achievement level of the Project stated PDM, are planned to be set within six months from the project commencement. The baseline survey was conducted and JICA Team proposed to consult with City Council of Addis Ababa on performance indicators and means of verification on “Overall Goal” and “Project Purpose”, however due to requirements of an official letter from the Mayor, consultation is not yet held. The issue was addressed to AACRA at the 2nd and 5th TAC, and AACRA agreed to communicate with Addis Ababa City Administration on this issue.

Considering the difficulty to consult with City Council of Addis Ababa, JICA Team revised the Indicator on “Project Purpose” and “Output” with Counterparts and consulted to JICA Ethiopia Office for approval prior to the 2nd JCC. At the 2nd JCC, proposed indicators were approved. In September 2016, the JICA Team revised the indicator and means of verification based on the baseline survey. If the consultation with Addis Ababa City Administration took a longer time, alternative indicator and means may have to be discussed.

Figure for the achievement of target roughness at Overall Goal will be recommended by the JICA Team based on the result of the on-going survey. In terms of indicator using the achievement of the Maintenance plan, the JICA Team has developed a system which AACRA can obtain the achievement level. The indicators are described in “1.3 Achievement of the Outputs” and “1.4 Achievement of the Project Purpose”.

(3) **ACTIVITY 0-3** Joint Coordination Committee and Technical Advisory Committee

Outline of Joint Coordination Committee (hereinafter called as “JCC”) and Technical Advisory Committee (hereinafter called as “TAC”) is summarized in Table 5. The member of JCC was set as agreed at R/D and assigned in September 2015, and member of TAC was assigned after the 1st JCC. Working Groups (hereinafter called as “WGs”) are set up as required through the course of project. It was confirmed in November 2016 by AACRA that the name of JCC and TAC members are updated based on the restructuring of AACRA. Members before and after restructuring are presented in below.

Table 5 Outline of JCC and TAC before AACRA re-structuring **Before November 2016**

Committee	Members		Frequency	Function
Joint Coordinating Committee (JCC)	[Ethiopia Side] <ul style="list-style-type: none"> • General Director of AACRA (Project Director) • Director of AACRA RAM (Project Manager) • Director of AACRA RTD • Director of AACRA C&M • AACRA other related Department • Addis Ababa City Road and Transport bureau • Addis Ababa City Administration • Road Funds Agency 	[Japanese Side] <ul style="list-style-type: none"> • JICA Experts • JICA Ethiopia Office • Embassy of Japan in Ethiopia 	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee (TAC)	[Ethiopia Side] <ul style="list-style-type: none"> • AACRA Project Director • AACRA Project Manager of RAM • AACRA RTD • AACRA C&M • AACRA other related Department 	[Japanese Side] <ul style="list-style-type: none"> • JICA Experts 	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by Project Director, Project Manager, Counterpart personnel, and JICA experts.

NOTE:

- Road Transportation Construction and Maintenance Core Process : C&M
- Road Transport Design Core Process :RTD
- Road Asset Registration Maintenance planning Sub Process: RAM

Table 6 Outline of JCC and TAC after AACRA re-structuring **After December 2016**

Committee	Members		Frequency	Function
Joint Coordinating Committee (JCC)	[Ethiopia Side] <ul style="list-style-type: none"> • General Director of AACRA(Project Director) • Deputy Director General of AACRA Engineering Stream, Road Asset Management (Project Manager) • Director of AACRA RAMDD • Director of AACRA CMDRID • Director of AACRA OFRMD • Director of AACRA Planning, Budget and Strategic Management Directorate • Director of AACRA Regional Asset Management • Director of AACRA Research & Technology Adaptation Directorate • Director General of Human Resources & Facility Management Directorate 	[Japanese Side] <ul style="list-style-type: none"> • JICA Experts • JICA Ethiopia Office • Embassy of Japan in Ethiopia 	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and exchange opinions on major issues that arise during the implementation of the Project.

Committee	Members	Frequency	Function
	<ul style="list-style-type: none"> • Director of AACRA other related Directorate • Addis Ababa City Road and Transport bureau • Addis Ababa City Administration • Road Funds Agency 		
Technical Advisory Committee (TAC)	<p>[Ethiopia Side]</p> <ul style="list-style-type: none"> • General Director of AACRA • Deputy Director General of AACRA Engineering Stream, Road Asset Management (Project Manager) • Director of AACRA RAMDD • Director of AACRA CMDRID • Director of AACRA OFRMD • Director of AACRA other related Department 	<p>[Japanese Side]</p> <ul style="list-style-type: none"> • JICA Experts 	<p>Monthly to Quarterly</p> <p>TAC is to handle technical and structural issues of the Project; composed by Project Director, Project Manager, Counterpart personnel, and JICA experts.</p>

NOTE:

- Own Force Road Maintenance Directorate : OFRMD
- Road Construction Maintenance Design Review and Implementation Directorate : CMDRID
- Road Asset Management and Database Directorate : RAMDD

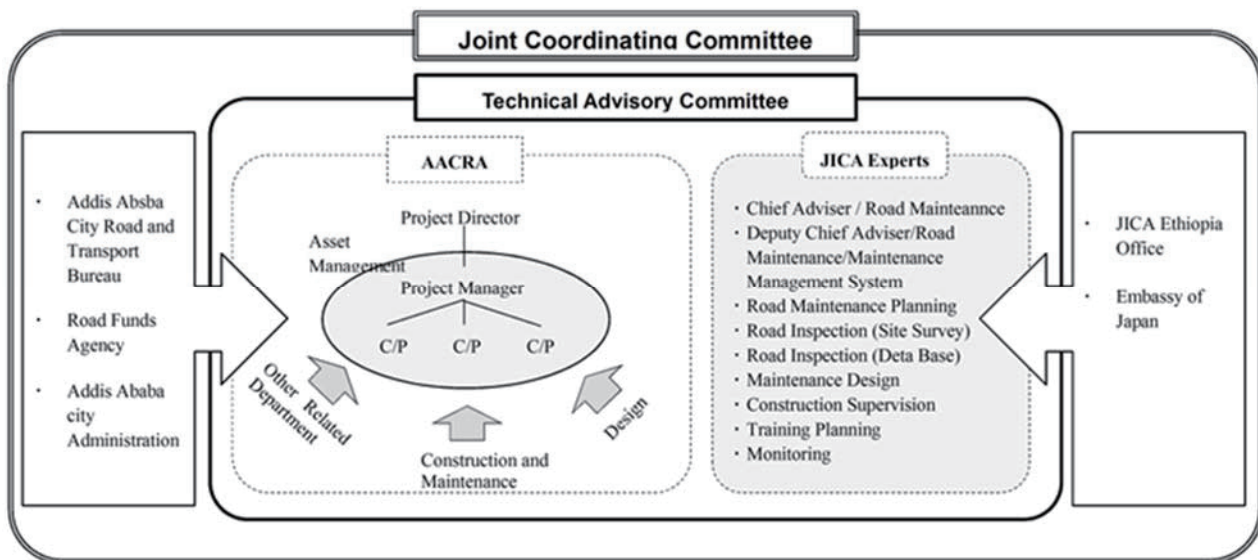


Figure 1 Structure of JCC and TAC

1) 1st JCC

The 1st JCC was held on August 17, 2015, chaired by the General Manager of AACRA, Eng. Fekadu Haile with total of 18 participants. At the meeting, revised PDM, monitoring sheet, and specification for procurement goods were approved. In addition, following items were requested and agreed on 1) Review of exiting quality of road maintenance works carried out by supervision consultants, 2) Immediate process for procurement of Pavement Condition Survey Vehicle.

2) 2nd JCC

The 2nd JCC is held on February 18, 2016, with a total 23 participants. Progress of activities including database preparation and inspection were informed, and smartphones for Visual Inspection Supporting System were handed over. The General Manager of AACRA pointed out the following points; 1) Addis Ababa’s Drainage during rainy season which affecting road condition will be studied under a project funded by World Bank (WB)¹,

¹ The Project on drainage funded by WB has not been implemented yet as of September 2017.

2) Acceleration of Procurement of Pavement Condition Survey Vehicle, and 3) need of clear justification for replacing the existing system to new system to be developed under the Project (road numbering system, road maintenance system, etc.)

3) 3rd JCC

The 3rd JCC is held on September 15, 2016, chaired by Eng. Habtamu Tegegne, the General Director of AACRA newly appointed in August, 2016, with a total 20 participants. After the explanation of progress of each activity carried out by both counterpart and JICA Team, revision of PDM, selection of Pilot project and 1st Training in Japan (conducted from end of Aug. to early Sep. 2016) were reported and discussed. After the discussion, matters confirmed and agreed by JCC were (1) AACRA has serious concern about the delay of equipment supply into the Pavement Condition survey Vehicle, (2) AACRA has an intention to reorganize its structure and request to JICA Team to adjust the work schedule considering the revised organization, (3) AACRA's new management gives the first priority on the update of the road network in Addis Ababa and request JICA Team to accelerate activities such as Maintenance Plan and Pilot project, and (4) AACRA requests the supply of Instrument for Structural Test should be supplied on time in order not to further delay in the project.

In the closing remarks, Eng. Habtamu Tegegne, GD of AACRA, mentioned that he was very pleased to hear the report of Training in Japan and hoped trainees committedly apply and contribute knowledge learnt, and serve as bridge between AACRA and JICA Team.

4) 4th JCC

The 4th JCC was held on April 4, 2017, chaired by Eng. Habtamu Tegegne, the General Director of AACRA, with 23 participants. At the meeting, following were reported; project progress, Activity Schedule, Revision of the Project Design Matrix and Presentation on Pavement Condition Survey Vehicle and Data collection and Restructuring of AACRA and Decentralization of Road Asset Management. In addition, delay in the project and needs of extending project period, procurement of the type of Structural Testing Instrument, restructuring of AACRA organization and AACRA's desire for more training opportunities were discussed during the meeting. .

5) 5th JCC

To be added after JCC.

Table 7 JCC Held during the Project (as of September, 2017)

No.	Date	Participants
1st	August 17, 2015	In total of 18 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
2nd	February 18, 2016	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
3rd	September 15, 2016	In total of 20 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.
4th	April 4, 2017	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.
5th	October 04, 2017	In total of __ participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.

(4) ACTIVITY 0-4 Training in Japan

At the 1st TAC, JICA Team explained the outline of Training in Japan. Training would be conducted twice during the project period of three years. The first training in Japan was conducted from August 23 to September 6, 2016, inviting five staff members from Road Asset Registration and Maintenance Planning Sub Process of AACRA. Two of the participants are traffic engineers while the rest are Road Asset inspectors. The Second training was conducted from August 23 to September 6 2017. The participants were 3 from Regional Road Asset Management, 2 were from AACRA Own Force Construction and Management. This training was focused on Construction and Maintenance core process of AACRA.

(5) ACTIVITY 0-5 Project Completion Report

Project Completion Report is planned to be submitted in June 2018.

1-2-3 OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is improved

(1) ACTIVITY 1-1 Review Implementation Structure of AACRA, and Compile Suggestions for the Structure Improvement

Since July 2015, JICA Team have been reviewing the road maintenance implementation structure of AACRA with Counterparts through discussions, interviews, questionnaire survey and site visits. Based on the findings, some improvements have been proposed at TACs such as involvement of RTD to maintenance design.

In November, 2016 AACRA announced a new organization structure. The project was designed prior to the restructuring and decentralization of the Asset Manamgenetm Department. Thus further investigation and evaluation of the new organization are currently carried out through interviews and careful observation. Especially regards to the inspection work, team member of inspection may be revised.

After the clarification of role and responsibility of relevant division to the Project, the compiled suggestions will be proposed to AACRA at the third year of the Project.

(2) ACTIVITY 1-2 Convene Technical Advisory Committee (TAC)

To date of September, 2017, six TAC meetings were held as shown in the table below. For further detail, please refer to Minuets of meetings.

Table 8 TAC during the Project (as of September 2017)

TAC	date	participants	Topic discussed	Action agreed/proposed
1st	Sep. 7, 2015	In total of 13 JICA experts: 3 AACRA: 10	<ul style="list-style-type: none"> • Progress of the Project • Challenges on road patrol • Strategic road and database setup • Inclusion of city administration 	<ul style="list-style-type: none"> • AACRA proposed to clarify the demarcation of C&M, Supervision consultant, and RAM through the progress of the Project. • JICA Team confirmed that drainage inspection and planning will be included.
2nd	Oct. 27, 2015	In total of 13 JICA experts: 5 AACRA: 8	<ul style="list-style-type: none"> • Review of the last TAC • Method of road patrol, progress 	<ul style="list-style-type: none"> • Maintenance plan based on visual inspection data will be prepared by February 2016 • Temperature digital gauge will be procured from

TAC	date	participants	Topic discussed	Action agreed/proposed
				Japan ² <ul style="list-style-type: none"> • Minimum length of road segment is to be confirmed, • Communication with City Administration will be improved • Lecture on Kaizen will be hold at the beginning of next year.
3rd	Mar. 22, 2016	In total of 9 JICA experts: 3 AACRA: 6	<ul style="list-style-type: none"> • Progress of the Project • Network centre for Road Numbering • Application of Road Management System for AACRA • Customised Mobile Inspection System • Training in Japan Besides, Report on Application of the Road Management System for Addis Ababa City Roads Authority was submitted.	<ul style="list-style-type: none"> • Adopt Leghar as centre of road network and will be report to GM. • Local and Collector streets will be included in numbering of roads • Set up and complete road inventory database and input inspection data will be conducted prior to the next TAC meeting
4th	Jul. 15, 2016	In total of 12 JICA experts: 6 AACRA: 6	<ul style="list-style-type: none"> • Progress of the Project • Workshop for Selection of Design Pilot Project • Structural Investigation Instruments • Necessity of Road Maintenance Handbook 	<ul style="list-style-type: none"> • Road Maintenance Handbook will be prepared • Structural investigation instrument will be discussed later. • JCC to be hold one day between Sep. 13 and 15 2016.
5th	Sep. 26, 2016	In total of 12 JICA experts: 3 AACRA 9	<ul style="list-style-type: none"> • Progress of the Project • Revision of some points of PDM which are pointed by Monitoring Expert. • Request AACRA to arrange a meeting with City Administration 	<ul style="list-style-type: none"> • Proposal of the revision will be exchanged by both parties before the 4th JCC scheduled in March 2017 • AACRA committed to arrange the meeting with City Administration during next visit of Mr. Honda
6th	January 27, 2017		<ul style="list-style-type: none"> • Progress of the Project • New organization structure of AACRA • Pavement Condition Survey Vehicle • Pilot Project 	Note: Based on the new organization structure of AACRA, the chairperson of TAC is changed from Mr. Melaku (Technical Advisor) to Mr. Demelash (Deputy Director General – Road asset management). <ul style="list-style-type: none"> • It will take time to complete the establishment of new AACRA organization. • It was informed that the PCSV was delivered to AACRA on January 16 and assembling would be completed by the end of January 2017.

(3) **ACTIVITY 1-3 Prepare Training Plan for AACRA Staff**

At the 1st TAC, JICA Team presented a training policy for each training scheme of Training in Addis Ababa (OJT and Lecture) and Training in Japan. Lecture and OJT are conducted in combination, which approx. one lecture by JICA Team, followed by 2 weeks of OJT lead by AACRA staff aiming to develop theoretical and practical knowledge and skill on road maintenance, whereas training in Japan will provide training by experts in the field to gain knowledge and experience on advanced technologies.

Training Plan was prepared in February 2016 and revised in August 2016, which summarises training courses (focusing on Activity 2-2, 2-3, 2-4, 2-5, 3-1,3-3,3-4 and 3-5), content covers, target trainees (mainly RAM members), frequency etc.

² The temperature digital gauge was provided in February 2016.

In addition to the above training course, JICA Ethiopia advised JICA Team in August, 2016 to hold a seminar for introducing this Project to other stakeholders including ERA, RF, WB, and Universities. JICA Team agreed and proposed to invite Professor Kobayashi from Kyoto University as the key lecturer/speaker. Professor Kobayashi is the leader in the development of 'Kyoto Model' which is the base frame of the RMMS to be developed in the project.

Besides the above, Workshop/Seminar will be provided targeting ERA and Road agencies, which is addressed under Activity 3-6.

(4) ACTIVITY 1-4 Conduct Training for AACRA Staff for Road Maintenance; Road Inspection, Maintenance Planning, Maintenance Management System, etc.

1) Trainings

Training Implementation schedule has been developed and JICA Team have conducting training accordingly. To date, 38 lectures and 18 OJTs were conducted under the project as summarized in the table shown below.

a. Training for Activity 2-2: Conduct Road Inspections in the City

A series of trainings on the activity has been provided from August 2015 on periodic and emergency patrolling including operation of Visual Inspection Supporting System. However on collected data, Errors were found on distress and damage identification, method of measuring distresses, distress dimensions etc. Thus JICA Team extended training on Inspection for further 6 months. Kaizen method was introduced to RAM staff by JICA expert which enable them to tackle their problems through consulting, discussion in groups and organizing regular meetings to schedule and use their resources effectively among themselves. Full scale 1st training (lecture and OJT) for automatic inspection using PCSV was conducted from February 1 to 13, 2017 (9 days). On September 22 2017, 1 day training for PCSV system maintenance was also provided. In October 2017, training will be continuously provided.

Technical support is also provided for the operation of PCSV as required. In July 2017, due to the some technical issue on vehicle program, JICA team update the system.

b. Training for Activity 2-3: Develop and Update the Road Inventory (database) of AACRA

Initial training on concept and setup of road network inventory was offered. Full scale data collection, was conducted for February 1 – 13, 2017 (9 days).

c. Training for Activity 2-4 and 2-5: Prepare and Revise Short / Medium / Long Term Road Maintenance Plan

As of September 2017, trainings (7 lectures and 1 OJTs) on road maintenance planning have been offered. Trainees have so far improved their knowledge and skill sufficiently. Once the system is developed, further training will be provided.

d. Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification

As of September 2017, 7 lectures have been held. Especially for this term, after the procurement of structural testing instruments, training on Introduction Dynamic Cone Penetrometer and Introduction UK DCP 3.1 were provided in July and August 2017.

e. Training for Activity 3-4 and 3-5: Selection of Pilot Project

Considering the scale, the damage severity and the expected repair method, the location and repair method of the 1st Pilot Project was decided in November 2016 through joint site investigation among JICA Team, Construction (Repair Maintenance) Department, and RAM. A series of OJT were offered from October – December 2017 on site selection and repair method related to the first pilot project.

Table 9 Training Implemented during the Project (as of September 2017)

Training Courses		Style	Date	Participants no.
A: Training for Activity 2-2: Conduct Road Inspections in the City				
A1 Visual inspection (Emergency patrolling)	A1-1 Concept of emergency patrolling	Lecture	11 Sep. 2015	11 RAM members
	A1-2 How to carry out emergency patrolling	Lecture	14 Sep. 2015	RAM members
		Lecture	9 Oct. 2015	11 RAM members
		OJT	15-22 Sep. 2015	11 RAM members
	A1-3 How to process geo-tagged photographs	Lecture	15 Sep. 2015	11 RAM members
		OJT	16-22.Sep., 2015	11 RAM members
A2 Visual inspection (Periodic inspection)	A2-1: Revision of Visual inspection	Lecture	15, Jun. 2016	13 RAM members
		Lecture	20 Jun. 2016	13 RAM members
		Lecture	22 Jun. 2016	13 RAM members
	A2-2: Visual Inspection using mobile system	Lecture	17 Feb. 2016	11 RAM members
		Lecture	23 Feb. 2016	RAM members
		Lecture	8 Mar. 2016	RAM members
		Lecture	18 Apr. 2016	RAM members
		Lecture	24 Oct. 2016	RAM members
		Lecture	25 July 2017	RAM members
		OJT	3 Feb. 2016	11 RAM members
OJT	20 Apr. 2016	11 RAM members		
A3 Scheduled inspection	A3-1: Introduction of inspection vehicle	Lecture	20 Aug. 2015	11 RAM members
		Lecture	1 Feb. 2017	RAM members
	A3-2 :Revision of visual inspection	Lecture	15 Oct. 2016	12 RAM members
	A3-3: Training for operation of PCSV and analysis of the data.	Lecture	1– 13 Feb. 2017 (9 days)	20-25 RAMDD members (Morning)
	A3-4: Training for operation of PCSV and analysis of the data (Field work).	OJT	1– 13 Feb. 2017 (9 days)	20-25 RAMDD members (Afternoon)
	A3-5: PCSV system maintenance	Lecture	22 Sep. 2017	RAMDD members
B: Training for Activity 2-3 : Develop and Update the Road Inventory (database) of AACRA				
B1 Restructuring of road network	B1-1 Concept of revised road network system (road numbering)			
	B1-2 Setup of road network inventory	Lecture	29 Oct. 2015	10 RAM Member
		Lecture	16 Dec. 2015	10 RAM members
	OJT	16-27 Dec. 2015	10 RAM members	
C Training for Activity 2-4 and 2-5: Prepare and revise short / medium / long term road maintenance plan				
C1 Road priority and service level	C1-1: Road priority and service level for AACRA	Lecture	19 May. 2016	11 RAM members
C2 Road Management System–Kyoto Model	C2-1: Introduction of Kyoto model	Lecture	11 Aug. 2016	11 RAM members
		Lecture	20 Aug. 2015	11 RAM members
		Lecture	26 July 2017	RAM members
C3: Mid/long-term maintenance planning	C3-1: Difference between Kyoto model result and mid/long-term plan		Conducted as the seminar in April	
	C3-2: Mid/long-term maintenance planning	Lecture	26 July 2017	RAM members
C4 Annual Maintenance Planning	C4-1 Annual Maintenance Planning	Lecture	11 Sep. 2015	3 RAM members
		Lecture	19 May 2016	RAM members
		OJT	6 May 2016	6 RAM members
D Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification				

Training Courses		Style	Date	Participants no.
D-1 Type of deterioration of pavement	D1-1 Type of damage maintenance	Lecture	2 Aug 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member
		Lecture	9 Aug. 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member
	D1-2 Repair method of Damage (construction method)	Lecture	19 Aug 2016	5 Member of RAM, 1 RTD, 1 C&M Member
D-2 Repair Method	D2-1 Selection of Repair Method	Lecture	15 Sep. 2016	at the 3rd JCC
D-3 Structural Instrument	D3-1 Selection of inspection instrument	Lecture	15 Sep. 2016	Member of Laboratory (Research and Technology Adaptation technology)
	D3-2: Introduction Dynamic Cone Penetrometer	Lecture	28 July 2017	Member of Laboratory
	D3-3 Introduction UK DCP 3.1	Lecture	2 August 2017	Member of Laboratory
E Training for Activity 3-4 and 3-5 Assist AACRA to execute pilot projects & feedback achievement & experience				
E-1 Preparation of Pilot Project	E1-0 Joint Site Investigation	OJT	28 Oct. 2016	2 from Construction, 2 from RAM
	E1-1 Selection of Construction method	Lecture	11 Nov. 2016	10 member of C&M
	E1-2 List up of material, equipment, signboard, manpower	Lecture	14. Nov. 2016	2 members of C&M
E-2 Preparation & Confirmation of asphalt mix	E2-1 Check Asphalt mix design	Lecture	29-30 Oct. 2016	5 members
	E2-2 Trial mix and test the contents of each material			
	E2-3 Temperature management of hot mix	OJT	29 Nov. 2016	2 members of C&M
E-3 Improper Work	E3-1: Procedure of work & Temperature management	Lecture	11 Nov. 2016	10 member of C&M
	E3-2: Typical mistake during the work			
E-4 Repair Method	E4-1:Crack sealing and Safety Measures	OJT	23 Nov. 2016	Engineers and Site supervisors
		OJT	24 Nov. 2016	
		OJT	25 Nov. 2016	
	E4-2: Patching and Pothole patching and Safety Measures	OJT	28 Nov. 2016	
		OJT	29 Nov. 2016	
		OJT	2 Dec. 2016	
		OJT	3 Dec. 2016	
		OJT	30 Nov. 2016	
		OJT	1 Dec. 2016	

2) Seminar

A seminar titled the “1st Seminar on the Project for Development of Road Maintenance Capacity of Addis Ababa City” was held on April 18, 2017 at Addis Ababa city. Professor Dr. Kiyoshi Kobayashi was invited to make a presentation for “infrastructure Asset Management”. He was the leader in developing the Kyoto Model together with PASCO. Total participants were approximately 100 people from Government agencies, Universities and AACRA. Agenda was as follows:

Table 10 Agenda for the 1st Seminar

Time	Title	Speaker
8:00	Reception	
8:30-8:40	Open Remark	AACRA Representative (Eng. Habtamu Tegegne, the General Director of AACRA)
8:40-9:00	Project Outline	Mr. Hiroshi HONDA (Project Manager, JICA Project Team)
9:00-10:30	Infrastructure Asset Management	Professor Dr. Kiyoshi KOBAYASHI (Kyoto University)
10:30-10:50	Tea Break	
10:50-11:20	Output performed in the Project	Eng. Mesert Abera (AACRA)
11:20-11:40	Asphalt Pavement Preservation and	Dr. Habtamu Zelelew (Lucy Consulting Engineers)

Time	Title	Speaker
	Management	
11:40-12:00	Road Fund and Road Maintenance in Ethiopia	Ato Alebachew Ahmed (Ethiopia Road Fund Office)
12:00-12:30	Discussion	
12:30-12:40	Key Note	JICA Representative (Mr. Takeshi Matsuyama)
12:40-12:50	Closing Remark	AACRA Representative (Eng. Habtamu Tegegne, the General Director of AACRA)
12:50-14:20	Lunch	

Table 11 Number of participants

Organizations	Number
Government of Ethiopia	17
Universities	9
Private companies	11
AACRA	47
JICA Ethiopia, Embassy of Japan	4
JICA Team	6
Total	94



Figure 2 Photos at the 1st Seminar (April 2017)

(5) ACTIVITY 1-5 Share Information of road condition in the City with Road Funds Agency and the City Administrations to request budget for road maintenance

At the 1st TAC, JICA Team and Counterparts developed a draft internal communication system among RAM, C&M, and RTD. Based on the proposed system, each department is communicating with other departments. JICA Team will continue to study on communication system between RAM and C&M, as well as external parties concerned such as City Council of Addis Ababa and Road Fund Agency.

(6) ACTIVITY 1-6 Promote Public Relations

At the 1st TAC, in order to promote understanding of public, professional and relevant authorities of the Project and importance of road maintenance, JICA Team presented Public Relation Policy as 1) use variety of media to deliver messages to wider public, 2) establish bidirectional communication, and 3) conduct maintenance activities with public participation.

Table 12 PR activities conducted on the Project

Date	Responsible person	Means	Outline
June 2016	JICA Team and Road Inspection Team	a leaflet for road inspection team	under Activity 2, JICA Team prepared a leaflet for road inspection team that will help them explain their field activity to the community around their area of assignment

Date	Responsible person	Means	Outline
January 31, 2017	AACRA Communications Affairs Directorate	AACRA Internal information sharing on Handover ceremony of PCSV	with attendance of approx. 55 people including AACRA Director General, Deputy Director General, Directors, JICA, Embassy of Japan, Addis Ababa City Road and transport Bureau. The ceremony was captured by AACRA Communications Affairs Directorate and a national newspaper and informed AACRA internally.
March 1, 2017	AACRA	Attendance of Conference	AACRA attended Japan Media Conference and presented the Progress of the Project
April 18, 2017	JICA Team and AACRA	Organize a Seminar	to disseminate the progress of project to relevant authorities and agencies in Addis Ababa inviting approximately 100 participants

1-2-4 OUTPUT 2: The Process for Formulating Road Maintenance Plans is established

(1) ACTIVITY 2-1 Review/Revise Road Maintenance Cycle of AACRA, Compile the PDCA Checklist and Revise the Checklist If Necessary

1) Review and Findings of Current Road Maintenance Cycle

Since August 2015, JICA Team have been reviewing the existing road maintenance cycle and the workflow of AACRA jointly with the Counterparts through interviews and lectures.

2) Ideal and Feasible Road Maintenance Cycle Framework

Based on the review, a series of discussions and lectures with AACRA, JICA Team formulated the Ideal Road Maintenance Cycle (version 1) adopting PDCA cycle and incorporating Road Maintenance Management System, Pavement Condition Survey Vehicle (PCSV), Visual Inspection Supporting System which are procured to AACRA through the Project. The version will be updated through the project progress and continuous discussions with Counterparts.

3) PDCA Checklist

In order to monitor whether road maintenance works is implemented properly based on the PDCA cycle by AACRA and to examine further improvements, JICA Team with AACRA developed the PDCA checklist (version 1) containing check items and evaluation indexes. The checklist was presented at the 2nd JCC, and will be updated as required according to the future discussions.

(2) ACTIVITY 2-2 Conduct Road Inspection in the City

1) Review and Challenges of Road Inspection

On August 12, 2015, JICA Team conducted a field survey to understand issues and problems on periodic inspection and data management and found that road inspection and data collection have been conducted insufficiently to be used for decision making of maintenance implementation. Findings were reported at the 1st TAC.

2) Hierarchical Inspection Scheme

At the 1st TAC, JICA Team presented a draft Hierarchical Inspection Scheme of a) Visual inspection with Smartphone, b) Automatic Inspection using pavement inspection vehicles, c) Structural Investigation. The proposal was approved by Counterparts. Scheme for Automatic Vehicle is currently reviewed based on the ongoing survey using PCSV.

Table 13 Hierarchical Inspection Scheme (draft)

Scheme		Measurement	Equipment	Target road	Inspection time	Frequency	Remark
Visual inspection	Periodic Inspection	Pothole, rutting, cracking, ravelling	Smartphone	Approx. 200 km (3.3 km/day)	Dec.– Mar.	As needed	Determine damage indicator, identify section for structural investigation
	Emergency Patrol & Inspection	Pothole, Major damage	Smartphone	scheduled	Sep.-Nov.	As needed	Identify light maintenance roads.
Automatic Inspection		IRI	Pavement Condition Survey Vehicle	All strategic and scheduled road. Approx. 500 km (50 km/day)	Nov.-Jan.	Scheduled	Identify roads to be visually inspected.
Structural Investigation		Structural defect	Structural investigation instruments	Depends on the result of inspection	Apr.– Jun.	Scheduled	Determine repair method

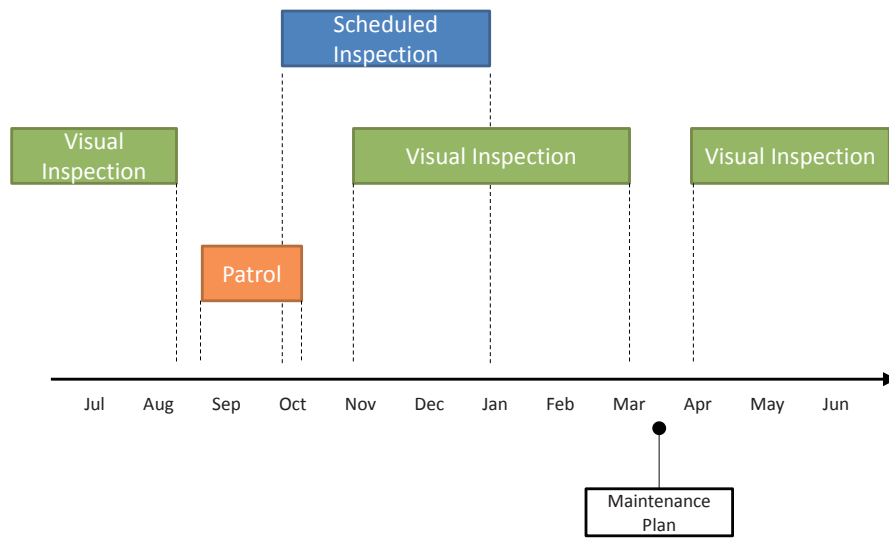


Figure 3 Inspection Schedule

3) Development of Visual Inspection Supporting System

a. Development of the System

At the 1st JCC, JICA Team confirmed the needs of inspection support in order to respond efficiently to public demand on road maintenance. Thus JICA added the procurement and development of Visual Inspection Supporting System into the project activity under the amended contract in January 2016. The system is composed of a) Field Reporting System and b) Visual Inspection Data Management Systems. The proposed functions of the system were presented and 5 smartphones have been procured and handed over to Counterparts at the 2nd JCC. JICA Team installed ArcGIS to the desktop set up the Project office and developed Visual Inspection Supporting System (version 1) in April 2016. The system will be upgraded and customized as required to apply demands of AACRA.

b. Update of the System

JICA Team conducted a field survey to monitor actual pavement distress data collection activities and data management using the system. Some shortcomings were noted such as lack of safety measures, inadequate use of scales. Moreover, comments to improve Field Reporting System and interfaces of Visual Inspection Data Management Systems (ArcGIS) were proposed and approved by RAM for action.

In addition, pavement distresses common to Addis Ababa were closely looked at and grouping of distresses carried out to improve distress identification. This resulted in more customized inspection system and review of the Field Reporter application interface in to version 2 completed in June 2016. Version 3 was issued in May 2017, to accommodate some request from AACRA such as inclusion of pavement defects such as ravelling and Local and Collector class of roads. Version 4 was issued in September 2017 to accommodate the collection of data, pavement maintenance history etc.

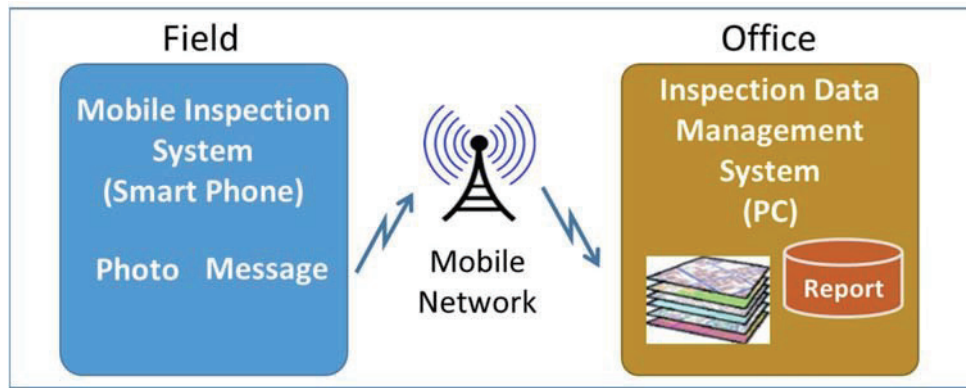


Figure 4 Visual Inspection Supporting System

4) Visual Inspection

After the restructure of ACCRA, this activity is transferred to the regional offices.

a. Periodic Inspection

Inspection (paper based)

RAM organized two teams of four staff, each to conduct visual inspection. The inspection started in November 2015 and completed in May 2016. Within this period about 247 km of Roads (PAS, SAS, and RR) were inspected (of which 97% of roads is identified as Strategic) based on the new road numbering. It was learned that actual rate of inspection is 3.3 Km/day by two teams which is lesser than planned rate of 5 km/day. As confirmed also in the 2nd JCC meeting, the minimum section of road inspected is 100 m length. Data collected on papers was input to Excel-based database in December 2016.

Inspection using Visual Inspection Supporting System

From April 2016, RAM data collectors were trained on the job in how to utilize Visual Inspection Supporting System to collect data. Currently, the system is used to collect data. Compared to the previous visual data collection process, this smartphone based system offers several advantages in terms of speed, accuracy, clarity, safety, error-minimization, and objective rather than subjective data collection.

Following surmised schedule of site inspection conducted.

Table 14 Progress of Visual Inspection

Activity	Date
Training on Visual Inspection	February - June 2016
1st round Inspection	November 2015 - May 2016



Figure 5 Training on Periodic Inspection using Visual Inspection Supporting System

b. Emergency Patrol and Inspection

At the 1st JCC, the issue was raised on the reduction of service level due to many potholes after rainy season, and at the 2nd TAC, JICA Team introduced Emergency Patrol to detect significant pavement damage in the city for emergency recovering, especially after rainy season, and the methodology was approved. Following the meeting, RAM carried out emergency patrols to collect basic information such as taking photos of section requires detailed inspection, and accordingly C&M conducted emergency recovery repairs. Proposed methodology of emergency patrol is as follows. RAM conducted Emergency Patrol from mid-August 2016 and completed. The patrol for 2017 was started from the middle of September 2017 and currently on going.

Table 15 Proposed Emergency Patrol Methodology

Item	Description
Period	Heavy rainy season (Jul – Sep) and through the year
Team	2 data collector with 1 vehicle per team or more
Expected pace	30 km/day-team (3 teams for 1 months for paved)
Target damage	Significant damages which degrade the minimum service level (e.g. pothole in centre of carriageway)
Objective road	All paved road from higher hierarchy sections
Outputs	Location of the damages from Field Reporter Application which includes Photos (Both distant and close-up views), and data of distresses uploaded to GIS database

Following summarises schedule of Emergency inspection conducted.

Table 16 Progress of Emergency Inspection

Activity	Date
Training on Emergency Inspection	September – October 2015
Inspection in 2016	September – October 2016
Inspection in 2017	September – October 2017

5) Automatic Inspection

a. Automatic Inspection

Data items to be collected by Pavement Condition Survey Vehicle (PCSV) were presented at the 1st TAC. The PCSV was officially handed over to AACRA from JICA on January 31, 2017. The PCSV was delayed one year from the initial schedule as explained during the 1st JCC including mitigating methods to cope with the delay.

The user guide for Road Inspection and Data Processing were also provide by the supplier in March 2017. The inspection was started from February 14, 2017 after 2 weeks of vehicle operation training (February 1 – 13. 2017) conducted by JICA Team. As mentioned previously, the procurement of the equipment for Operation Manual and Inspection Schedule was developed by the JICA Team and provided to AACR in April 2017. The first condition survey was conducted from March to July, 2017.

Table 17 Progress of Automatic Inspection

Activity	Date
Handover of PCSV	January 31, 2017
Training on PCSV	February 1 – 13. 2017 / September 22,2017
1st round Inspection using PCSV	March - July, 2017

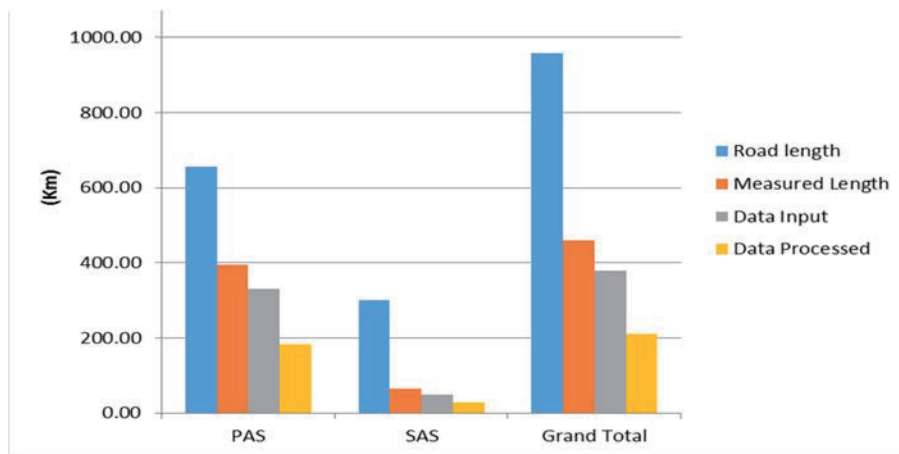


Figure 6 Road inspection using PCSV and Data processing

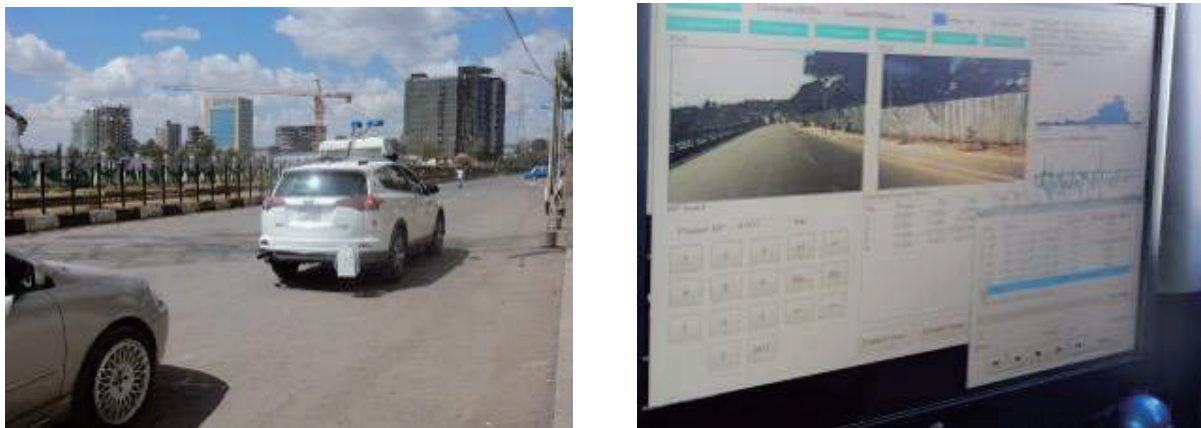


Figure 7 Road inspection using PCSV and Data processing

b. Preparation of Road Inspection and Data Processing Manual for Pavement Condition Survey

Due to change of procurement method, Road Inspection and Data Processing Manual were provided by the supplier in March 2017.

6) Structural Investigation

During the 3rd JCC in September 2016, JICA Team introduced a list of prospective instruments that can be used for structural investigation of pavements and proposed Dynamic Cone Penetrometer (DCP) among them as the instrument to be selected and this proposal was approved by the following the 4th JCC meeting. Based on the further consideration, JICA Team recommended the addition of an Asphalt Core Cutting Machine and the revised

list of equipment (two DCP and one Core Cutting Machine) was approved after the 4th JCC meeting. Two number of DCPs and a core-cutter was procured and delivered to AACRA in August 2017. In addition, one set of Generator has been provided to power Core-cutter at the field.

Table 18 Progress of Structural Investigation

Activity	Date
Handover of structure investigation instruments	August, 2017
Training	1 lecture at July and August, 2017
1st Inspection	To be planed



Figure 8 Photos on DCP testing on site (August 2017)

(3) ACTIVITY 2-3 Develop and Update Road Inventory (database) of AACRA, including road condition, traffic volume, and unit costs, etc.

1) Review of Road Inventory Data

JICA Team reviewed existing road inventory data and found that AACRA manages road network data as Master Plan Road Network Data in Microsoft Excel format and updates annually. Network Data is composed from mainly seven data items of Road No, Road Name, Type, Width, Length, Carriageway Type, and Others. Through the review and discussions with Counterparts, challenges for road inventory database were identified as lack of connectivity between inventory table and road network map, random road numbering, unclear definition of road section, and inconsistent direction from start to end point.

2) Updating of Road Inventory Database System

The schedule of Database update is summarised in below table.

Table 19 Progress of Database Update

Activity	Date
Step 1 Prepare Basic Inventory Information and Framework work of Road Inventory Databased	March 2016
Step 2: Road Inventory (Database) Structure Preparation	November 2015 - December 2016
Step 3: Input Repair Information	June 2016 - December 2016
Step 4: Input Visual Inspection Results	December 2015 - May 2016
Step 5: Prepare GIS Database and Import Database File	June 2016 – ongoing

Methodology to Update Road Inventory Database

JICA Team, through discussions with RAM, developed the steps for restructuring the existing inventory data to meet the actual needs of AACRA. The proposal was approved at the 2nd TAC.

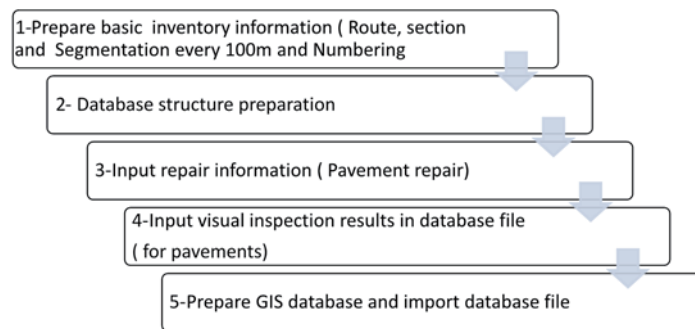


Figure 9 Database Setup Process

STEP 1: Prepare Basic Inventory Information and develop framework for Road Inventory Database

Based on the findings, JICA Team proposed following upgrading of the road network system including road classification and road numbering system, which will be the basis of road inventory database. The proposal was approved, and based on the agreed road network system, the framework for the road inventory database has been developed in March 2016.

Road Classification

At the 1st TAC, insufficiency of current road classes SAS, PAS, RR and Collector Streets (hereinafter referred as CS) to prioritise roads for road maintenance works were discussed. At the 2nd TAC, Counterparts pointed out a problem on the limitation of road maintenance budget, needs of clarifying sites for road inspection and repair construction works, and conducting works at a concentrated area. Based on these meetings, at the 2nd TAC, JICA Team proposed five road classification of a) Strategic roads, b) Major Arterial, c) Sub Arterial, d) Collector Streets, and e) Local Streets, which weigh higher prioritization to strategic roads.

Hierarchical Road Numbering Structure

At the 3rd TAC, JICA Team proposed Hierarchical Road Numbering Structure. The issue on the location of Network Centre was also discussed and agreed that Leghar (Train Station) to be the Road Network

Centre following consultation with Addis Ababa City Planning Project Office on March 7, 2016, and the same was approved on the 3rd TAC in June 2016.

STEP 2: Road Inventory (Database) Structure Preparation

Database is structured by identifying each road in three main categories of 1) Road ID consisting 10 items (Existing status, Road class, Route, Direction, Section, Segment number, Length of the segment, Old road no, strategic road, road/street name), 2) Start and end point of road, and 3) Junction type. The structure was presented at the 2nd TAC and approved. Restructuring of road inventory of AACRA by the lead of RAM defining data items (e.g. road numbering, road naming, and setting start/end points) started from November 2015 and completed in December 2016.

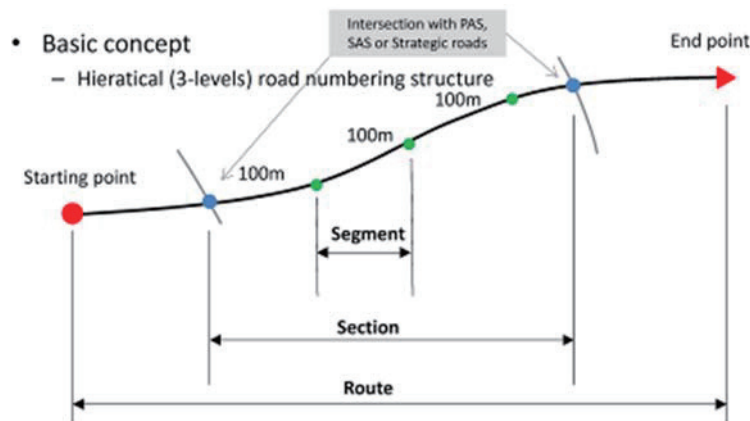


Figure 10 Hieratical Road Numbering Structure

Road ID										Name of Start/End points for Sections		Junction Type	
Status	Road Class	Route	Direction	Section	Segment	Length (m)	Road No. (Old)	Strategic Road	Road/Street Name	Start of section (Jct Name)	End of section (Jct Name)	Start (Jct. Type)	End (Jct. Type)
Existing	SAS1	S001	Down	1	1	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ
Existing	SAS1	S001	Down	1	2	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ

Figure 11 Database Structure

STEP 3: Input Repair Information

After the completion of the above inventory data, repair history and result of periodic inspection data are inputted to the database. Due to the absence of repair history, available data since the date of commencing data input was inputted. Inspection data on pavement damage and update of inventory were inputted using data recorded on inspection sheet in June 2016 and completed in December 2016. The data will be updated every year. To collect repair history, data collection is planned to be assisted by a mobile application system after training and when AACRA conduct maintenance activity the end of this year.

STEP 4: Input Visual Inspection Results

Inputting data of asphalt roads in order of Strategic Roads > Major Arterial > Sub Arterial conducted and completed in June 2016. The database created includes about 462 km of road length consisting PAS, SAS and RR class roads. Table 20 and Table 21 below shows length of each class of road in the inventory and corresponding length of road visually inspected by RAM from November 2015 to May 2016 (dry season).

Table 20 Inspected Road Length (m) from Inventory Database (Period: 2015-2016)

Road Classification	Existing road length in database (m)	Road length inspected visually (m)	Inspected length against total (%)
RR	36,946	36,946	100%
PAS	280,203	181,796	65%
SAS	144,910	54,068	37%
Total	462,059	272,810	59%

Table 21 Inspected Road Length (m) from Inventory Database (Period: 2016-2017)

Road Classification	Existing road length in database (m)	Road length inspected visually (m)	Inspected length against total (%)
RR	36,946	36,946	100%
PAS	290,892	276,347	95%
SAS	159,910	143,919	90%
Total	487,748	457,212	94%

STEP 5: Prepare GIS Database and Import Database File

Route and sections identification from the AutoCAD road network and corresponding Excel inventory data preparation were completed for RR, PAS and SAS class roads in June 2016. Based on these data, maps of roads subdivided into route, section and 100 m length segments, as mentioned previously, was set up and Excel inventory data imported in to GIS database. Functionality of the system was checked prior to starting importing relevant data in December 2016.

3) Methodology for Selection of Emphasis Management Road Segments and Structural Examination Segments

To be added as the Project progresses.

(4) ACTIVITY 2-4 Prepare and Revise Mid and Long Term Road Maintenance Plan based on the above Inventory Data**1) Review of Existing Road Management System**

JICA Team has reviewed existing Road Management System (RMS) (COTS System) installed in 2003 by SMEC International Private Ltd. Consulting Company, and it was found that the system is not functioning due to 1) turnover of trained staff, 2) complexity of the system, 3) needs of vast data to input requiring a huge amount of manpower.

2) Framework of Road Management System

According to the revision of Contract (January 2016) JICA Team procured ArcGIS which is the base system of Road Maintenance Management System (hereinafter called RMMS). Based on the ArcGIS, JICA Team will develop RMMS (Bespoke System) which meets the needs of AACRA. The prototype of RMMS will be completed within three to four months after the data collection started through PCSV. At the 3rd TAC, JICA Team introduced to counterpart and agreed on the system requirements and system functions in association with relevant technologies, and also introduced Bespoke System with stochastic deterioration model (KYOTO model) comparing to the COTS system in its advantage on adoptability to requirements, institutionalization, customizability, cost, and upgradability.

3) Development of Road Management System

The RMMS ver.1 has been developed and installed into the PC in AACRA in July 2017. The RMMS is the supporting system for the implementation of PDCA cycle of road maintenance work in AACRA. It has an integrated database function to manage all data collected by daily road maintenance work, such as inspection data and repair information. The IRI value and road image data collected by PCSV are registered to the database, and the system users can find the location and conditions of each road section on the PC screen.

Road maintenance planning function is installed as a main function of RMMS. The process of road maintenance planning works as follows; 1) road sections are categorized into several groups as defined in the maintenance policy, 2) targeted sections for routine maintenance are selected (road profiling), 3) using the deterioration performance evaluation function and the bench-marking function of the Kyoto Model, the deterioration performance of each section is evaluated, and 4) critical sections which has fast deterioration speed are selected for repair prioritization. The progress monitoring function, indicated by logic model in accordance with road maintenance activities in PDCA cycle, is also installed as a portal of the system,

Currently, road inspection and data accumulation of repair information are carried out continuously. When data is accumulated adequately, further discussion on the system utilization and customization will be held for system updating.

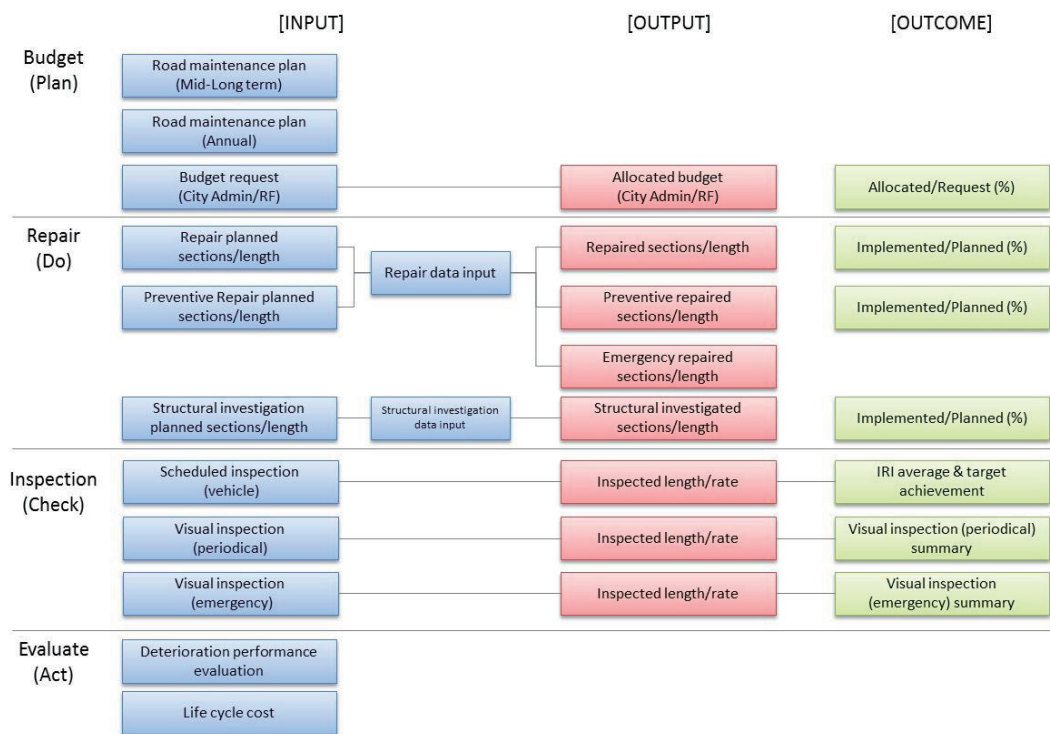


Figure 12 Progress monitoring function (System portal)

4) Formulation of Mid/Long Term Road Maintenance Management Plan

a. Definition and Type of Maintenance Plan

JICA Team was initially planned to propose the definition and type of Maintenance plans and discuss with Counterparts in early 2017. However, it was postponed till July 2017 in order to incorporate the

examination result of trial road conditioning survey by the PCSV. On July 26 2017, lecture on road Maintenance Plan was hold and clarified.

b. Methodology for formulating Road Maintenance Management Plan

Approach of maintenance planning was presented and agreed at the 4th TAC.

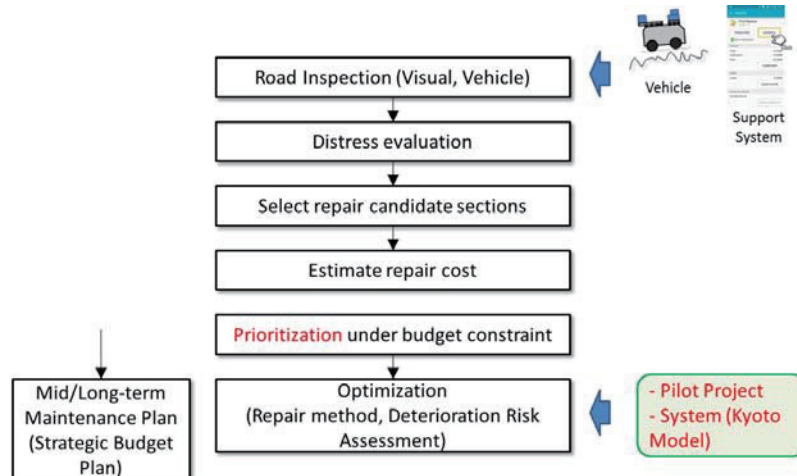


Figure 13 Approach of Mid / Long term Maintenance Planning

c. Formulation of Mid/Long Term Road Maintenance Management Plan

The first Mid/Long Term Road Maintenance Plan was initially planned to be drafted by the end of second year of the project term, however, due to the delay of the PSCV procurement, it is obliged to postpone until the end of third year of the project term.

5) Preparation of Manual and Guideline on Road Maintenance Management System

To be added as the Project progresses.

(5) ACTIVITY 2-5 Prepare Annual Road Maintenance Plan

1) Methodology for preparing Annual Maintenance Planning

During the 4th TAC meeting in July 2016, JICA team presented the preparation procedure of Annual Maintenance Plan following the approach consisting of steps 1 to 6 and agreed.

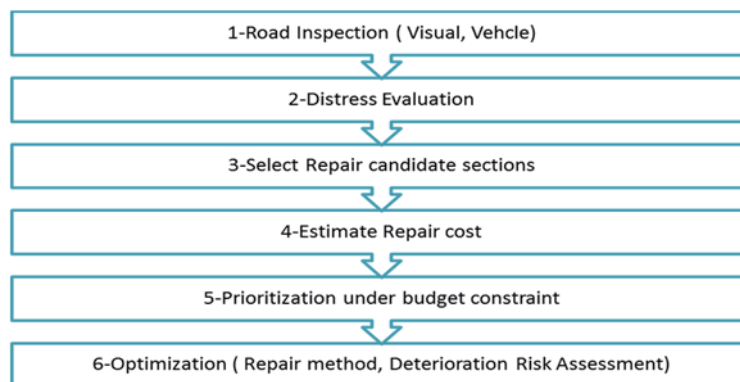


Figure 14 Procedure for Annual Maintenance planning

STEP 1: Road Inspection: to be referred to Activity 2-2 and 2-3

STEP 2: Distress Evaluation

Evaluation process (draft) as shown below has been developed to 1) Categorise the distress, 2) Develop Distress Indicators (draft) and 3) Evaluate the range of distress. The process was presented and agreed at the 3rd TAC. The preliminary distresses evaluation on road inspection data collected until May 2016 was conducted in June 2016.

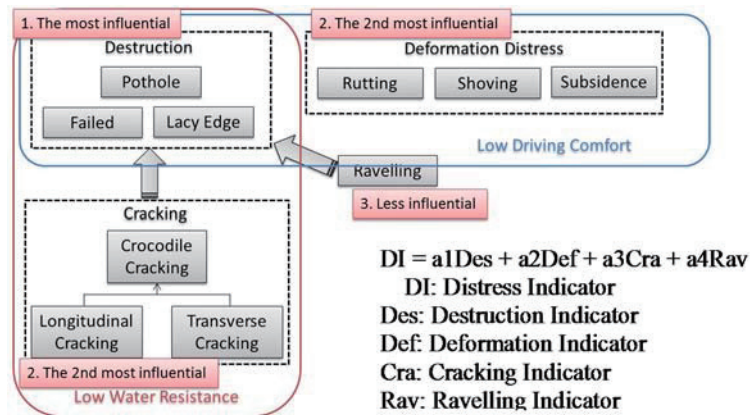


Figure 15 Distress Evaluation Process (DRAFT)

STEP 3: Selection of Candidate Repair Section

The two parameters on the priority repair route selection were presented at the 4th TAC. Prioritization of Risk Matrix is based on the Weight Index as shown in the below figure. One parameter is Consequences which includes traffic volume, accessibility to primary destinations, road class (RR, SAS, PAS, Strategic road) and others. The other is Risk likelihood (damage level). The discussion is still ongoing at the time of September 2017.

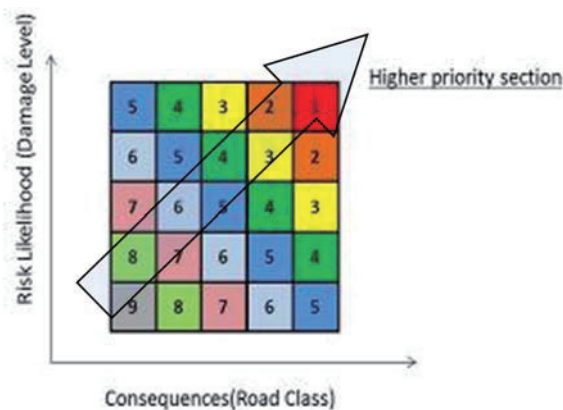


Figure 16 Prioritization by Risk Matrix (Draft)

STEP 4: Estimate Repair Cost

Repair cost estimation will be updated based on the unit rate obtained from the implementation of Pilot Projects.

2) Formulation of Annual Road Maintenance Management Plan

It was planned that the 2nd year Annual Road Maintenance Plan would be prepared in the period from June and July, 2016 based on the data obtained from the operation of PCSV. However, due to the delay in the procurement

of PCSV, the first Annual Road Maintenance Plan was prepared in July, 2017. Mid/Long Term Road Maintenance Plan will be prepared during the period from December, 2017 to April, 2018 based on the results of first full-scale road condition survey using the PCSV scheduled from October 2017 to January, 2018.

1-2-5 OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

(1) **ACTIVITY 3-1** Select Pilot Projects for Maintenance Work based on the Annual Road Maintenance Plan formulated under the Project

1) Site Survey

On October 13, 2015, JICA Team conducted a field survey to understand issues and problems on road maintenance works. The major findings are: 1) Quality of cold mix asphalt was questionable, 2) the same maintenance work (overlay) has been carried out at some places every year (structural improvement is required), 3) Surface cutting method was not employed in the pothole repair.

2) Selection of Pilot Project

The project is scheduled to be implemented twice in 2016 & 2017. Algorithm for Repair Work Selection has been presented at the 4th TAC. The selection of pilot projects was carried in September 2016. The policy for the selection of the first pilot project was presented and discussed at the 3rd JCC (refer to the handout of the 3rd JCC). As an example, the sketch of the damage of location No.1 is shown in Appendix 4.

Table 22 Outline of Pilot Project

Selected Points	First Pilot Project (2016)	Second Pilot Project (2017)
Selection Timing	October	June to July, 2017
Implementation Period	During dry season from October to December	
Targeted Road	Paved trunk roads such as Ring Road, PAS and SAS,	
Investigation	Detailed investigation <u>not</u> included	Detailed investigation included
Key Purposes	(1) Complying with annual plan (4) Feedback of repair record -	(2) Proper design (3) Proper repair method
Targeted Damage	Surface damage	Structural damage
Repair Method	- Pot hole patching - Crack sealing	- Cut-overlay - Pavement replacement
Key Control Items	Safety Control, Quality Control	

3) Implementation Plan

a. First Pilot Project

Based on the discussion JICA Team prepared the first version of Implementation Plan for the First Pilot Project on 28 September, 2016 (Revised on 1 November, 2016) and discussed with C&M and RAM.

The joint site inspection for the first pilot project was carried out on 28 October, 2016 among JICA Team, C&M and RAM and following four locations were selected as the first pilot project. As an example, the sketch of the damage of location No.2 is shown in Appendix 1.

The first pilot project focuses defaults of asphalt layer, which are repaired by sealing, patching, and typical potholes.

Table 23 1st Pilot Project Outline

No.	Location (Road Number)		Road Class	Defect	Repair Method	Work Volume	Remarks
	(Old)	(New)					
2	69	P002,S-14,S-1	PAS4	Crocodile Crack Delamination	Patching Patching	46m2 195m2	
3	4	P002,S-4,S-3	PAS3	Pothole Line Cracks	Pothole Repair Sealing	2 holes 68m	
4	4	P002,S-1,S-3	PAS3	Pothoe Line Cracks	Pothole Repair Sealing	1 hole 41m	
8	76	P001,S-12,S-3	PAS3	Pothole Broken Edge	Pothole Repair Patching	1 hole 36m2	Including base course repair

Table 24 Repair work area for each method

Maintenance Type	No.2	No.3	No.4	No.8	Total
Crack Sealing(m2)		67.9	40.9		108.8
Patching (m2)	240.6	3.0	1.5	4.2	249.3
Pothole Patching(m2)				35.6	35.6

(2) ACTIVITY 3-2 Share information of Pilot Project between/within Road Asset Management Process and Construction and Maintenance Process

1) First Pilot Project

After the selection of the pilot project, information such as site location, work method, work volume, necessary equipment and material, man power and work schedule was shared with the relevant units of AACRA which are RAM, RTD, Quality Control Support Sub process (laboratory), C&M (construction, machinery, and asphalt plant).

Table 25 List of Information to be shared prior to the implementation of Pilot Project

Before Repair Works	Before Detailed Investigation
<ul style="list-style-type: none"> • Implementation Plan • Basic Data (Width of Road, Structure of Pavement, etc.) • Inspection Results • Information of Road obtained from Image Photos • Condition of Damage • Selected Repair Method • Location of Works • Existence of Utilities and/or Drainage • Safety Plan • Traffic Condition • Consideration on Residential Neighbourhood • Points to keep in mind during Works 	<ul style="list-style-type: none"> • Implementation Plan • Basic Data (Width of Road, Structure of Pavement, etc.) • Inspection Results • Information of Road obtained from Image Photos • Condition of Damage • Review of Damage • Traffic Condition • Points to keep in mind during Works

2) Second Pilot Project (To be updated as project progress)

(3) ACTIVITY 3-3 Conduct the detailed Investigation and Design Specification of the Pilot Projects

The first pilot project does not require detailed investigation and design. This activity will be carried out during the second pilot project.

(4) ACTIVITY 3-4 Assist AACRA to execute Implementing Pilot Project

1) First Pilot Project

Construction plan was prepared by JICA Team and AACRA staff, and implemented by AACRA staff. Crack sealing work for all 4 locations has been started on 23 November, 2016. However the work was suspended on 29 November, 2016 by senior management of AACRA due to the higher priority given to the road near African Union due to the conference. The work for Pilot project was re-started in late January, 2017 and completed 10 February 2017.

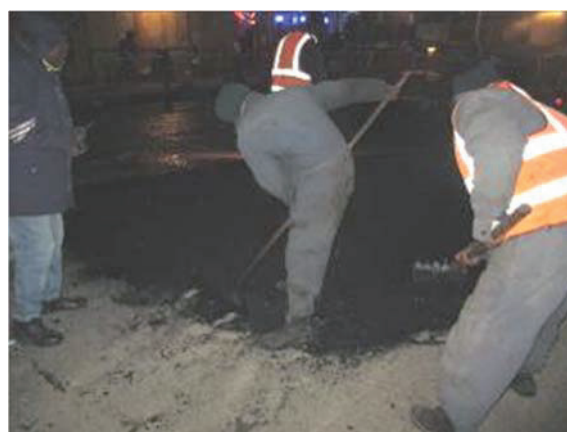
In order to improve the capacity on road maintenance, technical transfer training was also carried out on maintenance technology, health, and safety management. As of September 2017, so far, 5 Lectures and 10 OJTs were held. Advice for the equipment which AACRA has to own in the near future in order to carry out proper and effective repair work is strongly requested to JICA Team by AACRA.

Table 26 Implemented schedule of the 1st Pilot Project

Activity	Date
Maintenance work	November 23, 2016 - February 10, 2017
Training	October 2016 - December



Crack sealing



Patching

Figure 17 Photos of maintenance work during the 1st Pilot Project

2) Second Pilot Project (To be updated as project progress)

(5) **ACTIVITY 3-5 Feedback Achievements and Experience of Pilot Projects into the Next Annual Road Maintenance Plan**

During the pilot project implementation, maintenance works were monitored and evaluated using the monitoring form prepared. The result of observation will be utilised for annual maintenance planning prepared by asset management unit.

The feedback of the 1st Pilot Project was presented. Findings shared were as follows;

1) General

- Floodlight for night work is necessary.
- Traffic control such as safety corn and guard-man is not sufficient.

2) Crack Sealing

- Crack sealing machine is necessary.

3) Patching / Partial Construction

- Grinder disk of Asphalt cutter is too wear-out to use properly.
- Temperature control for asphalt mixture such as spreading and compaction is not carried out at all.
- A sheet over asphalt mixture during transportation is not used.
- Waiting time for arrival of asphalt mixture is too long. (Work is not effective.)

(6) ACTIVITY 3-6 Organize Workshop/Seminar of Pilot Project for ERA and Road Agencies at Regional and Municipal Level

To be described as the Project progresses.

1-2-6 TECHNICAL OUTPUT

Following technical outputs are planned to be developed under the Project and submitted at the end of the project term.

Table 27 List of Technical Output

Output	Status	Note
1 Medium/Long Term Road Maintenance Plan		To be drafted by the end of third year of the project (1 year postponed due to the delayed supply of Survey Vehicle.)
2 Annual Road Maintenance Plan		Annual Road Maintenance Plan was prepared in July 2017
3 Road Maintenance Management System	On going	
4 PDCA Checklist	Version 1 is prepared at February 2016	
5 Manual and Guideline on Road Maintenance Management System	On going	To be develop at the 3rd year (July 2017-June 2018)
6 Updated Existing Standard, Specification, Manuals		To be prepared as required
7 Training Materials	On going	To be prepared as required

1-3 ACHIEVEMENT OF THE OUTPUTS**(1) OUTPUT 1 The Implementation Structure of AACRA for Road Maintenance is improved.**

Verifiable Indicator	Achievement Level
1-1 Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 2017.	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussions are required after role and responsibility of each section under new AACRA structure is clarified
1-2 Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August 2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily.	In Progress: AACRA re structured in November 2016. Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for external communication and further strengthening of institution.
1-3 More than XX% of the requested budget on the basis of Annual Road Maintenance Plan is	In Progress: Baseline data is yet to be obtained.

Verifiable Indicator	Achievement Level
allocated from the 3rd project year.	
1-4 Trainings on road maintenance is conducted targeting AACRA staff	In Progress: As of September 2017, 38 lectures and 18 OJTs, and two trainings in Japan were conducted.
1-5 Public understanding and cooperation on road maintenance is enhanced.	In Progress: Leaflet on Activity 2 was prepared and distributed. One seminar was held in April 2017.

(2) **OUTPUT 2** The Process for Formulating Road Maintenance Plans is established

Verifiable Indicator	Achievement Level
2-1 PDCA Checklist is developed by January 2016.	In Progress: Checklist version 1 was developed. Version will be updates as necessary through the operation.
2-2 AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year.	In Progress: Framework for RMMS and planning procedure were agreed. Currently RMMS is currently under development. Due to the delayed supply of the Pavement Condition Survey Vehicle, both of the development of RMMS and Mid/Long Term Maintenance Plan are delayed accordingly.
2-3 AACRA Annual and Mid/Long term Road Maintenance Plan are formulated in consideration of Life Cycle Cost on Road.	In Progress: Approach and formulation process for road maintenance planning have been agreed. Annual Road Maintenance Plan was prepared in July 2017.

(3) **OUTPUT 3** The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

Verifiable Indicator	Achievement Level
3-1 Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted.	In Progress: 11 lectures and 11 OJT relevant to maintenance skill and knowledge were conducted.
3-2 Number of preventive maintenance works executed are increased through the implementation of the Project.	In Progress: Concept and importance of Preventive Maintenance should be shared first among all stake holders.

1-4 ACHIEVEMENT OF THE PROJECT PURPOSE

PROJECT PURPOSE: The Management Capacity of AACRA for Road Maintenance is enhanced.

Verifiable Indicator (By 3 months before the completion of the Project,)	Achievement Level
1 AACRA's capacity to secure the budget for road maintenance is enhanced.	In Progress: Baseline data from Addis Ababa City Administration is yet to be obtain.
2 Road maintenance works based on PDCA cycle established by the Project are executed by AACRA.	In Progress: PDCA Checklist (ver.1) has been developed. Currently operation method in consideration to inspection equipment and maintenance management system is under development.
3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in the AACRA Annual Road Maintenance Plan exceeds XX% from the 3rd project year.	In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.

1-5 CHANGES OF RISKS AND ACTIONS FOR MITIGATION

(1) Term July 2015 to August 2015

As per the JICA Risk Management Check List, no risk was observed during the first two months of the Project. Other events and issues that may become a risk to the Project were not recognized during this reporting period.

(2) Term September 2015 to February 2016

As mentioned at “1-1-2 (3) Provision of Machinery and Equipment”, procurement of PCSV was expected to delay. Hence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay and JICA Team took necessary actions as mentioned at “2.3 Action to be taken“ including postponing experts assignment.

(3) Term March 2016 to September 2016

As mentioned at “1-1-2 (3) Provision of Machinery and Equipment”, the procurement of the PCSV is expected to further delay. The PCSV PCSV was arrived in April 2016, however equipment to be fitted into the PCSV was expected to arrive in December 2016 and able to use in the Project from February 2017. This delay is expected to impact on the progress of procurement (Development) of Maintenance Management System, and Activity 1-4, 2-2, 2-3, 2-4, and 2-5.

(4) Term October 2016 to January 2017

The PCSV was procured to AACRA on January 16, 2017 approximately one year delay from the original schedule. Due to this delay, re-scheduling of the relevant activities and necessary measures to achieve the outputs required in the PDM including extension of overall project period was proposed by JICA Team.

(5) Term February 2017 to April 2017

As mentioned at the previous term, the JICA team has reschedule the activities to accommodate the delay of the procurement of PCSV. However it became clear that under the current contracted project period, the road inspection can be conducted only once and results to that database and maintenance plan are to be developed based on the limited inspection data.

(6) Term May 2017 to September 2017

There are continuous risks that road inspection can be conducted only once and database and maintenance are to be developed based on the limited inspection data. In order to accommodate the delay and to provide output based on full scale inspection data, JICA Team is currently consulting to JICA for the possible exertion of the project contracted period.

1-6 PROGRESS OF ACTIONS UNDERTAKEN BY JICA

After the amendment of contract was signed between JICA and JICA Team in January 2016, with a great effort of JICA Ethiopia, the PCSV was procured in April 2016, however, the equipment to be installed into the PCSV was delivered to AACRA on January 16, 2017 around 1 year delay from the original schedule. JICA is under consideration for the extension of the project contracted term for further 11 months which was proposed by JICA Team.

1-7 PROGRESS OF ACTIONS UNDERTAKEN BY GOV. OF ETHIOPIA

Thanks to the good cooperation and enthusiasm of Counterparts to the project, activities runs very smoothly and efficiently so far. Continuous involvement and support of Counterparts is very much appreciated for successful technical transfer of project output. Due to the re-structure of the AACRA announced in November, 2016, it is JICA Team's concern that some confusion may occur in each department and it will take time to return to the same service level as the level before the re-structuring.

In August 14, 2017, AACRA sent a letter to JICA Ethiopia Office to request an extension of the project period for 11 months up to the end of June, 2019, in order to conduct full scale road data collection and reflect to the road management system and prepare mid and long term road maintenance.

1-8 OTHER REMARKABLE/CONSIDERABLE ISSUES RELATED / AFFECT TO THE PROJECT

(Such as other JICA's projects, activities of Counterparts, other donors, private sectors, NGOs, etc.)

AACRA had a project called "Consultancy service for the study of permanent naming and code of road and transport infrastructure assets of Addis Ababa" which is an asset management study project with a period of service of 5 months (Feb – Jun. 2016). Objective of the consultancy include but not limited to developing permanent names and codes for identified transport infrastructures in Addis Ababa. This project is initiated by Addis Ababa Transport Program and Monitoring Office (TPMO) under World Bank fund. RAM of AACRA shared current numbering of Roads established by JICA Team to the concerned consultancy group.

2. DELAY OF WORK SCHEDULE AND/OR PROBLEMS (IF ANY)

2-1 DETAIL

(1) Term July 2015 to August 2015

No delay was observed during the first two months of the Project and the 1st JCC was held on 17th August 2015 as planned by JICA experts.

(2) Term September 2015 to February 2016

Procurement of PCSV was under the progress, and expected to be delivered in September 2016 as the earliest. This was nine months delay from the original schedule, and as consequence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay.

(3) Term March 2016 to September 2016

Procurement of equipment for PCSV is under the progress, and currently is to be delivered in December 2016 as the earliest, and be able to use for survey from February 2017 as earliest. This is 12 months delay from the original schedule, and as consequence, Procurement (Development) of Maintenance Management System and Activity 2-2, 2-3, 2-4, and 2-5 are expected to be further delay.

(4) Term Oct 2016 to January 2017

As mentioned previously, the PCSV was delivered to AACRA on January 16, 2017 around one year delay from the original schedule. Activities affected by the delay of the PCSV and the impact on the overall Project which will be caused by these activities' delay are summarized below.

Table 28 Effects on Activities and Impact on Project due to Vehicle's Delay

Act. No.	Activity	Effect by Delayed Vehicle	Impact on Project
1-4 (1)	Training for Inspection	Training Period for Vehicle shortened	Number of trained AACRA staff for vehicle decreased
1-4 (2)	Develop and Update the Database in AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update impossible Number of trained AACRA staff decreased
1-4 (3)	Prepare and revise short term /medium/.long term maintenance plan	Number of times for mid/long term m. plan is reduced from 2 to 1	Full-scale update impossible No revision of medium/long term maintenance plan
2-2	Conduct road inspection	Number of times for full-scale data collection is reduced from 2 to 1	Number of trained AACRA staff and their quality are decreased
2-3	Develop and update Database of AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update is impossible
2-4	Prepare and revise mid/long term M. plan	Number of times for full-scale data collection is reduced from 2 to 1	It is not possible to revise mid/long term M. plan.
2-5	Prepare annual road M. plan	The first plan is delayed from June-July, 2016 to June-July, 2017	No serious impact will be expected.

In order to achieve output, to the maximum extent, required in the PDM, the JICA Team has rescheduled the relevant activities affected by the delay of Vehicle supply and has proposed JICA to extend the term of Project for further 10 (ten) months.

(5) Term February 2017 to April 2017

Situation is same as the previous term

(6) Term May 2017 to September 2017

Situation is same as the previous term

2-2 CAUSE**(1) Term July 2015 to August 2015**

Not applicable for this term.

(2) Term September 2015 to February 2016

Due to need of amendment of contract for changing procurement owner of Pavement Condition Survey Vehicle to JICA, actual procedure has been delayed.

(3) Term March 2016 to September 2016

Since the change on procurement owner in January 2016 as described in at "1-1-2 (3) Provision of Machinery and Equipment", there was a further delay on procurement procedure for equipment for Pavement Condition Survey Vehicle at JICA headquarter. Tender notice was published in June 2016, tender was held in July 2016, a

contractor was selected in August 2016 and contracted with JICA headquarter.

(4) Term October 2016 to January 2017

After manufacturing and shipping, the equipment for PCSV arrived at Bole Airport, Addis Ababa, on 15 Nov. 2016 and was delivered to AACRA on 16 January 2017 after 2 months custom clearance. Equipment was assembled on to vehicle from 23 January 2017 to 30 January 2017. On 31 January 2017, the Pavement Condition Survey Vehicle was officially handed over to AACRA. After 2 weeks training operation and data analysis of the PCSV, the data collection was started by AACRA staff. Total delay in the equipment procurement from the original plan is 13 months.

(5) Term February 2017 to April 2017

As mentioned at the previous monitoring period, the project activities are delayed due to the delay in the procurement of the PCSV.

(6) Term May 2017 to September 2017

Same as the previous term.

2-3 ACTION TO BE TAKEN

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

JICA Headquarter preceded the procurement of Pavement Condition Survey Vehicle as a priority issue, so that the PCSV could arrive as earliest as possible to conduct activities proposed under the Project. Meanwhile, JICA Team provided necessary support for procurement as required, at the same time, conducted following actions; 1) Reschedule assignment of JICA experts, considering the feasible delivery schedule of the PCSV, 2) Provide training on relevant activities, 3) Develop Road Maintenance Management System using existing data, and 4) Formulate plans not requiring Pavement Condition Survey Vehicle.

(3) Term March 2016 to September 2016

The selected contractor is currently proceeding the procurement of equipment for Pavement Condition Survey Vehicle and JICA headquarter is providing the necessary supports for smooth delivery of procedure. At the same time, JICA Team is currently discussing the potential solution to make up this delay affecting data collection and resulting data quality requiring for road maintenance planning.

(4) Term October 2016 to January 2017

As described in 2-1 (4), several activities are affected by the delay of the Pavement Condition Survey Vehicle. Since the seasonal constraint, namely no field work in the rainy season, exists in Addis Ababa, to extend the term of Project is the sole solution in order to carry out all activities as planned, and JICA Team has started discussion with JICA regarding the possibility of the Project's term extension.

Meanwhile, JICA Team will take following measures in order to recover the delay even if only slightly.

- JICA Team will try to conduct highly concentrated lectures and training
- In order to keep AACRA staff the sense of tension, JICA Experts will decrease the duration of their each stay in Addis Ababa and increase the number of their visit to Addis Ababa. (The total MM is unchanged.)

(5) Term February 2017 to April 2017

JICA team has continuous discussions with JICA on the extension of the project term to cover the full road inspection, reflect data into road management system and prepare mid and long term maintenance plan. Meanwhile JICA team is working in accordance with the re-scheduled project activities.

(6) Term May 2017 to September 2017

JICA team is working in accordance with the re-scheduled project activities in conducting road inspection, development of Road Management System and Mid/Long maintenance planning. JICA team has also continuous discussions with JICA.

2-4 ROLES OF RESPONSIBLE PERSONS/ORGANIZATION (JICA, GOV. OF ETHIOPIA, ETC.)

- Procurement of Pavement Condition Survey Vehicle (Equipment to be assembled): JICA Headquarter
- Procurement of Pavement Condition Survey Vehicle (Vehicle): JICA Ethiopia Office

3. MODIFICATION OF PROJECT IMPLEMENTATION PLAN

3-1 MODIFICATION OF PDM AND PO

(1) Version 1

The Project proposed a modification of PDM from that outlined in R/D (signed in April 2015) to better correspond the circumstances of the Project. This proposal was approved by the 1st JCC on August 17, 2015 and reported to JICA Ethiopia Office and JICA Headquarter at a later date. PO was altered accordingly.

(2) Version 2

PDM was updated for 1) verification indicator, 2) addition of activity “ Development of Visual Inspection Supporting System” into Activity 2-2, 3) addition of activity “Develop Road Maintenance Management System” into Activity 2-4, 4) Experts of Japanese side, 5) extra item for provision of machinery and equipment in accordance with the contract amended in January 2016. PO was also altered accordingly. The modification was informed to JICA Ethiopia Office prior to the 2nd JCC, and approved at the 2nd JCC.

(3) Version 3

After the review of “Objective verifiable indicator” under activity 0-2, modification have been made on “Means of Verification”.

(4) Version 4

Through the discussion in TAC 5 and agreement made in TAC 6 (January 27 2017; detailed record of the 6th TAC is to be described in the next Monitoring Sheet Version 5). 80% is inserted into the target value of Objectively Variable Indicators for Project Purpose No. 3. With respect to other target values which have not been inserted any figure, all attendances to TAC 6 agreed that these values should be decided after observation actual figure for a while.

(5) Version 4 A

No modification was made at version 4A.

(6) Version 5 Draft

No modification was made at version 5 Draft.

3-2 OTHER MODIFICATIONS ON DETAILED IMPLEMENTATION PLAN

(1) Version 1

No other modification made for version 1.

(2) Version 2

Total experts assignment for Ethiopia has increased 0.5 MM which in total 72.50 MM.

(3) Version 3

No other modification made for version 3.

(4) Version 4

No other modification made for version 4.

(5) Version 4A

No other modification made for version 4A.

(6) Version 5 Draft

No other modification made for version 5 Draft.

4. PREPARATION OF GOV. OF ETHIOPIA TOWARD AFTER COMPLETION OF THE PROJECT

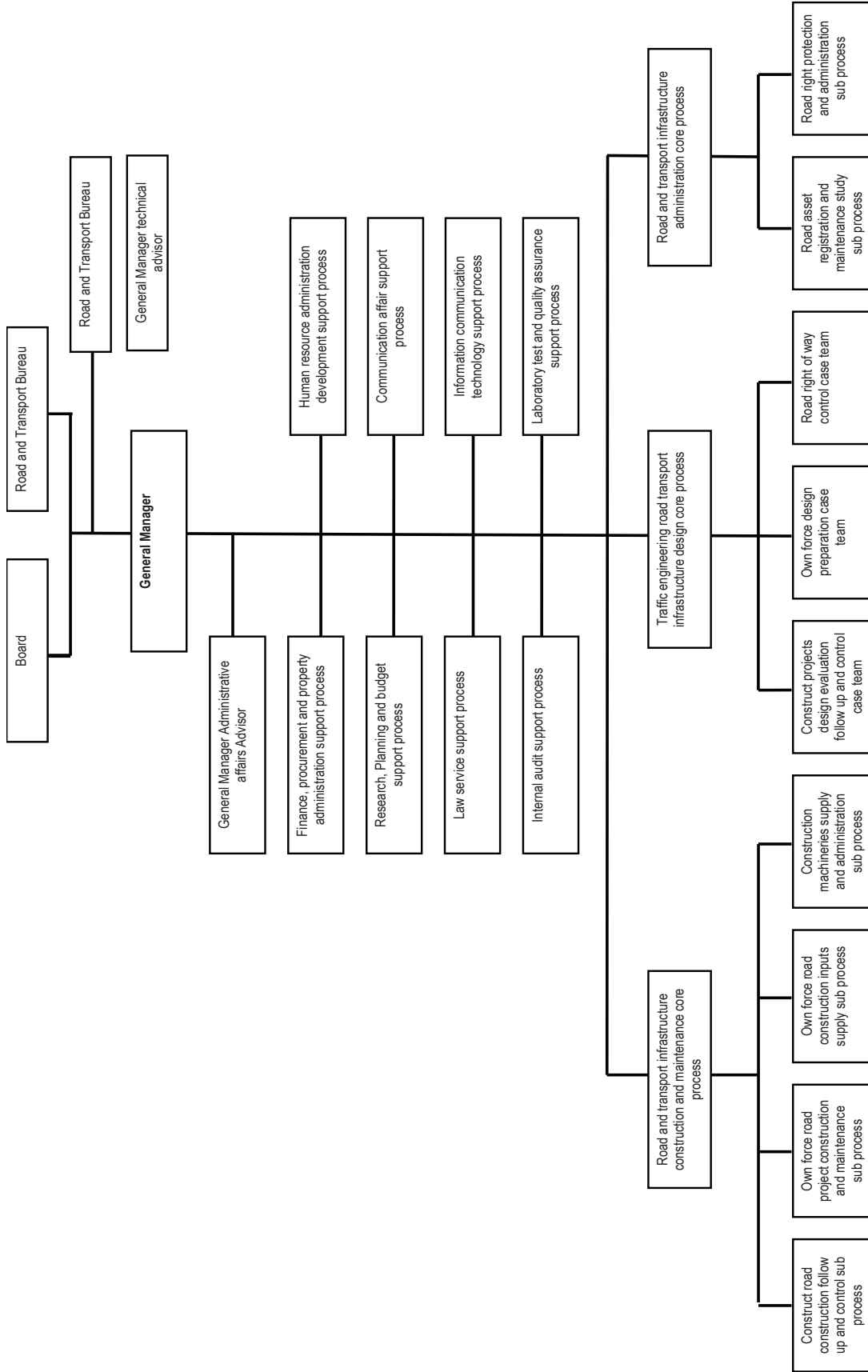
To be added as the Project progresses.

II. PROJECT MONITORING SHEET I & II

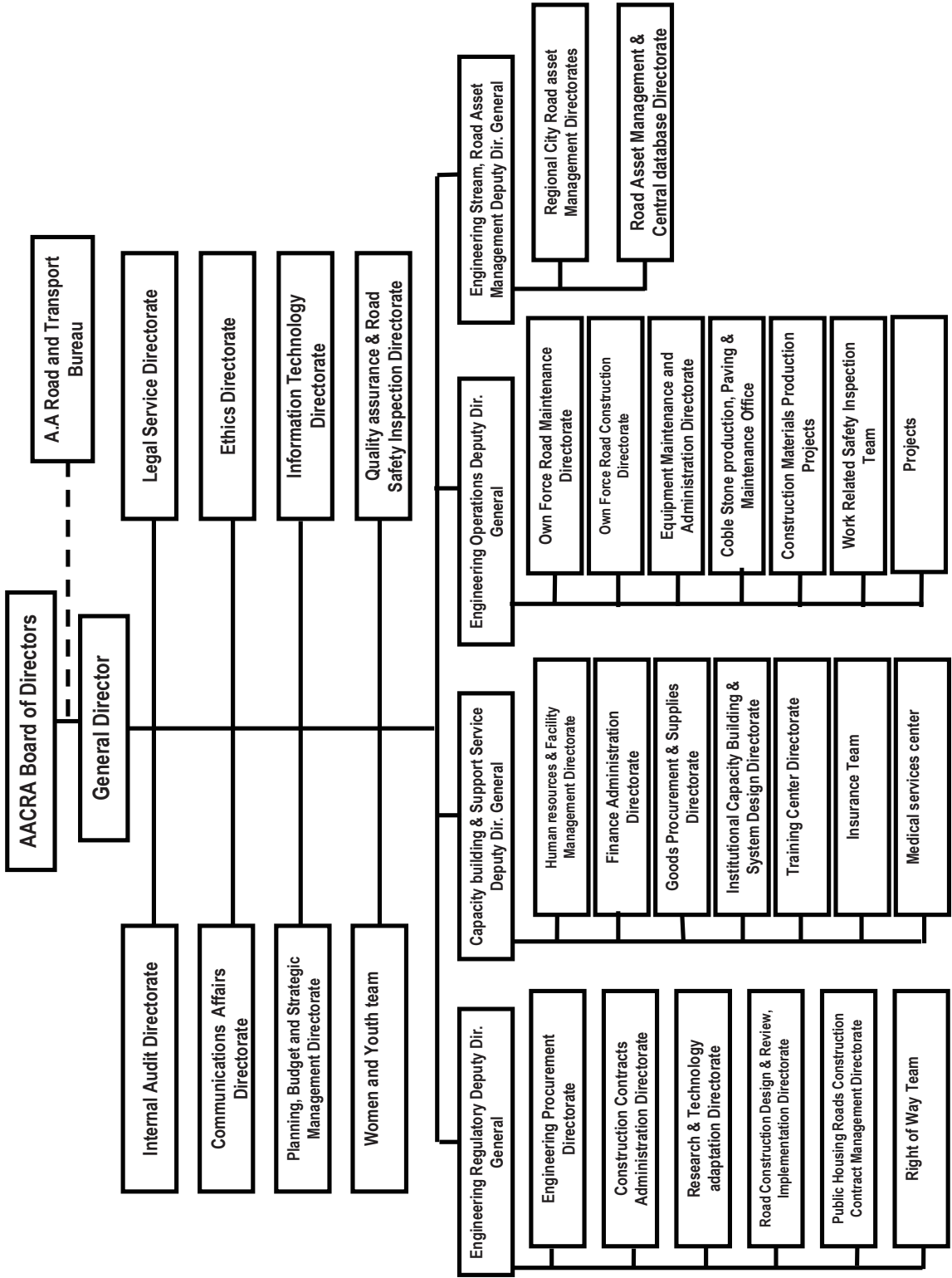
See the attached.

Appendix 1

Addis Ababa City Roads Authority Org. Structure (OLD)

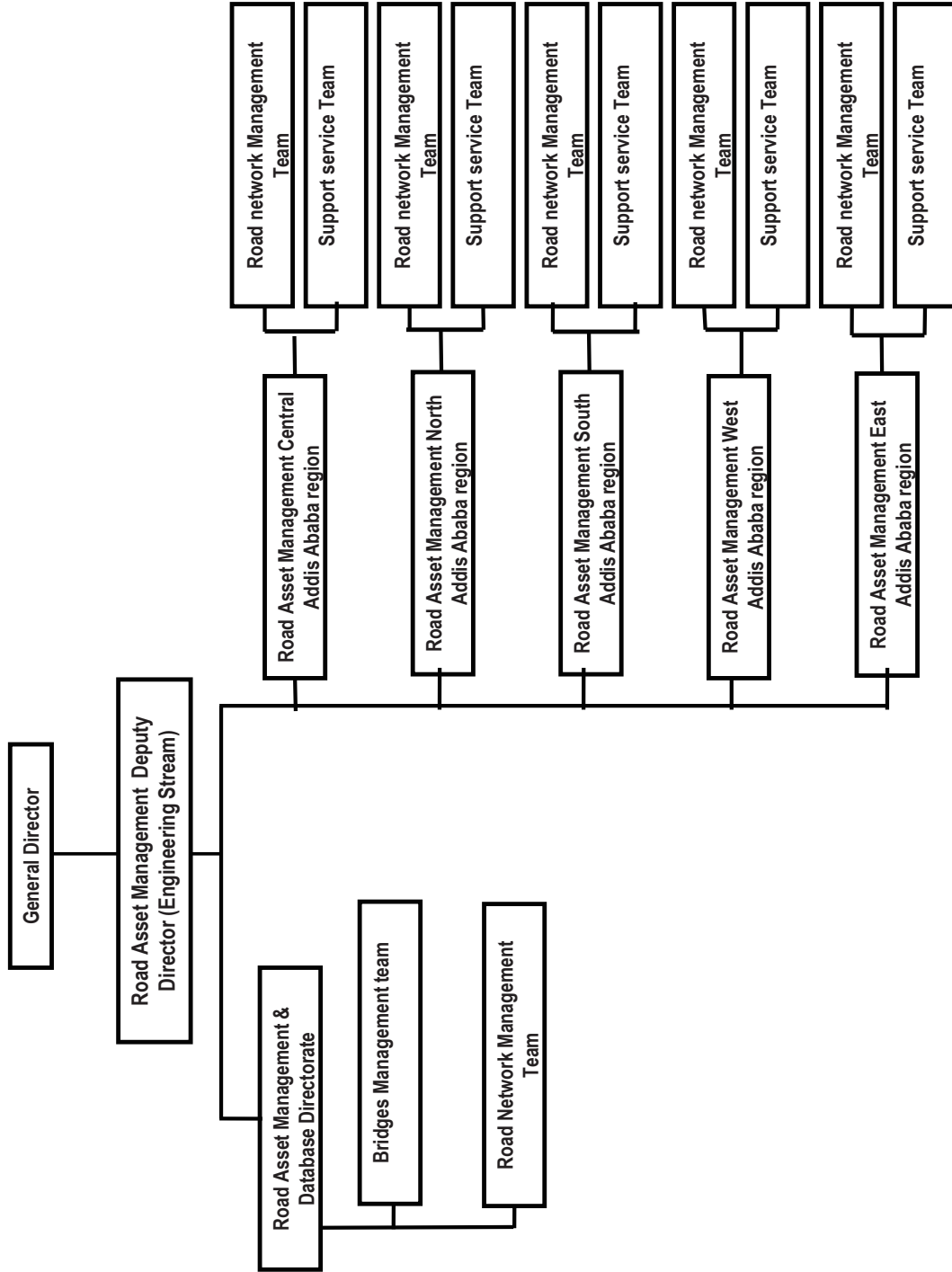


Addis Ababa City Roads Authority Org. Structure (NEW)



Appendix 3

AACRA Engineering Stream, Road Asset Management Org. Structure (NEW)



Appendix 4

Detail of Selected Location																								
No.	2																							
Old Road Number	69																							
New Road Number	P002, S-14, S-1																							
Road Class	PAS4																							
Drawing	Picture																							
<table border="1"> <thead> <tr> <th>No.</th> <th>Defect</th> <th>Unit</th> <th>Qty</th> </tr> </thead> <tbody> <tr> <td>①</td> <td>Pothole</td> <td>m2</td> <td>140.8</td> </tr> <tr> <td>②</td> <td>Pothole</td> <td>m2</td> <td>54.3</td> </tr> <tr> <td>③</td> <td>Crocodile Crack</td> <td>m2</td> <td>45.5</td> </tr> <tr> <td rowspan="2">Total</td> <td>Crocodile Crack</td> <td>m</td> <td>45.50</td> </tr> <tr> <td>Pothole</td> <td>m2</td> <td>195.10</td> </tr> </tbody> </table>		No.	Defect	Unit	Qty	①	Pothole	m2	140.8	②	Pothole	m2	54.3	③	Crocodile Crack	m2	45.5	Total	Crocodile Crack	m	45.50	Pothole	m2	195.10
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<p>③</p>																								

Project Monitoring Sheet I(Revision of the Project Design Matrix)

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Version 5

Implementing Agency: Addis Ababa City Roads Authority (AACRA)


Dated 4th Oct. 2017

Target Group: Staff of Addis Ababa City Roads Authority (AACRA)

Period of Project: 10/Jul/2015 - 9/Jul/2018

Project Site: Addis Ababa City

Model Site: Pilot project sites are to be determined

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important	Achievement	%
Overall Goal The roads in Addis Ababa City are maintained in a sustainable way.	Three years after the completion of the Project, 1. XX % of roads under AACRA is below the targeted roughness of YY. 2.The length(km) of road under AACRA inspected by the standardized method is increased by XX % compared to 3 months before the project completion.	1. Road inventory and Inspection Data in Addis Ababa City 2. Road inventory and Inspection Data in Addis Ababa City			N/A
Project Purpose The management capacity of AACRA for road maintenance is enhanced.	By 3 months before the completion of the Project, 1. AACRA's capacity to secure the budget for road maintenance is enhanced. 2. Road maintenance works based on PDCA ⁴ cycle established by the Project are executed by AACRA. 3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in AACRA Annual Road Maintenance Plan, exceeds 80% since the 3rd project year.	1. Interview to Addis Ababa City Administration and Road Funds Agency on Baseline and Endline data 2. Evaluation Result by PDCA Checklist 3. Baseline data (Maintenance record 2015-2016 and Road Maintenance Plan), AACRA Annual Road Maintenance Plan, AACRA Maintenance Historical Record	1.Human resources necessary for the road maintenance are continuously assigned by AACRA. 2.Financial resources are allocated by the City Administration and Road Funds Agency in a sustainable manner.	In Progress: Baseline data from Addis Ababa City Administration is yet to be obtain. In Progress: PDCA Checklist (ver.1) is developed. Currently operation method in consideration to inspection equipment and road management system is under development. In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.	N/A N/A N/A
Outputs 1. The implementation structure of AACRA for road maintenance is improved.	1-1. Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 5th JCC August 2017. 1-2. Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by August 2017 to be incorporated into the budget FY Jul/2017 - Jun/2018 if necessarily. 1-3. More than XX% of the requested budget on the basis of Annual Road Maintenance Plan are allocated since the 3rd project year. 1-4 Trainings on road maintenance is conducted targeting AACRA staff 1-5 Public understanding and cooperation on road maintenance is enhanced.	1-1. Compiled suggestions, Project meeting record 1-2. The Road Map, Minutes of JCC 1-3. Baseline data(Requested and allocated budget on annual road maintenance plan 2015-2016), AACRA annual report (Budget Plan), AACRA Annual Road Maintenance Plan 1-4. Training Record 1-5. PR outputs	The AACRA staff capacitated by the Project continue to work for their respective positions.	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussions are required after role and responsibility of each section under new AACRA structure is clarified. In Progress: AACRA re structured in November 2016. Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for external communication and further strengthening of institution. In Progress: Baseline data is yet to be obtained	50% 50% 0%
2. The process for formulating road maintenance plans is established.	2-1. PDCA Checklist is developed by January 2016. 2-2. AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 3rd project year. 2-3. AACRA Annual and Mid/Long term road maintenance plan are formulated in consideration of Life Cycle Cost on Road	2-1. PDCA checklist, Minutes of JCC 2-2. PDCA Checklist, ACCRA Annual and Mid/Long term road maintenance plan, Road Maintenance Management System 2-3. ACCRA Annual and Mid/Long term road maintenance plan, AACRA Maintenance Historical Record		In Progress: As of September 2017, 38 lectures and 18 OJTs, and two trainings in Japan were conducted. In Progress: Leaflet on Activity 2 was prepared and distributed. One seminar was held in April 2017. In Progress: Checklist version 1 was developed. Version will be updates as necessary through the operation. In Progress: Framework for RMMS and planning procedure were agreed. Currently RMMS is currently under development. Due to the delayed supply of the Pavement Condition Survey Vehicle, both of the development of RMMS and Mid/Long Term Maintenance Plan are delayed accordingly.	75% 20% 100% 50%
3. The maintenance skills and knowledge of AACRA technical staff are improved.	3-1. Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted. 3-2. Number of preventive maintenance works executed are increased through the implementation of the project.	3-1 Training Record, Report on Pilot Project 3-2. Baseline data(Maintenance record 2015-2016), AACRA Maintenance History Record, AACRA Annual Road Maintenance Plan		In Progress: Approach and formulation process for road maintenance planning have been agreed. Annual In Progress: 11 lectures and 11 OJT relevant to maintenance skill and knowledge were conducted. In Progress: Concept and importance of Preventive Maintenance should be shared first among all stake holders.	50% 70% 30%
Activities	Inputs		Important Assumption		
1-1 Review implementation structure of AACRA, and compile suggestions for the structure improvement. 1-2 Convene Technical Advisory Committee (TAC)	The Japanese Side 1. Experts • Chief Advisor/Road Maintenance • Road Maintenance Planning • Road Inspection (Site Survey) • Road Inspection (Database) • Maintenance Management System • Maintenance Design • Construction Supervision • Training Planning • Monitoring • System Development • Others as necessary	The Ethiopian Side 1. Personnel • Project Director • Project Manager • Counterpart personnel 2. Provision of the project office and facilities necessary for the project implementation 3. Traffic survey and pilot projects in Addis Ababa City 4. Administrative and operational expenses necessary for the project implementation • Electricity, water, communication, etc. • Local traveling costs and daily subsistence allowance (DSA) for counterpart personnel 5. Others as necessary	1. The turnover of AACRA staff does not profoundly affect the project activities. 2. Natural disasters, such as floods, do not profoundly affect the project activities.		
1-3 Prepare a training plan for AACRA Staff					
1-4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.					
1-5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance					
1-6 Promote public relations (PR) activities on road maintenance in the City					
2-1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed					
2-2 Conduct road inspections in the City					
2-3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.					
2-4 Prepare and revise Medium/Long term Road Maintenance Plan using Road Maintenance Management System developed under the project.					
2-5 Prepare Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project.					
3-1 Select pilot projects for maintenance works based on the Annual Road Maintenance Plan formulated under the Project					
3-2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process					
3-3 Conduct the detailed investigations and design specifications of the pilot projects					
3-4 Assist AACRA to execute pilot projects					
3-5 Feedback achievements and experiences of pilot projects into the next Annual Road Maintenance Plan					
3-6 Organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level					
					
				<Issues and countermeasures>	

Project Monitoring Sheet II (Revision of the Plan of Operation)

Version 5

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Dated 5th Apr. 2017

Inputs	Plan	1st EthFY				2nd EthFY				3rd EthFY				Remarks	Monitoring		
		2015		2016		2017		2018		Issue	Solution						
		III	IV	I	II	III	IV	I	II			III					
Expert	Actual																
Chief Advisor/Road Maintenance	Plan																
Deputy Chief Advisor/ Road Maintenance/ Maintenance Management System	Actual																
Road Maintenance Plan	Plan																
Road Inspection (Site Survey)	Actual													1MM of 2016 is held to meet the delay of inspection vehicle	Assignment was rescheduled		
Road Inspection (Database)	Plan													1MM of 2016 is held to meet the delay of inspection vehicle	Assignment was rescheduled		
Road Maintenance Design	Actual																
Construction Supervision	Plan																
Training Plan	Actual																
Monitoring	Plan																
System Development	Actual																
Equipment *A: to be used for the Project Activities	Plan																
Inspection Equipment (Pavement Condition Survey Vehicle)	Actual													Vehicle has arrived. Equipment was delivered to AACRA on 16 Jan., 2017.			
Structural Investigation Equipment	Plan													Completed			
Maintenance Management System	Actual													Due to delay of inspection equipment, system development is behind schedule			
Visual Inspection Supporting System	Plan													Completed			
Training in Japan	Actual																
Training for Counterpart Personnel	Plan													2nd Training in Japan was conducted			
In-country/Third country Training	Plan																
Not Appreciable	Actual																
Activities	Plan																
Sub-Activities	Actual																
Output 1: The implementation structure of AACRA for road maintenance is improved.																	
1.1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	Plan													JICA	AACRA	In progress	
1.2 Convene Technical Advisory Committee (TAC)	Actual													JICA	AACRA	6 TACs conducted	
1.3 Prepare a training plan for AACRA Staff	Plan													JICA	AACRA	Plan has developed and training implementing schedule developed accordingly.	
1.4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.	Actual													JICA	AACRA	38 lectures and 18 OJTs on Act. 2-2, 2-3, 2-4, 2-5, 3-1 and 3-3, two training in Japan were conducted	
1.5 Share information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	Plan													JICA	AACRA	Internal communication flow has been proposed	
1.6 Promote public relations (PR) activities on road maintenance in the City	Actual													JICA	AACRA	Leaflet on Activity 2 was prepared, 1 Seminar was held.	
Output 2: The process for formulating road maintenance plans is established.																	
2.1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	Plan													JICA	AACRA	Review is in progress, PDCA Checklist (ver.1) is prepared.	
2.2 Conduct road inspections in the City	Actual													JICA	AACRA	Visual Inspection Support System is developed. Visual, Emergency and Schedule Inspection have been conducted	
2.3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.	Plan													JICA	AACRA	Input of inventory data has been completed	
2.4 Prepare and revise Medium/Long term Road Maintenance Plan based on the above inventory data	Actual													JICA	AACRA	Planning approach has been agreed. Road Management System is currently under development	
2.5 Prepare Annual Road Maintenance Plan	Plan													JICA	AACRA	Planning procedure has been agreed. The Annual Road Maintenance Plan was developed.	
Output 3: The maintenance skills and knowledge of AACRA technical staff are improved.																	
3.1 Select pilot projects for maintenance works from the annual road maintenance plan	Plan													JICA	AACRA	The first pilot project was selected in September - October 2016.	
3.2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process	Actual													JICA	AACRA	Information on 1st pilot project was shared before and after the implementation. For the 2nd pilot project, it will be shared toward the end of 2017.	
3.3 Conduct the detailed investigations and design specifications of the pilot projects	Plan													JICA	AACRA	Discussion is ongoing for the 2nd pilot project.	
3.4 Assist AACRA to execute pilot projects	Actual													JICA	AACRA	Implementation of first pilot project was started in Nov., 2016 and completed in February 2017.	
3.5 Feedback achievements and experiences of pilot projects into the next annual road maintenance plan	Plan													JICA	AACRA	Feedback of the first pilot project was provided.	
3.6 Organize a workshop/seminar of the pilot projects for ERA and road agencies at regional and municipal level	Actual													JICA	AACRA		
Project Duration / Phasing	Plan																
	Actual																
Monitoring Plan	Plan																
	Actual																
Monitoring	Plan																
Joint Coordinating Committee	Actual																
Set-up the Detailed Plan of Operation	Plan																
Submission of Monitoring Sheet	Actual																
Monitoring Mission from Japan	Plan																
Joint Monitoring	Actual																
Reports/Documents	Plan																
Project Work Plan	Actual																
Project Completion Report	Plan																
	Actual																

■ Activities with fixed period
 ■ Activities to be continuously conducted, or with tentative schedule

TO CR of JICA Ethiopia OFFICE

PROJECT MONITORING SHEET**Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City****Version of the Sheet: Version 6A (Term: October 2017–March 2018)****Name: Mr. Hiroshi Honda****Title: Chief Advisor****Submission Date : 3rd April 2018****I. SUMMARY****1. PROGRESS**

The progress that has taken place in this term is as follows;

- 4 Lectures and 5 OJT (Activity 1-4)
- Development of Road Maintenance Management System continued (Activity 2-2 and 2-4)
- Data Input continued (Activity 2-3)
- Road Data Collection by RCSV and Analysis (Activity 2-2 and 2-3)
- Use the Structural Testing Instrument for Design of 2nd Pilot Project (Activity 3-3)
- Assist AACRA to implement 2nd Pilot Project (Activity 3-4)

1-1 PROGRESS OF INPUTS**1-1-1 The Japanese Side****(1) Experts**

In accordance with the amended contract agreed in January 2016 between JICA and JICA Team, number of experts has increased into a total 11 experts. Experts have been assigned since July 10, 2015, and at the end of March 2018, all experts have been assigned for a total of 59.17 Man/Month (hereinafter to be called “MM”) out of the project total assignment of 72.73 MM (assignment in Ethiopia only).

(2) Training of Counterparts Personnel

Under the Project, two trainings in Japan are planned. The first training in Japan was conducted from August 23 to September 6, 2016. The Second training was conducted from August 23, 2017 to September 6, 2017 for 16 days inviting 5 participants from AACRA.

(3) Provision of Machinery and Equipment

At the 1st Joint Coordination Committee meeting (hereinafter called “JCC”) held on August 17, 2015, specification of Inspection Equipment, which is a Pavement Condition Survey Vehicle (hereinafter called as “PCSV”) was approved by Counterparts.

Under the amended contract with JICA in January 2016, the procurement responsibility changed; 1) PCSV was procured directly by JICA Ethiopia, and equipment was procured by JICA headquarter. The rest of machinery and equipment were procured by JICA Team which are; 2) Structural Testing Instrument, and 3) Maintenance Management System and Visual Inspection Supporting System which are developed through the Project and transferred to Counterparts. At the 2nd Technical Advisory Committee meeting (hereinafter called “TAC”) held on October 27, 2015, JICA Team informed these changes to Counterparts.

So far, procurement of Visual Inspection Supporting System was completed in April 2016. Vehicle for the PCSV arrived in April 2016, and related tax payment and application of number plate completed in May 2016. The rest of equipment to be installed on the PCSV was delivered to AACRA on January 16, 2017 after two months of Custom Clearance. The PCSV assembly was completed at the end of January, and the

PCSV was handed over to AACRA on 31st January 2017. Out of the four computers, AACRA utilizes three at RAM office and one at JICA team office.

With regards to the Structural Testing Instrument, Dynamic Cone Penetrometer (hereinafter called DCP) was proposed during the 3rd JCC meeting held on 18th September 2016 and confirmed by AACRA after the discussions at the 4th JCC meeting. 2 sets of DCP with one Asphalt Core Cutter was procured by the end of June 2017 from Japan and arrived Addis Ababa on the 22nd July. After Customs clearance (completed on July 31st, 2017), two number of DCPs and a core-cutter machine was delivered to AACRA in August 2017. In addition, one set of Generator has been provided to power Core-cutter at the field.

Table 1 List of Equipment and Machinery to be procured

Equipment and Machinery	Component	Responsible Agency for Procurement	Original Planned procured Date	Expected procured Date*	Remark
Inspection Equipment (Pavement Condition Survey Vehicle)	<ul style="list-style-type: none"> 1 Vehicle Equipment to be fitted on the PCSV 	JICA	Sep. 2016	Vehicle was procured and transferred to AACRA in May 2016. A part of equipment (PCs) are procured in Apr. 2016, and the rest of equipment was delivered in January, 2017. PCSV assembly was completed at the end of January.	Completed on January 31, 2017.
Structural Testing Instrument	<ul style="list-style-type: none"> 2 set of DCP 1 set of Asphalt Core Cutter 1 set of Diesel generator (3kw) 	JICA Team	Jul. 2017	Instruments was procured by the end of June 2017 from Japan and arrived Addis Ababa on the 22 nd Jul. Generator was procured in September 2017 and transferred on Oct. 11, 2017.	Completed in October 2017.
Maintenance Management System	<ul style="list-style-type: none"> 1 set of Desktop Computer 1 GIS software 	JICA Team	Apr. 2016	Arc GIS was installed in April 2016. The whole system was delivered to AACRA in July 2017, after the completion of assembly of PCSV (the end of January, 2017).	Completed in July 2017.
Visual Inspection Supporting System	<ul style="list-style-type: none"> 5 set of Smartphone 1 GIS software 	JICA Team	Mar. 2016	Smartphone was procured in Feb. 2016, and GIS was installed in Apr. 2016.	Completed in Apr. 2016.

Note: "Expected procurement date" means Equipment and Machinery to be used for the project activities.

Besides above listed, JICA team procured 2 no. of PCs (1 no. is yet to be procured), 1 no. of Projector, and 1 no. of Printer for the operation of the project office.

(4) Local Expenses for the Project Activities

Local expense has been utilized for salary of national staff (Engineer and Accountant), office equipment, rent-a-car, and other consumables so far.

1-1-2 The Ethiopian Side

(1) Personnel

Project Manager was identified under Record of Discussion (hereinafter to be called as "R/D") and assigned in late August 2015. The rest of counterpart personnel was selected through the progress of the Project. In November 2015, three personnel for inspection activity have been assigned, and further two more road and transport engineers are assigned in June 2016. After new organization introduced in November 2016, number of counterpart personnel is considerably increased because 5 regional offices are newly provided in the road asset management department. In total approximately 16 personnel has been assigned as counterpart as of March 2018.

(2) Furnished Office Space and Facilities

Since the project commencement in July 2015, a project office (Room 318) has been allocated at Addis Ababa City Roads Authority (hereinafter to be called as “AACRA”). Office furniture were installed for eight experts.

(3) Traffic Survey and Pilot Project in Addis Ababa City

Based on the baseline survey, AACRA has not taken any traffic survey data so far even though AACRA promised to provide traffic survey data in M/D and, therefore, JICA Team is obliged to conduct the Project Activities without traffic survey data.

(4) Administrative and Operational Expense

Expense agreed at R/D has been secured and handled by the Ethiopian Side.

1-2 PROGRESS OF ACTIVITIES

The Project activities to achieve the project purpose under Work Plan were agreed at the 1st JCC held on August 17, 2015. The activities described in Project Design Matrix (hereinafter to be called as “PDM”) is summarized in the Table 2 shown below. Progress of each activity is described accordingly in the sections that follow.

Table 2 Outline of Project Activities

PROJECT PURPOSE: The Management capacity of AACRA for road maintenance is enhanced

Outputs	Act no.	Activities
Overall	0-1	Preparation, Updating and Review of Work Plan and Monitoring Sheet
	0-2	Baseline Survey and Performance Indicator
	0-3	JCC and TAC meeting
	0-4	Training in Japan
	0-5	Project Completion Report
Output 1: The implementation structure of AACRA for road maintenance is improved.	1-1	Review Implementation Structure of AACRA, and compile suggestions for the structure improvement
	1-2	Convene TAC
	1-3	Prepare training Plan for AACRA Staff
	1-4	Conduct training for AACRA Staff for road maintenance; road inspection, maintenance planning, maintenance management system, etc.
	1-5	Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance
	1-6	Promote Public Relation activities on road maintenance in the City
Output 2: The Process for formulating road maintenance plans is established	2-1	Review the road maintenance cycle of AACRA, compile PDCA Checklist, and revise the checklist if needed.
	2-2	Conduct Road Inspection in the City
	2-3	Develop and Update the Road Inventory (database) of AACRA, including road condition, traffic volume, nit costs, etc.
	2-4	Prepare and revise Mid and Long Term Road Maintenance Plan using road Maintenance Management System developed under the Project
	2-5	Prepare and Revise Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project
Output 3: The Maintenance skills and knowledge of AACRA Technical staff are improved	3-1	Select Pilot Projects for maintenance work based on the Annual Road Maintenance Plan formulated under the Project
	3-2	Share information of Pilot Project between/within Road Asset Management Process and Constructional and maintenance Process
	3-3	Conduct the detailed Investigation and design specification of the pilot projects
	3-4	Assist AACRA to execute Implementing Pilot Project
	3-5	Feedback achievements and experience of pilot projects into the next annual road maintenance plan
	3-6	Organize Workshop/Seminar of Pilot Project for ERA and Road agencies at regional and municipal level

1-2-1 ORGANIZATION STRUCTURE

Due to the reorganization of AACRA announced on 11th November, 2016, restructuring of the each department is underway, therefore, the list of counterpart personnel was revised.

In this monitoring sheet, name of relevant division will be called using old name for activities up to the end of November 2016, and new names for activities after December 2016. In April 2017 during the 4th JCC, the new structure of AACRA was presented. Key changes or revisions in this new organization is summarized as follows.

- ♦ 4 Deputy General Directors who are in charge of (1) Engineering Regulatory, (2) Capacity Building & Support Service, (3) Engineering Operation and (4) Engineering Stream and Road Asset Management, are assigned under Director General of AACRA.
- ♦ Decentralization of Road Asset Management Division, dividing into 5 regional offices located in different parts of the city and a Central Data Base Management Department located at the head office of AACRA.

Table 3 Changing Name of Division Related to the Project

Up to November 2016	After December 2016
Road Transport Infrastructure, Construction and Maintenance Core Process (C&M)	Engineering Regulatory (Labo. Design, Contract are included)
Traffic Engineering, Road Transport Infrastructure Design Core Process (RTD)	Capacity Building & Support Service (HR, Finance, Training are included)
Road and Transport Infrastructure Administration Core Process (Department of Road Asset Registration and Maintenance is included (RAM))	Engineering Operation (Own force Road Maintenance, Own Force Road Construction, Plant & Equipment are included)
-	Engineering Stream, Road Asset Management (Central Database and 5 no. of Regional Road Asset Management offices (Central, North, South, West and East) are included) (RAM)

1-2-2 ACTIVITIES FOR OVERALL

(1) **ACTIVITY 0-1** Preparation, Updating and Review of Work Plan and Monitoring Sheet

1) Kick off Meetings

Kick off meeting was held on July 15, 2015 in order to 1) obtain more understanding of the JICA project, 2) comprehend function of the concerned parties in and outside of AACRA, and 3) arrange the 1st JCC. Participants from AACRA were the General Manager, the Technical Advisor, Managers from Road Transportation Construction and Maintenance Core Process (C&M), Road Transport Design Core Process (RTD), and engineers from Road Asset Registration Maintenance Planning Sub Process (RAM).

Besides, Counterparts and JICA experts made a courtesy visit Addis Ababa City Road & Transportation Bureau, and Road Funds Agency to introduce and obtain their cooperation to the Project. JICA experts also visited the Embassy of Japan in Ethiopia.

2) Work Plan

The draft Work Plan was discussed with JICA Headquarter on July 13, 2015, and agreed at the 1st JCC held on August 17, 2015. However, due to the procurement delay of the equipment to be installed on the PCSV, the overall work plan was revised as attached in the Project Monitoring Sheet II (PM Form 3-3).

3) Monitoring Sheets

Every six months, monitoring sheets are updated based on the discussions made with Counterparts, and submitted to JICA Ethiopia Office. Following shows the scheduled submission of monitoring sheet.

Table 4 Schedule of Monitoring Sheet Submission

Project Year	Version	Date
1st year (July 2015-June 2016)	Monitoring Sheet Version 1	Agreed and submitted on August 20, 2015
	Monitoring Sheet Version 2	Agreed on February 18, 2016
2nd year (July 2016-June 2017)	Monitoring Sheet Version 3	Agreed and submitted on September 15, 2016
	Monitoring Sheet Version 4	Agreed and submitted on January 27, 2017
	Monitoring Sheet Version 4A	Agreed and submitted on April 5, 2017
3rd year (July 2017-June 2018)	Monitoring Sheet Version 5	Agreed and submitted on October 4, 2017
	Monitoring Sheet Version 6	Submitted in February 28, 2018 (to JICA only)
	Monitoring Sheet Version 6A	To be submitted in April 2018

(2) ACTIVITY 0-2 Baseline Survey and Performance Indicator

Performance indicators (hereinafter called “Objectively Verifiable Indicator”), which are to evaluate the achievement level of the Project stated PDM, was planned to be set within six months from the project commencement. The baseline survey was conducted and JICA Team proposed to consult with City Council of Addis Ababa on performance indicators and means of verification on “Overall Goal” and “Project Purpose”. However due to requirements of an official letter from the Mayor, consultation was not yet organised. The issue was addressed to AACRA at the 2nd and 5th TAC, and agreed that AACRA is to communicate with Addis Ababa City Administration on this issue, however it is yet to be organised as of March 2018.

Considering the difficulty to consult with City Council of Addis Ababa, JICA Team revised the Indicator on “Project Purpose” and “Output” with Counterparts and consulted to JICA Ethiopia Office for approval prior to the 2nd JCC. At the 2nd JCC, proposed indicators were approved. In September 2016, the JICA Team revised the indicator and means of verification based on the baseline survey.

Discussion on the Figure for the achievement of target roughness at Overall Goal will be initiated by the JICA Team at the 6th JCC based on the result of the on-going survey. In terms of indicator using the achievement of the Maintenance plan, the JICA Team has developed a system which AACRA can obtain the achievement level. The indicators are described in “1.3 Achievement of the Outputs” and “1.4 Achievement of the Project Purpose” of this paper.

(3) ACTIVITY 0-3 Joint Coordination Committee and Technical Advisory Committee

Outline of Joint Coordination Committee (hereinafter called as “JCC”) and Technical Advisory Committee (hereinafter called as “TAC”) is summarized in Table 5. The member of JCC was set as agreed at R/D and assigned in September 2015, and member of TAC was assigned after the 1st JCC. Working Groups (hereinafter called as “WGs”) are set up as required through the course of project. It was confirmed in November 2016 by AACRA that the name of JCC and TAC members are updated based on the restructuring of AACRA. Members before and after restructuring are presented in below.

Table 5 Outline of JCC and TAC before AACRA re-structuring Before November 2016

Committee	Members		Frequency	Function
Joint Coordinating Committee (JCC)	[Ethiopia Side] • General Director of AACRA (Project Director) • Director of AACRA RAM (Project Manager) • Director of AACRA RTD • Director of AACRA C&M • AACRA other related Department • Addis Ababa City Road and Transport bureau • Addis Ababa City Administration • Road Funds Agency	[Japanese Side] • JICA Experts • JICA Ethiopia Office • Embassy of Japan in Ethiopia	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee	[Ethiopia Side] • AACRA Project Director • AACRA Project Manager of RAM(Acting	[Japanese Side] • JICA Experts	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by

Committee	Members	Frequency	Function
(TAC)	<ul style="list-style-type: none"> Chairperson) AACRA RTD) AACRA C&M AACRA other related Department 		Project Director, Project Manager, Counterpart personnel, and JICA experts.

NOTE:

- Road Transportation Construction and Maintenance Core Process : C&M
- Road Transport Design Core Process :RTD
- Road Asset Registration Maintenance planning Sub Process: RAM

Table 6 Outline of JCC and TAC after AACRA re-structuring After December 2016

Committee	Members	Frequency	Function	
Joint Coordinating Committee (JCC)	<p>[Ethiopia Side]</p> <ul style="list-style-type: none"> General Director of AACRA(Project Director) Deputy Director General of AACRA Engineering Stream, Road Asset Management (Project Manager) Director of AACRA RAMDD Director of AACRA CMDRID Director of AACRA OFRMD Director of AACRA Planning, Budget and Strategic Management Directorate Director of AACRA Regional Asset Management Director of AACRA Research & Technology Adaptation Directorate Director General of Human Resources & Facility Management Directorate Director of AACRA other related Directorate Addis Ababa City Road and Transport bureau Addis Ababa City Administration Road Funds Agency 	<p>[Japanese Side]</p> <ul style="list-style-type: none"> JICA Experts JICA Ethiopia Office Embassy of Japan in Ethiopia 	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee (TAC)	<p>[Ethiopia Side]</p> <ul style="list-style-type: none"> General Director of AACRA Deputy Director General of AACRA Engineering Stream, Road Asset Management (Project Manager) Director of AACRA RAMDD Director of AACRA CMDRID Director of AACRA OFRMD Director of AACRA other related Department 	<p>[Japanese Side]</p> <ul style="list-style-type: none"> JICA Experts 	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by Project Director, Project Manager, Counterpart personnel, and JICA experts.

NOTE:

- Own Force Road Maintenance Directorate : OFRMD
- Road Construction Maintenance Design Review and Implementation Directorate : CMDRID
- Road Asset Management and Database Directorate : RAMDD

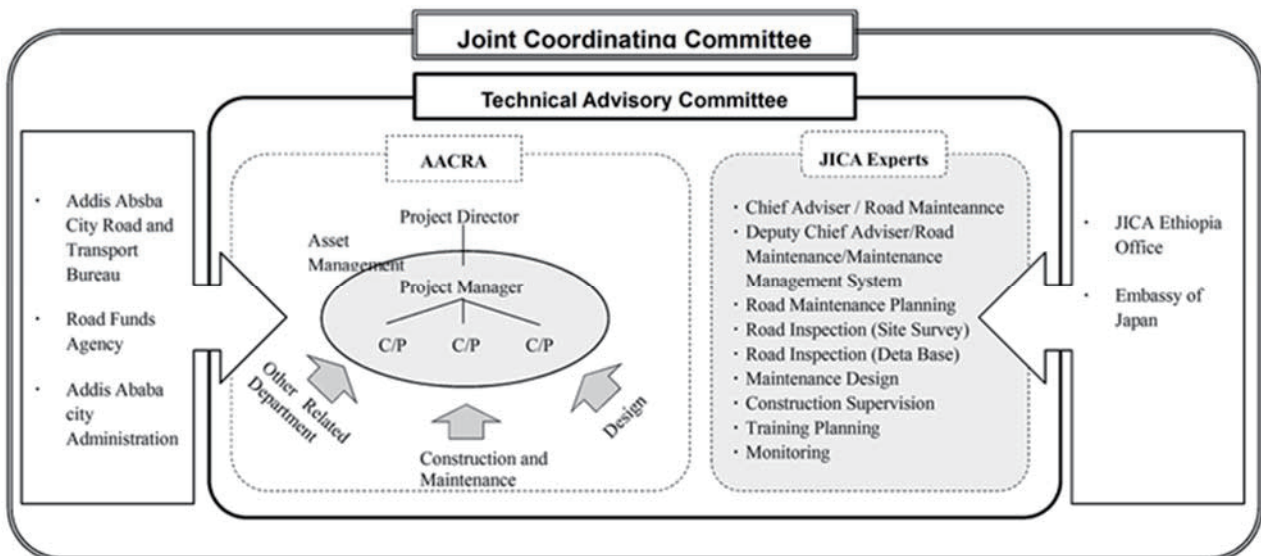


Figure 1 Structure of JCC and TAC

1) 1st JCC

The 1st JCC was held on August 17, 2015, chaired by the General Manager of AACRA, Eng. Fekadu Haile with total of 18 participants. At the meeting, revised PDM, monitoring sheet, and specification for procurement goods were approved. In addition, following items were requested and agreed on 1) Review of exiting quality of road maintenance works carried out by supervision consultants, 2) Immediate process for procurement of Pavement Condition Survey Vehicle.

2) 2nd JCC

The 2nd JCC is held on February 18, 2016, with a total 23 participants. Progress of activities including database preparation and inspection were informed, and smartphones for Visual Inspection Supporting System were handed over. The General Manager of AACRA pointed out the following points; 1) Addis Ababa's Drainage during rainy season which affecting road condition will be studied under a project funded by World Bank (WB)¹, 2) Acceleration of Procurement of Pavement Condition Survey Vehicle, and 3) need of clear justification for replacing the existing system to new system to be developed under the Project (road numbering system, road maintenance system, etc.)

3) 3rd JCC

The 3rd JCC is held on September 15, 2016, chaired by Eng. Habtamu Tegegne, the General Director of AACRA newly appointed in August, 2016, with a total 20 participants. After the explanation of progress of each activity carried out by both counterpart and JICA Team, revision of PDM, selection of Pilot project and 1st Training in Japan (conducted from end of Aug. to early Sep. 2016) were reported and discussed. After the discussion, matters confirmed and agreed by JCC were (1) AACRA has serious concern about the delay of equipment supply into the Pavement Condition survey Vehicle, (2) AACRA has an intention to reorganize the its structure and request to JICA Team to adjust the work schedule considering the revised organization, (3) AACRA's new management gives the first priority on the update of the road network in Addis Ababa and request JICA Team to accelerate activities such as Maintenance Plan and Pilot project, and (4) AACRA requests the supply of Instrument for Structural Test should be supplied on time in order not to further delay in the project.

In the closing remarks, Eng. Habtamu Tegegne, GD of AACRA, mentioned that he was very pleased to hear the report of Training in Japan and hoped trainees committedly apply and contribute knowledge learnt, and serve as bridge between AACRA and JICA Team.

4) 4th JCC

The 4th JCC was held on April 4, 2017, chaired by Eng. Habtamu Tegegne, the General Director of AACRA, with 23 participants. At the meeting, following were reported; project progress, Activity Schedule, Revision of the Project Design Matrix and Presentation on Pavement Condition Survey Vehicle and Data collection and Restructuring of AACRA and Decentralization of Road Asset Management. In addition, delay in the project and needs of extending project period, procurement of the type of Structural Testing Instrument, restructuring of AACRA organization and AACRA's desire for more training opportunities were discussed during the meeting. .

5) 5th JCC

The 5th JCC was held on October 4, 2017, chaired by Eng. Habtamu Tegegne, the General Director of AACRA, with 21 participants. At the meeting, following the report on the progress of each activity, three special reports was presented which are (1) Structural Investigation Instrument, (2) Overview of Road Maintenance Management System (RMMS), and (3) the 2nd Training in Japan. JICA Team also pointed out the delay in the progress of Data Collection and Development of the RMMS for about 1 year due to the delayed procurement of the PCSV. AACRA has also expressed their serious concern on such as delay, sustainability of survey system, and technology transfer from Japan to Ethiopia as described in the signed MM of the meeting. With respect to the delay in the Data Collection and Development of RMMS, Mr. Kondo, Representative of the Project from JICA HQ replied to the request of Extension of Time (EOT) made by Eng. Habtamu, that the need of EOT would be relayed to JICA HQ for subsequent approval and

¹ The Project on drainage funded by WB has not been implemented yet as of September 2017.

fulfilling of the necessary procedures.

Table 7 JCC Held during the Project (as of March, 2018)

No.	Date	Participants
1st	August 17, 2015	In total of 18 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
2nd	February 18, 2016	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
3rd	September 15, 2016	In total of 20 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.
4th	April 4, 2017	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.
5th	October 4, 2017	In total of 21 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA headquarter and JICA Team.
6th	April 3, 2018	To be updated

(4) ACTIVITY 0-4 Training in Japan

At the 1st TAC, JICA Team explained the outline of Training in Japan. Two trainings during the project period of three years were conducted. The first training in Japan was conducted from August 23 to September 6, 2016, inviting five staff members from Road Asset Registration and Maintenance Planning Sub Process of AACRA. Two of the participants were traffic engineers while the rest are Road Asset inspectors. The second training was conducted from August 23 to September 6 2017 focused on Procedure of Road Asset Management and Repair Method. The three participants were from Regional Road Asset Management, two were from AACRA Own Force Construction and Management.

(5) ACTIVITY 0-5 Project Completion Report

Project Completion Report is planned to be submitted in May 2019.

1-2-3 OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is improved

(1) ACTIVITY 1-1 Review Implementation Structure of AACRA, and Compile Suggestions for the Structure Improvement

Since July 2015, JICA Team have been reviewing the road maintenance implementation structure of AACRA with Counterparts through discussions, interviews, questionnaire survey and site visits. Based on the findings, some improvements have been proposed at TACs such as involvement of RTD to maintenance design.

In November 2016 AACRA announced a new organization structure as mentioned earlier. The project was designed prior to the restructuring and decentralization of the Asset Management Department. Further investigation and evaluation of the new organization are currently carried out through interviews and careful observation. Especially regards to the inspection work, team member of inspection may be revised.

Draft Questionnaire to obtain the comments from the AACRA staff on the current organization arrangement, is prepared and will be discussed at the 6th JCC. After the clarification of role and responsibility of relevant division to the Project, the compiled suggestions will be proposed to AACRA at the 7th JCC (September 2018). Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by March 2019.

(2) ACTIVITY 1-2 Convene Technical Advisory Committee (TAC)

To date of March 2018, six TAC meetings were held as shown in the table below. For further detail, please refer to Minutes of meetings. TAC meeting has not been held since the January 2017 due to the restructuring

of the AACRA. The needs of TAC will be discussed during the 6th JCC. As of the technical issues and concern at the site levels has been addressed through trainings and OJTs.

Table 8 TAC during the Project (as of March 2018)

TAC	date	participants	Topic discussed	Action agreed/proposed
1st	Sep. 7, 2015	In total of 13 JICA experts: 3 AACRA: 10	<ul style="list-style-type: none"> Progress of the Project Challenges on road patrol Strategic road and database setup Inclusion of city administration 	<ul style="list-style-type: none"> AACRA proposed to clarify the demarcation of C&M, Supervision consultant, and RAM through the progress of the Project. JICA Team confirmed that drainage inspection and planning will be included.
2nd	Oct. 27, 2015	In total of 13 JICA experts: 5 AACRA: 8	<ul style="list-style-type: none"> Review of the last TAC Method of road patrol, progress 	<ul style="list-style-type: none"> Maintenance plan based on visual inspection data will be prepared by February 2016 Temperature digital gauge will be procured from Japan² Minimum length of road segment is to be confirmed, Communication with City Administration will be improved Lecture on Kaizen will be hold at the beginning of next year.
3rd	Mar. 22, 2016	In total of 9 JICA experts: 3 AACRA: 6	<ul style="list-style-type: none"> Progress of the Project Network centre for Road Numbering Application of Road Management System for AACRA Customised Mobile Inspection System Training in Japan <p>Besides, Report on Application of the Road Management System for Addis Ababa City Roads Authority was submitted.</p>	<ul style="list-style-type: none"> Adopt Leghar as centre of road network and will be report to GM. Local and Collector streets will be included in numbering of roads Set up and complete road inventory database and input inspection data will be conducted prior to the next TAC meeting
4th	Jul. 15, 2016	In total of 12 JICA experts: 6 AACRA: 6	<ul style="list-style-type: none"> Progress of the Project Workshop for Selection of Design Pilot Project Structural Investigation Instruments Necessity of Road Maintenance Handbook 	<ul style="list-style-type: none"> Road Maintenance Handbook will be prepared Structural investigation instrument will be discussed later. JCC to be hold one day between Sep. 13 and 15 of 2016.
5th	Sep. 26, 2016	In total of 12 JICA experts: 3 AACRA 9	<ul style="list-style-type: none"> Progress of the Project Revision of some points of PDM which are pointed by Monitoring Expert. Request AACRA to arrange a meeting with City Administration 	<ul style="list-style-type: none"> Proposal of the revision will be exchanged by both parties before the 4th JCC scheduled in March 2017 AACRA committed to arrange the meeting with City Administration during next visit of Mr. Honda
6th	January 27, 2017		<ul style="list-style-type: none"> Progress of the Project New organization structure of AACRA Pavement Condition Survey Vehicle Pilot Project 	<p>Note: Based on the new organization structure of AACRA, the chairperson of TAC is changed from Mr. Melaku (Technical Advisor) to Mr. Demelash (Deputy Director General – Road asset management).</p> <ul style="list-style-type: none"> It will take time to complete the establishment of new AACRA organization. It was informed that the PCSV was delivered to AACRA on January 16 and assembling would be completed by the end of January 2017.

(3) **ACTIVITY 1-3 Prepare Training Plan for AACRA Staff**

At the 1st TAC, JICA Team presented a training policy for each training scheme on Training in Addis Ababa (OJT and Lecture) and Training in Japan. Training in Addis Ababa is that lecture and OJT are conducted in combination, which approx. one lecture by JICA Team, followed by 2 weeks of OJT lead by AACRA staff aiming to develop theoretical and practical knowledge and skill on road maintenance. Whereas training in Japan will provide training by Japanese experts in the field so that AACRA staff can gain knowledge and experience on advanced technologies.

Training Plan was prepared in February 2016 and revised in August 2016, which summarises training courses (focusing on Activity 2-2, 2-3, 2-4, 2-5, 3-1,3-3,3-4 and 3-5), content covers, target trainees (mainly

²The temperature digital gauge was provided in February 2016.

RAM members), frequency etc.

In addition to the above training course, based on the JICA Ethiopia advice made in August 2016 to hold a seminar for introducing this Project to other stakeholders including ERA, RF, WB, and Universities, JICA Team agreed and held the seminar on April 18, 2017.

Besides the above, Workshop/Seminar will be provided targeting ERA and Road agencies, which is addressed under Activity 3-6.

(4) ACTIVITY 1-4 Conduct Training for AACRA Staff on Road Maintenance; Road Inspection, Maintenance Planning, Maintenance Management System, etc.

1) Trainings

JICA Team have been conducting training in accordance with the Training Implementation schedule. To date, 41 lectures and 23 OJTs were conducted under the project as summarized in the table shown below.

a. Training for Activity 2-2: Conduct Road Inspections in the City

From August 2015, a series of trainings has been provided on periodic and emergency patrolling including operation of Visual Inspection Supporting System. However, errors were found in collected data on distress and damage identification, method of measuring distresses, distress dimensions etc. Thus, JICA Team extended training on Inspection for further 6 months. Kaizen method was introduced to RAM staff by JICA expert which enable them to tackle their problems through consulting, discussion in groups and organizing regular meetings to schedule and use their resources effectively among themselves. Full scale 1st training (lecture and OJT) for automatic inspection using PCSV was conducted from February 1 to 13, 2017 (9 days). On September 22, 2017, 1 day training for PCSV system maintenance was also provided. From October 2017 to January 2018, lectures and OJT on the mobile data registration have been conducted. Further training will be continuously provided.

b. Training for Activity 2-3: Develop and Update the Road Inventory (database) of AACRA

Initial training on concept and setup of road network inventory was offered. Full scale data collection, was conducted for February 1 – 13, 2017 (9 days).

c. Training for Activity 2-4 and 2-5: Prepare and Revise Short / Medium / Long Term Road Maintenance Plan

As of September 2017, trainings (7 lectures and 1 OJTs) on road maintenance planning have been offered. Trainees have so far improved their knowledge and skill sufficiently. In 5th JCC held on October 4, 2017, the detailed presentation including demonstration of the RMMS was conducted. Once the system is developed, further training will be provided.

d. Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification

As of September 2017, 7 lectures have been held. Especially for this term, after the procurement of structural testing instruments, training on Introduction Dynamic Cone Penetrometer and Introduction UK DCP3.1 were provided in July and August 2017. Actual testing work in the areas selected as the second pilot project was conducted in October and November, 2017. 3 (three) locations were selected as the second pilot project in November 2017 through the joint inspection.

e. Training for Activity 3-4 and 3-5: Selection of Pilot Project

Considering the scale, the damage severity and the expected repair method, the location and repair method of the 1st Pilot Project was decided in November 2016 through joint site investigation among JICA Team, Construction (Repair Maintenance) Department, and RAM. A series of OJT were offered from October – December 2017 on site selection and repair method related to the first pilot project.

Table 9 Training Implemented during the Project (as of March 2018)

Training Courses	Style	Date	Participants no.
A: Training for Activity 2-2: Conduct Road Inspections in the City			

		Training Courses	Style	Date	Participants no.	
A1 inspection (Emergency patrolling)	Visual	A1-1 Concept of emergency patrolling	Lecture	11 Sep. 2015	11 RAM members	
		A1-2 How to carry out emergency patrolling	Lecture	14 Sep. 2015	RAM members	
			Lecture	9 Oct. 2015	11 RAM members	
			OJT	15-22 Sep. 2015	11 RAM members	
		A1-3 How to process geo-tagged photographs	Lecture	15 Sep. 2015	11 RAM members	
OJT	16-22.Sep., 2015		11 RAM members			
A2 inspection (Periodic inspection)	Visual	A2-1: Revision of Visual inspection	Lecture	15, Jun. 2016	13 RAM members	
			Lecture	20 Jun. 2016	13 RAM members	
			Lecture	22 Jun. 2016	13 RAM members	
		A2-2: Visual Inspection using mobile system	Lecture	17 Feb. 2016	11 RAM members	
			Lecture	23 Feb. 2016	RAM members	
			Lecture	8 Mar. 2016	RAM members	
			Lecture	18 Apr. 2016	RAM members	
			Lecture	24 Oct. 2016	RAM members	
			Lecture	25 July 2017	RAM members	
			OJT	3 Feb.2016	11 RAM members	
OJT	20 Apr. 2016	11 RAM members				
A3 Scheduled inspection	Scheduled	A3-1: Introduction of inspection vehicle	Lecture	20 Aug. 2015	11 RAM members	
			Lecture	1 Feb. 2017	RAM members	
		A3-2 :Revision of visual inspection	Lecture	15 Oct. 2016	12 RAM members	
		A3-3: Training for operation of PCSV and analysis of the data.	Lecture	1– 13 Feb. 2017 (9 days)	20-25 RAMDD members (Morning)	
		A3-4: Training for operation of PCSV and analysis of the data (Field work).	OJT	1– 13 Feb. 2017 (9 days)	20-25 RAMDD members (Afternoon)	
		A3-5: PCSV system maintenance	Lecture	22 Sep. 2017	RAMDD members	
		A3-6 Mobile Data Registration Method	OJT	11 Oct. 2017	RAM member	
		A3-7 Vehicle Inspection Review	Lecture	26 Jan. 2018	8 RAM members	
		A3-8 Follow up Mobile Inspection System and Data Registration 2	Lecture	29 Jan. 2018	7 RAM members	
A3-9 Mobile Inspection and Data Registration	OJT	30 Jan. 2018	5 RAM members			
B: Training for Activity 2-3 : Develop and Update the Road Inventory (database) of AACRA						
B1 Restructuring of road network		B1-1 Concept of revised road network system (road numbering)				
			B1-2 Setup of road network inventory	Lecture	29 Oct. 2015	10 RAM member
				Lecture	16 Dec. 2015	10 RAM members
				OJT	16-27 Dec. 2015	10 RAM members
B2 GIS		B2-1 GIS Database Preparation for CS Roads	Lecture	26 Jan. 2018	7 RAM member	
C Training for Activity 2-4 and 2-5: Prepare and revise short / medium / long term road maintenance plan						
C1 Road priority and service level		C1-1: Road priority and service level for AACRA	Lecture	19 May. 2016	11 RAM members	
C2 Road Management System–Kyoto Model		C2-1: Introduction of Kyoto model	Lecture	11 Aug. 2016	11 RAM members	
			Lecture	20 Aug. 2015	11 RAM members	
			Lecture	26 July 2017	RAM members	
C3: Mid/long-term maintenance planning		C3-1: Difference between Kyoto model result and mid/long-term plan		Conducted as the seminar in April		
			C3-2: Mid/long-term maintenance planning	Lecture	26 July 2017	RAM members
C4 Annual Maintenance Planning	Annual	C4-1 Annual Maintenance Planning	Lecture	11 Sep. 2015	3 RAM members	
			Lecture	19 May 2016	RAM members	
			OJT	6 May 2016	6 RAM members	
D Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification						
D-1 Type of deterioration of pavement	Type of	D1-1 Type of damage maintenance	Lecture	2 Aug 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member	
			Lecture	9 Aug. 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member	
		D1-2 Repair method of Damage (construction method)	Lecture	19 Aug 2016	5 Member of RAM, 1 RTD, 1 C&M Member	

Training Courses		Style	Date	Participants no.
D-2 Repair Method	D2-1 Selection of Repair Method	Lecture	15 Sep. 2016	at the 3rd JCC
D-3 Structural Instrument	D3-1 Selection of inspection instrument	Lecture	15 Sep. 2016	Member of Laboratory (Research and Technology Adaptation technology)
	D3-2: Introduction Dynamic Cone Penetrometer	Lecture	28 July 2017	Member of Laboratory
	D3-3 Introduction UK DCP 3.1	Lecture	2 August 2017	Member of Laboratory
	D3-4 Method and Procedure of Maintenance Design	OJT	7 Nov. 2017	Construction and Design
E Training for Activity 3-4 and 3-5 Assist AACRA to execute pilot projects & feedback achievement & experience				
E-1 Preparation of Pilot Project	E1-0 Joint Site Investigation	OJT	28 Oct. 2016	2 from Construction, 2 from RAM
	E1-1 Selection of Construction method	Lecture	11 Nov. 2016	10 member of C&M
	E1-2 List up of material, equipment, signboard, manpower	Lecture	14. Nov. 2016	2 members of C&M
	E1-3 Joint Site Inspection	OJT	16 Oct. 2017	5 C&M
E-2 Preparation & Confirmation of asphalt mix	E2-1 Check Asphalt mix design	Lecture	29-30 Oct. 2016	5 members
	E2-2 Trial mix and test the contents of each material			
	E2-3 Temperature management of hot mix	OJT	29 Nov. 2016	2 members of C&M
E-3 Improper Work	E3-1: Procedure of work & Temperature management	Lecture	11 Nov. 2016	10 member of C&M
	E3-2: Typical mistake during the work			
E-4 Repair Method	E4-1: Crack sealing and Safety Measures	OJT	23 Nov. 2016	Engineers and Site supervisors
		OJT	24 Nov. 2016	
		OJT	25 Nov. 2016	
		OJT	28 Nov. 2016	
	E4-2: Patching and Pothole patching and Safety Measures	OJT	29 Nov. 2016	
		OJT	2 Dec. 2016	
		OJT	3 Dec. 2016	
		OJT	30 Nov. 2016	
		OJT	1 Dec. 2016	
		OJT	14 Jan. 2018	
E4-3 Implementation Methodology	OJT	14 Jan. 2018		



a) Lecture on how to use DCP data (Nov. 2016)



b) OJT on how to use Dip Stick for road roughness measurement

Figure 2 Photos of Training

2) Seminar

A seminar titled the “1st Seminar on the Project for Development of Road Maintenance Capacity of Addis Ababa City” was held on April 18, 2017 at Addis Ababa city. Professor Kobayashi from Kyoto University was invited as the key lecturer to make a presentation for “infrastructure Asset Management”. Professor Kobayashi is also the leader in the development of ‘Kyoto Model’ together with PASCO which is the base frame of the RMMS to be developed in the project. Total participants were approximately 100 people from Government agencies, Universities and AACRA. Agenda was as follows:

Table 10 Agenda for the 1st Seminar

Time	Title	Speaker
8:00	Reception	
8:30-8:40	Open Remark	AACRA Representative (Eng. Habtamu Tegegne, the General Director of AACRA)
8:40-9:00	Project Outline	Mr. Hiroshi HONDA(Project Manager, JICA Project Team)
9:00-10:30	Infrastructure Asset Management	Professor Dr. Kiyoshi KOBAYASHI (Kyoto University)
10:30-10:50	Tea Break	
10:50-11:20	Output performed in the Project	Eng. Mesert Abera (AACRA)
11:20-11:40	Asphalt Pavement Preservation and Management	Dr.Habtamu Zelelew (Lucy Consulting Engineers)
11:40-12:00	Road Fund and Road Maintenance in Ethiopia	Ato Alebachew Ahmed (Ethiopia Road Fund Office)
12:00-12:30	Discussion	
12:30-12:40	Key Note	JICA Representative (Mr. Takeshi Matsuyama)
12:40-12:50	Closing Remark	AACRA Representative (Eng. Habtamu Tegegne, the General Director of AACRA)
12:50-14:20	Lunch	

Table 11 Number of Participants

Organizations	Number
Government of Ethiopia	17
Universities	9
Private companies	11
AACRA	47
JICA Ethiopia, Embassy of Japan	4
JICA Team	6
Total	94



a) Professor Kobayashi



b) Participants

Figure 3 Photos of 1st Seminar (April 2017)**3) Technical Support**

Technical support has been by the supplier of PCSV as a part of service as required. In September 2017, due to the some technical issue on vehicle program. In addition, in March 2018, PCSV system was updated.

(5) ACTIVITY 1-5 Share Information of road condition in the City with Road Funds Agency and the City Administrations to request budget for road maintenance

At the 1st TAC, JICA Team and Counterparts developed a draft internal communication system among RAM, C&M, and RTD. Based on the proposed system, each department is communicating with other departments. Study on communication system between RAM and C&M, as well as external parties concerned such as City Council of Addis Ababa and Road Fund Agency is still on going and will be discussed in July 2018.

(6) ACTIVITY 1-6 Promote Public Relations

At the 1st TAC, in order to promote understanding of public, professional and relevant authorities of the

Project and importance of road maintenance, JICA Team presented Public Relation Policy as 1) use variety of media to deliver messages to wider public, 2) establish bidirectional communication, and 3) conduct maintenance activities with public participation. JICA Team is currently considering the next PR activities.

Table 12 PR Activities Conducted on the Project

Date	Responsible person	Means	Outline
June 2016	JICA Team and Road Inspection Team	a leaflet for road inspection team	under Activity 2, JICA Team prepared a leaflet for road inspection team that will help them explain their field activity to the community around their area of assignment
January 31, 2017	AACRA Communications Affairs Directorate	AACRA Internal information sharing on Handover ceremony of PCSV	with attendance of approx. 55 people including AACRA Director General, Deputy Director General, Directors, JICA, Embassy of Japan, Addis Ababa City Road and Transport Bureau. The ceremony was captured by AACRA Communications Affairs Directorate and a national newspaper and informed AACRA internally.
March 1, 2017	AACRA	Attendance of Conference	AACRA attended Japan Media Conference and presented the Progress of the Project
April 18, 2017	JICA Team and AACRA	Organize a Seminar	to disseminate the progress of project to relevant authorities and agencies in Addis Ababa inviting approximately 100 participants

1-2-4 OUTPUT 2: The Process for Formulating Road Maintenance Plans is established

(1) ACTIVITY 2-1 Review/Revise Road Maintenance Cycle of AACRA, Compile the PDCA Checklist and Revise the Checklist If Necessary

1) Review and Findings of Current Road Maintenance Cycle

Since August 2015, JICA Team reviewed the existing road maintenance cycle and the workflow of AACRA jointly with the Counterparts through interviews and lectures.

2) Ideal and Feasible Road Maintenance Cycle Framework

Based on the review and a series of discussions and lectures with AACRA, JICA Team formulated the Ideal Road Maintenance Cycle (version 1) adopting PDCA cycle and incorporating Road Maintenance Management System, Pavement Condition Survey Vehicle (PCSV), Visual Inspection Supporting System which are procured to AACRA through the Project. The version will be updated through the project progress and continuous discussions with Counterparts. Ver. 2 is currently prepared and will be discussed in July 2018.

3) PDCA Checklist

In order to monitor whether road maintenance works is implemented properly based on the PDCA cycle by AACRA and to examine further improvements, JICA Team with AACRA developed the PDCA checklist (version 1) containing check items and evaluation indexes. The checklist was presented at the 2nd JCC, and will be updated as required according to the future discussions.

(2) ACTIVITY 2-2 Conduct Road Inspection in the City

1) Review and Challenges of Road Inspection

On August 12, 2015, JICA Team conducted a field survey to understand issues and problems on periodic inspection and data management. It was found that road inspection and data collection have been conducted insufficiently to be used for decision making of maintenance implementation. Findings were reported at the 1st TAC.

2) Hierarchical Inspection Scheme

At the 1st TAC, JICA Team presented a draft Hierarchical Inspection Scheme of a) Visual inspection with Smartphone, b) Automatic Inspection using Pavement Condition Survey Vehicle, c) Structural Investigation. The proposal was approved by Counterparts. Currently inspection activities are conducted accordingly.

Table 13 Hierarchical Inspection Scheme (updated in March 2018)

Scheme		Measurement	Equipment	Target road	Inspection time	Frequency	Remark
Visual inspection	Periodic Inspection	Pothole, rutting, cracking, ravelling	Smartphone	Approx. 200 km (3.3 km/day)	Nov.– Mar.	As needed	Determine damage indicator, identify section for structural investigation
	Emergency Patrol & Inspection	Pothole, Major damage	Smartphone	scheduled	Sep. – Oct.	As needed	Identify light maintenance roads.
Automatic Inspection		IRI	Pavement Condition Survey Vehicle	All strategic and scheduled road. Approx. 500 km (50 km/day)	Oct. – Mar.	Scheduled	Identify roads to be visually inspected.
Structural Investigation		Structural defect	Structural investigation instruments	Depends on the result of inspection	Oc.– Nov.	Scheduled	Determine repair method

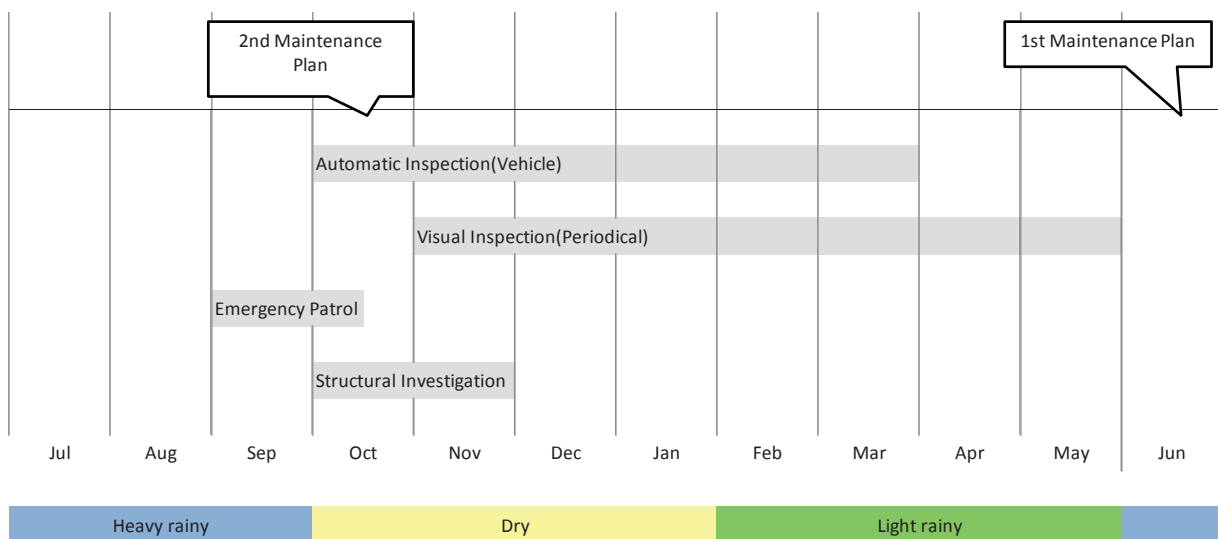


Figure 4 Inspection Schedule (updated in March 2018)

3) Development of Visual Inspection Supporting System

a. Development of the System

At the 1st JCC, JICA Team confirmed the needs of inspection support system in order to respond efficiently to public demand on road maintenance. Thus JICA added the procurement and development of Visual Inspection Supporting System into the project activity under the amended contract in January 2016. The system is composed of a) Field Reporting System and b) Visual Inspection Data Management Systems. The proposed functions of the system were presented and 5 smartphones have been procured and handed over to Counterparts at the 2nd JCC. JICA Team installed ArcGIS to the desktop set up the Project office and developed Visual Inspection Supporting System (version 1) in April 2016.

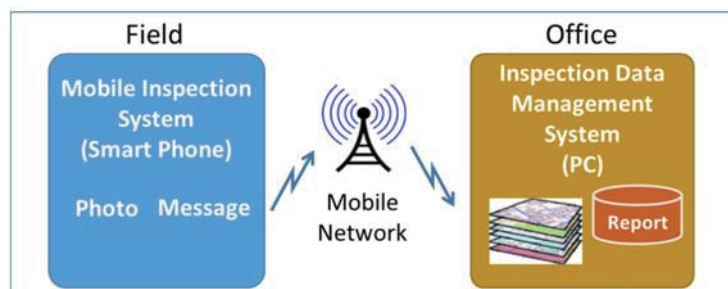


Figure 5 Visual Inspection Supporting System

b. Update of the System

The system has been upgraded and customized four times to meet the demands of AACRA. Training and OJT have been also provided at the time of version upgrade.

JICA Team conducted a field survey to monitor actual pavement distress data collection activities and data management using the system. Some shortcomings were noted such as lack of safety measures, inadequate use of scales. Moreover, comments to improve Field Reporting System and interfaces of Visual Inspection Data Management Systems (ArcGIS) were proposed and approved by RAM for action. In addition, pavement distresses common to Addis Ababa were closely looked at and grouping of distresses carried out to improve distress identification. This resulted in more customized inspection system and review of the Field Reporter application interface in to version 2 completed in June 2016. Version 3 was issued in May 2017, to accommodate some request from AACRA such as inclusion of pavement defects such as ravelling and Local and Collector class of roads. Version 4 was issued in October 2017 to accommodate the collection of data, pavement maintenance history etc.

Table 14 Upgrading history of Visual Inspection Supporting System

Version	Date	Upgraded context
Ver.1	April 2016	
Ver.2	June 2016	Customized inspection system and review of the Field Reporter application interface
Ver.3	May 2017	inclusion of pavement defects such as ravelling and Local and Collector class of roads
Ver.4	October 2017	accommodate the collection of data, pavement maintenance history etc.

4) Visual Inspection

After the restructuring of ACCRA, this activity is transferred to the regional offices.

a. Periodic Inspection

Inspection (paper based)

RAM organized two teams of four staff, so that each of the team is to conduct visual inspection. The inspection started in November 2015 and completed in May 2016. Within this period about 247 km of Roads (PAS, SAS, and RR) were inspected (of which 97% of roads is identified as Strategic) based on the new road numbering. It was learned that actual rate of inspection is 3.3 Km/day by two teams which is lesser than planned rate of 5 km/day. As confirmed also in the 2nd JCC meeting, the minimum section of road inspected is 100 m length. Data collected on papers was input to Excel-based database in December 2016.

Inspection using Visual Inspection Supporting System

From April 2016, RAM data collectors were trained on the job in how to utilize Visual Inspection Supporting System to collect data and the system is currently used to collect data. Compared to the previous visual data collection process, this smartphone based system offers several advantages in terms of speed, accuracy, clarity, safety, error-minimization, and objective rather than subjective data collection.

The 3rd round inspection, which is scheduled to start from November 2017 in accordance to the inspection schedule, is now been delayed due to the engagement of Regional Asset Management to other projects, and now plans to start from March 2018.

Following surmised schedule of site inspection conducted.

Table 15 Progress of Visual Inspection

Activity	Date
Training on Visual Inspection	February - June 2016
1st round Inspection	November 2015 - May 2016
2nd round Inspection	November 2016 – May 2017
3rd round Inspection	March 2018 - Ongoing



Figure 6 Training on Periodic Inspection using Visual Inspection Supporting System (May 19, 2016)

b. Emergency Patrol and Inspection

At the 1st JCC, the issue was raised on the reduction of service level due to many potholes after rainy season, and at the 2nd TAC, JICA Team introduced Emergency Patrol to detect significant pavement damage in the city for emergency recovering, especially after rainy season. The methodology was approved. Following the meeting, RAM carried out emergency patrols to collect basic information such as taking photos of section requires detailed inspection, and accordingly C&M conducted emergency recovery repairs. RAM conducted Emergency Patrol from mid-August 2016 and completed. The patrol for 2017 was started from the middle of September 2017 and completed October 2017.

Proposed methodology of emergency patrol is as follows.

Table 16 Proposed Emergency Patrol Methodology

Item	Description
Period	Heavy rainy season (Jul – Sep) and through the year
Team	2 data collector with 1 vehicle per team or more
Expected pace	30 km/day-team (3 teams for 1 months for paved)
Target damage	Significant damages which degrade the minimum service level (e.g. pothole in centre of carriageway)
Objective road	All paved road from higher hierarchy sections
Outputs	Location of the damages from Field Reporter Application which includes Photos (Both distant and close-up views), and data of distresses uploaded to GIS database

Following summarises schedule of Emergency inspection conducted.

Table 17 Progress of Emergency Inspection

Activity	Date
Training on Emergency Inspection	September – October 2015
Inspection in 2016	September – October 2016
Inspection in 2017	September – October 2017

5) Automatic Inspection

a. Automatic Inspection

Data items to be collected by Pavement Condition Survey Vehicle (PCSV) were presented at the 1st TAC. The PCSV was officially handed over to AACRA from JICA on January 31, 2017. The PCSV was delayed one year from the initial schedule as explained during the 1st JCC including mitigating methods to cope with the delay.

The user guide for Road Inspection and Data Processing were also provide by the supplier in March 2017. The inspection was started from February 14, 2017 after 2 weeks of vehicle operation training (February 1 – 13, 2017) conducted by JICA Team. As mentioned previously, the procurement of the equipment for Operation Manual and Inspection Schedule was developed by the JICA Team and provided to AACR in April 2017. The first condition survey was conducted from March to July 2017.

Table 18 Progress of Automatic Inspection

Activity	Date
Handover of PCSV	January 31, 2017
Training on PCSV	February 1 – 13. 2017 / September 22,2017
1st round Inspection using PCSV(Trial)	March - July, 2017
2 nd round Inspection using PCSV(Full Scale)	November 2017- May 2018
Re calibration after 1 year from handover	January 2018
Training on Screening survey using road image	January 2018



Figure 7 Road Inspection Using PCSV and Data Processing (First round)

The 2nd round full scale automatic survey has started in November 2017, delayed one months from originally planned due to the emergency inspection being very busy after rainy season, and currently ongoing to complete in May 2018. Records of the inspected road length and processed are shown in the below table.

Table 19 Result of the 2nd Automatic Survey and Processing during Nov. 2017 – Mar. 2018

Month	Inspected Road Length (km)		Data Processed R. L. (km)	
	Planned	Implemented	Planned	Implemented
Nov. 2017	150	126.9	150	126.9
Dec. 2017	300	268.31	300	268.31
*Jan. 2018	300	73	300	73
February	300	158	300	158

*Due to the annual calibration and system update, actual working days were very limited in January 2018.

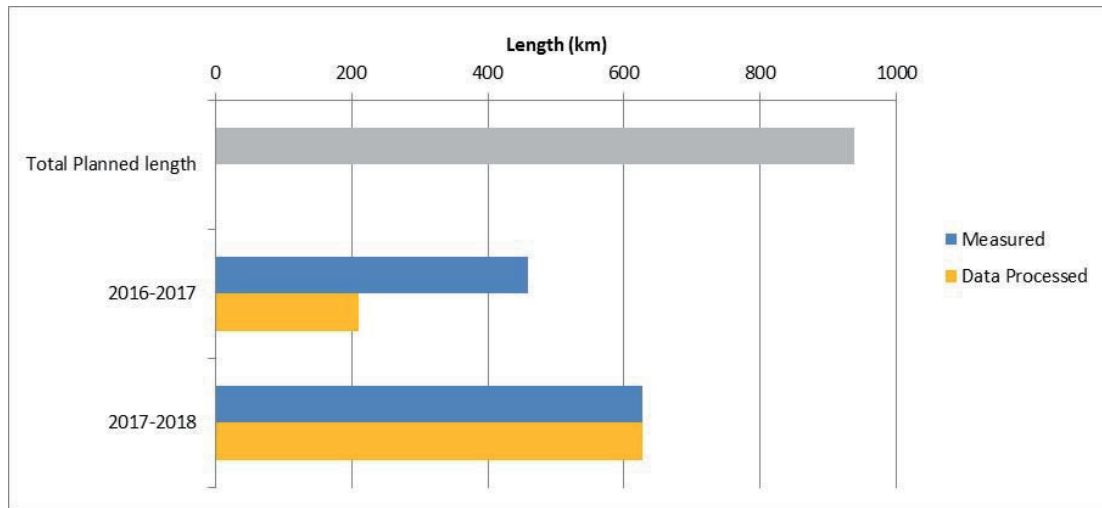


Figure 8 Progress of PCSV road inspection and Data processing (second Round)

b. Preparation of Road Inspection and Data Processing Manual for Pavement Condition Survey

Due to change of procurement method, Road Inspection and Data Processing Manual were provided by the supplier in March 2017.

6) Structural Investigation

Training provided is introduction to Dynamic Cone Penetrometer purpose and procedure of DCP test, safety measures during testing, procedure of data input, layer analysis, CBR and Structural number calculation, maintenance design using DCP test. The DCP test and the procedures learnt through the training were implemented in the 2nd Pilot project.

Table 20 Progress of Structural Investigation

Activity	Date
Handover of structure investigation instruments	August, 2017
Training	1 lecture at July and August, 2017
1st Inspection	Trial Inspection in Aug. 2017 after several WSs
2 nd Inspection	For selection and design of 2 nd Pilot Project





Figure 9 Photos on DCP Testing on Site (August 2017)

(3) ACTIVITY 2-3 Develop and Update Road Inventory (database) of AACRA, Including Road Condition, Traffic Volume, and Unit Costs, etc.

1) Review of Road Inventory Data

JICA Team reviewed existing road inventory data and found that AACRA manages road network data as Master Plan Road Network Data in Microsoft Excel format and updates annually. Network Data is composed from mainly seven data items of Road No, Road Name, Type, Width, Length, Carriageway Type, and Others. Through the review and discussions with Counterparts, challenges for road inventory database were identified as lack of connectivity between inventory table and road network map, random road numbering, unclear definition of road section, and inconsistent direction from start to end point.

2) Updating of Road Inventory Database System

The schedule of Database update is summarised in below table.

Table 21 Progress of Database Update

Activity	Frequency	Date
Step 1 Prepare Basic Inventory Information and Framework work of Road Inventory Database		March 2016
Step 2: Road Inventory (Database) Structure Preparation		November 2015 - December 2016
Step 3: Input Repair Information	Every year	June 2016 - December 2016 On-going for 2017
Step 4: Input Visual Inspection Results	Every year	December 2015 - May 2016 On-going for 2017
Step 5: Prepare GIS Database and Import Database File		June 2016 – July 2017

3) Methodology to Update Road Inventory Database

JICA Team, through discussions with RAM, developed the steps for restructuring the existing inventory data to meet the actual needs of AACRA. The proposal was approved at the 2nd TAC.

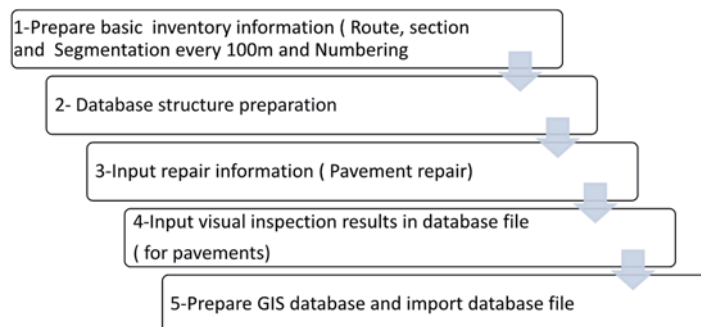


Figure 10 Database Setup Process

STEP 1: Prepare Basic Inventory Information and develop framework for Road Inventory Database

Based on the findings, JICA Team proposed following upgrading of the road network system including road classification and road numbering system, which will be the basis of road inventory database. The proposal was approved, and based on the agreed road network system, the framework for the road inventory database was developed in March 2016.

Road Classification

At the 1st TAC, insufficiency of current road classes SAS, PAS, RR and Collector Streets (hereinafter referred as CS) to prioritise roads for road maintenance works were discussed. At the 2nd TAC, Counterparts pointed out a problem on the limitation of road maintenance budget, needs of clarifying sites for road inspection and repair construction works, and conducting works at a concentrated area. Based on these meetings, at the 2nd TAC, JICA Team proposed five road classification of a) Strategic roads, b) Major Arterial, c) Sub Arterial, d) Collector Streets, and e) Local Streets, which weigh higher prioritization to strategic roads.

Hierarchical Road Numbering Structure

At the 3rd TAC, JICA Team proposed Hierarchical Road Numbering Structure. The issue on the location of Network Centre was also discussed and agreed that Leghar (Train Station) to be the Road Network Centre following consultation with Addis Ababa City Planning Project Office on March 7, 2016, and the same was approved on the 3rd TAC in June 2016.

STEP 2: Road Inventory (Database) Structure Preparation

Database is structured by identifying each road in three main categories of 1) Road ID consisting 10 items (Existing status, Road class, Route, Direction, Section, Segment number, Length of the segment, Old road no, strategic road, road/street name), 2) Start and end point of road, and 3) Junction type. The structure was presented at the 2nd TAC and approved. Restructuring of road inventory of AACRA by the lead of RAM defining data items (e.g. road numbering, road naming, and setting start/end points) started from November 2015 and completed in December 2016.

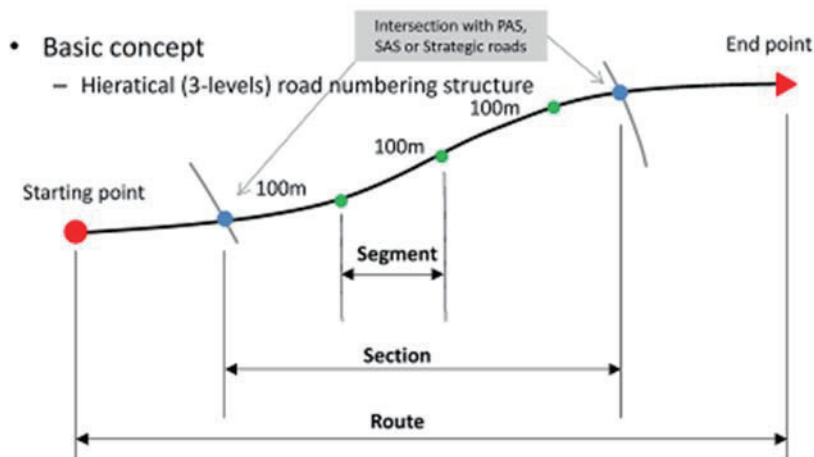


Figure 11 Hieratical Road Numbering Structure

Road ID										Name of Start/End points for Sections		Junction Type	
Status	Road Class	Route	Direction	Section	Segment	Length (m)	Road No. (Old)	Strategic Road	Road/Street Name	Start of section (Jct Name)	End of section (Jct Name)	Start (Jct.Type)	End (Jct.Type)
Existing	SAS1	S001	Down	1	1	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ
Existing	SAS1	S001	Down	1	2	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ

Figure 12 Database Structure

STEP 3: Input Repair Information

After the completion of the above inventory data, repair history and result of periodic inspection data are inputted to the database. Due to the absence of repair history, available data since the date of commencing data input was inputted. Inspection data on pavement damage and update of inventory were inputted using data recorded on inspection sheet in June 2016 and completed in December 2016. The data will be updated every year. To collect repair history, data collection is planned to be assisted by a mobile application system after training and when AACRA conduct maintenance activity the end of this year. Currently 2017/2018 repair activity is planned to be collected and data updated to the AACRA RMS database.

STEP 4: Input Visual Inspection Results

Inputting data of asphalt roads in order of Strategic Roads > Major Arterial > Sub Arterial conducted and completed in June 2016. The database created includes about 462 km of road length consisting PAS, SAS and RR class roads. Table 22 and Table 23 below shows length of each road class in the inventory and corresponding length of road visually inspected by RAM from 2015 to 2016 and 2016 to 2017. The inspected road length reached to approximately 1.7 times of previous year, which covers 94 % of the existing road length.

Table 22 Inspected Road Length (m) from Inventory Database (Period: 2015-2016)

Road Classification	Existing Road Length in Database (m)	Road Length Inspected Visually (m)	Inspected Length Against Total (%)
RR	36,946	36,946	100%
PAS	280,203	181,796	65%
SAS	144,910	54,068	37%
Total	462,059	272,810	59%

Table 23 Inspected Road Length (m) from Inventory Database (Period: 2016-2017)

Road Classification	Existing Road Length in Database (m)	Road Length Inspected Visually (m)	Inspected Length Against Total (%)
RR	36,946	36,946	100%
PAS	290,892	276,347	95%
SAS	159,910	143,919	90%
Total	487,748	457,212	94%

STEP 5: Prepare GIS Database and Import Database File

Route and sections identification from the AutoCAD road network and corresponding Excel inventory data preparation were completed for RR, PAS and SAS class roads in June 2016. Based on these data, maps of roads subdivided into route, section and 100 m length segments, as mentioned previously, was set up and Excel inventory data imported in to GIS database. Functionality of the system was checked prior to starting relevant data import in December 2016. Since October 2017, data registration to AACRA RMS (application for pavement management system (PMS)) was introduced. From same month, visual inspection data collected by mobile phone from 2016 to 2017 is being registered to the PMS database.

4) Methodology for Selection of Emphasis Management Road Segments and Structural Examination Segments

To be added as the Project progresses.

(4) ACTIVITY 2-4 Prepare and Revise Mid and Long Term Road Maintenance Plan based on the above Inventory Data

It should be noted that the detailed explanation and demonstration for the progress of the RMMS and Mid/Long-term Maintenance Plan were made in 5th JCC held on 4th October 2017.

1) Review of Existing Road Management System

JICA Team has reviewed existing Road Maintenance Management System (hereinafter called RMMS) (COTS System) installed in 2003 by SMEC International Private Ltd. Consulting Company, and it was found that the system is not functioning due to 1) turnover of trained staff, 2) complexity of the system, 3)

needs of vast data to input requiring a huge amount of manpower.

2) Framework of Road Management System

In accordance to the revised contract (January 2016) JICA Team procured ArcGIS which is the base of the RMMS to develop the system meeting the needs of AACRA. The prototype of RMMS was completed in July 2017 and updated twice so far as required. At the 3rd TAC, JICA Team introduced to counterpart and agreed on the system requirements and system functions in association with relevant technologies, and also introduced Bespoke System with stochastic deterioration model (KYOTO model) comparing to the COTS system in its advantage on adoptability to requirements, institutionalization, customizability, cost, and upgradability.

3) Development of Road Management System

The RMMS ver.1 has been developed and installed into the PC in AACRA in July 2017. The RMMS is the supporting system for the implementation of PDCA cycle of road maintenance work in AACRA. It has an integrated database function to manage all data collected by daily road maintenance work, such as inspection data and repair information. The IRI value and road image data collected by PCSV are registered to the database, and the system users can find the location and conditions of each road section on the PC screen.

Road maintenance planning function is installed as a main function of RMMS. The process of road maintenance planning works as follows; 1) road sections are categorized into several groups as defined in the maintenance policy, 2) targeted sections for routine maintenance are be selected (road profiling), 3) using the deterioration performance evaluation function and the bench-marking function of the Kyoto Model, the deterioration performance of each section is evaluated, and 4) critical sections which has fast deterioration speed are selected for repair prioritization. The progress monitoring function, indicated by logic model in accordance with road maintenance activities in PDCA cycle, is also installed as a portal of the system,

Currently, road inspection and data accumulation of repair information of 2016/2017 are carried out continuously. When data is accumulated adequately, further discussion on the system utilization and customization will be held for system updating.

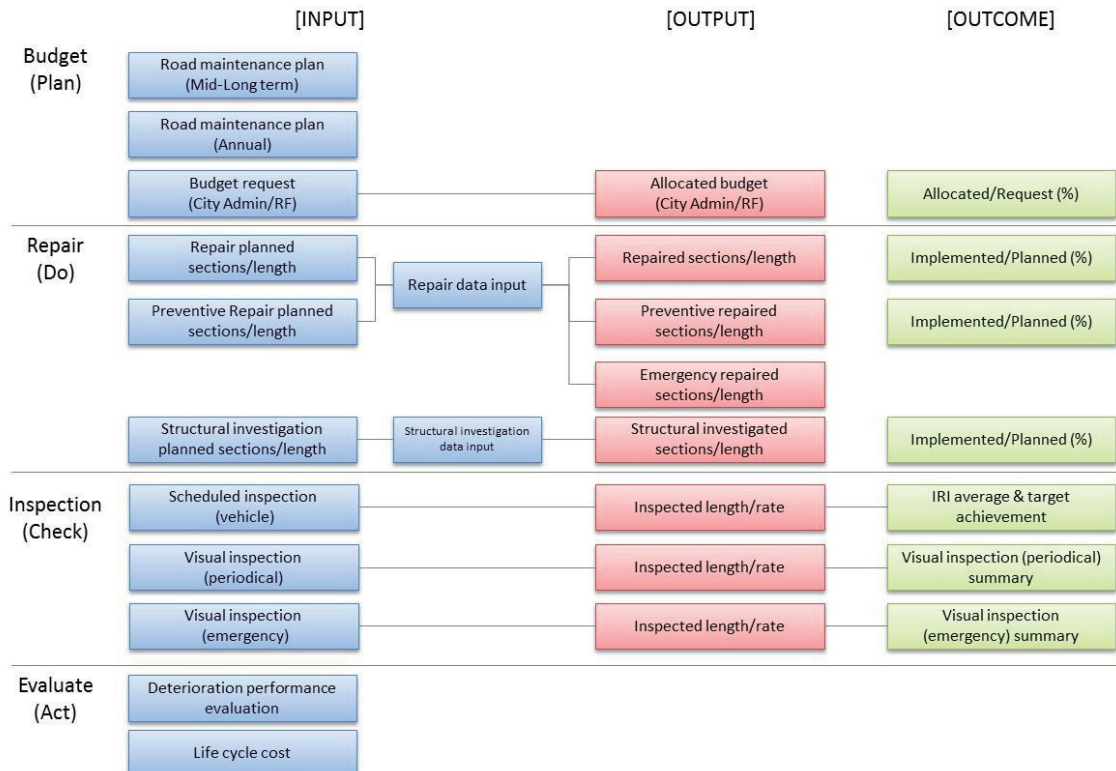


Figure 13 Progress monitoring function (System portal)

Table 24 Upgrade History of RMMS

Version	Date	Upgraded content
Ver. 1	July 2017	
Ver. 2	January 2018	Automatic line allocation function of point data, Recording function of Repair History Data
Ver. 3 (proposed)	April-July 2018	Improvement of Database structure, including of Mid/long term road maintenance planning function, function required for regional office, inputting function of repair history data

4) Formulation of Mid/Long Term Road Maintenance Management Plan

a. Definition and Type of Maintenance Plan

JICA Team was initially planned to propose the definition and type of Maintenance plans and discuss with Counterparts in early 2017. However, it was postponed till July 2017 in order to incorporate the examination result of trial road conditioning survey by the PCSV. On July 26, 2017, lecture on road Maintenance Plan was hold and clarified.

b. Methodology for formulating Road Maintenance Management Plan

Approach of maintenance planning was presented and agreed at the 4th TAC.

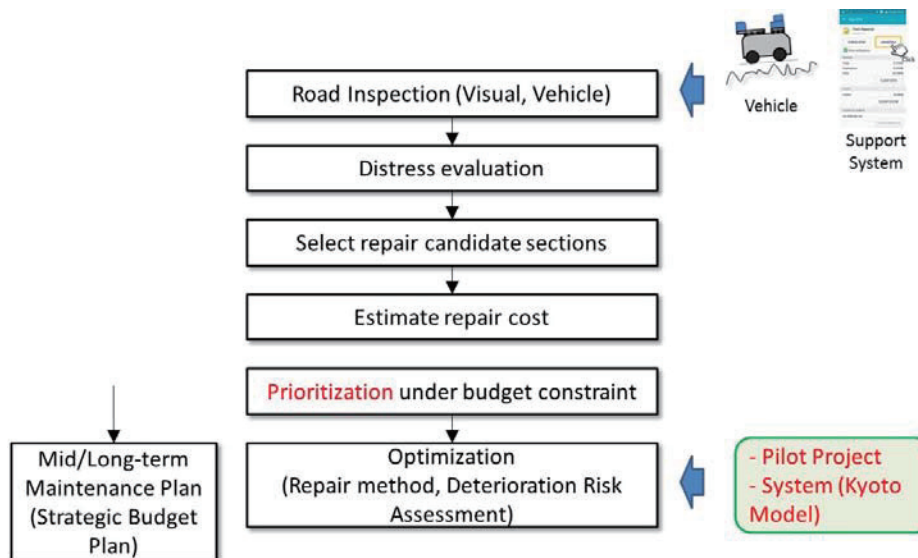


Figure 14 Approach of Mid / Long term Maintenance Planning

c. Formulation of Mid/Long Term Road Maintenance Management Plan

The first Mid/Long Term Road Maintenance Plan was initially planned to be drafted by the end of second year of the project term, however, due to the delay of the PSCV procurement, currently it is propose dot discuss from April to July 2018.

5) Preparation of Manual and Guideline on Road Maintenance Management System

The manual will be prepared targeting to issue in July 2018.

(5) ACTIVITY 2-5 Prepare Annual Road Maintenance Plan

1) Methodology for preparing Annual Maintenance Planning

During the 4th TAC meeting in July 2016, JICA team presented the preparation procedure of Annual Maintenance Plan following the approach consisting of steps 1 to 6 and agreed.

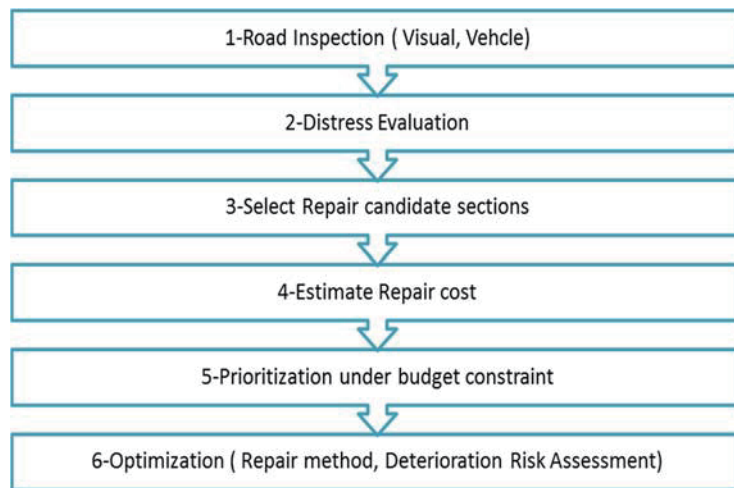


Figure 15 Procedure for Annual Maintenance planning

STEP 1: Road Inspection: to be referred to Activity 2-2 and 2-3

STEP 2: Distress Evaluation

Evaluation process (draft) as shown below has been developed to 1) Categorise the distress, 2) Develop Distress Indicators (draft) and 3) Evaluate the range of distress. The process was presented and agreed at the 3rd TAC. The preliminary distresses evaluation on road inspection data collected until May 2016 was conducted in June 2016.

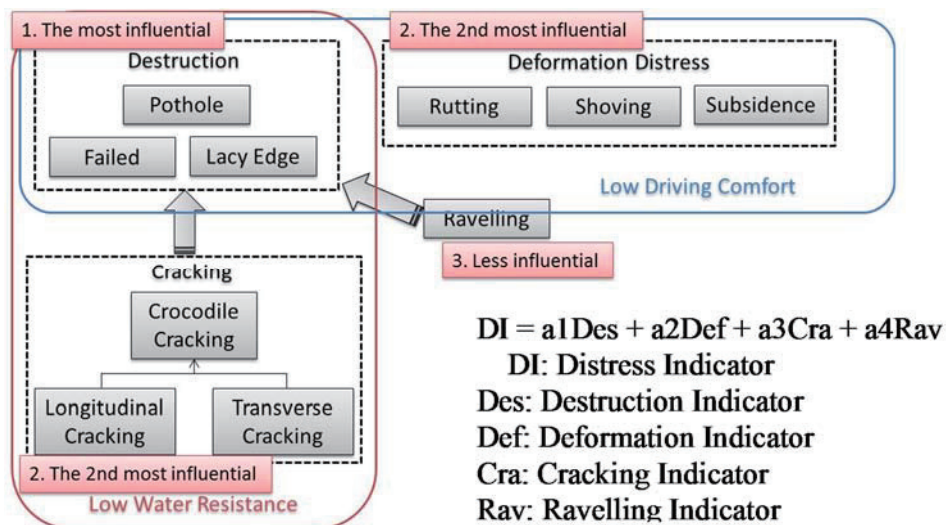


Figure 16 Distress Evaluation Process (DRAFT)

STEP 3: Selection of Candidate Repair Section

The two parameters on the priority repair route selection were presented at the 4th TAC. Prioritization of Risk Matrix is based on the Weight Index as shown in the below figure. One parameter is Consequences which includes traffic volume, accessibility to primary destinations, road class (RR, SAS, PAS, Strategic road) and others. The other is Risk likelihood (damage level). The discussion is still ongoing and will be finalised in July 2018.

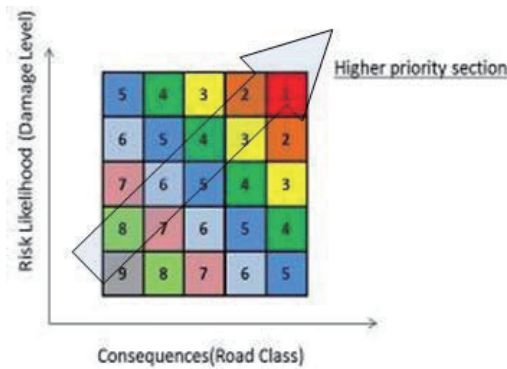


Figure 17 Prioritization by Risk Matrix (DRAFT)

STEP 4: Estimate Repair Cost

Repair cost estimation will be updated by July 2018 based on the unit rate obtained from the implementation of Pilot Projects.

2) Formulation of Annual Road Maintenance Management Plan

It was planned that the 2nd year Annual Road Maintenance Plan would be prepared in the period from June and July 2016 based on the data obtained from the operation of PCSV. However, due to the delay in the procurement of PCSV, the first Annual Road Maintenance Plan was prepared in July 2017. Mid/Long Term Road Maintenance Plan will be prepared from April 2018 to July 2018 based on the results of first full-scale road condition survey using the PCSV scheduled from November 2017 to May 2018.

1-2-5 OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

(1) ACTIVITY 3-1 Select Pilot Projects for Maintenance Work based on the Annual Road Maintenance Plan formulated under the Project

1) Site Survey

On October 13, 2015, JICA Team conducted a field survey to understand issues and problems on road maintenance works. The major findings are: 1) Quality of cold mix asphalt was questionable, 2) the same maintenance work (overlay) has been carried out at some places every year (structural improvement is required), 3) Surface cutting method was not employed in the pothole repair.

2) Selection of Pilot Project

The project is scheduled to be implemented twice in 2016 and 2017. Algorithm for Repair Work Selection has been presented at the 4th TAC. The selection of the first pilot projects was carried in September 2016, and for the second pilot project was conducted in November 2017. The policy for the selection of the first pilot project was presented and discussed at the 3rd JCC (refer to the handout of the 3rd JCC).

Table 25 Outline of Pilot Project

Selected Points	First Pilot Project (2016)	Second Pilot Project (2017)
Selection Timing	September 2016	November 2017
Implementation Period	During dry season from October to December	
Targeted Road	Paved trunk roads such as Ring Road, PAS and SAS,	
Investigation	Detailed investigation <u>not</u> included	Detailed investigation included
Key Purposes	(1) Complying with annual plan (4) Feedback of repair record -	(2) Proper design (3) Proper repair method
Targeted Damage	Surface damage	Structural damage
Repair Method	- Pot hole patching - Crack sealing	- Cut-overlay - Pavement replacement
Key Control Items	Safety Control, Quality Control	

a. Selected site for 2nd pilot project

Through joint site inspection among RAM, C&M, Design, and JICA Team conducted on 27th Oct. 2017, following 3 locations were selected out of 11 repair works contained in the Ethiopian Calendar (E.C.) 2010 repair plan.

Table 26 Selected location for the 2nd Pilot Project

	Road No.78 PAS 4 (New No. P017,S-3)	Road No.23 PA S2 (New No. S020, S-1)	Road No.7.2PAS4 (New No. P307, S-2)
Selected reason	The road is listed in 10 mp, & there is much kind of defects continuously on the stretch. The result of DCP test shows that CBR value of subbase is only 15%	The road is listed in 10 mp, & centre portion was overlaid. DCP test could not complete but the types of observed defects were not caused by structural problem in usual. So we supposed damages are caused by hot mix problem.	The road is listed in routine maintenance of 10 mp, & centre portion was overlaid 2 times. DCP test could not complete but the thickness & CBR value of base course were confirmed by the analysis of DCP data. We can easily reach assumption that this thin base course caused the defects in short cycle.
Exact Location	N 9.042663, E 38.764565	N 9.033121, E 38.746785	N 9.021202, E 38.749492



Road No.78PAS4 (New No. P017,S-3)



Road No.23 PAS 2 (New No. S020, S-1)



Road No.7.2 PAS 4 (New No. P307, S-2)



Figure 18 2nd pilot project site

3) Implementation Plan

a. First Pilot Project

Based on the discussion JICA Team prepared the first version of Implementation Plan for the First Pilot Project on 28 September, 2016 (Revised on 1 November, 2016) and discussed with C&M and RAM.

The joint site inspection for the first pilot project was carried out on October 28, 2016 among JICA Team, C&M and RAM and following four locations were selected as the first pilot project. As an example, the sketch of the damage of location No.2 is shown in Monitoring Sheet Version 5. The first pilot project focuses defaults of asphalt layer, which are repaired by sealing, patching, and typical potholes.

Table 27 1st Pilot Project Outline

No.	Road Number		Road Class	Defect	Repair Method	Work Volume	Remarks
	Old	New					
2	69	P002,S-14,S-1	PAS4	Crocodile Crack Delamination	Patching	46 m ² 195 m ²	
3	4	P002,S-4,S-3	PAS3	Pothole Line Cracks	Pothole Repair Sealing	2 holes 68m	
4	4	P002,S-1,S-3	PAS3	Pothole Line Cracks	Pothole Repair Sealing	1 hole 41 m	
8	76	P001,S-12,S-3	PAS3	Pothole Broken Edge	Pothole Repair Patching	1 hole 36 m ²	Including base course repair

Table 28 Repair Work Area for Each Method

Maintenance Type	No.2	No.3	No.4	No.8	Total
Crack Sealing(m ²)		67.9	40.9		108.8
Patching (m ²)	240.6	3.0	1.5	4.2	249.3
Pothole Patching(m ²)				35.6	35.6

b. Second Pilot Project

Implementation Plan for Second Pilot Project attached hereto as Appendix was provided in November 2017.

- According to the annual maintenance plan of AACRA, detailed site investigation and repair work shall be carried out.
- Proper design and selection of repair method shall be conducted.
- According to the damage of the subject road, proper repair method shall be adopted.
- A sustainable system in which data and results maintenance works are accumulated so as to be reused in future works shall be established.

The work programme Schedule is shown in Table below.

Table 29 Work Programme of 2nd Pilot Project

	Oct.	Nov.	Dec.	Jan.
Selection of candidate location	★			
Investigation by DCP	—			
Joint investigation & deciding	★			
Work method & design		—		
Repair works at the site			—	
Evaluation & record				—

Table 30 the 2nd Pilot Project Outline

Road Number		Road Class	Defect	Repair Method	Work Volume
Old	New				
78	P017,S-3	PAS 4	surface failure, subsided, crocodile crack, delamination	replace weak layer	10.5 m(w) x 200 m(l), lane to West direction only
23	S020, S-1	PAS 2	corrugation, delamination, surface failure	milling & overlay	14.0 m(w) x 100 m(l)
7.2	P307, S-2	PAS 4	surface failure, waving, crocodile crack	replace weak layer	14.0 m(w) x 100 m(l)

(2) ACTIVITY 3-2 Share information of Pilot Project between/within Road Asset Management Process and Constructional and Maintenance Process

After the selection of the pilot project, information such as site location, work method, work volume, necessary equipment and material, man power and work schedule was shared with the relevant units of AACRA which are RAM, RTD, Quality Control Support Sub process(laboratory), C&M(construction, machinery, and asphalt plant).

Table 31 List of Information to be shared prior to the Implementation of Pilot Project

Before Repair Works	Before Detailed Investigation
<ul style="list-style-type: none"> • Implementation Plan • Basic Data (Width of Road, Structure of Pavement, etc.) • Inspection Results • Information of Road obtained from Image Photos • Condition of Damage • Selected Repair Method • Location of Works • Existence of Utilities and/or Drainage • Safety Plan • Traffic Condition • Consideration on Residential Neighbourhood • Points to keep in mind during Works 	<ul style="list-style-type: none"> • Implementation Plan • Basic Data (Width of Road, Structure of Pavement, etc.) • Inspection Results • Information of Road obtained from Image Photos • Condition of Damage • Review of Damage • Traffic Condition • Points to keep in mind during Works

(3) ACTIVITY 3-3 Conduct the detailed Investigation and Design Specification of the Pilot Projects

The first pilot project does not require detailed investigation and design. DCP test was conducted for selection of the location of Second Pilot Project and also for the design of the repair work. As previously mentioned, 3 locations were selected, and Cutting Overlay and Pavement Replacement were selected for repair works.

(4) ACTIVITY 3-4 Assist AACRA to execute Implementing Pilot Project

1) First Pilot Project

Construction plan was prepared by JICA Team and AACRA staff, and implemented by AACRA staff. Crack sealing work for all 4 locations has been started on November 23, 2016. However the work was suspended on November 29, 2016 by senior management of AACRA due to the higher priority given to the road near African Union due to the conference. The work for Pilot project was re-started in late January, 2017 and completed February 10, 2017.

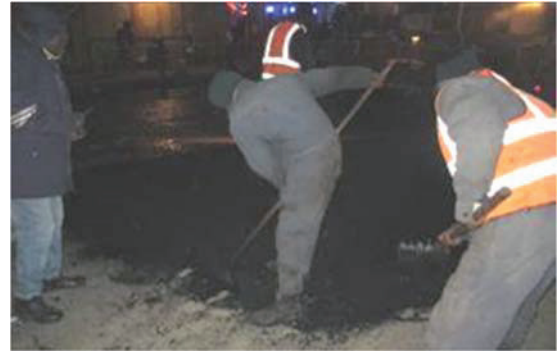
In order to improve the capacity on road maintenance, technical transfer training was also carried out on maintenance technology, health, and safety management. As of March 2018, so far, 4 Lectures and 13 OJTs were held. Advice for the equipment which AACRA has to own in the near future in order to carry out proper and effective repair work is strongly requested to JICA Team by AACRA.

Table 32 Implemented Schedule of the 1st Pilot Project

Activity	Date
Maintenance work	November 23, 2016 - February 10, 2017
Training	October 2016 - December



Crack sealing



Patching

Figure 19 Photos of maintenance work during the 1st Pilot Project

2) Second Pilot Project

Based on the “Implementation Plan of Second Pilot Project” prepared in November 2017, the second pilot project was carried out. Two locations (P017 and P307) were repaired in this season, however, the project on S020 was postponed to April 2018. The implementation report of first location (Road No. 78, from 6th Dec. 2017 to 13th Jan. 2018) is summarized below. Detailed report will be prepared after completion of the repair works for second location.

Finding and Design Change

Based on the DCP test results, the replacement of sub-base course, base course, and surface layer were required. During trial excavation, however, the black cotton layer (Unsuitable soft clay material) was found at the sub-grade zone and, therefore, the design of the pavement composition was changed as shown in Figure below.

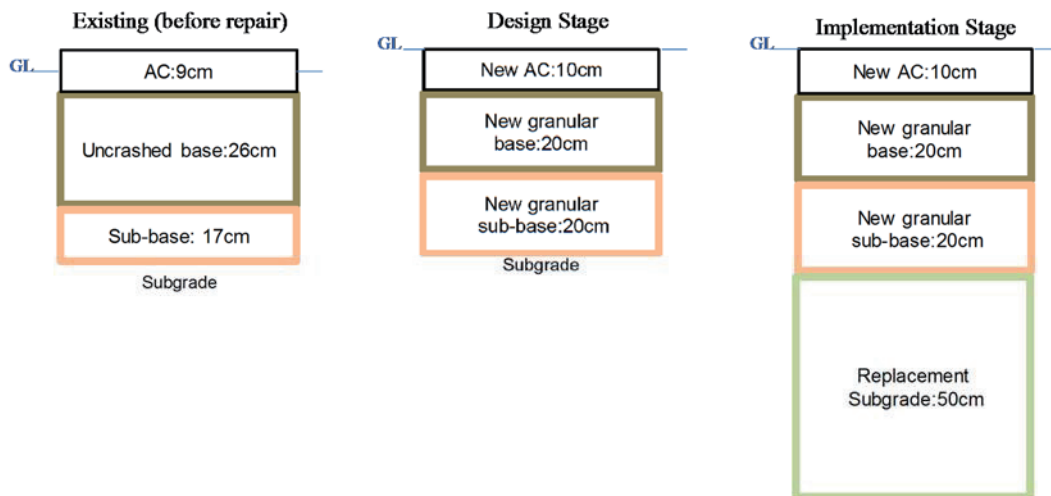
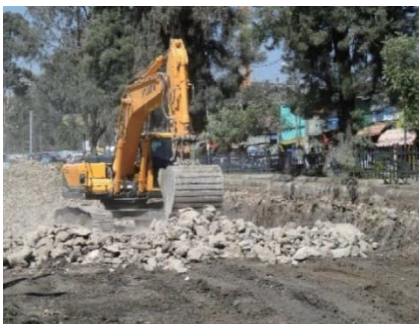


Figure 20 Pavement Composition in Each Stage



Spreading Subgrade



Compaction of Subgrade



Excavation for Subgrade

Figure 21 Photos of 2nd Pilot Project

(5) ACTIVITY 3-5 Feedback Achievements and Experience of Pilot Projects into the Next Annual Road Maintenance Plan

During the pilot project implementation, maintenance works were monitored and evaluated using the monitoring form prepared. The result of observation will be utilised for annual maintenance planning prepared by asset management unit.

1) The 1st Pilot Project

The feedback of the 1st Pilot Project was presented in January 2017, at the 6th TAC meeting. Findings shared were as follows;

a. General

- Floodlight for night work is necessary.
- Traffic control such as safety corn and guard-man is not sufficient.

b. Crack Sealing

- Crack sealing machine is necessary.

c. Patching / Partial Construction

- Grinder disk of Asphalt cutter is too wear-out to use properly.
- Temperature control for asphalt mixture such as spreading and compaction is not carried out at all.
- A sheet over asphalt mixture during transportation is not used.
- Waiting time for arrival of asphalt mixture is too long. (Work is not effective.)

d. Cutting Overlay

- Milling machine is not available
- AACRA is obliged to lease heavy equipment from Contractor and/or other agency.

2) The 2nd Pilot Project

The feedback of the 2nd Pilot Project will be reported in April 2018.

(6) ACTIVITY 3-6 Organize Workshop/Seminar of Pilot Project for ERA and Road Agencies at Regional and Municipal Level

To be described as the Project progresses.

1-2-6 TECHNICAL OUTPUT

Following technical outputs are developed under the Project and submitted at the end of the project term.

Table 33 List of Technical Output

	Output	Status	Note
1	Medium/Long Term Road Maintenance Plan	On going	To be drafted by July 2018 (1 year postponed due to the delayed supply of Survey Vehicle.)
2	Annual Road Maintenance Plan	On going	Annual Road Maintenance Plan (August 2017-July 2018) was prepared in July 2017. Annual Road Maintenance Plan (August 2018-July 2019) will be prepared in July 2018.
3	Road Maintenance Management System	On going	Ver. 1 was developed in July 2017, and updated into ver. 2 in January 2018. Ver. 3 is currently under development to issue in July 2018.
4	PDCA Checklist	Version 1 is prepared at February 2016	

Output	Status	Note
5 Manual and Guideline on Road Maintenance Management System	On going	To be developed by July 2018.
6 Updated Existing Standard, Specification, Manuals		To be prepared as required
7 Training Materials	On going	To be prepared as required

1-3 ACHIEVEMENT OF THE OUTPUTS

(1) **OUTPUT 1** The Implementation Structure of AACRA for Road Maintenance is improved

Verifiable Indicator	Achievement Level
1-1 Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 7th JCC (September 2018).	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussions are required after role and responsibility of each section under new AACRA structure is clarified. The verifiable indicator is updated.
1-2 Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by March 2019 to be incorporated into the budget FY Jul/2019 - Jun/2020 if necessarily.	In Progress: AACRA has re-structured in November 2016. Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for the needs of external communication and further strengthening of institution. The verifiable indicator is updated.
1-3 More than 100 % of the requested budget on the basis of Annual Road Maintenance Plan is allocated from the 3rd project year.	In Progress: JICA team proposed to set verifiable indicator as 100% at the 6th JCC. The verifiable indicator is updated.
1-4 Trainings on road maintenance is conducted targeting AACRA staff	In Progress: As of end of March 2018, 41 lectures and 23 OJTs, and two trainings in Japan were conducted.
1-5 Public understanding and cooperation on road maintenance is enhanced.	In Progress: Leaflet on Activity 2 was prepared and distributed. One seminar was held in April 2017. Other PR activities are currently under discussion.

(2) **OUTPUT 2** The Process for Formulating Road Maintenance Plans is established

Verifiable Indicator	Achievement Level
2-1 PDCA Checklist is developed by January 2016.	In Progress: Checklist version 1 was developed. Version will be updates as necessary through the operation.
2-2 AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 4th project year.	In Progress: Framework for RMMS and planning procedure were agreed. RMMS ver. 1 was issued July 2017 and ver. 2 in January 2018. Ver. 3 is currently developed to issue in July 2018. Mid/Long term Road Maintenance Plan will be formulated in July 2018. The verifiable indicator is updated.
2-3 AACRA Annual and Mid/Long term Road Maintenance Plan are formulated in consideration of Life Cycle Cost on Road.	In Progress: Approach and formulation process for road maintenance planning have been agreed. Annual Road Maintenance Plan for August 2017- July 2018 was prepared in July 2017. Annual Road Maintenance Plan for August 2018- July 2019 will be prepared in July 2017.

(3) **OUTPUT 3** The Maintenance Skills & Knowledge of AACRA Technical Staff are improved

Verifiable Indicator	Achievement Level
3-1 Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted.	In Progress: 11 lectures and 14 OJT relevant to maintenance skill and knowledge were conducted.
3-2 Number of preventive maintenance works executed are increased through the implementation of the Project.	In Progress: Concept and importance of Preventive Maintenance have been shared through pilot projects

1-4 ACHIEVEMENT OF THE PROJECT PURPOSE

PROJECT PURPOSE: The Management Capacity of AACRA for Road Maintenance is enhanced.

Verifiable Indicator (By 3 months before the completion of the Project,)	Achievement Level
1 AACRA's capacity to secure the budget for road maintenance is enhanced.	In Progress: JICA team will propose the indicators.
2 Road maintenance works based on PDCA cycle established by the Project are executed by AACRA.	In Progress: PDCA Checklist (ver.1) has been developed. Currently operation method in consideration to inspection equipment and maintenance management system is under development.
3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in the AACRA Annual Road Maintenance Plan exceeds 80% from the 3rd project year.	In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.

1-5 CHANGES OF RISKS AND ACTIONS FOR MITIGATION

(1) Term July 2015 to August 2015

As per the JICA Risk Management Check List, no risk was observed during the first two months of the Project. Other events and issues that may become a risk to the Project were not recognized during this reporting period.

(2) Term September 2015 to February 2016

As mentioned at "1-1-2 (3) Provision of Machinery and Equipment", procurement of PSCV was expected to delay, Hence, Activity 2-2,2-3,2-4, and 2-5 were expected to be delay and JICA Team took necessary actions as mentioned at "2.3 Action to be taken "including postponing experts assignment.

(3) Term March 2016 to September 2016

As mentioned at "1-1-2 (3) Provision of Machinery and Equipment", the procurement of the PSCV is expected to further delay. The PSCV PCSV was arrived in April 2016, however equipment to be fitted into the PCSV was expected to arrive in December 2016 and able to use in the Project from February 2017. This delay is expected to impact on the progress of procurement (Development) of Maintenance Management System, and Activity 1-4, 2-2, 2-3, 2-4, and 2-5.

(4) Term October 2016 to January 2017

The PSCV was procured to AACRA on January 16, 2017 approximately one year delay from the original schedule. Due to this delay, re-scheduling of the relevant activities and necessary measures to achieve the outputs required in the PDM including extension of overall project period was proposed by JICA Team.

(5) Term February 2017 to April 2017

As mentioned at the previous term, the JICA team has reschedule the activities to accommodate the delay of the procurement of PCSV. However it became clear that under the current contracted project period, the road inspection can be conducted only once and results to that database and maintenance plan are to be developed based on the limited inspection data.

(6) Term May 2017 to September 2017

There are continuous risks that road inspection can be conducted only once and database and maintenance are to be developed based on the limited inspection data. In order to accommodate the delay and to provide output based on full scale inspection data, JICA Team is currently consulting to JICA for the possible exertion of the project contracted period.

(7) Term October 2017 to January 2018

In the 5th JCC conducted on 4th October 2017, AACRA formally requested JICA to extend the project period to achieve the outputs agreed in R/D and JICA Representative, Mr. Tatsuhiro Kondo, informed the JICA willingness to extend the project period as required and this matter would be relayed to senior management of JICA HQ for their approval. Official actions for extension of the project period will be started between JICA and JICA Team soon.

(8) Term February 2018 to March 2018

The amendment of JICA contract was made in March 2018 and the project contracted term has extended to July 2019, which allows the delayed activities to be fully conducted. However there are concern that the increase on the expert assignment is yet to be approved by JICA to cover the activities during the extended period.

1-6 PROGRESS OF ACTIONS UNDERTAKEN BY JICA

After the amendment of contract was signed between JICA and JICA Team in January 2016, with a great effort of JICA Ethiopia, the PCSV was procured in April 2016, however, the equipment to be installed into the PCSV was delivered to AACRA on January 16, 2017 around 1 year delay from the original schedule. The amendment of JICA contract was made in March 2018 and the project contracted term has extended to July 2019. The increase on the expert assignment is yet to be approved by JICA.

1-7 PROGRESS OF ACTIONS UNDERTAKEN BY GOV. OF ETHIOPIA

Thanks to the good cooperation and enthusiasm of Counterparts to the project, activities runs very smoothly and efficiently so far. Continuous involvement and support of Counterparts is very much appreciated for successful technical transfer of project output. Due to the re-structure of the AACRA announced in November, 2016, it is JICA Team's concern that some confusion may occur in each department and it will take time to return to the same service level as the level before the re-structuring.

In August 14, 2017, AACRA sent a letter to JICA Ethiopia Office to request an extension of the project period for 11 months up to the end of June, 2019, in order to conduct full scale road data collection and reflect to the road management system and prepare mid and long term road maintenance. This issue was discussed in 5th JCC held on 4th October 2017 among JICA, AACRA and JICA Team. The request was granted and JICA has extend the project term up to July 2019.

1-8 OTHER REMARKABLE/CONSIDERABLE ISSUES RELATED/AFFECT TO THE PROJECT

(Such as other JICA's projects, activities of Counterparts, other donors, private sectors, NGOs, etc.)

AACRA had a project called "Consultancy service for the study of permanent naming and code of road and transport infrastructure assets of Addis Ababa" which is an asset management study project with a period of service of 5 months (Feb –Jun. 2016). Objective of the consultancy include but not limited to developing permanent names and codes for identified transport infrastructures in Addis Ababa. This project is initiated by Addis Ababa Transport Program and Monitoring Office (TPMO) under World Bank fund. RAM of AACRA shared current numbering of Roads established by JICA Team to the concerned consultancy group.

2. DELAY OF WORK SCHEDULE AND/OR PROBLEMS (IF ANY)

2-1 DETAIL

(1) Term July 2015 to August 2015

No delay was observed during the first two months of the Project and the 1st JCC was held on 17th August 2015 as planned by JICA experts.

(2) Term September 2015 to February 2016

Procurement of PCSV was under the progress, and expected to be delivered in September 2016 as the earliest. This was nine months delay from the original schedule, and as consequence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay.

(3) Term March 2016 to September 2016

Procurement of equipment for PCSV is under the progress, and currently is to be delivered in December 2016 as the earliest, and be able to use for survey from February 2017 as earliest. This is 12 months delay from the original schedule, and as consequence, Procurement (Development) of Maintenance Management System and Activity 2-2, 2-3, 2-4, and 2-5 are expected to be further delay.

(4) Term Oct 2016 to January 2017

As mentioned previously, the PCSV was delivered to AACRA on January 16, 2017 around one year delay from the original schedule. Activities affected by the delay of the PCSV and the impact on the overall Project which will be caused by these activities' delay are summarized below.

Table 34 Effects on Activities and Impact on Project due to Vehicle's Delay

Act. No.	Activity	Effect by Delayed Vehicle	Impact on Project
1-4 (1)	Training for Inspection	Training Period for Vehicle shortened	Number of trained AACRA staff for vehicle decreased
1-4 (2)	Develop and Update the Database in AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update impossible Number of trained AACRA staff decreased
1-4 (3)	Prepare and revise short /medium/.long term maintenance plan	Number of times for mid/long term m. plan is reduced from 2 to 1	Full-scale update impossible No revision of medium/long term maintenance plan
2-2	Conduct road inspection	Number of times for full-scale data collection is reduced from 2 to 1	Number of trained AACRA staff and their quality are decreased
2-3	Develop and update Database of AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update is impossible
2-4	Prepare and revise mid/long term M. plan	Number of times for full-scale data collection is reduced from 2 to 1	It is not possible to revise mid/long term M. plan.
2-5	Prepare annual road maintenance plan	The first plan is delayed from June-July, 2016 to June-July, 2017	No serious impact will be expected.

In order to achieve output, to the maximum extent, required in the PDM, the JICA Team has rescheduled the relevant activities affected by the delay of Vehicle supply and has proposed JICA to extend the term of Project for further 10 (ten) months.

(5) Term February 2017 to April 2017

Situation is same as the previous term

(6) Term May 2017 to September 2017

Situation is same as the previous term

(7) Term October 2017 to January 2018

Situation is same as the previous term but with respect to the extension of Project Period, favourable advance step can be expected as described above.

(8) Term February 2018 to March 2018

Concern on the delay of project activities has been resolved by the extension of the project term. However there are delay in visual inspection activities and in sufficient execution of road maintenance works by AACRA.

2-2 CAUSE

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

Due to need of amendment of contract for changing procurement owner of Pavement Condition Survey Vehicle to JICA, actual procedure has been delayed.

(3) Term March 2016 to September 2016

Since the change on procurement owner in January 2016 as described in at “1-1-2 (3) Provision of Machinery and Equipment”, there was a further delay on procurement procedure for equipment for Pavement Condition Survey Vehicle at JICA headquarter. Tender notice was published in June 2016, tender was held in July 2016, a contractor was selected in August 2016 and contracted with JICA headquarter.

(4) Term October 2016 to January 2017

After manufacturing and shipping, the equipment for PCSV arrived at Bole Airport, Addis Ababa, on 15 Nov. 2016 and was delivered to AACRA on 16 January 2017 after 2 months custom clearance. Equipment was assembled on to vehicle from 23 January 2017 to 30 January 2017. On 31 January 2017, the Pavement Condition Survey Vehicle was officially handed over to AACRA. After 2 weeks training operation and data analysis of the PCSV, the data collection was started by AACRA staff. Total delay in the equipment procurement from the original plan is 13 months.

(5) Term February 2017 to April 2017

As mentioned at the previous monitoring period, the project activities are delayed due to the delay in the procurement of the PCSV.

(6) Term May 2017 to September 2017

Same as the previous term.

(7) Term October 2017 to January 2018

Same as the previous term but with respect to the extension of Project Period, favourable advance step can be expected as described above.

(8) Term February 2018 to March 2018

Visual inspection activities are assigned to Regional Asset Management after the restructuring of AACRA. Due to the other projects engagement of Regional Asset Management, scheduled visual inspection in November 2017 is yet to be implemented (Planned to start from March 2018). Insufficient maintenance work by AACRA is due to the lack of necessary maintenance equipment and machineries.

2-3 ACTION TO BE TAKEN

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

JICA Headquarter preceded the procurement of Pavement Condition Survey Vehicle as a priority issue, so that the PCSV could arrive as earliest as possible to conduct activities proposed under the Project. Meanwhile, JICA Team provided necessary support for procurement as required, at the same time, conducted following actions; 1) Reschedule assignment of JICA experts, considering the feasible delivery schedule of the PCSV, 2) Provide training on relevant activities, 3) Develop Road Maintenance Management System using existing data, and 4) Formulate plans not requiring Pavement Condition Survey Vehicle.

(3) Term March 2016 to September 2016

The selected contractor is currently proceeding the procurement of equipment for Pavement Condition Survey Vehicle and JICA headquarter is providing the necessary supports for smooth delivery of procedure. At the same time, JICA Team is currently discussing the potential solution to make up this delay affecting data collection and resulting data quality requiring for road maintenance planning.

(4) Term October 2016 to January 2017

As described in 2-1 (4), several activities are affected by the delay of the Pavement Condition Survey Vehicle. Since the seasonal constraint, namely no field work in the rainy season, exists in Addis Ababa, to extend the term of Project is the sole solution in order to carry out all activities as planned, and JICA Team has started discussion with JICA regarding the possibility of the Project's term extension.

Meanwhile, JICA Team will take following measures in order to recover the delay even if only slightly.

- JICA Team will try to conduct highly concentrated lectures and training
- In order to keep AACRA staff the sense of tension, JICA Experts will decrease the duration of their each stay in Addis Ababa and increase the number of their visit to Addis Ababa. (The total MM is unchanged.)

(5) Term February 2017 to April 2017

JICA team has continuous discussions with JICA on the extension of the project term to cover the full road inspection, reflect data into road management system and prepare mid and long term maintenance plan. Meanwhile JICA team is working in accordance with the re-scheduled project activities.

(6) Term May 2017 to September 2017

JICA team is working in accordance with the re-scheduled project activities in conducting road inspection, development of Road Management System and Mid/Long maintenance planning. JICA team has also continuous discussions with JICA.

(7) Term October 2017 to January 2018

At the 5th JCC held on October 4, 2017, the extension of project period was discussed among AACRA, JICA and JICA Team. JICA representative informed that JICA was very willing to accept this idea subject to the approval of the senior management in JICA HQ Tokyo. JICA team is working in accordance with the re-scheduled project activities in conducting road inspection, development of Road Management System and Mid/Long maintenance planning.

(8) Term February 2018 to March 2018

JICA team will propose AACRA to clarify demarcation on road maintenance implementation, and advise

necessary equipment and machinery for road maintenance work.

2-4 ROLES OF RESPONSIBLE PERSONS/ORGANIZATION (JICA, GOV. OF ETHIOPIA, ETC.)

- Procurement of Pavement Condition Survey Vehicle (Equipment to be assembled): JICA Headquarter
- Procurement of Pavement Condition Survey Vehicle (Vehicle): JICA Ethiopia Office

3. MODIFICATION OF PROJECT IMPLEMENTATION PLAN

3-1 MODIFICATION OF PDM AND PO

(1) Version 1

The Project proposed a modification of PDM from that outlined in R/D (signed in April 2015) to better correspond the circumstances of the Project. This proposal was approved by the 1st JCC on August 17, 2015 and reported to JICA Ethiopia Office and JICA Headquarter at a later date. PO was altered accordingly.

(2) Version 2

PDM was updated for 1) verification indicator, 2) addition of activity “Development of Visual Inspection Supporting System” into Activity 2-2, 3) addition of activity “Develop Road Maintenance Management System” into Activity 2-4, 4) Experts of Japanese side, 5) extra item for provision of machinery and equipment in accordance with the contract amended in January 2016. PO was also altered accordingly. The modification was informed to JICA Ethiopia Office prior to the 2nd JCC, and approved at the 2nd JCC.

(3) Version 3

After the review of “Objective verifiable indicator” under activity 0-2, modification have been made on “Means of Verification”.

(4) Version 4

Through the discussion in TAC 5 and agreement made in TAC 6 (January 27 2017; detailed record of the 6th TAC is to be described in the next Monitoring Sheet Version 5). 80% is inserted into the target value of Objectively Variable Indicators for Project Purpose No. 3. With respect to other target values which have not been inserted any figure, all attendances to TAC 6 agreed that these values should be decided after observation actual figure for a while.

(5) Version 4A

No modification was made.

(6) Version 5

No modification was made.

(7) Version 6

No modification was made.

(8) Version 6A

PO of Project term is extended in accordance to the JICA amended contract. Thus the schedule of project activities and monitoring activities were updated. Expert assignments are yet to be increased. Objectively Verifiable Indicator of PDM are updated.

3-2 OTHER MODIFICATIONS ON DETAILED IMPLEMENTATION PLAN

(1) Version 1

No other modification made for version 1.

(2) Version 2

Total experts assignment for Ethiopia has increased 0.5 MM which in total 72.50 MM.

(3) Version 3

No other modification made.

(4) Version 4

No other modification made.

(5) Version 4A

No other modification made.

(6) Version 5

No other modification made.

(7) Version 6

No other modification made.

(8) Version 6A

No other modification made.

4. PREPARATION OF GOV. OF ETHIOPIA TOWARD AFTER COMPLETION OF THE PROJECT

To be added as the Project progresses.

II. PROJECT MONITORING SHEET I & II

See the attached.

APPENDIX**Implementation Plan of the Second Pilot Project**

November 2017

(1) Background

Project for development of road maintenance capacity of Addis Ababa City was started in July 2015. This Project is a collaboration project where both parties, JICA and AACRA, work together to develop the project outputs, focusing more on the process of development and technology transfer during project implementation rather than simply producing project output. With this mature, AACRA is kindly requested to take an initiative and actively participate in the project.

(2) Scope of Work and Expected Outputs

PDM, which has been discussed in JCC, manage the progress of the Project.

- Project output 1: The implementation structure of AACRA for road maintenance is improved.
- Project output 2: The process for formulating road maintenance plan is established.
- Project output 3: The maintenance skills and knowledge of AACRA technical staff are improved.

For achieve the project output, Activities in the project are listed up concretely. The pilot project is the main activity for “Project output 3”.

3-1 Select pilot projects for maintenance works from annual road maintenance plan.

3-2 Share the information of pilot projects between/within Road Asset Management Process (RAM) and Construction and Maintenance Process (C&M)

3-3 Conduct the detailed investigation and design specification of the pilot projects.

3-4 Assist AACRA to execute pilot projects.

3-5 Feedback the achievement and experiences of pilot projects into the next annual road maintenance plan.

3-6 organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level.

(3) Selection of pilot projects

Prior to the selection of pilot projects, coordination with C/Ps, with respect to the purpose and implementation methodology of pilot projects, shall be made and results shall be shared with all parties concerned. The selection of pilot projects will be carried out beginning of fiscal year in Ethiopia when annual maintenance plan will be prepared. The project is scheduled twice in 2016 & 2017.

In the selection of pilot projects, the following purposes shall be considered.

- According to the annual maintenance plan of AACRA, detailed site investigation and repair work shall be carried out.
- Proper design and selection of repair method shall be conducted.
- According to the damage of the subject road, proper repair method shall be adopted.
- A sustainable system in which data and results maintenance works are accumulated so as to be reused in future works shall be established.

The second pilot project will be scheduled to carry out structural investigation. Considering differences of the circumstances, proposed contents of each pilot project are shown below.

Table Proposed Contents of Pilot Project

Selected Points	Fist Pilot Project (2016)	Second Pilot Project (2017)
Selection Timing	October 2016	October, 2017
Implementation Period	During dry season from October to December	

Targeted Road	Paved trunk roads such as Ring Road, PAS and SAS,	
Investigation	Detailed investigation not included	Detailed investigation included
Key Purposes	(1) Complying with annual plan (4) Feedback of repair record -	(2) Proper design (3) Proper repair method
Targeted Damage	Surface damage	Structural damage
Repair Method	- Pot hole patching - Crack sealing	- Cut-overlay - Pavement replacement
Key Control Items	Safety Control, Quality Control	

(4) Second pilot projects

As the discussion at fifth JCC, the second pilot project will carry out structural investigation on the short-listed locations of projects. Based on the result of DCP test data, candidate locations will investigate by RAM, C&M, Design and JICA team jointly, and final project locations will decided. Design group will decide the maintenance method and design of construction.

● **Milling & Overlay**

Proposed location: corrugation, shallow rutting, delamination

Expected equipment: milling machine, dump truck, sweeper, compressor, asphalt distributor, asphalt finisher, roller

● **Replace weak layer**

Proposed location: deep rutting, crocodile crack, depression

Expected equipment: asphalt cutter, excavator, dump truck, motor grader, water spread truck, asphalt distributor, asphalt finisher, roller

Overall schedule of the first pilot project will be shown below.

	Oct.	Nov.	Dec.	Jan.
Selection of candidate location	★			
Investigation by DCP	■			
Joint investigation & deciding		★		
Work method & design		■		
Repair works at the site			■	
Evaluation & record				■

(5) Monitoring of repair result

The condition of repaired places shall be observed to check the quality of works. The repaired places with usual work method works shall be also observed to compare the difference in condition of road surface. It shall be carried out at end of dry season and before major rainy season.

The result of observation shall feedback for the preparation of maintenance plan of 2011 E.C.

(6) Selected location of the second pilot project

Basically, the proposed locations were selected from 2010 maintenance plan (10 mp) prepared by AACRA. Selected candidate locations were investigated & analysed by DCP. Based on the result of analysis, locations fitting for purpose of pilot project were picked up. During the joint site inspection, surveyed on 27/10/2017 by RAM, C&M, Design and JICA team, the defect of pavement was recognized and the repair method was discussed at the site. The selection of pilot project locations were finalized and listed in the following page.

Road No.78PAS4 (New No. P017,S-3)

- Selected reason: The road is listed in 10 mp, & there is much kind of defects continuously on the stretch. The result of DCP test shows that CBR value of subbase is only 15%
- Type of defect: surface failure, subsided, crocodile crack, delamination
- Repair method: replace weak layer
- Maintenance Area: 10.5 m(w) x 200 m(l), lane to West direction only

- Exact Location: N 9.042663, E 38.764565

Road No.23PAS2 (New No. S020, S-1)

- Selected reason: The road is listed in 10 mp, & center portion was overlaid. DCP test could not complete but the types of observed defects were not caused by structural problem in usual. So we supposed damages are caused by hot mix problem.
- Type of defect: corrugation, delamination, surface failure
- Repair method: milling & overlay
- Maintenance Area: 14.0 m(w) x 100 m(l)
- Exact Location: N 9.033121, E 38.746785

Road No.7.2PAS4 (New No. P307, S-2)

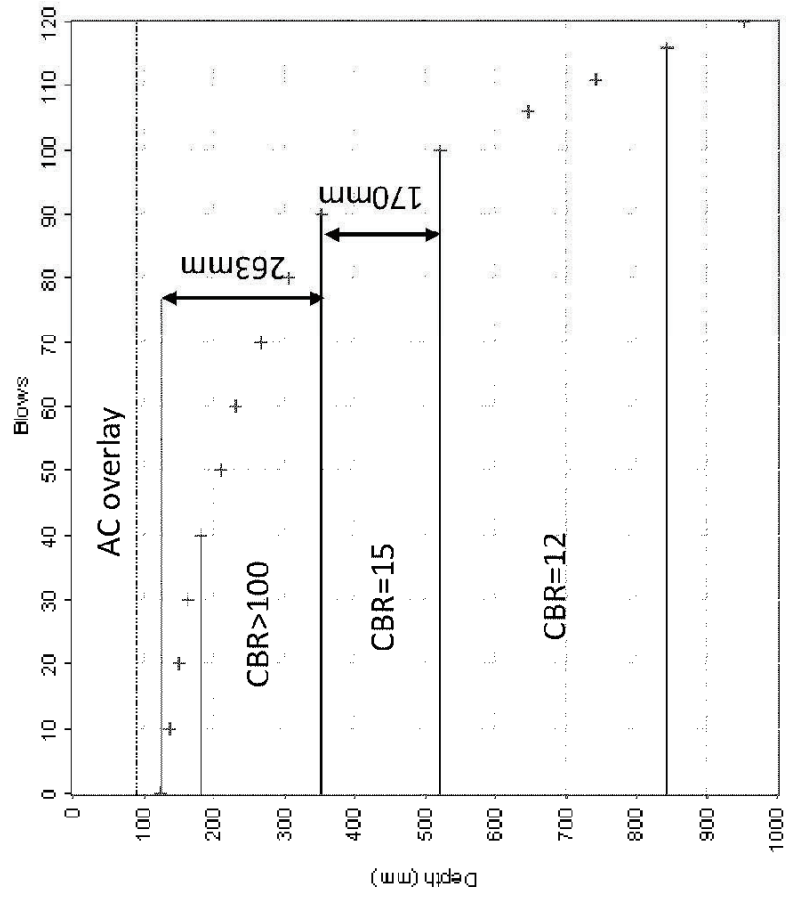
- Selected reason: The road is listed in routine maintenance of 10 mp, & center portion was overlaid 2 times. DCP test could not complete but the thickness & CBR value of base course were confirmed by the analysis of DCP data. We can easily reach assumption that this thin base course caused the defects in short cycle.
- Type of defect: surface failure, waving, crocodile crack
- Repair method: replace weak layer
- Maintenance Area: 14.0 m(w) x 100 m(l)
- Exact Location: N 9.021202, E 38.749492

Investigated Places for Pilot Project in E.C. 2010
(picked up from maintenance plan 2010)

Road No.	New Route No.	History of Overlay	Default	DCP Test	Test Bit Reached	Condition of under layers	Remarks	Road Name
Selected Location for second pilot project								
78 Central	P017-S3	4cm	surface failure crocodile crack	complete	subgrade	weaker subbase course	Candidate -> Selected	From Lion zoo north/Total (petrol) west to Janmeda sports hall front
23 Central	S020-S1	4cm	delamination, waving	stop	in base	seems OK	Candidate -> Selected	From Somale Tera RA to Kelifa Bldg./ intersection with Fitawrari
Substituting Location for Road No.78								
7.2 Central	P307-S2	4+6cm	waving, pothole crocodile crack	stop	subbase	thinner base course	Candidate	From Ethiopian Telecom HQ to Tikur Anbesa Hospital
Out of Scope of second pilot project								
76 North	P001-S12	none	depress	stop	in base	seems existing unsuitable layer	Didn't get enough data of design by DCP test	From Addis Ababa University Faculty of Social Science North East to Shiro Meda(RR)
76 North	P001-S11	none	depress	stop	in base	seems existing unsuitable layer	Didn't get enough data of design by DCP test	From 4kilo to Addis Ababa University Faculty of Social Science
69 North	P002-S12	5cm	depress	stop	subbase	seems existing unsuitable layer	Didn't get enough data of design by DCP test	From Vvro Kelemwork Tiruneghe Primary & Secondary School to Poland Embassy
165 South	P807-S1	5cm	depress, rutting crocodile crack	complete	subgrade	lack of strength for big traffic load	Need axle survey due to many heavy trucks	From Kidanemihret Church to Salo
163 South	P701-S3	none	surface failure	stop	subbase	seems OK	It is only reconstruction of surface work	Giyorgis Bete Kristiyan South West
1 Central	P305-S1	4cm	surface failure	stop	subbase	seems OK		From Akaki Kality Fire Station South/ Akaki Health center to tulu
78 Central	P017-S4	4cm	surface failure	stop	in base	seems OK		From ministry of urban development housing construction to oromia inter national bank oda
10 Central	S015-S2	3cm	delamination, shoving	complete	subgrade	sound	Candidate	From Janmeda sports hall front gate to Minilik Hospital
								From Somale Tera RA to Fasil Hotel/ intersection with Fitawrari Gebevehu St

Road No. 78

Layer Boundaries: Chainage 0+420



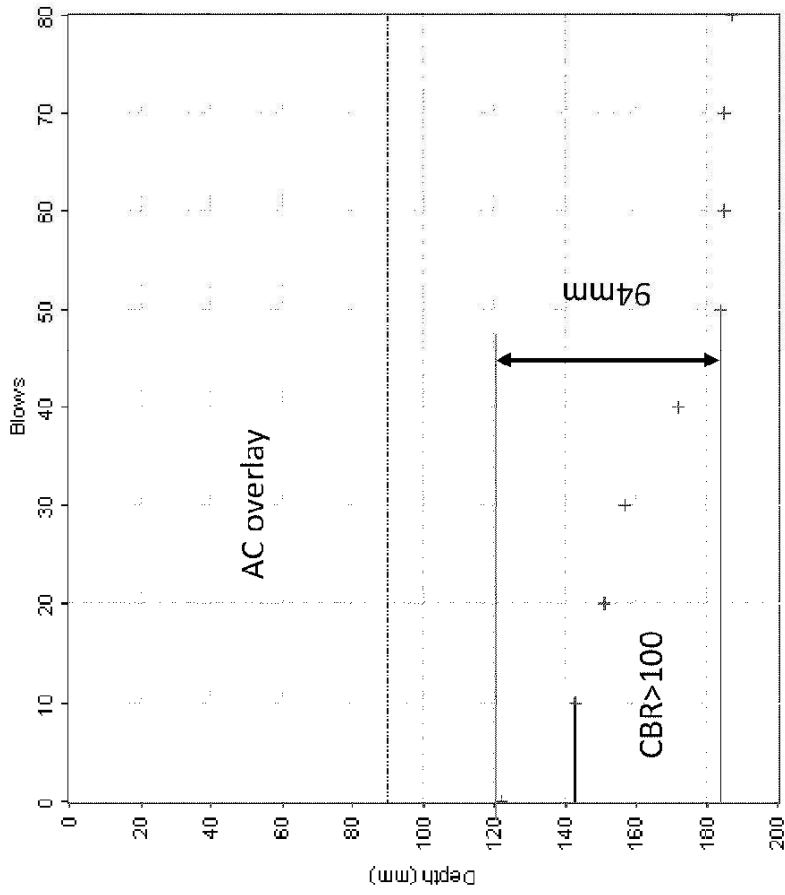
W=10.5m L=200m



W=14.0m L=100m

Road No. 23

Layer Boundaries: Chainage 0.130

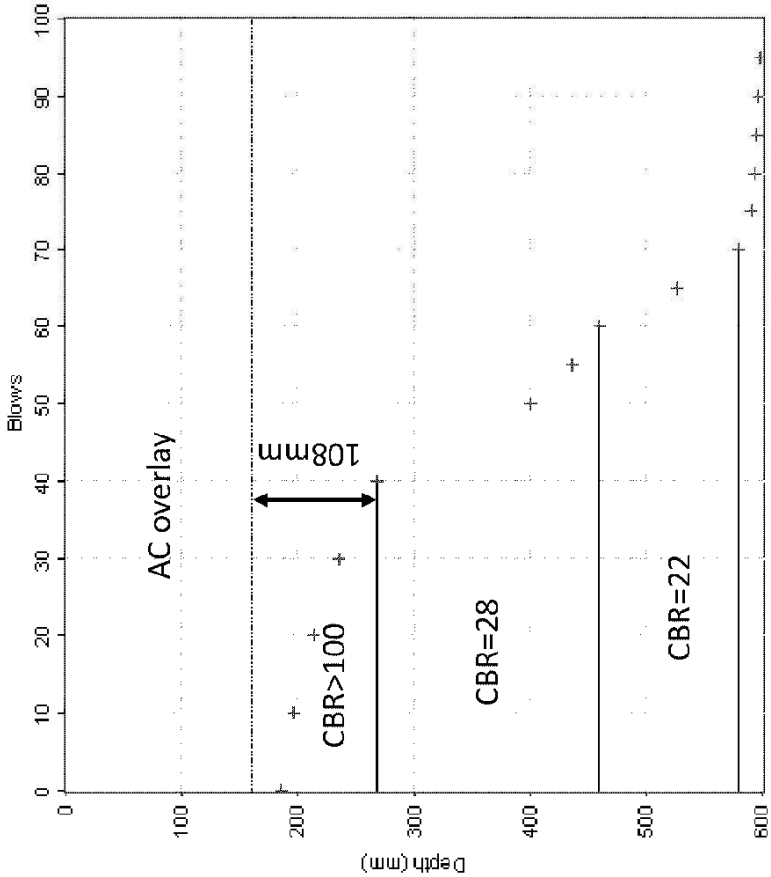




W=10.7m L=200m

Road No. 7.2

Layer Boundaries: Chainage 0.300



Pavement Design for Road No.78

Tested

Layer	Material	Strength Coeff.	Thickness (mm)	SN
Surface	HMA	0.10	90	0.35
Base	Uncrashed	0.14	263	1.45
Sub-base		0.08	170	0.54
Subgrade	CBR=12		523	2.34

ORN31

Chart 5

	T8	T7	T6
S1 = CBR 2	N/A	N/A	N/A
S2 = CBR 3,4	N/A	N/A	N/A
S3 = CBR 5 - 7	SN = 4.93	SN = 4.29	SN = 3.76
S4 = CBR 8 - 14	SN = 4.50	SN = 3.97	SN = 3.44
S5 = CBR 15-29	SN = 4.17	SN = 3.64	SN = 3.11
S6 = CBR 30+	SN = 3.74	SN = 3.21	SN = 2.68

Design

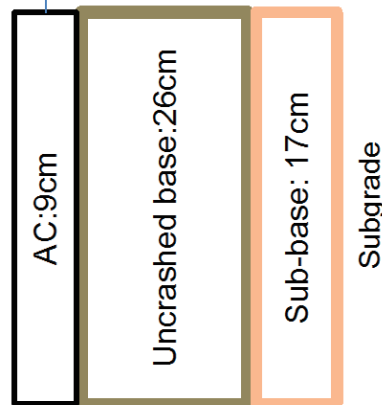
Layer	Material	Strength Coeff.	Thickness (mm)	SN
Surface	HMA	0.40	100	1.57
Base	Granular	0.13	200	1.02
Sub-base	Granular	0.10	200	0.79
			500	3.39

Chart 3

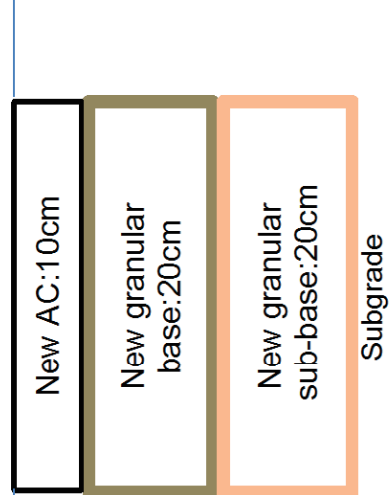
	T4	T5	T6
S1 = CBR 2	N/A	N/A	N/A
S2 = CBR 3,4	N/A	N/A	N/A
S3 = CBR 5 - 7	SN = 2.94	SN = 3.16	SN = 3.41
S4 = CBR 8 - 14	SN = 2.62	SN = 2.83	SN = 3.08
S5 = CBR 15-29	SN = 2.29	SN = 2.40	SN = 2.65
S6 = CBR 30+	SN = 1.75	SN = 1.89	SN = 2.03

Formula by	Base CBR	80
TRL	a=	0.13
	Subbase CBF	15
	a=	0.08

Present Section



Maintenance Design



Pavement Design for Road No.23

ORN31

Tested

Layer	Material	Strength Coeff.	Thickness (mm)	SN
Surface	HMA	0.10	90	0.35
Base	Uncrashed	0.14	200	1.10
Sub-base		0.10	250	0.98
Subgrade	CBR=7		540	2.44

Chart 5

S1 = CBR 2	T8	T7	T6
S2 = CBR 3,4	N/A	N/A	N/A
S3 = CBR 5 - 7	SN = 4.93	SN = 4.29	SN = 3.76
S4 = CBR 8 - 14	SN = 4.50	SN = 3.97	SN = 3.44
S5 = CBR 15-29	SN = 4.17	SN = 3.64	SN = 3.11
S6 = CBR 30+	SN = 3.74	SN = 3.21	SN = 2.68

Design

Layer	Material	Strength Coeff.	Thickness (mm)	SN
Surface	HMA	0.40	70	1.10
Base	Uncrashed	0.14	200	1.10
Sub-base		0.10	250	0.98
			520	3.19

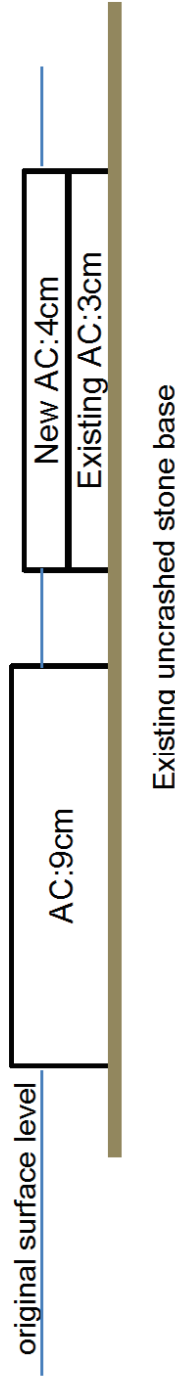
Chart 3

S1 = CBR 2	T4	T5	T6
S2 = CBR 3,4	N/A	N/A	N/A
S3 = CBR 5 - 7	SN = 2.94	SN = 3.16	SN = 3.41
S4 = CBR 8 - 14	SN = 2.62	SN = 2.83	SN = 3.08
S5 = CBR 15-29	SN = 2.29	SN = 2.40	SN = 2.65
S6 = CBR 30+	SN = 1.75	SN = 1.89	SN = 2.03

Formula	Base CBR	110
by	a=	0.14
TRL	Subbase CBR	30
	a=	0.10

Maintenance Design

Present Section



Pavement Design for Road No.7.2

Tested

Layer	Material	Strength Coeff.	Thickness (mm)	SN
Surface	HMA	0.10	160	0.63
Base	Uncrashed	0.14	100	0.55
Sub-base		0.10	200	0.79
Subgrade	CBR=11		460	1.97

Design

Layer	Material	Strength Coeff.	Thickness (mm)	SN
Surface	HMA	0.40	90	1.42
Base	Granular	0.14	150	0.83
Sub-base		0.10	150	0.59
			390	2.83

Formula by TRL	Base CBR	110
	a=	0.14
	Subbase CBR	28
	a=	0.10

ORN31

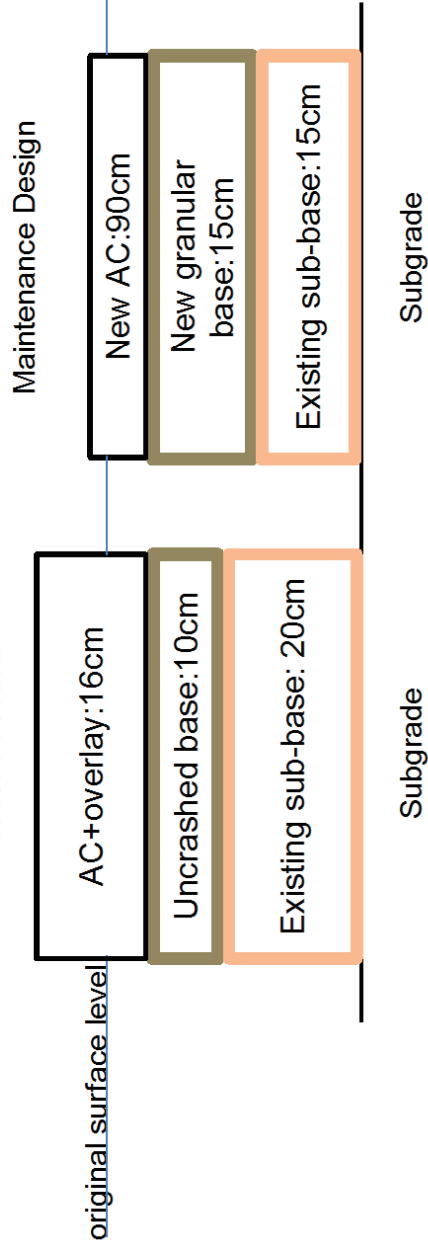
Chart 5

	T8	T7	T6
S1 = CBR 2	N/A	N/A	N/A
S2 = CBR 3,4	N/A	N/A	N/A
S3 = CBR 5 - 7	SN = 4.93	SN = 4.29	SN = 3.76
S4 = CBR 8 - 14	SN = 4.50	SN = 3.97	SN = 3.44
S5 = CBR 15-29	SN = 4.17	SN = 3.64	SN = 3.11
S6 = CBR 30+	SN = 3.74	SN = 3.21	SN = 2.68

Chart 3

	T4	T5	T6
S1 = CBR 2	N/A	N/A	N/A
S2 = CBR 3,4	N/A	N/A	N/A
S3 = CBR 5 - 7	SN = 2.94	SN = 3.16	SN = 3.41
S4 = CBR 8 - 14	SN = 2.62	SN = 2.83	SN = 3.08
S5 = CBR 15-29	SN = 2.29	SN = 2.40	SN = 2.65
S6 = CBR 30+	SN = 1.75	SN = 1.89	SN = 2.03

Present Section



Joint Site Inspection for the Second Pilot Project

Date:

October 27, 2017

Attendants:

- C&M: Eng. Solomon
- RAM: Abiy
- Design: Eng. Mehariw
- JICA team: Murakami

Findings :

At suggested location on Road No.7.2, it found during DCP test that surface was overlaid two times and thickness of base course was 10 cm only. There are still a lot of defects, i.e. crocodile crack, pothole, waving, shoving, surface failure. Project area will be estimated 10.7 m x 200 m. We gave the attention at twice overlay, and supposed the lack of base course strength. It becomes alternative candidate of pilot project.

At suggested location on Road No.78, it found during DCP test that CBR value of subbase was only 15%. Project area will be estimated 10.5 m x 200 m. According to Eng. Solomon, this section is prioritized by city council, so construction work will start soon. It means they may not wait the execution of pilot project. On the other day, JICA team discussed with Director Mekonnen about the problem of subbase strength, and he accept to wait the proper design & construction work until December executing under the pilot project. So, Road No.7.2 become the substituting location of Road No.78.

At suggested location on Road No.10, the under layer is sound due to the result of DCP test. We observed intersperse defects in the section i.e. surface failure, shoving, pothole, and delamination.

At suggested location on Road No.23, DCP test could not penetrate base course, so data of under layer was not available. We observed defects i.e. delamination, waving, corrugation and pothole. Those defects are caused by the quality of asphalt concrete and not related with structural problem in usual.

Eng. Solomon expressed he prefers Road No.23 in view of workability of construction. Then all attendants understood to select Road No. 23 for pilot project.

As the result of joint inspection, every attendant understood that Road No.78 & Road No.23 were selected locations and the defects on the road maintained under the pilot project.

Project Monitoring Sheet I (Revision of the Project Design Matrix)

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Implementing Agency: Addis Ababa City Roads Authority (AACRA)


Target Group: Staff of Addis Ababa City Roads Authority (AACRA)

Period of Project: 10/Jul/2015 - 9/Jul/2019

Project Site: Addis Ababa City

Model Site: Pilot project sites in Addis Ababa City

Version 6A
Dated 3rd Apr., 2018

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important	Achievement	%	
Overall Goal The roads in Addis Ababa City are maintained in a sustainable way.	Three years after the completion of the Project, 1. XX % of roads under AACRA is below the targeted roughness of YY. 2. The length(km) of road under AACRA inspected by the standardized method is increased by XX % compared to 3 months before the project completion.	1. Road inventory and Inspection Data in Addis Ababa City 2. Road inventory and Inspection Data in Addis Ababa City		JICA team will propose the verifiable indicator based on the survey results. JICA team will propose the verifiable indicator based on the survey results.	N/A	
Project Purpose The management capacity of AACRA for road maintenance is enhanced.	By 3 months before the completion of the Project, 1. AACRA's capacity to secure the budget for road maintenance is enhanced. 2. Road maintenance works based on PDCA ¹ cycle established by the Project are executed by AACRA. 3. The percentage of the implemented road maintenance works against all the maintenance works scheduled in AACRA Annual Road Maintenance Plan, exceeds 80% since the 3rd project year.	1. Interview to Addis Ababa City Administration and Road Funds Agency on Baseline and Endline data 2. Evaluation Result by PDCA Checklist 3. Baseline data (Maintenance record 2015-2016 and Road Maintenance Plan), AACRA Annual Road Maintenance Plan, AACRA Maintenance Historical Record	1. Human resources necessary for the road maintenance are continuously assigned by AACRA. 2. Financial resources are allocated by the City Administration and Road Funds Agency in a sustainable manner.	In Progress: Baseline data from Addis Ababa City Administration is yet to be obtain. In Progress: PDCA Checklist (ver.1) is developed. Currently operation method in consideration to inspection equipment and road management system is under development. In Progress: Baseline data shows maintenance work have been conducted more than 100 % of scheduled work. Appropriateness of Indicator needs to be discussed.	N/A N/A N/A	
Outputs 1. The implementation structure of AACRA for road maintenance is improved.	1-1. Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 7th JCC (September 2018). 1-2. Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by March 2019 to be incorporated into the budget FY Jul/2019-Jun/2020 if necessarily. 1-3. More than 100% of the requested budget on the basis of Annual Road Maintenance Plan are allocated since the 3rd project year. 1-4. Trainings on road maintenance is conducted targeting AACRA staff 1-5. Public understanding and cooperation on road maintenance is enhanced.	1-1. Complied suggestions, Project meeting record 1-2. The Road Map, Minutes of JCC 1-3. Baseline data (Requested and allocated budget on annual road maintenance plan 2015-2016), AACRA annual report (Budget Plan), AACRA Annual Road Maintenance Plan. 1-4. Training Record 1-5. PR outputs	The AACRA staff capacitated by the Project continue to work for their respective positions.	In Progress: JICA Team has proposed suggestions at TACs. Further review and discussions are required after role and responsibility of each section under new AACRA structure is clarified. In Progress: AACRA has re-structured in November 2016. Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for the needs of external communication and further strengthening of institution. The verifiable indicator is updated. In Progress: JICA team proposed to set verifiable indicator as 100% at the 6th JCC. The verifiable indicator is updated.	50% 50% 0%	
2. The process for formulating road maintenance plans is established.	2-1. PDCA Checklist is developed by January 2016. 2-2. AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 4th project year. 2-3. AACRA Annual and Mid/Long term road maintenance plan are formulated in consideration of Life Cycle Cost on Road	2-1. PDCA checklist, Minutes of JCC 2-2. PDCA Checklist, ACCRA Annual and Mid/Long term road maintenance plan, Road Maintenance Management System 2-3. ACCRA Annual and Mid/Long term road maintenance plan, AACRA Maintenance Historical Record		In Progress: As of end of March 2018, 41 lectures and 23 OJTs, and two trainings in Japan were conducted In Progress: Leaflet on Activity 2 was prepared and distributed. One seminar was held in April 2017. Other PR activities are currently under discussion. In Progress: Checklist version 1 was developed. Version will be updates as necessary through the operation. In Progress: Framework for RMMS and planning procedure were agreed. RMMS ver. 1 was issued July 2017 and ver. 2 in January 2018. Ver. 3 is currently developed to issue in July 2018. The verifiable indicator is updated. In Progress: Approach and formulation process for road maintenance planning have been agreed. Annual Road Maintenance Plan for August 2017- July 2018 was prepared in July 2017. Annual Road Maintenance Plan for August 2018- July 2019 will be prepared in July 2017.	80% 20% 100% 60% 50%	
3. The maintenance skills and knowledge of AACRA technical staff are improved.	3-1. Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted. 3-2. Number of preventive maintenance works executed are increased through the implementation of the project.	3-1. Training Record, Report on Pilot Project 3-2. Baseline data (Maintenance record 2015-2016), AACRA Maintenance History Record, AACRA Annual Road Maintenance Plan		In Progress: 11 lectures and 14 OJT relevant to maintenance skill and knowledge were conducted. In Progress: Concept and importance of Preventive Maintenance have been shared through pilot projects.	90% 30%	
Activities	Inputs		Important Assumption			
1-1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	The Japanese Side 1. Experts • Chief Advisor/Road Maintenance • Road Maintenance Planning • Road Inspection (Site Survey) • Road Inspection (Database) • Maintenance Management System • Maintenance Design • Construction Supervision • Training Planning • Monitoring • System Development • Others as necessary 2. Training of counterpart personnel, including Project Director and Project Manager, in Japan and/or the Third Countries 3. Provision of machinery and equipment • Inspection Equipment (Pavement Condition Survey Vehicle) • Maintenance Management System • Visual Inspection Supporting System • Structural Investigation Equipment • Others 4. Local expenses for the project activities as necessary	The Ethiopian Side 1. Personnel • Project Director • Project Manager • Counterpart personnel 2. Provision of the project office and facilities necessary for the project implementation 3. Traffic survey and pilot projects in Addis Ababa City 4. Administrative and operational expenses necessary for the project implementation • Electricity, water, communication, etc. • Local traveling costs and daily subsistence allowance (DSA) for counterpart personnel 5. Others as necessary	1. The turnover of AACRA staff does not profoundly affect the project activities.			
1-2 Convene Technical Advisory Committee (TAC)			2. Natural disasters, such as floods, do not profoundly affect the project activities.			
1-3 Prepare a training plan for AACRA Staff			Pre-Conditions			
1-4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.			Understanding and cooperation on road maintenance in the City are obtained from the project stakeholders such as the City Administration, Addis Ababa City Road and Transport Bureau, Road Funds Agency, etc.			
1-5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance						
1-6 Promote public relations (PR) activities on road maintenance in the City			<Issues and countermeasures>			
2-1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed						
2-2 Conduct road inspections in the City						
2-3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.						
2-4 Prepare and revise Medium/Long term Road Maintenance Plan using Road Maintenance Management System developed under the project.						
2-5 Prepare Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project.						
3-1 Select pilot projects for maintenance works based on the Annual Road Maintenance Plan formulated under the Project						
3-2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process						
3-3 Conduct the detailed investigations and design specifications of the pilot projects						
3-4 Assist AACRA to execute pilot projects						
3-5 Feedback achievements and experiences of pilot projects into the next Annual Road Maintenance Plan						
3-6 Organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level						

Draft of Plan of Operation for Extended Project Period

Revised 6A

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Dated Apr. 3rd 2018

Inputs	Plan	1st EthFY				2nd EthFY				3rd EthFY				4th EthFY				Remarks	Monitoring	
		2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	Issue		Solution	
Expert	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II			
Chief Advisor/Road Maintenance	Plan																			
Deputy Chief Advisor/ Road Maintenance/ Maintenance Management System	Plan																			
Road Maintenance Plan	Plan																			
Road Inspection (Site Survey)	Plan																			
Road Inspection (Database)	Plan																			
Road Maintenance Design	Plan																			
Construction Supervision	Plan																			
Training Plan	Plan																	Completed		
Monitoring	Plan																	Monitoring will increase due to extension of project term, but not yet increased assignment.	Currently waiting JICA clearance on admin. procedure.	
System Development	Plan																	Completed		
Equipment ▲: to be used for the Project Activities	Plan																			
Inspection Equipment (Pavement Condition Survey Vehicle)	Plan																	Completed		
Structural Investigation Equipment	Plan																	Completed		
Maintenance Management System	Plan																	Completed		
Visual Inspection Supporting System	Plan																	Completed		
Training in Japan	Plan																	Completed		
Training for Counterpart Personnel	Plan																	Completed		
Activities	Plan																			
Sub-Activities	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	Responsible Organization	Achievements	Issue & C. Measures
Output 1: The implementation structure of AACRA for road maintenance is improved.																				
1.1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	Plan																	JICA AACRA	JICA Team proposed suggestions at TACs. Further review and discussions are required after role and responsibility of each section under new AACRA structure is clarified.	
1.2 Convene Technical Advisory Committee (TAC)	Plan																	JICA AACRA	6 TACs conducted	
1.3 Prepare a training plan for AACRA Staff	Plan																	JICA AACRA	Plan has developed and training implementing schedule developed accordingly.	
1.4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.	Plan																	JICA AACRA	As of end of March 2018, 41 lectures and 23 OJTs, and two trainings in Japan were conducted.	
1.5 Share information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	Plan																	JICA AACRA	AACRA has re-structured in November 2016. Proposed improvement on internal communication institution has been proposed by JICA Team. Further discussions are required for the needs of external communication and further strengthening of institution.	
1.6 Promote public relations (PR) activities on road maintenance in the City	Plan																	JICA AACRA	Leaflet on Activity 2 was prepared and distributed. One seminar was held in April 2017. Other PR activities are currently under discussion.	
Output 2: The process for formulating road maintenance plans is established.																				
2.1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	Plan																	JICA AACRA	Checklist version 1 was developed. Version will be updated as necessary through the operation.	
2.2 Conduct road inspections in the City	Plan																	JICA AACRA	Visual Inspection Support System is developed and updated to ver.4. Visual inspection for 2015 and 2016 were completed and currently preparing for 2018. Emergency and Schedule Inspection were conducted in 2016 and 2017. Full scale automatic inspection is on going.	
2.3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.	Plan																	JICA AACRA	Basic Inventory Information and Framework work of Road Inventory Database was set in Mar. 2016. Database Structure was prepared in Dec. 2016. Repair Information and Visual Inspection Results are inputted every year and currently 2017 data input is on going.	
2.4 Prepare and revise Medium/Long term Road Maintenance Plan based on the above inventory data	Plan																	JICA AACRA	Mid/Long term Road Maintenance Plan will be formulated in July 2018.	
2.5 Prepare Annual Road Maintenance Plan	Plan																	JICA AACRA	Planning procedure has been agreed. The Annual Road Maintenance Plan for 2017/2018 was developed in July 2017, and for 2018/2019 will be developed in July 2018.	
Output 3: The maintenance skills and knowledge of AACRA technical staff are improved.																				
3.1 Select pilot projects for maintenance works from the annual road maintenance plan	Plan																	JICA AACRA	The 1st pilot project was selected in September - October 2016, and the 2nd pilot project was selected at the end of October 2017.	
3.2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process	Plan																	JICA AACRA	Information on 1st pilot project was shared before and after the implementation. For the 2nd pilot project, it will be shared in April 2018.	
3.3 Conduct the detailed investigations and design specifications of the pilot projects	Plan																	JICA AACRA	Selection of locations, test using DCP and design of 2nd Pilot Project were completed in Nov. 2017.	
3.4 Assist AACRA to execute pilot projects	Plan																	JICA AACRA	1st pilot project was implemented Nov., 2016 - Feb. 2017. 2nd pilot project was implemented in Dec. 2017- Jan. 2018.	The remaining one pilot project will be conducted in April 2018.
3.5 Feedback achievements and experiences of pilot projects into the next annual road maintenance plan	Plan																	JICA AACRA	Feedback of the first pilot project was provided. Feedback from second one will be made in March 2018.	
3.6 Organize a workshop/seminar of the pilot projects for ERA and road agencies at regional and municipal level	Plan																	JICA AACRA		
Project Duration / Phasing																				
Plan																				
Actual																				
Monitoring Plan	Plan																			
Actual																				
Monitoring	Plan																			
Actual																				
Joint Coordinating Committee	Plan																		Due to extension of project term, number of JCC increased	
Set-up the Detailed Plan of Operation	Plan																		Completed	
Submission of Monitoring Sheet	Plan																		Due to extension of project term, number of monitoring increased.	
Monitoring Mission from Japan	Plan																			
Joint Monitoring	Plan																		Due to extension of project term, number of monitoring increased.	
Reports/Documents	Plan																			
Project Work Plan	Plan																			
Project Completion Report	Plan																		Due to extension of project term, submission of project completion report is shifted to the June 2019.	

■ Activities with fixed period
 ■ Activities to be continuously conducted, or with tentative schedule

TO CR of JICA Ethiopia OFFICE

PROJECT MONITORING SHEET

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City
Version of the Sheet: Version 7 (Term: April 2018 – September 2018)

Name: Mr. Hiroshi Honda
Title: Chief Advisor
Submission Date: 4th Oct. 2018

I. SUMMARY**1. PROGRESS**

The progress that has taken place in this term is as follows;

- 1 Lectures and 2 OJT (Activity 1-4)
- Development of Road Maintenance Management System continued and Update to the version 3 of RMMS (Activity 2-2 and 2-4)
- Data Collection and registering by Mobile system (Visual Inspection and Repair data collection) (Activity 2-2 and 2-3)
- Preparation of Annual Maintenance Plan with system (Activity 2-5)
- Data Collection by PCSV (IRI and Images) and Data processing (Activity 2-2 and 2-3)
- The 6th JCC Meeting was conducted on the 3rd of April 2018
- Collection of questionnaire to Suggest improve implementation structure of AACRA (Activity 1-1)
- Preparation of Video Clip to enhance public understanding and cooperation on road maintenance (Activity 1-6)
- Discussion on Sustainability of Mobile Application system

1-1 PROGRESS OF INPUTS**1-1-1 The Japanese Side****(1) Experts**

In accordance with the amended contract agreed in January 2016 between JICA and JICA Team, number of experts has increased into a total 11 experts. Experts have been assigned since July 10, 2015, and at the end of October 2018, all experts have been assigned for a total of 69.80 Man/Month (hereinafter to be called “MM”) out of the project total assignment of 80.73 MM (assignment in Ethiopia only).

(2) Training of Counterparts Personnel

Under the Project, two trainings in Japan were planned. The first training in Japan was conducted from August 23 to September 6, 2016. The Second training was conducted from August 23, 2017 to September 6, 2017 for 16 days inviting 5 participants from AACRA.

(3) Provision of Machinery and Equipment

At the 1st Joint Coordination Committee meeting (hereinafter called “JCC”) held on August 17, 2015, specification of Inspection Equipment, which is a Pavement Condition Survey Vehicle (hereinafter called as “PCSV”) was approved by Counterparts.

Under the amended contract with JICA in January 2016, the procurement responsibility changed; 1) PCSV was procured directly by JICA Ethiopia, and equipment was procured by JICA headquarter. The rest of machinery and equipment were procured by JICA Team which are; 2) Structural Testing Instrument, and 3) Maintenance Management System and Visual Inspection Supporting System which are developed through the Project and transferred to Counterparts. At the 2nd Technical Advisory Committee meeting (hereinafter called

“TAC”) held on October 27, 2015, JICA Team informed these changes to Counterparts.

So far, procurement of Visual Inspection Supporting System was completed in April 2016. Vehicle for the PCSV arrived in April 2016, and related tax payment and application of number plate completed in May 2016. The rest of equipment to be installed on the PCSV was delivered to AACRA on January 16, 2017 after two months of Custom Clearance. The PCSV assembly was completed at the end of January, and the PCSV was handed over to AACRA on January 31, 2017. Out of the four computers, AACRA utilizes three at RAM office and one at JICA team office.

With regards to the Structural Testing Instrument, Dynamic Cone Penetrometer (hereinafter called DCP) was proposed during the 3rd JCC meeting held on 18th September 2016 and confirmed by AACRA after the discussions at the 4th JCC meeting. Two sets of DCP with one Asphalt Core Cutter was procured by the end of June 2017 from Japan and arrived Addis Ababa on the 22 July. After Customs clearance (completed on July 31, 2017), two number of DCPs and a core-cutter machine was delivered to AACRA in August 2017. In addition, one set of Generator has been provided to power Core-cutter at the field.

Table 1 List of Equipment and Machinery to be procured

Equipment and Machinery	Component	Responsible Agency for Procurement	Original Planned procured Date	Expected procured Date*	Remark
Inspection Equipment (Pavement Condition Survey Vehicle)	<ul style="list-style-type: none"> 1 Vehicle Equipment to be fitted on the PCSV 	JICA	Sep. 2016	Vehicle was procured and transferred to AACRA in May 2016. A part of equipment (PCs) are procured in Apr. 2016, and the rest of equipment was delivered in January, 2017. PCSV assembly was completed at the end of January.	Completed on January 31, 2017.
Structural Testing Instrument	<ul style="list-style-type: none"> 2 set of DCP 1 set of Asphalt Core Cutter 1 set of Diesel generator (3 kw) 	JICA Team	Jul. 2017	Instruments was procured by the end of June 2017 from Japan and arrived Addis Ababa on the 22 nd Jul. Generator was procured in September 2017 and transferred on Oct. 11, 2017.	Completed in October 2017.
Maintenance Management System	<ul style="list-style-type: none"> 1 set of Desktop Computer 1 GIS software 	JICA Team	Apr. 2016	Arc GIS was installed in April 2016. The whole system was delivered to AACRA in July 2017, after the completion of assembly of PCSV (the end of January, 2017).	Completed in July 2017.
Visual Inspection Supporting System	<ul style="list-style-type: none"> 5 set of Smartphone 1 GIS software 	JICA Team	Mar. 2016	Smartphone was procured in Feb. 2016, and GIS was installed in Apr. 2016.	Completed in Apr. 2016.

Note: “Expected procurement date” means Equipment and Machinery to be used for the project activities.

Besides above listed, JICA team procured 2 no. of PCs (1 no. is yet to be procured), 1 no. of Projector, and 1 no. of Printer for the operation of the project office.

(4) Local Expenses for the Project Activities

Local expense has been utilized for salary of national staff (Engineer and Accountant), office equipment, rent-a-car, and other consumables so far.

1-1-2 The Ethiopian Side

(1) Personnel

Project Manager was identified under Record of Discussion (hereinafter to be called as “R/D”) and assigned in late August 2015. The rest of counterpart personnel was selected through the progress of the Project. In November 2015, three personnel for inspection activity have been assigned, and further two more road and

transport engineers are assigned in June 2016. After new organization introduced in November 2016, number of counterpart personnel is considerably increased because 5 regional offices are newly provided in the road asset management department. In total approximately 16 personnel has been assigned as counterpart as of March 2018.

(2) Furnished Office Space and Facilities

Since the project commencement in July 2015, a project office (Room 318) has been allocated at Addis Ababa City Roads Authority (hereinafter to be called as “AACRA). Office furniture were installed for eight experts.

(3) Traffic Survey and Pilot Project in Addis Ababa City

Based on the baseline survey, AACRA has not taken any traffic survey data so far even though AACRA promised to provide traffic survey data in M/D and, therefore, JICA Team is obliged to conduct the Project Activities without traffic survey data.

(4) Administrative and Operational Expense

Expense agreed at R/D has been secured and handled by the Ethiopian Side.

1-2 PROGRESS OF ACTIVITIES

The Project activities to achieve the project purpose under Work Plan were agreed at the 1st JCC held on August 17, 2015. The activities described in Project Design Matrix (hereinafter to be called as “PDM”) is summarized in the Table 2 shown below. Progress of each activity is described accordingly in the sections that follow.

Table 2 Outline of Project Activities

PROJECT PURPOSE: The Management capacity of AACRA for road maintenance is enhanced

Outputs	Act no.	Activities
Overall	0-1	Preparation, Updating and Review of Work Plan and Monitoring Sheet
	0-2	Baseline Survey and Performance Indicator
	0-3	JCC and TAC meeting
	0-4	Training in Japan
	0-5	Project Completion Report
Output 1: The implementation structure of AACRA for road maintenance is improved.	1-1	Review Implementation Structure of AACRA, and compile suggestions for the structure improvement
	1-2	Convene TAC
	1-3	Prepare training Plan for AACRA Staff
	1-4	Conduct training for AACRA Staff for road maintenance; road inspection, maintenance planning, maintenance management system, etc.
	1-5	Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance
	1-6	Promote Public Relation activities on road maintenance in the City
Output 2: The Process for formulating road maintenance plans is established	2-1	Review the road maintenance cycle of AACRA, compile PDCA Checklist, and revise the checklist if needed.
	2-2	Conduct Road Inspection in the City
	2-3	Develop and Update the Road Inventory (database) of AACRA, including road condition, traffic volume, nit costs, etc.
	2-4	Prepare and revise Mid and Long Term Road Maintenance Plan using road Maintenance Management System developed under the Project
	2-5	Prepare and Revise Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project
Output 3: The Maintenance skills and knowledge of AACRA	3-1	Select Pilot Projects for maintenance work based on the Annual Road Maintenance Plan formulated under the Project
	3-2	Share information of Pilot Project between/within Road Asset Management Process and Constructional and maintenance Process

Outputs	Act no.	Activities
Technical staff are improved	3-3	Conduct the detailed Investigation and design specification of the pilot projects
	3-4	Assist AACRA to execute Implementing Pilot Project
	3-5	Feedback achievements and experience of pilot projects into the next annual road maintenance plan
	3-6	Organize Workshop/Seminar of Pilot Project for ERA and Road agencies at regional and municipal level

1-2-1 ORGANIZATION STRUCTURE

Due to the reorganization of AACRA announced on 11th November, 2016, restructuring of the each department is underway, therefore, the list of counterpart personnel was revised.

In this monitoring sheet, name of relevant division will be called using old name for activities up to the end of November 2016, and new names for activities after December 2016. In April 2017 during the 4th JCC, the new structure of AACRA was presented. Key changes or revisions in this new organization is summarized as follows.

- ♦ 4 Deputy General Directors who are in charge of (1) Engineering Regulatory, (2) Capacity Building & Support Service, (3) Engineering Operation and (4) Engineering Stream and Road Asset Management, are assigned under Director General of AACRA.
- ♦ Decentralization of Road Asset Management Division, dividing into 5 regional offices located in different parts of the city and a Central Data Base Management Department located at the head office of AACRA.

Table 3 Changing Name of Division Related to the Project

Up to November 2016	After December 2016
Road Transport Infrastructure, Construction and Maintenance Core Process (C&M)	Engineering Operation (Own force Road Maintenance, Own Force Road Construction, Plant & Equipment are included)
Traffic Engineering, Road Transport Infrastructure Design Core Process (RTD)	Engineering Regulatory (Eng. Procurement, Construction contract management, Maint. And Construction design and review, Research and Technology adaptation)
Road and Transport Infrastructure Administration Core Process (Department of Road Asset Registration and Maintenance is included (RAM))	Engineering Stream, Road Asset Management (Central Database and 5 no. of Regional Road Asset Management offices (Central, North, South, West and East) are included)(RAM)

1-2-2 ACTIVITIES FOR OVERALL

(1) **ACTIVITY 0-1** Preparation, Updating and Review of Work Plan and Monitoring Sheet

1) Kick off Meetings

Kick off meeting was held on July 15, 2015 in order to 1) obtain more understanding of the JICA project, 2) comprehend function of the concerned parties in and outside of AACRA, and 3) arrange the 1st JCC. Participants from AACRA were the General Manager, the Technical Advisor, Managers from Road Transportation Construction and Maintenance Core Process (C&M), Road Transport Design Core Process (RTD), and engineers from Road Asset Registration Maintenance Planning Sub Process (RAM).

Besides, Counterparts and JICA experts made a courtesy visit Addis Ababa City Road & Transportation Bureau, and Road Funds Agency to introduce and obtain their cooperation to the Project. JICA experts also visited the Embassy of Japan in Ethiopia.

2) Work Plan

The draft Work Plan was discussed with JICA Headquarter on July 13, 2015, and agreed at the 1st JCC held on August 17, 2015. However, due to the procurement delay of the equipment to be installed on the PCSV, the overall work plan was revised as attached in the Project Monitoring Sheet II (PM Form 3-3).

3) Monitoring Sheets

Every six months, monitoring sheets are updated based on the discussions made with Counterparts, and submitted to JICA Ethiopia Office. Following shows the scheduled submission of monitoring sheet.

Table 4 Schedule of Monitoring Sheet Submission

Project Year	Version	Date
1st year (July 2015-June 2016)	Monitoring Sheet Version 1	Agreed and submitted on August 20, 2015
	Monitoring Sheet Version 2	Agreed on February 18, 2016
2nd year (July 2016-June 2017)	Monitoring Sheet Version 3	Agreed and submitted on September 15, 2016
	Monitoring Sheet Version 4	Agreed and submitted on January 27, 2017
	Monitoring Sheet Version 4A	Agreed and submitted on April 5, 2017
3rd year (July 2017-June 2018)	Monitoring Sheet Version 5	Agreed and submitted on October 4, 2017
	Monitoring Sheet Version 6	Submitted in February 28, 2018 (to JICA only)
	Monitoring Sheet Version 6A	Submitted on April 3 2018
4th year (July 2018-June 2019)	Monitoring Sheet Version 7	To be Submitted in October 2018

(2) **ACTIVITY 0-2** Baseline Survey and Performance Indicator

Performance indicators (hereinafter called “Objectively Verifiable Indicator”), which are to evaluate the achievement level of the Project stated PDM was planned to be set within six months from the project commencement. The baseline survey was conducted and JICA Team proposed to consult with City Council of Addis Ababa on performance indicators and means of verification on “Overall Goal” and “Project Purpose”. However due to requirements of an official letter from the Mayor, consultation was not yet organised. The issue was addressed to AACRA at the 2nd and 5th TAC, and agreed that AACRA is to communicate with Addis Ababa City Administration on this issue, however it is yet to be organised as of March 2018.

Considering the difficulty to consult with City Council of Addis Ababa, JICA Team revised the Indicator on “Project Purpose” and “Output” with Counterparts and consulted to JICA Ethiopia Office for approval prior to the 2nd JCC. At the 2nd JCC, proposed indicators were approved. In September 2016, the JICA Team revised the indicator and means of verification based on the baseline survey.

Discussion on the figure for the achievement of target roughness at Overall Goal will be initiated by the JICA Team at the 6th JCC based on the result of the on-going survey. AACRA will provide their proposed Target Roughness at the 7th JCC.

In terms of indicator for Project Purpose using the achievement of the Maintenance plan, the JICA Team has developed a system which AACRA can obtain the achievement level. The indicators are described in “1.3 Achievement of the Outputs” and “1.4 Achievement of the Project Purpose” of this paper.

(3) **ACTIVITY 0-3** Joint Coordination Committee and Technical Advisory Committee

Outline of Joint Coordination Committee (hereinafter called as “JCC”) and Technical Advisory Committee (hereinafter called as “TAC”) is summarized in Table 5. The member of JCC was set as agreed at R/D and assigned in September 2015, and member of TAC was assigned after the 1st JCC. Working Groups (hereinafter called as “WGs”) are set up as required through the course of project. It was confirmed in November 2016 by AACRA that the name of JCC and TAC members are updated based on the restructuring of AACRA. Members before and after restructuring are presented in below.

Table 5 Outline of JCC and TAC before AACRA re-structuring Before November 2016

Committee	Members	Frequency	Function	
Joint Coordinating Committee	[Ethiopia Side] <ul style="list-style-type: none"> • General Director of AACRA (Project Director) • Director of AACRA RAM (Project Manager) 	[Japanese Side] <ul style="list-style-type: none"> • JICA Experts • JICA Ethiopia 	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and

Committee	Members		Frequency	Function
(JCC)	<ul style="list-style-type: none"> Director of AACRA RTD Director of AACRA C&M AACRA other related Department Addis Ababa City Road and Transport bureau Addis Ababa City Administration Road Fund Agency 	<ul style="list-style-type: none"> Office Embassy of Japan in Ethiopia 		exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee (TAC)	<ul style="list-style-type: none"> [Ethiopia Side] AACRA Project Director AACRA Project Manager of RAM (Acting Chairperson) AACRA RTD AACRA C&M AACRA other related Department 	<ul style="list-style-type: none"> [Japanese Side] JICA Experts 	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by Project Director, Project Manager, Counterpart personnel, and JICA experts.

NOTE:

- Road Transportation Construction and Maintenance Core Process : C&M
- Road Transport Design Core Process :RTD
- Road Asset Registration Maintenance planning Sub Process: RAM

Table 6 Outline of JCC and TAC after AACRA re-structuring After December 2016

Committee	Members		Frequency	Function
Joint Coordinating Committee (JCC)	<ul style="list-style-type: none"> [Ethiopia Side] General Director of AACRA(Project Director) Deputy Director General of AACRA Engineering Stream, Road Asset Management (Project Manager) Director of AACRA RAMDD Director of AACRA CMDRID Director of AACRA OFRMD Director of AACRA Planning, Budget and Strategic Management Directorate Director of AACRA Regional Asset Management Director of AACRA Research & Technology Adaptation Directorate Director General of Human Resources & Facility Management Directorate Director of AACRA other related Directorate Addis Ababa City Road and Transport bureau Addis Ababa City Administration Road Funds Agency 	<ul style="list-style-type: none"> [Japanese Side] JICA Experts JICA Ethiopia Office Embassy of Japan in Ethiopia 	Semi-Annually	Approve a work plan, review overall progress, monitor the Project, and exchange opinions on major issues that arise during the implementation of the Project.
Technical Advisory Committee (TAC)	<ul style="list-style-type: none"> [Ethiopia Side] General Director of AACRA Deputy Director General of AACRA Engineering Stream, Road Asset Management (Project Manager) Director of AACRA RAMDD Director of AACRA CMDRID Director of AACRA OFRMD Director of AACRA other related Department 	<ul style="list-style-type: none"> [Japanese Side] JICA Experts 	Monthly to Quarterly	TAC is to handle technical and structural issues of the Project; composed by Project Director, Project Manager, Counterpart personnel, and JICA experts.

NOTE:

- Own Force Road Maintenance Directorate : OFRMD
- Road Construction Maintenance Design Review and Implementation Directorate : CMDRID
- Road Asset Management and Database Directorate : RAMDD

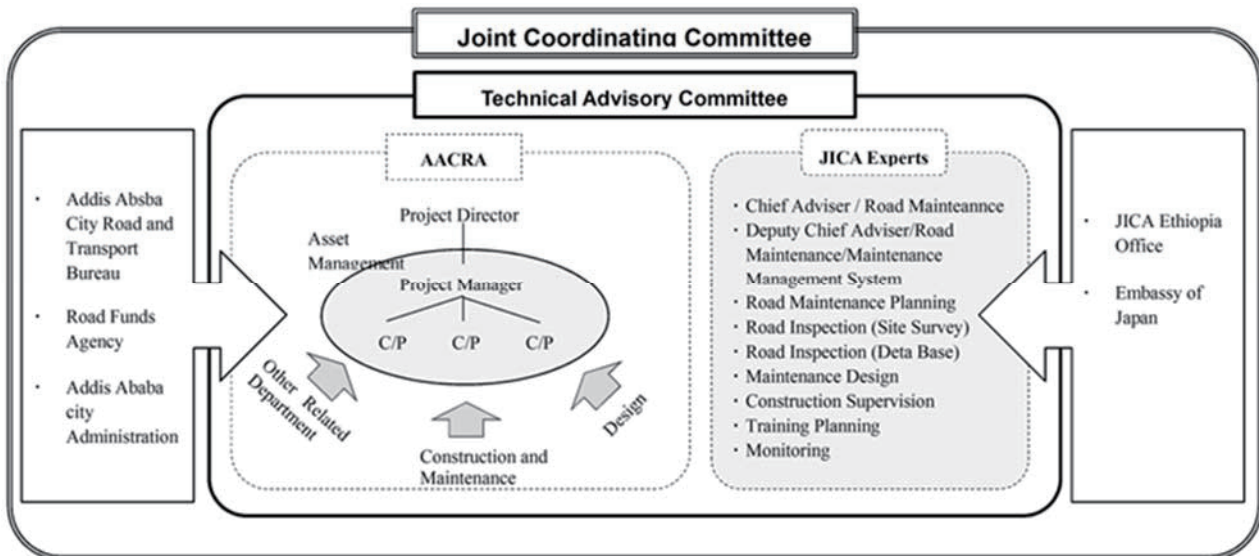


Figure 1 Structure of JCC and TAC

1) 1st JCC

The 1st JCC was held on August 17, 2015, chaired by the General Manager of AACRA, Eng. Fekadu Haile with total of 18 participants. At the meeting, revised PDM, monitoring sheet, and specification for procurement goods were approved. In addition, following items were requested and agreed on 1) Review of exiting quality of road maintenance works carried out by supervision consultants, 2) Immediate process for procurement of Pavement Condition Survey Vehicle.

2) 2nd JCC

The 2nd JCC is held on February 18, 2016, with a total 23 participants. Progress of activities including database preparation and inspection were informed, and smartphones for Visual Inspection Supporting System were handed over. The General Manager of AACRA pointed out the following points; 1) Addis Ababa's Drainage during rainy season which affecting road condition will be studied under a project funded by World Bank (WB)¹, 2) Acceleration of Procurement of Pavement Condition Survey Vehicle, and 3) need of clear justification for replacing the existing system to new system to be developed under the Project (road numbering system, road maintenance system, etc.)

3) 3rd JCC

The 3rd JCC is held on September 15, 2016, chaired by Eng. Habtamu Tegegne, the General Director of AACRA newly appointed in August, 2016, with a total 20 participants. After the explanation of progress of each activity carried out by both counterpart and JICA Team, revision of PDM, selection of Pilot project and 1st Training in Japan (conducted from end of Aug. to early Sep. 2016) were reported and discussed. After the discussion, matters confirmed and agreed by JCC were (1) AACRA has serious concern about the delay of equipment supply into the Pavement Condition survey Vehicle, (2) AACRA has an intention to reorganize its structure and request to JICA Team to adjust the work schedule considering the revised organization, (3) AACRA's new management gives the first priority on the update of the road network in Addis Ababa and request JICA Team to accelerate activities such as Maintenance Plan and Pilot project, and (4) AACRA requests the supply of Instrument for Structural Test should be supplied on time in order not to further delay in the project.

In the closing remarks, Eng. Habtamu Tegegne, GD of AACRA, mentioned that he was very pleased to hear the report of Training in Japan and hoped trainees committedly apply and contribute knowledge learnt, and serve as bridge between AACRA and JICA Team.

4) 4th JCC

The 4th JCC was held on April 4, 2017, chaired by Eng. Habtamu Tegegne, the General Director of AACRA,

¹ The Project on drainage funded by WB has not been implemented yet as of September 2017.

with 23 participants. At the meeting, following were reported; project progress, Activity Schedule, Revision of the Project Design Matrix and Presentation on Pavement Condition Survey Vehicle and Data collection and Restructuring of AACRA and Decentralization of Road Asset Management. In addition, delay in the project and needs of extending project period, procurement of the type of Structural Testing Instrument, restructuring of AACRA organization and AACRA's desire for more training opportunities were discussed during the meeting. .

5) 5th JCC

The 5th JCC was held on October 4, 2017, chaired by Eng. Habtamu Tegegne, the General Director of AACRA, with 21 participants. At the meeting, following the report on the progress of each activity, three special reports was presented which are (1) Structural Investigation Instrument, (2) Overview of Road Maintenance Management System (RMMS), and (3) the 2nd Training in Japan. JICA Team also pointed out the delay in the progress of Data Collection and Development of the RMMS for about 1 year due to the delayed procurement of the PCSV. AACRA has also expressed their serious concern on such as delay, sustainability of survey system, and technology transfer from Japan to Ethiopia as described in the signed MM of the meeting. With respect to the delay in the Data Collection and Development of RMMS, Mr. Kondo, Representative of the Project from JICA HQ replied to the request of Extension of Time (EOT) made by Eng. Habtamu, that the need of EOT would be relayed to JICA HQ for subsequent approval and fulfilling of the necessary procedures.

6) 6th JCC

The 6th JCC was held on April 3, 2018, chaired by Eng. Habtamu Tegegne, the General Director of AACRA, with 30 participants. At the meeting following the report on the progress of each activity, three special reports was presented which are 1. Design and implementation of pilot project, 2. Data collection and processing, 3. Development of RMMS and 4. Challenges for sustainable implementation of road management. JICA Ethiopia office confirmed that for the supply of operations and maintenance equipment that was requested by AACRA in August 2017 will likely be approved by GoJ. JICA may continue support AACRA's restructuring. AACRA will work on promoting jointly with JICA team to promote public awareness of the project.

Table 7 JCC Held during the Project (as of March, 2018)

No.	Date	Participants
1st	Aug. 17, 2015	In total of 18 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
2nd	Feb. 18, 2016	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, and JICA Team
3rd	Sep. 15, 2016	In total of 20 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.
4th	Ap. 4, 2017	In total of 23 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA Team, and Road Fund.
5th	Oct. 4, 2017	In total of 21 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA headquarter and JICA Team.
6th	Ap. 3, 2018	In total of 30 participants from AACRA, Embassy of Japan in Ethiopia, JICA Ethiopia Office, JICA headquarter, Road Fund and JICA Team.
7th	Oct. 4, 2018	To be added after JCC.

(4) **ACTIVITY 0-4** Training in Japan

At the 1st TAC, JICA Team explained the outline of Training in Japan. Two trainings during the project period of three years were conducted. The first training in Japan was conducted from August 23 to September 6, 2016, inviting five staff members from Road Asset Registration and Maintenance Planning Sub Process of AACRA. Two of the participants were traffic engineers while the rest are Road Asset inspectors. The second training was conducted from August 23 to September 6 2017 focused on Procedure of Road Asset Management and Repair Method. The three participants were from Regional Road Asset Management, two were from AACRA Own Force Construction and Management.

(5) **ACTIVITY 0-5** Project Completion Report

Project Completion Report is planned to be submitted in May 2019.

1-2-3 OUTPUT 1: The Implementation Structure of AACRA for Road Maintenance is improved

(1) **ACTIVITY 1-1** Review Implementation Structure of AACRA, and Compile Suggestions for the Structure Improvement

Since July 2015, JICA Team have been reviewing the road maintenance implementation structure of AACRA with Counterparts through discussions, interviews, questionnaire survey and site visits. Based on the findings, some improvements have been proposed at TACs such as involvement of RTD to maintenance design.

In November 2016 AACRA announced a new organization structure as mentioned earlier. The project was designed prior to the restructuring and decentralization of the Asset Management Department. Further investigation and evaluation of the new organization are currently carried out through interviews and careful observation. Especially regards to the inspection work, team member of inspection may be revised.

Draft Questionnaire to obtain the comments from the AACRA staff on the current organization arrangement, is prepared and will be discussed at the 6th JCC. After the clarification of role and responsibility of relevant division to the Project, the compiled suggestions for a sustainable implementation structure of road management will be proposed to AACRA at the 7th JCC (October 2018). Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by March 2019.

(2) **ACTIVITY 1-2** Convene Technical Advisory Committee (TAC)

To date of March 2018, six TAC meetings were held as shown in the table below. For further detail, please refer to Minuets of meetings. TAC meeting has not been held since the January 2017 due to the restructuring of the AACRA and the technical issues and concern at the site levels has been sufficiently addressed through trainings and OJTs. TAC will be set on demand basis.

Table 8 TAC during the Project

TAC	date	participants	Topic discussed	Action agreed/proposed
1st	Sep. 7, 2015	In total of 13 JICA experts: 3 AACRA: 10	<ul style="list-style-type: none"> Progress of the Project Challenges on road patrol Strategic road and database setup Inclusion of city administration 	<ul style="list-style-type: none"> AACRA proposed to clarify the demarcation of C&M, Supervision consultant, and RAM through the progress of the Project. JICA Team confirmed that drainage inspection and planning will be included.
2nd	Oct. 27, 2015	In total of 13 JICA experts: 5 AACRA: 8	<ul style="list-style-type: none"> Review of the last TAC Method of road patrol, progress 	<ul style="list-style-type: none"> Maintenance plan based on visual inspection data will be prepared by February 2016 Temperature digital gauge will be procured from Japan² Minimum length of road segment is to be confirmed, Communication with City Administration will be improved Lecture on Kaizen will be hold at the beginning of next year.
3rd	Mar. 22, 2016	In total of 9 JICA experts: 3 AACRA: 6	<ul style="list-style-type: none"> Progress of the Project Network centre for Road Numbering Application of Road Management System for AACRA Customised Mobile Inspection System Training in Japan <p>Besides, Report on Application of the Road Management System for Addis Ababa City Roads Authority was submitted.</p>	<ul style="list-style-type: none"> Adopt Leghar as centre of road network and will be report to GM. Local and Collector streets will be included in numbering of roads Set up and complete road inventory database and input inspection data will be conducted prior to the next TAC meeting
4th	Jul. 15, 2016	In total of 12 JICA experts: 6 AACRA: 6	<ul style="list-style-type: none"> Progress of the Project Workshop for Selection of Design Pilot Project Structural Investigation Instruments Necessity of Road Maintenance 	<ul style="list-style-type: none"> Road Maintenance Handbook will be prepared Structural investigation instrument will be discussed later. JCC to be hold one day between Sep. 13 and 15 of 2016.

²The temperature digital gauge was provided in February 2016.

TAC	date	participants	Topic discussed	Action agreed/proposed
			Handbook	
5th	Sep. 26, 2016	In total of 12 JICA experts: 3 AACRA 9	<ul style="list-style-type: none"> Progress of the Project Revision of some points of PDM which are pointed by Monitoring Expert. Request AACRA to arrange a meeting with City Administration 	<ul style="list-style-type: none"> Proposal of the revision will be exchanged by both parties before the 4th JCC scheduled in March 2017 AACRA committed to arrange the meeting with City Administration during next visit of Mr. Honda
6th	January 27, 2017		<ul style="list-style-type: none"> Progress of the Project New organization structure of AACRA Pavement Condition Survey Vehicle Pilot Project 	<p>Note: Based on the new organization structure of AACRA, the chairperson of TAC is changed from Mr. Melaku (Technical Advisor) to Mr. Demelash (Deputy Director General – Road asset management).</p> <ul style="list-style-type: none"> It will take time to complete the establishment of new AACRA organization. It was informed that the PCSV was delivered to AACRA on January 16 and assembling would be completed by the end of January 2017.

(3) **ACTIVITY 1-3** Prepare Training Plan for AACRA Staff

At the 1st TAC, JICA Team presented a training policy for each training scheme on Training in Addis Ababa (OJT and Lecture) and Training in Japan. Training in Addis Ababa is that lecture and OJT are conducted in combination, which approx. one lecture by JICA Team, followed by 2 weeks of OJT lead by AACRA staff aiming to develop theoretical and practical knowledge and skill on road maintenance. Whereas training in Japan will provide training by Japanese experts in the field so that AACRA staff can gain knowledge and experience on advanced technologies.

Training Plan was prepared in February 2016 and revised in August 2016, which summarises training courses (focusing on Activity 2-2, 2-3, 2-4, 2-5, 3-1,3-3,3-4 and 3-5), content covers, target trainees (mainly RAM members), frequency etc. Currently training plan for 2018-2019 is under planning.

In addition to the above training course, based on the JICA Ethiopia advice made in August 2016 to hold a seminar for introducing this Project to other stakeholders including ERA, RF, WB, and Universities, JICA Team agreed and held the seminar on April 18, 2017.

Besides the above, Workshop/Seminar will be provided targeting ERA and Road agencies, which is addressed under Activity 3-6.

(4) **ACTIVITY 1-4** Conduct Training for AACRA Staff or Road Maintenance; Road Inspection, Maintenance Planning, Maintenance Management System, etc.

1) Trainings

JICA Team have been conducting training in accordance with the Training Implementation schedule. To date, 42 lectures and 25 OJTs were conducted under the project as summarized in the table shown below.

a. Training for Activity 2-2: Conduct Road Inspections in the City

From August 2015, a series of trainings has been provided on periodic and emergency patrolling including operation of Visual Inspection Supporting System. However, errors were found in collected data on distress and damage identification, method of measuring distresses, distress dimensions etc. Thus, JICA Team extended training on Inspection for further 6 months. Kaizen method was introduced to RAM staff by JICA expert which enable them to tackle their problems through consulting, discussion in groups and organizing regular meetings to schedule and use their resources effectively among themselves. Full scale 1st training (lecture and OJT) for automatic inspection using PCSV was conducted from February 1 to 13, 2017 (9 days). On September 22, 2017, 1 day training for PCSV system maintenance was also provided. From October 2017 to January 2018, lectures and OJT on the mobile data registration have been conducted. From April 2018 to September 2018, 2 OJT and 1 lecture were conducted as a follow up (kaizen) on the use of visual inspection system, condition survey with vehicle and data transfer to RMMS database. Further training will be continuously provided.

b. Training for Activity 2-3: Develop and Update the Road Inventory (database) of AACRA

Initial training on concept and setup of road network inventory was offered. Full scale data collection, was conducted for February 1 – 13, 2017 (9 days).

c. Training for Activity 2-4 and 2-5: Prepare and Revise Short / Medium / Long Term Road Maintenance Plan

As of September 2017, trainings (7 lectures and 1 OJTs) on road maintenance planning have been offered. Trainees have so far improved their knowledge and skill sufficiently. In 5th JCC held on October 4, 2017, the detailed presentation including demonstration of the RMMS was conducted. Once the system is developed, further training will be provided.

d. Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification

As of September 2017, 7 lectures have been held. Especially for this term, after the procurement of structural testing instruments, training on Introduction Dynamic Cone Penetrometer and Introduction UK DCP 3.1 were provided in July and August 2017. Actual testing work in the areas selected as the second pilot project was conducted in October and November, 2017. 3 (three) locations were selected as the second pilot project in November 2017 through the joint inspection.

e. Training for Activity 3-4 and 3-5: Selection of Pilot Project

Considering the scale, the damage severity and the expected repair method, the location and repair method of the 1st Pilot Project was decided in November 2016 through joint site investigation among JICA Team, Construction (Repair Maintenance) Department, and RAM. A series of OJT were offered from October – December 2017 on site selection and repair method related to the first pilot project.

Table 9 Training Implemented during the Project (as of October 2018)

Training Courses		Style	Date	Participants no.	
A: Training for Activity 2-2: Conduct Road Inspections in the City					
A1 inspection (Emergency patrolling)	Visual	A1-1 Concept of emergency patrolling	Lecture	11 Sep. 2015	11 RAM members
		A1-2 How to carry out emergency patrolling	Lecture	14 Sep. 2015	RAM members
	Lecture		9 Oct. 2015	11 RAM members	
	OJT		15-22 Sep. 2015	11 RAM members	
	A1-3 How to process geo-tagged photographs	Lecture	15 Sep. 2015	11 RAM members	
		OJT	16-22 Sep. 2015	11 RAM members	
A2 inspection (Periodic inspection)	Visual	A2-1: Revision of Visual inspection	Lecture	15, Jun. 2016	13 RAM members
			Lecture	20 Jun. 2016	13 RAM members
			Lecture	22 Jun. 2016	13 RAM members
	A2-2: Visual Inspection using mobile system	Lecture	17 Feb. 2016	11 RAM members	
		Lecture	23 Feb. 2016	RAM members	
		Lecture	8 Mar. 2016	RAM members	
		Lecture	18 Apr. 2016	RAM members	
		Lecture	24 Oct. 2016	RAM members	
		Lecture	25 Jul. 2017	RAM members	
		OJT	3 Feb. 2016	11 RAM members	
		OJT	20 Apr. 2016	11 RAM members	
A3 Scheduled inspection	A3-1: Introduction of inspection vehicle	Lecture	20 Aug. 2015	11 RAM members	
		Lecture	1 Feb. 2017	RAM members	
	A3-2 :Revision of visual inspection	Lecture	15 Oct. 2016	12 RAM members	
	A3-3: Training for operation of PCSV and analysis of the data.	Lecture	1– 13 Feb. 2017 (9 days)	20-25 RAMDD members (Morning)	
	A3-4: Training for operation of PCSV and analysis of the data (Field work).	OJT	1– 13 Feb. 2017 (9 days)	20-25 RAMDD members (Afternoon)	
	A3-5: PCSV system maintenance	Lecture	22 Sep. 2017	RAMDD members	
	A3-6 Mobile Data Registration Method	OJT	11 Oct. 2017	RAM member	
	A3-7 Vehicle Inspection Review	Lecture	26 Jan. 2018	8 RAM members	
A3-8 Follow up Mobile Inspection System and Data Registration 2	Lecture	29 Jan. 2018	7 RAM members		
	Lecture	30 Apr. 2018	5 RAM members		

Training Courses		Style	Date	Participants no.
	A3-9 Mobile Inspection and Data Registration	OJT	30 Jan. 2018 30 Apr. 2018 1 Oct. 2018	5 RAM members 5 RAM members 6 RAM members
B: Training for Activity 2-3 : Develop and Update the Road Inventory (database) of AACRA				
B1 Restructuring of road network	B1-1 Concept of revised road network system (road numbering)			
	B1-2 Setup of road network inventory	Lecture	29 Oct. 2015	10 RAM member
		Lecture	16 Dec. 2015	10 RAM members
		OJT	16-27 Dec. 2015	10 RAM members
B2 GIS	B2-1 GIS Database Preparation for CS Roads	Lecture	26 Jan. 2018	7 RAM member
C Training for Activity 2-4 and 2-5: Prepare and revise short / medium / long term road maintenance plan				
C1 Road priority and service level	C1-1: Road priority and service level for AACRA	Lecture	19 May. 2016	11 RAM members
C2 Road Management System–Kyoto Model	C2-1: Introduction of Kyoto model	Lecture	11 Aug. 2016	11 RAM members
		Lecture	20 Aug. 2015	11 RAM members
		Lecture	26 Jul. 2017	RAM members
C3: Mid/long-term maintenance planning	C3-1: Difference between Kyoto model result and mid/long-term plan		Conducted as the seminar in Apr.	
	C3-2: Mid/long-term maintenance planning	Lecture	26 Jul. 2017	RAM members
C4 Annual Maintenance Planning	C4-1 Annual Maintenance Planning	Lecture	11 Sep. 2015	3 RAM members
		Lecture	19 May 2016	RAM members
		OJT	6 May 2016	6 RAM members
D Training for Activity 3-3: Conduct Detailed Investigation and Design Technical Specification				
D-1 Type of deterioration of pavement	D1-1 Type of damage maintenance	Lecture	2 Aug 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member
		Lecture	9 Aug. 2016	5 Member of RAM, 1 RTD, 1 Laboratory Member
	D1-2 Repair method of Damage (construction method)	Lecture	19 Aug 2016	5 Member of RAM, 1 RTD, 1 C&M Member
D-2 Repair Method	D2-1 Selection of Repair Method	Lecture	15 Sep. 2016	at the 3rd JCC
D-3 Structural Instrument	D3-1 Selection of inspection instrument	Lecture	15 Sep. 2016	Member of Laboratory (Research and Technology Adaptation technology)
	D3-2: Introduction Dynamic Cone Penetrometer	Lecture	28 Jul. 2017	Member of Laboratory
	D3-3 Introduction UK DCP 3.1	Lecture	2 Aug. 2017	Member of Laboratory
	D3-4 Method and Procedure of Maintenance Design	OJT	7 Nov. 2017	Construction and Design
E Training for Activity 3-4 and 3-5 Assist AACRA to execute pilot projects & feedback achievement & experience				
E-1 Preparation of Pilot Project	E1-0 Joint Site Investigation	OJT	28 Oct. 2016	2 from Construction, 2 from RAM
	E1-1 Selection of Construction method	Lecture	11 Nov. 2016	10 member of C&M
	E1-2 List up of material, equipment, signboard, manpower	Lecture	14. Nov. 2016	2 members of C&M
	E1-3 Joint Site Inspection	OJT	16 Oct. 2017	5 C&M
E-2 Preparation & Confirmation of asphalt mix	E2-1 Check Asphalt mix design	Lecture	29-30 Oct. 2016	5 members
	E2-2 Trial mix and test the contents of each material			
	E2-3 Temperature management of hot mix	OJT	29 Nov. 2016	2 members of C&M
E-3 Improper Work	E3-1: Procedure of work & Temperature management	Lecture	11 Nov. 2016	10 member of C&M
	E3-2: Typical mistake during the work			
E-4 Repair Method	E4-1: Crack sealing and Safety Measures	OJT	23 Nov. 2016	Engineers and Site supervisors
		OJT	24 Nov. 2016	
	E4-2: Patching and Pothole patching and Safety Measures	OJT	25 Nov. 2016	
		OJT	28 Nov. 2016	
		OJT	29 Nov. 2016	
		OJT	2 Dec. 2016	

Training Courses	Style	Date	Participants no.
E4-3 Implementation Methodology	OJT	3 Dec. 2016	
	OJT	30 Nov. 2016	
	OJT	1 Dec. 2016	
	OJT	14 Jan. 2018	



a) Lecture on how to use DCP data (Nov. 2016)



b) OJT on how to use Dip Stick for road roughness measurement



c) Follow up OJT on the use of Mobile System and PCSV

Figure 2 Photos of Training**2) Seminar**

A seminar titled the “1st Seminar on the Project for Development of Road Maintenance Capacity of Addis Ababa City” was held on April 18, 2017 at Addis Ababa city. Professor Kobayashi from Kyoto University was invited as the key lecturer to make a presentation for “infrastructure Asset Management”. Professor Kobayashi is also the leader in the development of ‘Kyoto Model’ together with PASCO which is the base frame of the RMMS to be developed in the project. Total participants were approximately 100 people from Government agencies, Universities and AACRA. Agenda was as follows:

Table 10 Agenda for the 1st Seminar

Time	Title	Speaker
8:00	Reception	
8:30-8:40	Open Remark	AACRA Representative (Eng. Habtamu Tegegne, the General Director of AACRA)
8:40-9:00	Project Outline	Mr. Hiroshi HONDA (Project Manager, JICA Project Team)
9:00-10:30	Infrastructure Asset Management	Professor Dr. Kiyoshi KOBAYASHI (Kyoto University)
10:30-10:50	Tea Break	
10:50-11:20	Output performed in the Project	Eng. Mesert Abera (AACRA)
11:20-11:40	Asphalt Pavement Preservation and Management	Dr. Habtamu Zelelew (Lucy Consulting Engineers)
11:40-12:00	Road Fund and Road Maintenance in Ethiopia	Ato Alebachew Ahmed (Ethiopia Road Fund Office)
12:00-12:30	Discussion	

Time	Title	Speaker
12:30-12:40	Key Note	JICA Representative (Mr. Takeshi Matsuyama)
12:40-12:50	Closing Remark	AACRA Representative (Eng. Habtamu Tegegne, the General Director of AACRA)
12:50-14:20	Lunch	

Table 11 Number of Participants

Organizations	Number
Government of Ethiopia	17
Universities	9
Private companies	11
AACRA	47
JICA Ethiopia, Embassy of Japan	4
JICA Team	6
Total	94



a) Professor Kobayashi



b) Participants

Figure 3 Photos of 1st Seminar (April 2017)

3) Technical Support

Technical support has been by the supplier of PCSV as a part of service as required. In September 2017, due to the some technical issue on vehicle program. In addition, in March 2018, PCSV system was updated. Daily Technical Support has been also provided when issue and problems arises.

(5) **ACTIVITY 1-5** Share Information of Road Condition in the City with Road Funds Agency and the City Administrations to Request Budget for Road Maintenance

At the 1st TAC, JICA Team and Counterparts developed a draft internal communication system among RAM, C&M, and RTD. Based on the proposed system, each department is communicating with other departments. Study on communication system between RAM and C&M, as well as external parties concerned such as City Council of Addis Ababa and Road Fund Agency is still on going and will be discussed in July 2018.

From this year 2018, new budget called “Transport Funds” is established. The road maintenance budget will be distributed from this funds.

(6) **ACTIVITY 1-6** Promote Public Relations

At the 1st TAC, in order to promote understanding of public, professional and relevant authorities of the Project and importance of road maintenance, JICA Team presented Public Relation Policy as 1) use variety of media to deliver messages to wider public, 2) establish bidirectional communication, and 3) conduct maintenance activities with public participation. JICA Team is currently considering the next PR activities. At the 6th JCC, JICA team indicated a plan to develop a short video clip which shows AACRA maintenance activity and JICA Project. Activities are ongoing to develop video in collaboration with AACRA Communications department.

Table 12 PR Activities Conducted on the Project

Date	Responsible person	Means	Outline
Jun. 2016	JICA Team and Road Inspection Team	a leaflet for road inspection team	under Activity 2, JICA Team prepared a leaflet for road inspection team that will help them explain their field activity to the community around their area of assignment
Jan. 31, 2017	AACRA Communications Affairs Directorate	AACRA Internal information sharing on Handover ceremony of PCSV	with attendance of approx. 55 people including AACRA Director General, Deputy Director General, Directors, JICA, Embassy of Japan, Addis Ababa City Road and Transport Bureau. The ceremony was captured by AACRA Communications Affairs Directorate and a national newspaper and informed AACRA internally.
Mar.1, 2017	AACRA	Attendance of Conference	AACRA attended Japan Media Conference and presented the Progress of the Project
Apr.18, 2017	JICA Team and AACRA	Organize a Seminar	to disseminate the progress of project to relevant authorities and agencies in Addis Ababa inviting approximately 100 participants

1-2-4 OUTPUT 2: The Process for Formulating Road Maintenance Plans is established

(1) ACTIVITY 2-1 Review/Revise Road Maintenance Cycle of AACRA, Compile the PDCA Checklist and Revise the Checklist if Necessary

1) Review and Findings of Current Road Maintenance Cycle

Since August 2015, JICA Team reviewed the existing road maintenance cycle and the workflow of AACRA jointly with the Counterparts through interviews and lectures.

2) Ideal and Feasible Road Maintenance Cycle Framework

Based on the review and a series of discussions and lectures with AACRA, JICA Team formulated the Ideal Road Maintenance Cycle (version 1) adopting PDCA cycle and incorporating Road Maintenance Management System, Pavement Condition Survey Vehicle (PCSV), Visual Inspection Supporting System which are procured to AACRA through the Project. The version will be updated through the project progress and continuous discussions with Counterparts. Ver. 2 is currently prepared and will be discussed in July 2018.

3) PDCA Checklist

In order to monitor whether road maintenance works is implemented properly based on the PDCA cycle by AACRA and to examine further improvements, JICA Team with AACRA developed the PDCA checklist (version 1) containing check items and evaluation indexes. The check list was presented at the 2nd JCC, and will be updated as required according to the future discussions.

(2) ACTIVITY 2-2 Conduct Road Inspection in the City

1) Review and Challenges of Road Inspection

On August 12, 2015, JICA Team conducted a field survey to understand issues and problems on periodic inspection and data management. It was found that road inspection and data collection have been conducted insufficiently to be used for decision making of maintenance implementation. Findings were reported at the 1st TAC.

2) Hierarchical Inspection Scheme

At the 1st TAC, JICA Team presented a draft Hierarchical Inspection Scheme of a) Visual inspection with Smartphone, b) Automatic Inspection using Pavement Condition Survey Vehicle, c) Structural Investigation. The proposal was approved by Counterparts. Currently inspection activities are conducted accordingly.

Table 13 Hierarchical Inspection Scheme

Scheme		Measurement	Equipment	Target road	Inspection time	Frequency	Remark
Visual inspection	Periodic Inspection	Pothole, rutting, cracking,	Smartphone	Approx. 200 km (3.3 km/day)	Nov.– Mar.	As needed	Determine damage indicator, identify

Scheme	Measurement	Equipment	Target road	Inspection time	Frequency	Remark	
	ravelling					section for structural investigation	
	Emergency Patrol & Inspection	Pothole, Major damage	Smartphone	scheduled	Sep. – Oct.	As needed	Identify light maintenance roads.
Automatic Inspection	IRI	Pavement Condition Survey Vehicle	All strategic and scheduled road. Approx. 500 km (50 km/day)	Oct. – Mar.	Scheduled	Identify roads to be visually inspected.	
Structural Investigation	Structural defect	Structural investigation instruments	Depends on the result of inspection	Oct.– Nov.	Scheduled	Determine repair method	

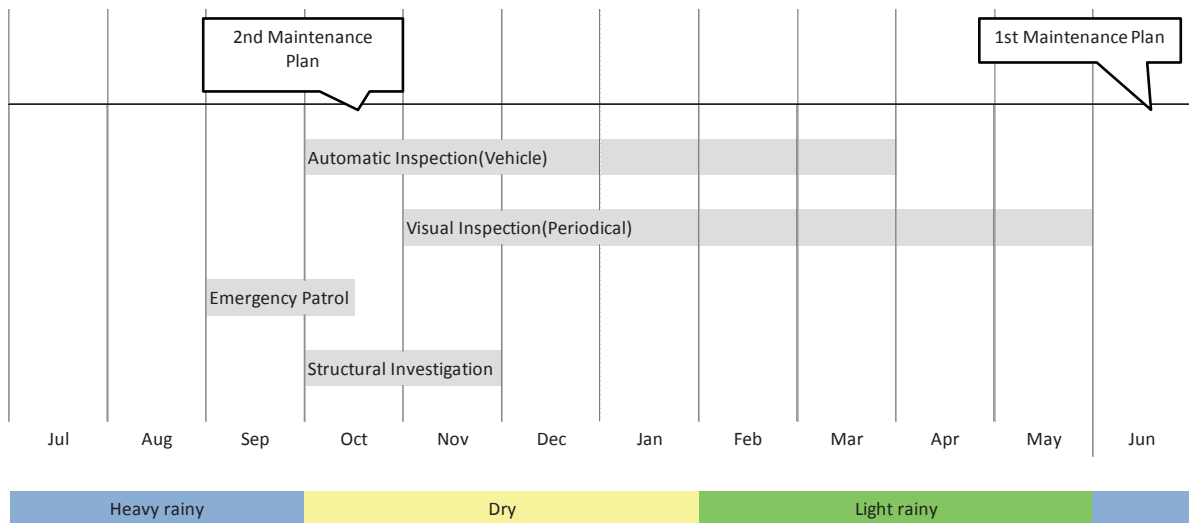


Figure 4 Inspection Schedule (updated in March 2018)

3) Development of Visual Inspection Supporting System

a. Development of the System

At the 1st JCC, JICA Team confirmed the needs of inspection support system in order to respond efficiently to public demand on road maintenance. Thus JICA added the procurement and development of Visual Inspection Supporting System into the project activity under the amended contract in January 2016. The system is composed of a) Field Reporting System and b) Visual Inspection Data Management Systems. The proposed functions of the system were presented and 5 smartphones have been procured and handed over to Counterparts at the 2nd JCC. JICA Team installed ArcGIS to the desktop set up the Project office and developed Visual Inspection Supporting System (version 1) in April 2016.

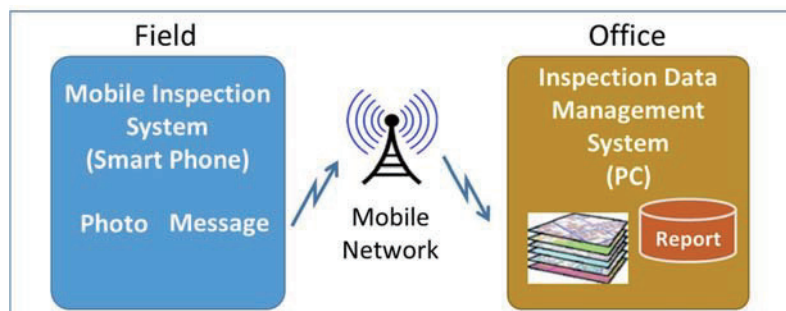


Figure 5 Visual Inspection Supporting System

b. Update of the System

The system has been upgraded and customized four times to meet the demands of AACRA. Training and OJT have been also provided at the time of version upgrade.

JICA Team conducted a field survey to monitor actual pavement distress data collection activities and data management using the system. Some shortcomings were noted such as lack of safety measures, inadequate use of scales. Moreover, comments to improve Field Reporting System and interfaces of Visual Inspection Data Management Systems (ArcGIS) were proposed and approved by RAM for action. In addition, pavement distresses common to Addis Ababa were closely looked at and grouping of distresses carried out to improve distress identification. This resulted in more customized inspection system and review of the Field Reporter application interface in to version 2 completed in June 2016. Version 3 was issued in May 2017, to accommodate some request from AACRA such as inclusion of pavement defects such as ravelling and Local and Collector class of roads. Version 4 was issued in October 2017 to accommodate the collection of data, pavement maintenance history etc.

Table 14 Upgrading History of Visual Inspection Supporting System

Version	Date	Upgraded context
Ver.1	Apr. 2016	
Ver.2	Jun. 2016	Customized inspection system and review of the Field Reporter application interface
Ver.3	May 2017	inclusion of pavement defects such as ravelling and Local and Collector class of roads
Ver.4	Oct. 2017	accommodate the collection of data, pavement maintenance history (repair information)etc.

4) Visual Inspection

After the restructuring of ACCRA, this activity is transferred to the regional offices.

a. Periodic Inspection

Inspection (paper based)

RAM organized two teams of four staff, so that each of the team is to conduct visual inspection. The inspection started in November 2015 and completed in May 2016. Within this period about 247 km of Roads (PAS, SAS, and RR) were inspected (of which 97% of roads is identified as Strategic) based on the new road numbering. It was learned that actual rate of inspection is 3.3 Km/day by two teams which is lesser than planned rate of 5 km/day. As confirmed also in the 2nd JCC meeting, the minimum section of road inspected is 100 m length. Data collected on papers was input to Excel-based database in December 2016.

Inspection using Visual Inspection Supporting System

From April 2016, RAM data collectors were trained on the job in how to utilize Visual Inspection Supporting System to collect data and the system is currently used to collect data. Compared to the previous visual data collection process, this smartphone based system offers several advantages in terms of speed, accuracy, clarity, safety, error-minimization, and objective rather than subjective data collection.

The 3rd round inspection, which is scheduled to start from November 2017 in accordance to the inspection schedule, is now been delayed due to the engagement of Regional Asset Management to other projects. The 3rd Round commenced in April 2018 at the Regional Road Asset Management levels. Visual inspection of PAS, SAS and RR class roads was completed in May 2018. Visual inspection Data input and registering to computed system (RMMS) was completed June to July 2018. The 4th Round is planned to start from November 2018 to June 2019.

Following summarised schedule of site inspection conducted.

Table 15 Progress of Visual Inspection

Activity	Date
Training on Visual Inspection	February – June 2016
1 st round Inspection	November 2015 – May 2016
2 nd round Inspection	November 2016 – May 2017
3 rd round Inspection	April 2018 – May 2018
4 th round Inspection	November 2018 - June 2019 (tentative)



Figure 6 Training on Periodic Inspection using Visual Inspection Supporting System (May 19, 2016)

b. Emergency Patrol and Inspection

At the 1st JCC, the issue was raised on the reduction of service level due to many potholes after rainy season, and at the 2nd TAC, JICA Team introduced Emergency Patrol to detect significant pavement damage in the city for emergency recovering, especially after rainy season. The methodology was approved. Following the meeting, RAM carried out emergency patrols to collect basic information such as taking photos of section requires detailed inspection, and accordingly C&M conducted emergency recovery repairs. RAM conducted Emergency Patrol from mid-August 2016 and completed. The patrol for 2017 was started from the middle of September 2017 and completed October 2017.

Proposed methodology of emergency patrol is as follows.

Table 16 Proposed Emergency Patrol Methodology

Item	Description
Period	Heavy rainy season (Jul – Sep) and through the year
Team	2 data collector with 1 vehicle per team or more
Expected pace	30 km/day-team (3 teams for 1 months for paved)
Target damage	Significant damages which degrade the minimum service level (e.g. pothole in centre of carriageway)
Objective road	All paved road from higher hierarchy sections
Outputs	Location of the damages from Field Reporter Application which includes Photos (Both distant and close-up views), and data of distresses uploaded to GIS database

Following summarises schedule of Emergency inspection conducted.

Table 17 Progress of Emergency Inspection

Activity	Date
Training on Emergency Inspection	September – October 2015
Inspection in 2016	September – October 2016
Inspection in 2017	September – October 2017
Inspection in 2018	October 2018

5) Automatic Inspection

a. Automatic Inspection

Data items to be collected by Pavement Condition Survey Vehicle (PCSV) were presented at the 1st TAC. The PCSV was officially handed over to AACRA from JICA on January 31, 2017. The PCSV was delayed one year from the initial schedule as explained during the 1st JCC including mitigating methods to cope with the delay.

The user guide for Road Inspection and Data Processing were also provide by the supplier in March 2017. The inspection was started from February 14, 2017 after 2 weeks of vehicle operation training (February 1 – 13, 2017) conducted by JICA Team. As mentioned previously, the procurement of the equipment for Operation Manual and Inspection Schedule was developed by the JICA Team and provided to AACR in April 2017. The first condition survey was conducted from March to July 2017. The second round started in November 2017 and was completed in May 2018. Annual calibration as recommended by operation manual was conducted on January 22 and 23, 2018. The 3rd round inspection is scheduled to start from October 2018.

Table 18 Progress of Automatic Inspection

Activity	Date
Handover of PCSV	January 31, 2017
Training on PCSV	February 1 – 13, 2017 / September 22,2017
1st round Inspection using PCSV(Trial)	March - July, 2017
2 nd round Inspection using PCSV(Full Scale)	November 2017- May 2018
3 rd round Inspection using PCSV(Full Scale)	October 2018 -
Re calibration after 1 year from handover	January 2018
Training on Screening survey using road image	January 2018



Figure 7 Road Inspection Using PCSV and Data Processing (First round)

The 2nd round full scale automatic survey has started in November 2017, delayed one months from originally planned due to the emergency inspection being very busy after rainy season, completed in May 2018. Records of the inspected road length and processed are shown in the below table.

Table 19 Result of the 2nd Automatic Survey and Processing during Nov. 2017 – May 2018

Month	Inspected Road Length (km)		Data Processed R. L. (km)	
	Planned	Implemented	Planned	Implemented
Nov. 2017	150	126.9	150	126.9
Dec. 2017	300	268.31	300	268.31
*Jan. 2018	300	73	300	73
February 2018	300	158	300	158
March 2018	150	73	150	73

Month	Inspected Road Length (km)		Data Processed R. L. (km)	
	Planned	Implemented	Planned	Implemented
April 2018	170	140	170	145
May 2018	-	-	25	25

*Due to the annual calibration and system update, actual working days were very limited in January 2018.

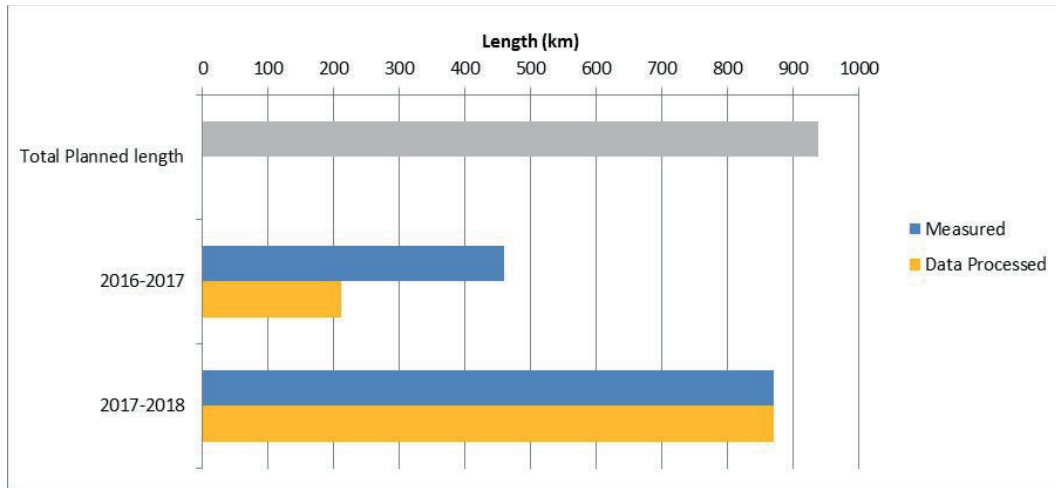


Figure 8 Progress of PCSV road inspection and Data processing (second Round)

b. Preparation of Road Inspection and Data Processing Manual for Pavement Condition Survey

Due to change of procurement method, Road Inspection and Data Processing Manual were provided by the supplier in March 2017.

6) Structural Investigation

Training provided is introduction to Dynamic Cone Penetrometer purpose and procedure of DCP test, safety measures during testing, procedure of data input, layer analysis, CBR and Structural number calculation, maintenance design using DCP test. The DCP test and the procedures learnt through the training were implemented in the 2nd Pilot project.

Table 20 Progress of Structural Investigation

Activity	Date
Handover of structure investigation instruments	August, 2017
Training	1 lecture at July and August, 2017
1st Inspection	Trial Inspection in Aug. 2017 after several WSs
2 nd Inspection	For selection and design of the 2 nd Pilot Project





Figure 9 Photos on DCP Testing on Site (August 2017)

(3) ACTIVITY 2-3 Develop and Update Road Inventory (database) of AACRA, Including Road Condition, Traffic Volume, and Unit Costs, etc.

1) Review of Road Inventory Data

JICA Team reviewed existing road inventory data and found that AACRA manages road network data as Master Plan Road Network Data in Microsoft Excel format and updates annually. Network Data is composed from mainly seven data items of Road No, Road Name, Type, Width, Length, Carriageway Type, and Others. Through the review and discussions with Counterparts, challenges for road inventory database were identified as lack of connectivity between inventory table and road network map, random road numbering, unclear definition of road section, and inconsistent direction from start to end point.

2) Updating of Road Inventory Database System

The schedule of Database update is summarised in below table.

Table 21 Progress of Database Update

Activity	Frequency	Date
Step 1 Prepare Basic Inventory Information & Framework of Road Inventory Database		Mar. 2016
Step 2: Road Inventory (Database) Structure Preparation		Nov. 2015 – Dec. 2016
Step 3: Input Repair Information	Every year	Jun. 2016 – Dec. 2016 Nov. 2016 – May 2017 Jul. 2018
Step 4: Input Visual Inspection Results	Every year	Dec. 2015 - May 2016 Nov. 2016 – May 2017 Jun. 2018 – Jul. 2018
Step 5: Prepare GIS Database and Import Database File	Every year	Jun. 2016 – Jul. 2017 Jul. 2018

3) Methodology to Update Road Inventory Database

JICA Team, through discussions with RAM, developed the steps for restructuring the existing inventory data to meet the actual needs of AACRA. The proposal was approved at the 2nd TAC.

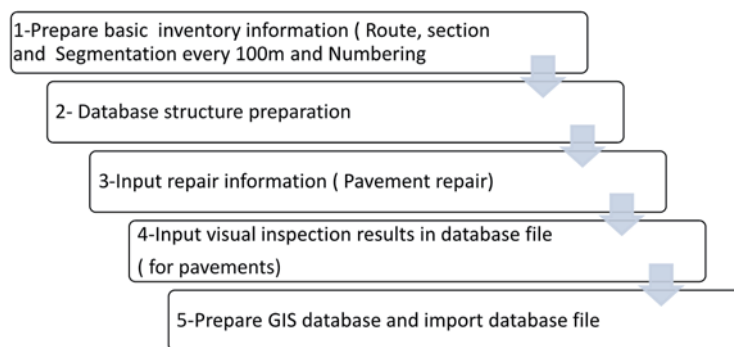


Figure 10 Database Setup Process

STEP 1: Prepare Basic Inventory Information and develop framework for Road Inventory Database

Based on the findings, JICA Team proposed following upgrading of the road network system including road classification and road numbering system, which will be the basis of road inventory database. The proposal was approved, and based on the agreed road network system, the framework for the road inventory database was developed in March 2016.

Road Classification

At the 1st TAC, insufficiency of current road classes SAS, PAS, RR and Collector Streets (hereinafter referred as CS) to prioritise roads for road maintenance works were discussed. At the 2nd TAC, Counterparts pointed out a problem on the limitation of road maintenance budget, needs of clarifying sites for road inspection and repair construction works, and conducting works at a concentrated area. Based on these meetings, at the 2nd TAC, JICA Team proposed five road classification of a) Strategic roads, b) Major Arterial, c) Sub Arterial, d) Collector Streets, and e) Local Streets, which weigh higher prioritization to strategic roads.

Hierarchical Road Numbering Structure

At the 3rd TAC, JICA Team proposed Hierarchical Road Numbering Structure. The issue on the location of Network Centre was also discussed and agreed that Leghar (Train Station) to be the Road Network Centre following consultation with Addis Ababa City Planning Project Office on March 7, 2016, and the same was approved on the 3rd TAC in June 2016.

STEP 2: Road Inventory (Database) Structure Preparation

Database is structured by identifying each road in three main categories of 1) Road ID consisting 10 items (Existing status, Road class, Route, Direction, Section, Segment number, Length of the segment, Old road no, strategic road, road/street name), 2) Start and end point of road, and 3) Junction type. The structure was presented at the 2nd TAC and approved. Restructuring of road inventory of AACRA by the lead of RAM defining data items (e.g. road numbering, road naming, and setting start/end points) started from November 2015 and completed in December 2016.

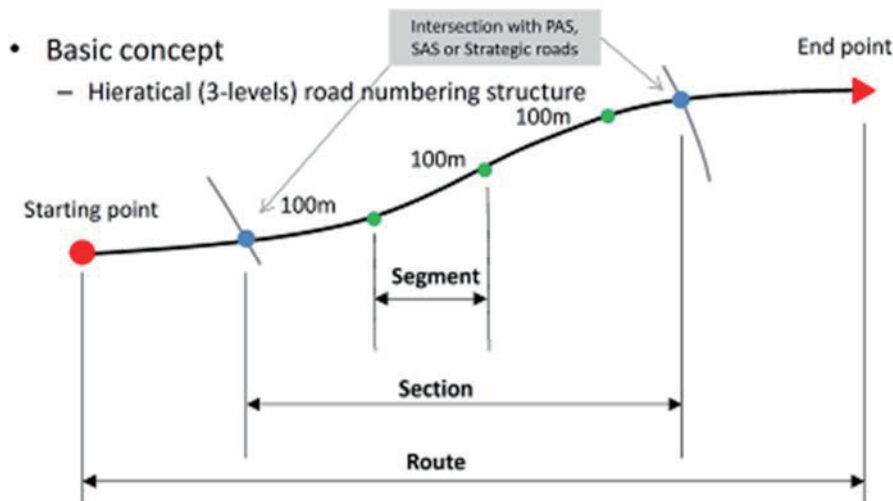


Figure 11 Hierarchical Road Numbering Structure

Road ID										Name of Start/End points for Sections		Junction Type	
Status	Road Class	Route	Direction	Section	Segment	Length (m)	Road No. (Old)	Strategic Road	Road/Street Name	Start of section (Jct Name)	End of section (Jct Name)	Start (Jct.Type)	End (Jct.Type)
Existing	SAS1	S001	Dow	1	1	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ
Existing	SAS1	S001	Dow	1	2	100	33	Yes	Tesema Aba Kemaw Street	Mexico Station East	Ethiopian Roads Authority HQ	SJ	SJ

Figure 12 Database Structure

STEP 3: Input Repair Information

After the completion of the above inventory data, repair history and result of periodic inspection data are inputted to the database. Due to the absence of repair history, available data from the date of commencing data input was inputted. Inspection data on pavement damage and update of inventory were inputted using data recorded on inspection sheet in June 2016 and completed in December 2016. The data will be updated every year. To collect repair history, data collection is planned to be assisted by a mobile application system after training and when AACRA conduct maintenance activity the end of this year. The planned repair information was collected using mobile application. Repair data collection for 2017/18 period was completed in June 2018. The data collected was registered to RMMS database in July 2018.

STEP 4: Input Visual Inspection Results

Inputting data of asphalt roads in order of Strategic Roads > Major Arterial > Sub Arterial conducted and completed in June 2016. The database created includes about 462 km of road length consisting PAS, SAS and RR class roads. Table 22 and Table 23 below shows length of each road class in the inventory and corresponding length of road visually inspected by RAM from 2015 to 2016, 2016 to 2017 and 2017-2018. The inspected road length reached to 98 % of the existing road length.

Table 22 Inspected Road Length (m) from Inventory Database (Period: 2015-2016)

Road Classification	Existing Road Length in Database (m)	Road Length Inspected Visually (m)	Inspected Length Against Total (%)
RR	36,946	36,946	100%
PAS	280,203	181,796	65%
SAS	144,910	54,068	37%
Total	462,059	272,810	59%

Table 23 Inspected Road Length (m) from Inventory Database (Period: 2016-2017)

Road Classification	Existing Road Length in Database (m)	Road Length Inspected Visually (m)	Inspected Length Against Total (%)
RR	36,946	36,946	100%
PAS	290,892	276,347	95%
SAS	159,910	143,919	90%
Total	487,748	457,212	94%

Table 24 Inspected Road Length (m) from Inventory Database (Period: 2017-2018)

Road Classification	Existing Road Length in Database (m)	Road Length Inspected Visually (m)	Inspected Length Against Total (%)
RR	36,946	34,932	95%
PAS	290,892	284,258	98%
SAS	159,910	158,613	99%
Total	487,748	477,803	98%

STEP 5: Prepare GIS Database and Import Database File

Route and sections identification from the AutoCAD road network and corresponding Excel inventory data preparation were completed for RR, PAS and SAS class roads in June 2016. Based on these data, maps of roads subdivided into route, section and 100m length segments, as mentioned previously, was set up and Excel inventory data imported in to GIS database. Functionality of the system was checked prior to starting relevant data import in December 2016. Since October 2017, data registration to AACRA RMS (application for pavement management system (PMS)) was introduced. From same month, visual inspection data collected by mobile phone from 2016 to 2017 is being registered to the RMMS database. Visual inspection data for 2017/18 period was registered to RMMS in June and July 2018.

4) Standards for Selecting Road Segment for “Prioritised Maintenance and Management” and “Structural Examination”

JICA Team and AACRA agreed to select all RR and most of PAS and SAS as the strategic road based on the classification provided by AACRA. As for the locations which will require the structural examination, it was

also agreed that they would be selected among the locations which have been repaired at least 2 years successively in the same manner according to the historical record of repair works because of the difficulty to find out visually.

(4) ACTIVITY 2-4 Prepare and Revise Mid and Long Term Road Maintenance Plan based on the above Inventory Data

It should be noted that the detailed explanation and demonstration for the progress of the RMMS and Mid/Long-term Maintenance Plan were made in 5th JCC held on 4th October 2017.

1) Review of Existing Road Management System

JICA Team has reviewed existing Road Maintenance Management System (hereinafter called RMMS) (COTS System) installed in 2003 by SMEC International Private Ltd. Consulting Company, and it was found that the system is not functioning due to 1) turnover of trained staff, 2) complexity of the system, 3) needs of vast data to input requiring a huge amount of manpower.

2) Framework of Road Management System

In accordance to the revised contract (January 2016) JICA Team procured ArcGIS which is the base of the RMMS to develop the system meeting the needs of AACRA. The prototype of RMMS was completed in July 2017 and updated twice so far as required. At the 3rd TAC, JICA Team introduced to counterpart and agreed on the system requirements and system functions in association with relevant technologies, and also introduced Bespoke System with stochastic deterioration model (KYOTO model) comparing to the COTS system in its advantage on adoptability to requirements, institutionalization, customizability, cost, and upgradability.

3) Development of Road Management System

The RMMS ver. 1 has been developed and installed into the PC in AACRA in July 2017. The RMMS is the supporting system for the implementation of PDCA cycle of road maintenance work in AACRA. It has an integrated database function to manage all data collected by daily road maintenance work, such as inspection data and repair information. The IRI value and road image data collected by PCSV are registered to the database, and the system users can find the location and conditions of each road section on the PC screen.

Road maintenance planning function is installed as a main function of RMMS. The process of road maintenance planning works as follows; 1) road sections are categorized into several groups as defined in the maintenance policy, 2) targeted sections for routine maintenance are be selected (road profiling), 3) using the deterioration performance evaluation function and the bench-marking function of the Kyoto Model, the deterioration performance of each section is evaluated, and 4) critical sections which has fast deterioration speed are selected for repair prioritization. The progress monitoring function, indicated by logic model in accordance with road maintenance activities in PDCA cycle, is also installed as a portal of the system. Several minor updates were made to RMMS from April 2018 to September 2018.

Currently, road inspection and data accumulation of repair information of 2016/2017 are carried out continuously. When data is accumulated adequately, further discussion on the system utilization and customization will be held for system updating.

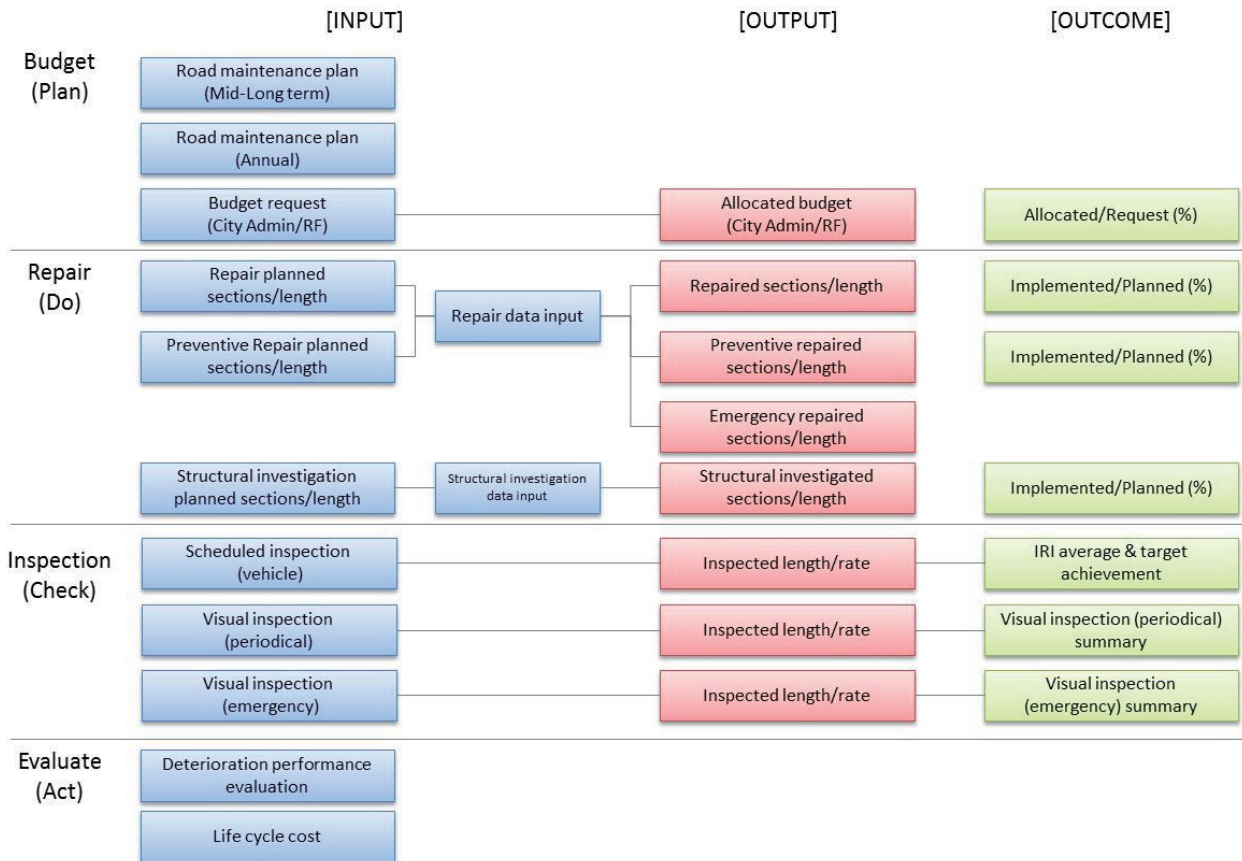


Figure 13 Progress monitoring function (System portal)

Table 24 Upgrade History of RMMS

Version	Date	Upgraded content
Ver. 1	Jul. 2017	
Ver. 2	Jan. 2018	Automatic line allocation function of point data, Recording function of Repair History Data
Ver. 3 (proposed)	Apr. 2018 - Jan. 2019	Improvement of Database structure, including of Mid/long term road maintenance planning function, function required for regional office, inputting function of repair history data

4) Formulation of Mid/Long Term Road Maintenance Management Plan

a. Definition and Type of Maintenance Plan

JICA Team was initially planned to propose the definition and type of Maintenance plans and discuss with Counterparts in early 2017. However, it was postponed till July 2017 in order to incorporate the examination result of trial road conditioning survey by the PCSV. On July 26, 2017, lecture on road Maintenance Plan was hold and clarified.

b. Methodology for formulating Road Maintenance Management Plan

Approach of maintenance planning was presented and agreed at the 4th TAC.

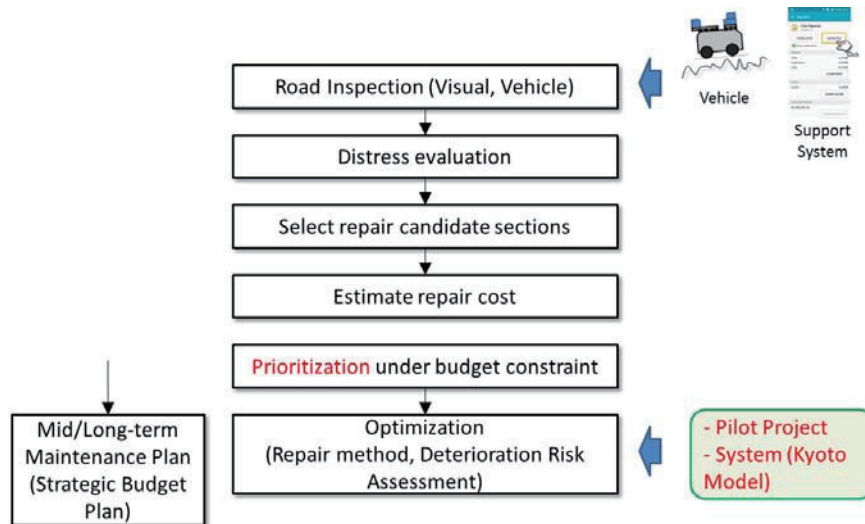


Figure 14 Approach of Mid / Long term Maintenance Planning

c. Formulation of Mid/Long Term Road Maintenance Management Plan

The first Mid/Long Term Road Maintenance Plan was initially planned to be drafted by the end of second year of the project term, however, due to the delay of the PSCV procurement, currently it is propose to discuss from April to October 2018.

5) Preparation of Manual and Guideline on Road Maintenance Management System

The draft manual will be prepared targeting to issue by the end of 2018, and finalised in March 2019

(5) ACTIVITY 2-5 Prepare Annual Road Maintenance Plan

1) Methodology for preparing Annual Maintenance Planning

During the 4th TAC meeting in July 2016, JICA team presented the preparation procedure of Annual Maintenance Plan, which consist following steps 1 to 6. The procedure was agreed at the JCC.

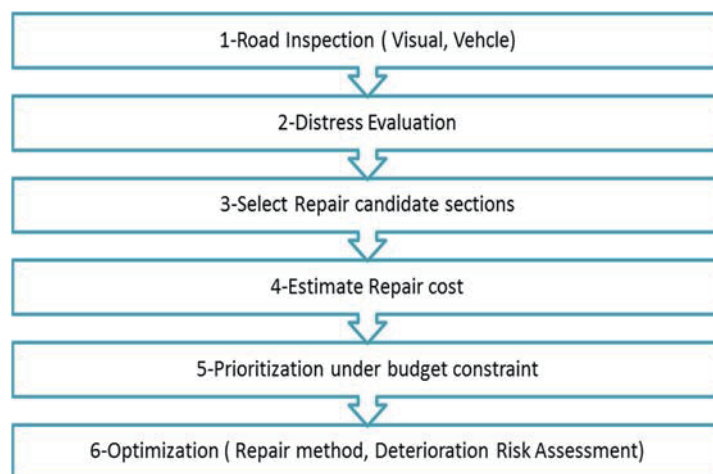


Figure 15 Procedure for Annual Maintenance planning

STEP 1: Road Inspection: to be referred to Activity 2-2 and 2-3

STEP 2: Distress Evaluation

Evaluation process has been developed as follows; 1) Categories distress, 2) Develop severity of each damage, 3) Develop weight coefficient according to road class, 4) Develop Damage Index, and 5) Evaluate the range of distress. The process was presented and agreed at the 3rd TAC. The distresses evaluation was conducted in June 2018.

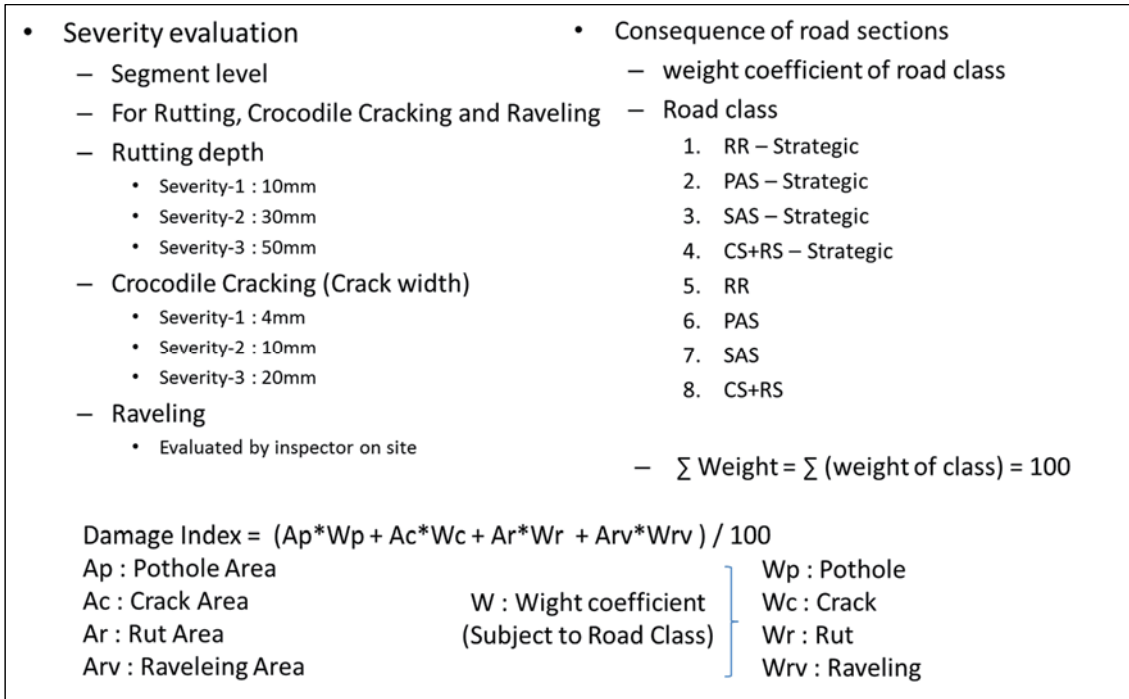


Figure 16 Distress Evaluation Process

STEP 3: Selection of Candidate Repair Section

A workflow for selecting repair sites was developed and agreed through a series of consultations with AACRA staff. The workflow is shown in Table 16.

The two parameters on the priority repair route selection were presented at the 4th TAC. Prioritization of Risk Matrix is based on the Weight Index as shown in the below figure. One parameter is Consequences which includes traffic volume, accessibility to primary destinations, road class (RR, SAS, PAS, Strategic road) and others. The other is Risk likelihood (damage level). The selection flow is developed in July 2018, based on the discussion with RAM, and the flow is incorporated into the pavement condition survey system.

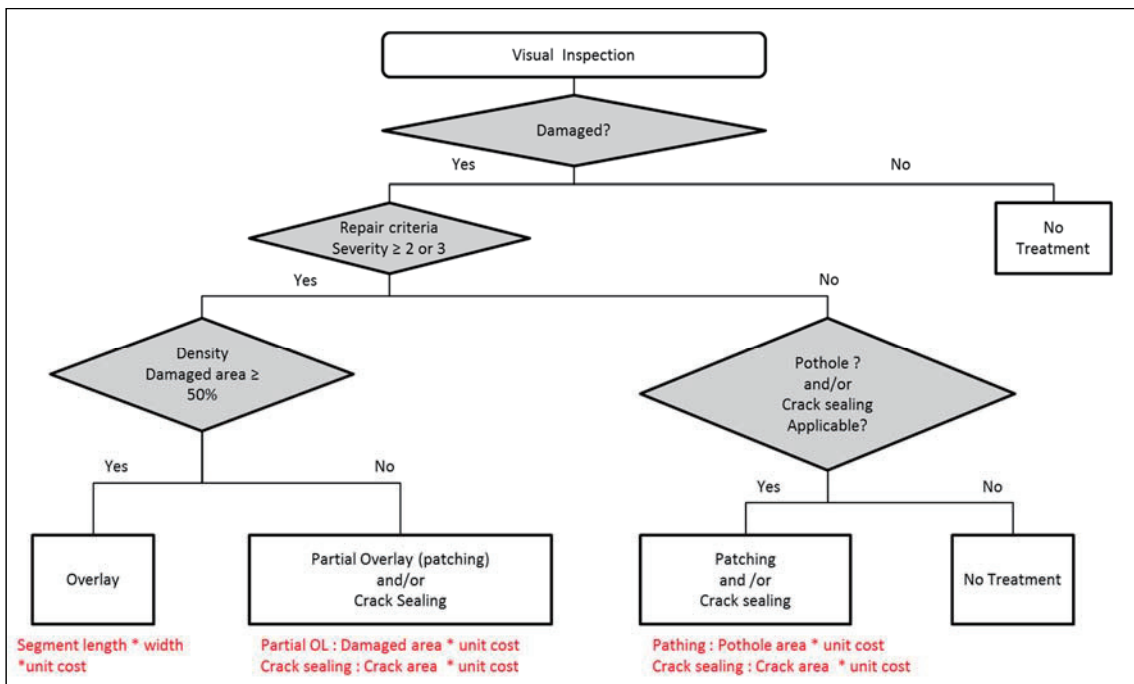


Figure 17 Prioritization by Risk Matrix

STEP 4: Estimate Repair Cost

Repair cost estimation will be updated by October 2018 based on the unit rate obtained from the implementation of Pilot Projects.

2) Formulation of Annual Road Maintenance Management Plan

It was planned that the 2nd year Annual Road Maintenance Plan would be prepared in the period from June and July 2016 based on the data obtained from the operation of PCSV. However, due to the delay in the procurement of PCSV, the first Annual Road Maintenance Plan was prepared in July 2017. Mid/Long Term Road Maintenance Plan will be prepared from April 2018 to October 2018 based on the results of first full scale road condition survey using the PCSV and Visual Inspection Support system scheduled from November 2017 to August 2018.

1-2-5 OUTPUT 3: The Maintenance Skills and Knowledge of AACRA Technical Staff are improved

(1) ACTIVITY 3-1 Select Pilot Projects for Maintenance Work based on the Annual Road Maintenance Plan formulated under the Project
1) Site Survey

On October 13, 2015, JICA Team conducted a field survey to understand issues and problems on road maintenance works. The major findings are: 1) Quality of cold mix asphalt was questionable, 2) the same maintenance work (overlay) has been carried out at some places every year (structural improvement is required), 3) Surface cutting method was not employed in the pothole repair.

2) Selection of Pilot Project

The project is scheduled to be implemented twice in 2016 and 2017. Algorithm for Repair Work Selection has been presented at the 4th TAC. The selection of the first pilot projects was carried in September 2016, and for the second pilot project was conducted in November 2017. The policy for the selection of the first pilot project was presented and discussed at the 3rd JCC (refer to the handout of the 3rd JCC).

Table 25 Outline of Pilot Project

Selected Points	First Pilot Project (2016)	Second Pilot Project (2017)
Selection Timing	September 2016	November 2017
Implementation Period	During dry season from October to December	
Targeted Road	Paved trunk roads such as Ring Road, PAS and SAS,	
Investigation	Detailed investigation not included	Detailed investigation included
Key Purposes	(1) Complying with annual plan (4) Feedback of repair record -	(2) Proper design (3) Proper repair method
Targeted Damage	Surface damage	Structural damage
Repair Method	- Pot hole patching - Crack sealing	- Cut-overlay - Pavement replacement
Key Control Items	Safety Control, Quality Control	

a. Selected Site for 2nd Pilot Project

Through joint site inspection among RAM, C&M, Design, and JICA Team conducted on 27th Oct. 2017, following 3 locations were selected out of 11 repair works contained in the Ethiopian Calendar (E.C.) 2010 repair plan.

Table 26 Selected location for the 2nd Pilot Project

	Road No.78 PAS 4 (New No. P017,S-3)	Road No.23 PA S2 (New No. S020, S-1)	Road No.7.2PAS4 (New No. P307, S-2)
Selected reason	The road is listed in 10 mp, & there is much kind of defects continuously on the stretch. The result of DCP test shows	The road is listed in 10 mp, & centre portion was overlaid. DCP test could not complete but the types of observed defects were not	The road is listed in routine maintenance of 10 mp, & centre portion was overlaid 2 times. DCP test could not complete but the thickness & CBR value of base course were

	Road No.78 PAS 4 (New No. P017,S-3)	Road No.23 PA S2 (New No. S020, S-1)	Road No.7.2PAS4 (New No. P307, S-2)
	that CBR value of subbase is only 15%	caused by structural problem in usual. So we supposed damages are caused by hot mix problem.	confirmed by the analysis of DCP data. We can easily reach assumption that this thin base course caused the defects in short cycle.
Exact Location	N 9.042663, E 38.764565	N 9.033121, E 38.746785	N 9.021202, E 38.749492



Road No.78PAS4 (New No. P017,S-3)



Road No.23 PAS 2 (New No. S020, S-1)



Road No.7.2 PAS 4 (New No. P307, S-2)



Figure 182nd pilot project site

3) Implementation Plan

a. First Pilot Project

Based on the discussion JICA Team prepared the first version of Implementation Plan for the First Pilot Project on 28 September, 2016 (Revised on 1 November, 2016) and discussed with C&M and RAM.

The joint site inspection for the first pilot project was carried out on October 28, 2016 among JICA Team, C&M and RAM and following four locations were selected as the first pilot project. As an example, the sketch

of the damage of location No. 2 is shown in Monitoring Sheet Version 5. The first pilot project focuses defaults of asphalt layer, which are repaired by sealing, patching, and typical potholes.

Table 27 1st Pilot Project Outline

No.	Road Number		Road Class	Defect	Repair Method	Work Volume	Remarks
	Old	New					
2	69	P002,S-14,S-1	PAS4	Crocodile Crack Delamination	Patching	46 m2 195 m2	
3	4	P002,S-4,S-3	PAS3	Pothole Line Cracks	Pothole Repair Sealing	2 holes 68 m	
4	4	P002,S-1,S-3	PAS3	Pothole Line Cracks	Pothole Repair Sealing	1 hole 41 m	
8	76	P001,S-12,S-3	PAS3	Pothole Broken Edge	Pothole Repair Patching	1 hole 36 m2	Including base course repair

Table 28 Repair Work Area for Each Method

Maintenance Type	No. 2	No.3	No. 4	No. 8	Total
Crack Sealing(m ²)		67.9	40.9		108.8
Patching (m ²)	240.6	3.0	1.5	4.2	249.3
Pothole Patching(m ²)				35.6	35.6

b. Second Pilot Project for Pavement Replacement

Implementation Plan for Second Pilot Project was provided in November 2017.

- According to the annual maintenance plan of AACRA, detailed site investigation and repair work shall be carried out.
- Proper design and selection of repair method shall be conducted.
- According to the damage of the subject road, proper repair method shall be adopted.
- A sustainable system in which data and results maintenance works are accumulated so as to be reused in future works shall be established.

The work programme Schedule is shown in Table below.

Table 29 Work Programme of 2nd Pilot Project

	Oct.	Nov.	Dec.	Jan.
Selection of candidate location	★			
Investigation by DCP	—			
Joint investigation & deciding	★			
Work method & design		—		
Repair works at the site			—	
Evaluation & record				—

Table 30 the 2nd Pilot Project Outline

Road Number		Road Class	Defect	Repair Method	Work Volume
Old	New				
78	P017,S-3	PAS 4	surface failure, subsided, crocodile crack, delamination	replace weak layer	10.5 m(w) x 200 m(l), lane to West direction only
23	S020, S-1	PAS 2	corrugation, delamination, surface failure	milling & overlay	14.0 m(w) x 100 m(l)
7.2	P307, S-2	PAS 4	surface failure, waving, crocodile crack	replace weak layer	14.0 m(w) x 100 m(l)

(2) ACTIVITY 3-2 Share information of Pilot Project between/within Road Asset Management Process and Constructional and Maintenance Process

After the selection of the pilot project, information such as site location, work method, work volume, necessary equipment and material, man power and work schedule was shared with the relevant units of AACRA which are RAM, RTD, Quality Control Support Sub process(laboratory), C&M(construction, machinery, and asphalt plant).

Table 31 List of Information to be shared prior to the Implementation of Pilot Project

Before Repair Works	Before Detailed Investigation
<ul style="list-style-type: none"> • Implementation Plan • Basic Data (Width of Road, Structure of Pavement, etc.) • Inspection Results • Information of Road obtained from Image Photos • Condition of Damage • Selected Repair Method • Location of Works • Existence of Utilities and/or Drainage • Safety Plan • Traffic Condition • Consideration on Residential Neighbourhood • Points to keep in mind during Works 	<ul style="list-style-type: none"> • Implementation Plan • Basic Data (Width of Road, Structure of Pavement, etc.) • Inspection Results • Information of Road obtained from Image Photos • Condition of Damage • Review of Damage • Traffic Condition • Points to keep in mind during Works

(3) ACTIVITY 3-3 Conduct the detailed Investigation and Design Specification of the Pilot Projects

The first pilot project does not require detailed investigation and design. DCP test was conducted for selection of the location of Second Pilot Project and also for the design of the repair work. As previously mentioned, 3 locations were selected, and Cutting Overlay and Pavement Replacement were selected for repair works.

(4) ACTIVITY 3-4 Assist AACRA to execute Implementing Pilot Project

1) First Pilot Project

Construction plan was prepared by JICA Team and AACRA staff, and implemented by AACRA staff. Crack sealing work for all 4 locations has been started on November 23, 2016. However the work was suspended on November 29, 2016 by senior management of AACRA due to the higher priority given to the road near African Union due to the conference. The work for Pilot project was re-started in late January, 2017 and completed February 10, 2017.

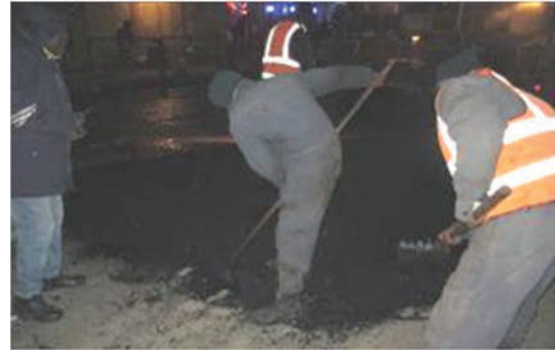
In order to improve the capacity on road maintenance, technical transfer training was also carried out on maintenance technology, health, and safety management. As of March 2018, so far, 4 Lectures and 13 OJTs were held. Advice for the equipment which AACRA has to own in the near future in order to carry out proper and effective repair work is strongly requested to JICA Team by AACRA.

Table 32 Implemented Schedule of the 1st Pilot Project

Activity	Date
Maintenance work	November 23, 2016 - February 10, 2017
Training	October 2016 - December



Crack sealing



Patching

Figure 19 Photos of maintenance work during the 1st Pilot Project**2) Second Pilot Project for Pavement Replacement**

Based on the “Implementation Plan of Second Pilot Project” prepared in November 2017, the second pilot project was carried out. Two locations (P017 and P307) were repaired in this season, however, the project on S020 was postponed to April 2018. However due to not been able to secure the required equipment and machinery, the proposed pilot project was cancelled and rescheduled to December 2018.

(5) ACTIVITY 3-5 Feedback Achievements and Experience of Pilot Projects into the Next Annual Road Maintenance Plan

During the pilot project implementation, maintenance works were monitored and evaluated using the monitoring form prepared. The result of observation will be utilised for annual maintenance planning prepared by asset management unit.

1) The 1st Pilot Project

The feedback of the 1st Pilot Project was presented in January 2017, at the 6th TAC meeting. Findings shared were as follows;

c. General

- Floodlight for night work is necessary.
- Traffic control such as safety corn and guard-man is not sufficient.

d. Crack Sealing

- Crack sealing machine is necessary.

e. Patching / Partial Construction

- Grinder disk of Asphalt cutter is too wear-out to use properly.
- Temperature control for asphalt mixture such as spreading and compaction is not carried out at all.
- A sheet over asphalt mixture during transportation is not used.
- Waiting time for arrival of asphalt mixture is too long. (Work is not effective.)

f. Cutting Overlay

- Milling machine is not available
- AACRA is obliged to lease heavy equipment from Contractor and/or other agency.

2) The 2nd Pilot Project on Pavement Replacement

The implementation report of first location (Road No. 78, from 6th Dec. 2017 to 13th Jan. 2018) is summarized below. Detailed report will be prepared after completion of the repair works for second location.

Finding and Design Change

Based on the DCP test results, the replacement of sub-base course, base course, and surface layer were required. During trial excavation, however, the black cotton layer (Unsuitable soft clay material) was found at the sub-grade zone and, therefore, the design of the pavement composition was changed as shown in Figure below.

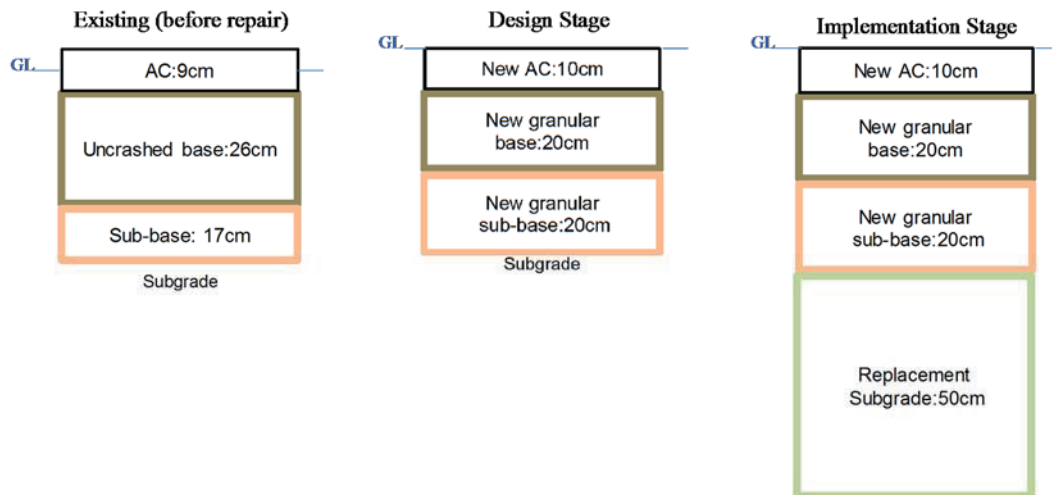


Figure 20 Pavement Composition in Each Stage



Figure 21 Photos of 2nd Pilot Project

Findings are summarised in below.

- Road affiliate facilities such as curb stone were broken by heavy equipment during maintenance works. However, those were left as they were without being repaired.
- Three floodlights were newly purchased by AACRA for safe night work. However, AACRA has no choice but to lease a lot of heavy equipment from contractors as before, which makes maintenance cost expensive compared to using AACRA owned equipment.
- Safety measures below are not enough.
 - Allocation of guard-man for traffic regulation at night
 - Installation of barricade and/or safety corn for the third person’s safety at night as well as daytime
- Milling & Overlay work was scheduled to be carried out at the second pilot project. However, there is no prospect of procuring a milling machine this dry season including lease from contractors, the work was cancelled. As extension of project period, the possibility of the work shall be considered being implemented in the dry season this year.

(6) ACTIVITY 3-6 Organize Workshop/Seminar of Pilot Project for ERA and Road Agencies at Regional and Municipal Level

To be described as the Project progresses.

1-2-6 TECHNICAL OUTPUT

Following technical outputs are developed under the Project and submitted at the end of the project term.

Table 33 List of Technical Output

Output	Status	Note
1 Medium/Long Term Road Maintenance Plan	On going	To be drafted by October 2018 (1 year postponed due to the delayed supply of Survey Vehicle.)
2 Annual Road Maintenance Plan	On going	Annual Road Maintenance Plan (August 2017-July 2018) was prepared in July 2017. Annual Road Maintenance Plan (August 2018-July 2019) was prepared in July 2018.
3 Road Maintenance Management System	On going	Ver. 1 was developed in July 2017, and updated into ver. 2 in January 2018. Ver. 3 is currently under development and will be completed in Jan. 2019.
4 PDCA Checklist	Version 1 is prepared at February 2016	
5 Manual and Guideline on Road Maintenance Management System	On going	Preparation is undergoing. Expected to be have a draft by the end of 2018, and completed in March 2019.
6 Updated Existing Standard, Specification, Manuals		To be prepared as required
7 Training Materials	On going	To be prepared as required

1-3 ACHIEVEMENT OF THE OUTPUTS

(1) **OUTPUT 1** The Implementation Structure of AACRA for Road Maintenance is improved

Verifiable Indicator	Achievement Level
1-1 Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 7th JCC (October 2018).	In Progress: Implementation structure has been improved dramatically since restructuring of AACRA, which is confirmed from the results of questionnaire. Recommendation for sustainable implementation structure for road management will be presented at the 7th JCC.
1-2 Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by March 2019 to be incorporated into the budget FY Jul/2019-Jun/2020 if necessarily.	In Progress: Internal Communication has been improved dramatically since restructuring of AACRA, which is confirmed from the results of questionnaire. Further discussion will be made for the needs of further strengthening of institution and communication at the 7th JCC.
1-3 More than 100 % of the approved budget on the basis of Annual Road Maintenance Plan is allocated from the 3rd project year.	In Progress: JICA team proposed to set verifiable indicator as 100% at the 6th JCC. Based on the discussion during the 7th JCC, the proposed verifiable indicator was agreed.
1-4 Trainings on road maintenance is conducted targeting AACRA staff	In Progress: As of end of October 2018, 42 lectures and 24 OJTs, and two trainings in Japan were conducted.
1-5 Public understanding and cooperation on road maintenance is enhanced.	In Progress: Leaflet on Activity 2 was prepared and distributed. One seminar was held in April 2017. Development of Video clip is currently under discussion.

(2) **OUTPUT 2** The Process for Formulating Road Maintenance Plans is established

Verifiable Indicator	Achievement Level
2-1 PDCA Checklist is developed by January 2016.	In Progress: Checklist version 1 was developed. Version will be updates as necessary

Verifiable Indicator	Achievement Level
	through the operation.
2-2 AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 4 th project year.	In Progress: Framework for RMMS and planning procedure were agreed. RMMS ver. 1 was issued July 2017 and ver. 2 in Jan. 2018. Ver. 3 is currently development and will be finalized in Jan. 2019.
2-3 AACRA Annual and Mid/Long term Road Maintenance Plan are formulated in consideration of Life Cycle Cost on Road.	In Progress: Approach and formulation process for road maintenance planning have been agreed. Annual Road Maintenance Plan for August 2017- July 2018 was prepared in July 2017. Annual Road Maintenance Plan for August 2018- July 2019 was prepared in July 2018. Mid-term plan will be presented in October 2018.

(3) **OUTPUT 3** The Maintenance Skills & Knowledge of AACRA Technical Staff are improved

Verifiable Indicator	Achievement Level
3-1 Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted.	In Progress: 11 lectures and 14 OJT relevant to maintenance skill and knowledge were conducted.
3-2 Number of preventive maintenance works executed are increased through the implementation of the Project.	In Progress: Concept and importance of Preventive Maintenance have been shared through pilot projects

1-4 ACHIEVEMENT OF THE PROJECT PURPOSE

PROJECT PURPOSE: The Management Capacity of AACRA for Road Maintenance is enhanced.

Verifiable Indicator (By 3 months before the completion of the Project,)	Achievement Level
1 AACRA's capacity to secure the budget for road maintenance is enhanced.	In Progress: JICA team propose the means of verification is to be revised by removing "Interview to Addis Ababa City Administration".
2 Road maintenance works based on PDCA cycle established by the Project are executed by AACRA.	In Progress: PDCA Checklist (ver.1) has been developed. Currently operation method in consideration to inspection equipment and maintenance management system is under development.
3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in the AACRA Annual Road Maintenance Plan exceeds 80% from the 3rd project year.	In Progress: Baseline data shows that there were some years that maintenance work have been conducted more than 100 % of scheduled work.

1-5 CHANGES OF RISKS AND ACTIONS FOR MITIGATION

(1) Term July 2015 to August 2015

As per the JICA Risk Management Check List, no risk was observed during the first two months of the Project. Other events and issues that may become a risk to the Project were not recognized during this reporting period.

(2) Term September 2015 to February 2016

As mentioned at "1-1-2 (3) Provision of Machinery and Equipment", procurement of PSCV was expected to delay, Hence, Activity 2-2,2-3,2-4, and 2-5 were expected to delay and JICA Team took necessary actions as mentioned at "2.3 Action to be taken" including postponing experts assignment.

(3) Term March 2016 to September 2016

As mentioned at "1-1-2 (3) Provision of Machinery and Equipment", the procurement of the PSCV is expected to further delay. The PSCV PCSV was arrived in April 2016, however equipment to be fitted into the PCSV

was expected to arrive in December 2016 and able to use in the Project from February 2017. This delay is expected to impact on the progress of procurement (Development) of Maintenance Management System, and Activity 1-4, 2-2, 2-3, 2-4, and 2-5.

(4) Term October 2016 to January 2017

The PCSV was procured to AACRA on January 16, 2017 approximately one year delay from the original schedule. Due to this delay, re-scheduling of the relevant activities and necessary measures to achieve the outputs required in the PDM including extension of overall project period was proposed by JICA Team.

(5) Term February 2017 to April 2017

As mentioned at the previous term, the JICA team has reschedule the activities to accommodate the delay of the procurement of PCSV. However it became clear that under the current contracted project period, the road inspection can be conducted only once and results to that database and maintenance plan are to be developed based on the limited inspection data.

(6) Term May 2017 to September 2017

There are continuous risks that road inspection can be conducted only once and database and maintenance are to be developed based on the limited inspection data. In order to accommodate the delay and to provide output based on full scale inspection data, JICA Team is currently consulting to JICA for the possible exertion of the project contracted period.

(7) Term October 2017 to January 2018

In the 5th JCC conducted on 4th October 2017, AACRA formally requested JICA to extend the project period to achieve the outputs agreed in R/D and JICA Representative, Mr. Tatsuhiro Kondo, informed the JICA willingness to extend the project period as required and this matter would be relayed to senior management of JICA HQ for their approval. Official actions for extension of the project period will be started between JICA and JICA Team soon.

(8) Term February 2018 to March 2018

The 4th amendment of JICA contract was made in March 2018 and the project contracted term has extended to July 2019, which allows the delayed activities to be fully conducted. However there are concern that the increase on the expert assignment is yet to be approved by JICA to cover the activities during the extended period.

(9) Term April 2018 to September 2018

The increase on the expert assignment for extended period has been also approved by JICA under the 5th amendment of JICA contract in May 2018.

1-6 PROGRESS OF ACTIONS UNDERTAKEN BY JICA

After the amendment of contract was signed between JICA and JICA Team in January 2016, with a great effort of JICA Ethiopia, the PCSV was procured in April 2016, however, the equipment to be installed into the PCSV was delivered to AACRA on January 16, 2017 around 1 year delay from the original schedule. The 5th amendment of JICA contract was made in March 2018 and the project contracted term has extended to July 2019. The increase on the expert assignment is also approved by JICA under the 5th amendment contract.

1-7 PROGRESS OF ACTIONS UNDERTAKEN BY GOV. OF ETHIOPIA

Thanks to the good cooperation and enthusiasm of Counterparts to the project, activities runs very smoothly and efficiently so far. Continuous involvement and support of Counterparts is very much appreciated for successful technical transfer of project output. Due to the re-structure of the AACRA announced in November,

2016, it is JICA Team's concern that some confusion may occur in each department and it will take time to return to the same service level as the level before the re-structuring.

In August 14, 2017, AACRA sent a letter to JICA Ethiopia Office to request an extension of the project period for 11 months up to the end of June, 2019, in order to conduct full scale road data collection and reflect to the road management system and prepare mid and long term road maintenance. This issue was discussed in 5th JCC held on 4th October 2017 among JICA, AACRA and JICA Team. The request was granted and JICA has extend the project term up to July 2019.

1-8 OTHER REMARKABLE/CONSIDERABLE ISSUES RELATED/AFFECT TO THE PROJECT

(Such as other JICA's projects, activities of Counterparts, other donors, private sectors, NGOs, etc.)

AACRA had a project called "Consultancy service for the study of permanent naming and code of road and transport infrastructure assets of Addis Ababa" which is an asset management study project with a period of service of 5 months (Feb –Jun. 2016). Objective of the consultancy include but not limited to developing permanent names and codes for identified transport infrastructures in Addis Ababa. This project is initiated by Addis Ababa Transport Program and Monitoring Office (TPMO) under World Bank fund. RAM of AACRA shared current numbering of Roads established by JICA Team to the concerned consultancy group.

2. DELAY OF WORK SCHEDULE AND/OR PROBLEMS (IF ANY)

2-1 DETAIL

(1) Term July 2015 to August 2015

No delay was observed during the first two months of the Project and the 1st JCC was held on August 17, 2015 as planned by JICA experts.

(2) Term September 2015 to February 2016

Procurement of PCSV was under the progress, and expected to be delivered in September 2016 as the earliest. This was nine months delay from the original schedule, and as consequence, Activity 2-2, 2-3, 2-4, and 2-5 were expected to be delay.

(3) Term March 2016 to September 2016

Procurement of equipment for PCSV is under the progress, and currently is to be delivered in December 2016 as the earliest, and be able to use for survey from February 2017 as earliest. This is 12 months delay from the original schedule, and as consequence, Procurement (Development) of Maintenance Management System and Activity 2-2, 2-3, 2-4, and 2-5 are expected to be further delay.

(4) Term Oct 2016 to January 2017

As mentioned previously, the PCSV was delivered to AACRA on January 16, 2017 around one year delay from the original schedule. Activities affected by the delay of the PCSV and the impact on the overall Project which will be caused by these activities' delay are summarized below.

Table 34 Effects on Activities and Impact on Project due to Vehicle's Delay

Act. No.	Activity	Effect by Delayed Vehicle	Impact on Project
1-4 (1)	Training for Inspection	Training Period for Vehicle shortened	Number of trained AACRA staff for vehicle decreased
1-4 (2)	Develop and Update the Database in AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update impossible Number of trained AACRA staff decreased
1-4 (3)	Prepare and revise short /medium/.long	Number of times for mud/long term m.	Full-scale update impossible

Act. No.	Activity	Effect by Delayed Vehicle	Impact on Project
	term maintenance plan	plan is reduced from 2 to 1	No revision of medium/long term maintenance plan
2-2	Conduct road inspection	Number of times for full-scale data collection is reduced from 2 to 1	Number of trained AACRA staff and their quality are decreased
2-3	Develop and update Database of AACRA	Number of times for full-scale data collection is reduced from 2 to 1	Full-scale update is impossible
2-4	Prepare and revise mid/long term M. plan	Number of times for full-scale data collection is reduced from 2 to 1	It is not possible to revise mid/long term M. plan.
2-5	Prepare annual road maintenance plan	The first plan is delayed from June-July, 2016 to June-July, 2017	No serious impact will be expected.

In order to achieve output to the maximum extent, required in the PDM, the JICA Team has rescheduled the relevant activities affected by the delay of Vehicle supply and has proposed JICA to extend the term of Project for further 10 (ten) months.

(5) Term February 2017 to April 2017

Situation is same as the previous term

(6) Term May 2017 to September 2017

Situation is same as the previous term

(7) Term October 2017 to January 2018

Situation is same as the previous term but with respect to the extension of Project Period, favourable advance step can be expected as described above.

(8) Term February 2018 to March 2018

Concern on the delay of project activities has been resolved by the extension of the project term. However there are delay in visual inspection activities and in sufficient execution of road maintenance works by AACRA.

(9) Term April 2018 to September 2018

The 2nd Pilot Project on cut and overlay planned in April 2018 was cancelled and postponed to December 2018.

2-2 CAUSE

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

Due to need of amendment of contract for changing procurement owner of Pavement Condition Survey Vehicle to JICA, actual procedure has been delayed.

(3) Term March 2016 to September 2016

Since the change on procurement owner in January 2016 as described in at “1-1-2 (3) Provision of Machinery and Equipment”, there was a further delay on procurement procedure for equipment for Pavement Condition Survey Vehicle at JICA headquarter. Tender notice was published in June 2016, tender was held in July 2016, a contractor was selected in August 2016 and contracted with JICA headquarter.

(4) Term October 2016 to January 2017

After manufacturing and shipping, the equipment for PCSV arrived at Bole Airport, Addis Ababa, on 15 Nov. 2016 and was delivered to AACRA on 16 January 2017 after 2 months custom clearance. Equipment was assembled on to vehicle from 23 January 2017 to 30 January 2017. On 31 January 2017, the Pavement Condition Survey Vehicle was officially handed over to AACRA. After 2 weeks training operation and data analysis of the PCSV, the data collection was started by AACRA staff. Total delay in the equipment procurement from the original plan is 13 months.

(5) Term February 2017 to April 2017

As mentioned at the previous monitoring period, the project activities are delayed due to the delay in the procurement of the PCSV.

(6) Term May 2017 to September 2017

Same as the previous term.

(7) Term October 2017 to January 2018

Same as the previous term but with respect to the extension of Project Period, favourable advance step can be expected as described above.

(8) Term February 2018 to March 2018

Visual inspection activities are assigned to Regional Asset Management after the restructuring of AACRA. Due to the other projects engagement of Regional Asset Management, scheduled visual inspection in November 2017 is yet to be implemented (Planned to start from March 2018). Insufficient maintenance work by AACRA is due to the lack of necessary maintenance equipment and machineries.

(9) Term April 2018 to September 2018

Required equipment and machinery for the pilot project were expected to utilise the items procured through the separate JICA project. However this project was cancelled. AACRA has enquired local companies however none of them have available equipment and machinery to rent AACRA.

2-3 ACTION TO BE TAKEN

(1) Term July 2015 to August 2015

Not applicable for this term.

(2) Term September 2015 to February 2016

JICA Headquarter preceded the procurement of Pavement Condition Survey Vehicle as a priority issue, so that the PCSV could arrive as earliest as possible to conduct activities proposed under the Project. Meanwhile, JICA Team provided necessary support for procurement as required, at the same time, conducted following actions; 1) Reschedule assignment of JICA experts, considering the feasible delivery schedule of the PCSV, 2) Provide training on relevant activities, 3) Develop Road Maintenance Management System using existing data, and 4) Formulate plans not requiring Pavement Condition Survey Vehicle.

(3) Term March 2016 to September 2016

The selected contractor is currently proceeding the procurement of equipment for Pavement Condition Survey Vehicle and JICA headquarter is providing the necessary supports for smooth delivery of procedure. At the same time, JICA Team is currently discussing the potential solution to make up this delay affecting data collection and resulting data quality requiring for road maintenance planning.

(4) Term October 2016 to January 2017

As described in 2-1 (4), several activities are affected by the delay of the Pavement Condition Survey Vehicle. Since the seasonal constraint, namely no field work in the rainy season, exists in Addis Ababa, to extend the term of Project is the sole solution in order to carry out all activities as planned, and JICA Team has started discussion with JICA regarding the possibility of the Project's term extension.

Meanwhile, JICA Team will take following measures in order to recover the delay even if only slightly.

- JICA Team will try to conduct highly concentrated lectures and training
- In order to keep AACRA staff the sense of tension, JICA Experts will decrease the duration of their each stay in Addis Ababa and increase the number of their visit to Addis Ababa. (The total MM is unchanged.)

(5) Term February 2017 to April 2017

JICA team has continuous discussions with AACRA on the extension of the project term to cover the full road inspection, reflect data into road management system and prepare mid and long term maintenance plan. Meanwhile JICA team is working in accordance with the re-scheduled project activities.

(6) Term May 2017 to September 2017

JICA team is working in accordance with the re-scheduled project activities in conducting road inspection, development of Road Management System and Mid/Long maintenance planning. JICA team has also continuous discussions with AACRA.

(7) Term October 2017 to January 2018

At the 5th JCC held on October 4, 2017, the extension of project period was discussed among AACRA, JICA and JICA Team. JICA representative informed that JICA was very willing to accept this idea subject to the approval of the senior management in JICA HQ Tokyo. JICA team is working in accordance with the re-scheduled project activities in conducting road inspection, development of Road Management System and Mid/Long maintenance planning.

(8) Term February 2018 to March 2018

JICA team will propose AACRA to clarify demarcation on road maintenance implementation, and advise necessary equipment and machinery for road maintenance work.

(9) Term April 2018 to September 2018

For proposed pilot project in December 2018, AACRA is coordinating local companies to rent the required equipment. At the same time JICA team is preparing alternative Pilot Project activity using DCP.

2-4 ROLES OF RESPONSIBLE PERSONS/ORGANIZATION (JICA, GOV. OF ETHIOPIA, ETC.)

Procurement of Pavement Condition Survey Vehicle (Equipment to be assembled): JICA Headquarter

Procurement of Pavement Condition Survey Vehicle (Vehicle): JICA Ethiopia Office

3. MODIFICATION OF PROJECT IMPLEMENTATION PLAN

3-1 MODIFICATION OF PDM AND PO

(1) Version 1

The Project proposed a modification of PDM from that outlined in R/D (signed in April 2015) to better correspond the circumstances of the Project. This proposal was approved by the 1st JCC on August 17, 2015 and reported to JICA Ethiopia Office and JICA Headquarter at a later date. PO was altered accordingly.

(2) Version 2

PDM was updated for 1) verification indicator, 2) addition of activity “Development of Visual Inspection Supporting System” into Activity 2-2, 3) addition of activity “Develop Road Maintenance Management System” into Activity 2-4, 4) Experts of Japanese side, 5) extra item for provision of machinery and equipment in accordance with the contract amended in January 2016. PO was also altered accordingly. The modification was informed to JICA Ethiopia Office prior to the 2nd JCC, and approved at the 2nd JCC.

(3) Version 3

After the review of “Objective verifiable indicator” under activity 0-2, modification have been made on “Means of Verification”.

(4) Version 4

Through the discussion in TAC 5 and agreement made in TAC 6 (January 27 2017; detailed record of the 6th

TAC is to be described in the next Monitoring Sheet Version 5). 80% is inserted into the target value of Objectively Variable Indicators for Project Purpose No. 3. With respect to other target values which have not been inserted any figure, all attendances to TAC 6 agreed that these values should be decided after observation actual figure for a while.

(5) Version 4A

No modification was made.

(6) Version 5

No modification was made.

(7) Version 6

No modification was made.

(8) Version 6A

PO of Project term is extended in accordance to the JICA amended contract. Thus the schedule of project activities and monitoring activities were updated. Expert assignments are yet to be increased. Objectively Verifiable Indicator of PDM are updated.

(9) Version 7

PDM means of verification on Overall Goal 1 and 2, and Outputs 1-3 are amended based on the discussion and agreement during the 7th JCC. Project Purposed 1 is amended by removing “interview to Addis Ababa City Administration “due to difficulty to have interview. JICA team justified that the interview with Road Funds Agency is sufficient to obtain the baseline data.

3-2 OTHER MODIFICATIONS ON DETAILED IMPLEMENTATION PLAN

(1) Version 1

No other modification made for version 1.

(2) Version 2

Total experts assignment for Ethiopia has increased 0.5 MM which in total 72.50 MM.

(3) Version 3

No other modification made.

(4) Version 4

No other modification made.

(5) Version 4A

No other modification made.

(6) Version 5

No other modification made.

(7) Version 6

No other modification made.

(8) Version 6A

No other modification made.

(9) Version 7

No other modification made.

4. PREPARATION OF GOV. OF ETHIOPIA TOWARD AFTER COMPLETION OF THE PROJECT

To be added as the Project progresses.

II. PROJECT MONITORING SHEET I & II

See the attached.

APPENDIX

Project Monitoring Sheet I(Revision of the Project Design Matrix)

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Implementing Agency: Addis Ababa City Roads Authority (AACRA)

Target Group: Staff of Addis Ababa City Roads Authority (AACRA)

Period of Project: 10/Jul/2015 - 9/Jul/2019

Project Site: Addis Ababa City

Model Site: Pilot project sites in Addis Ababa City

Version 7

Dated 4th Oct. 2018

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	%
Overall Goal The roads in Addis Ababa City are maintained in a sustainable way.	Three years after the completion of the Project, 1. 60 % of Strategic roads (PR, PAS and SAS) is below the targeted roughness of 3.5. 2. The 90% of length(km) of planned road under AACRA is inspected by the standardized method.	1. Road inventory and Inspection Data in Addis Ababa City 2. Road inventory and Inspection Data in Addis Ababa City		JICA team has proposed the verifiable indicator based on the survey results in April 2018. During the 7th JCC, the verifiable indicator proposed by JICA team was agreed. During the 7th JCC, the verifiable indicator proposed by JICA team was agreed.	N/A
Project Purpose The management capacity of AACRA for road maintenance is enhanced.	By 3 months before the completion of the Project, 1. AACRA's capacity to secure the budget for road maintenance is enhanced. 2. Road maintenance works based on PDCA* cycle established by the Project are executed by AACRA. 3 The percentage of the implemented road maintenance works against all the maintenance works scheduled in AACRA Annual Road Maintenance Plan, exceeds 80% since the 3rd project year.	1. Interview Road Funds Agency on Baseline and Endline data 2. Evaluation Result by PDCA Checklist 3 Baseline data (Maintenance record 2015-2016 and Road Maintenance Plan), AACRA Annual Road Maintenance Plan, AACRA Maintenance Historical Record	1. Human resources necessary for the road maintenance are continuously assigned by AACRA. 2. Financial resources are allocated by the City Administration and Road Funds Agency in a sustainable manner.	In Progress: JICA team will propose the means of verification is to be revised by removing "Interview to Addis Ababa City Administration". In Progress: PDCA Checklist (ver.1) is developed. Currently operation method in consideration to inspection equipment and road management system is under development. In Progress: Baseline data shows that there were some years that maintenance work have been conducted more than 100 % of scheduled work.	N/A N/A N/A
Outputs 1. The implementation structure of AACRA for road maintenance is improved.	1-1. Suggestions for improving the implementation structure of AACRA for road maintenance is compiled and presented at the 7th JCC (September 2018). 1-2. Road map on institutional strengthening to act on the suggestions is prepared by AACRA, by March 2019 to be incorporated into the budget FY Jul/2019 - Jun/2020 if necessary. 1-3. More than 100% of the approved budget on the basis of Annual Road Maintenance Plan are allocated since the 3rd project year. 1-4 Trainings on road maintenance is conducted targeting AACRA staff 1-5 Public understanding and cooperation on road maintenance is enhanced.	1-1. Complied suggestions, Project meeting record 1-2. The Road Map, Minutes of JCC 1-3 Baseline data(Requested and allocated budget on annual road maintenance plan 2015-2016), AACRA annual report (Budget Plan), AACRA Annual Road Maintenance Plan. 1-4. Training Record 1-5. PR outputs	The AACRA staff capacitated by the Project continue to work for their respective positions.	In Progress: Implementation structure has been improved dramatically since restructuring of AACRA, which is confirmed from the results of questionnaire. Recommendation for sustainable implementation structure for road management will be presented at the 7th JCC. In Progress: Internal Communication has been improved dramatically since restructuring of AACRA, which is confirmed from the results of questionnaire. Further discussion will be made for the needs of further strengthening of institution and communication at the 7th JCC. In Progress: JICA team proposed to set verifiable indicator as 100% at the 6th JCC. Based on the discussion during the 7th JCC, the proposed verifiable indicator was agreed. In Progress: As of end of Sep. 2018, 42 lectures and 25 OJTs, and two trainings in Japan were conducted. In Progress: Leaflet on Activity 2 was prepared and distributed. One seminar was held in Apr. 2017. Developing video clip is currently under discussion.	80% 80% 50% 90% 50%
2. The process for formulating road maintenance plans is established.	2-1. PDCA Checklist is developed by January 2016. 2-2. AACRA Annual and Mid/Long term Road Maintenance Plan contains necessary items based on the PDCA checklist are formulated using Road Maintenance Management System developed under the Project, from the beginning of the 4th project year. 2-3. AACRA Annual and Mid/Long term road maintenance plan are formulated in consideration of Life Cycle Cost on Road	2-1. PDCA checklist, Minutes of JCC 2-2. PDCA Checklist, AACRA Annual and Mid/Long term road maintenance plan, Road Maintenance Management System 2-3 AACRA Annual and Mid/Long term road maintenance plan, AACRA Maintenance Historical Record		In Progress: Checklist version 1 was developed. Version will be updates as necessary through the operation. In Progress: Framework for RMMS and planning procedure were agreed. RMMS ver. 1 was issued July 2017 and ver. 2 in Jan. 2018. Ver. 3 is currently developed and will be finalized in Jan. 2019. In Progress: Approach and formulation process for road maintenance planning have been agreed. Annual Road Maintenance Plan for August 2017 - July 2018 was prepared in July 2017. Annual Road Maintenance Plan for August 2018 - July 2019 was prepared in July 2018. Mid term plan will be presented in October 2018.	100% 80% 75%
3. The maintenance skills and knowledge of AACRA technical staff are improved.	3-1. Technical Transfer on Road maintenance skills and knowledge targeting AACRA technical staff are conducted. 3-2. Number of preventive maintenance works executed are increased through the implementation of the project.	3-1 Training Record, Report on Pilot Project 3-2. Baseline data(Maintenance record 2015-2016), AACRA Maintenance History Record, AACRA Annual Road Maintenance Plan		In Progress: Leaflet and 14 OJT relevant to maintenance skill and knowledge were conducted. In Progress: Concept and importance of Preventive Maintenance have been shared through pilot projects.	90% 50%
Activities	Inputs		Important Assumption		
	The Japanese Side	The Ethiopian Side			
1-1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	1. Experts • Chief Advisor/Road Maintenance • Road Maintenance Planning • Road Inspection (Site Survey) • Road Inspection (Database)	1. Personnel • Project Director • Project Manager • Counterpart personnel	1. The turnover of AACRA staff does not profoundly affect the project activities.		
1-2 Convene Technical Advisory Committee (TAC)	• Maintenance Management System	2. Provision of the project office and facilities necessary for the project implementation	2. Natural disasters, such as floods, do not profoundly affect the project activities.		
1-3 Prepare a training plan for AACRA Staff	• Maintenance Design • Construction Supervision • Training Planning • Monitoring • System Development • Others as necessary	3. Traffic survey and pilot projects in Addis Ababa City			
1-4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.		4. Administrative and operational expenses necessary for the project implementation • Electricity, water, communication, etc. • Local traveling costs and daily subsistence allowance (DSA) for counterpart personnel			
1-5 Share Information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance		5. Others as necessary	Pre-Conditions Understanding and cooperation on road maintenance in the City are obtained from the project stakeholders such as the City Administration, Addis Ababa City Road and Transport Bureau, Road Funds Agency, etc.		
1-6 Promote public relations (PR) activities on road maintenance in the City	2. Training of counterpart personnel, including Project Director and Project Manager, in Japan and/or the Third Countries				
2-1 Review the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	3. Provision of machinery and equipment • Inspection Equipment(Pavement Condition Survey Vehicle) • Maintenance Management System • Visual Inspection Supporting System • Structural Investigation Equipment • Others				
2-2 Conduct road inspections in the City	4. Local expenses for the project activities as necessary				
2-3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.			↓		
2-4 Prepare and revise Medium/Long term Road Maintenance Plan using Road Maintenance Management System developed under the project.			<Issues and countermeasures>		
2-5 Prepare Annual Road Maintenance Plan using Road Maintenance Management System developed under the Project.					
3-1 Select pilot projects for maintenance works based on the Annual Road Maintenance Plan formulated under the Project					
3-2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process					
3-3 Conduct the detailed investigations and design specifications of the pilot projects					
3-4 Assist AACRA to execute pilot projects					
3-5 Feedback achievements and experiences of pilot projects into the next Annual Road Maintenance Plan					
3-6 Organize a workshop/seminar of the pilot projects for Ethiopian Roads Authority (ERA) and road agencies at regional and municipal level					

Draft of Plan of Operation for Extended Project Period

Ver. 7

Project Title: Project for Development of Road Maintenance Capacity of Addis Ababa City

Dated Oct. 4th 2018

Inputs	Plan	2015				2016				2017				2018				2019		Remarks	Monitoring	
		III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	Issue	Solution			
Expert																						
Chief Advisor/Road Maintenance	Plan																					
Deputy Chief Advisor/ Road Maintenance/ Maintenance Management System	Plan																					
Road Maintenance Plan	Plan																					
Road Inspection (Site Survey)	Plan																					
Road Inspection (Database)	Plan																					
Road Maintenance Design	Plan																					
Construction Supervision	Plan																					
Training Plan	Plan																	Completed				
Monitoring	Plan																					
System Development	Plan																	Completed				
Equipment *: to be used for the Project Activities																						
Inspection Equipment (Pavement Condition Survey Vehicle)	Plan																	Completed				
Structural Investigation Equipment	Plan																	Completed				
Maintenance Management System	Plan																	Completed				
Visual Inspection Supporting System	Plan																	Completed				
Training in Japan																						
Training for Counterpart Personnel	Plan																	Completed				
Activities																						
Sub-Activities	Plan																	Responsible Organization	Achievements	Issue & C. Measures		
Output 1: The implementation structure of AACRA for road maintenance is improved.	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	Japan	GOE			
1.1 Review Implementation Structure of AACRA, and compile suggestions for the structure improvement	Plan																	JICA	AACRA	JICA Team proposed suggestions at TACs. Further review and discussions are required after role and responsibility of each section under new AACRA structure is clarified.		
1.2 Convene Technical Advisory Committee (TAC)	Plan																	JICA	AACRA	6 TACs have been conducted. Since 2017, TAC activities have been covered at the onsite discussions. In the future, TAC will be formed as necessary.		
1.3 Prepare a training plan for AACRA Staff	Plan																	JICA	AACRA	Plan has been developed and training implementing schedule was also developed accordingly. Training plan for 2018-2019 is currently under planning.		
1.4 Conduct training of AACRA staff for road maintenance: road inspection, maintenance planning, maintenance management system, etc.	Plan																	JICA	AACRA	As of Sep. 2018, 42 lectures and 25 OUTs, and two trainings in Japan were conducted.		
1.5 Share information of road conditions in the City with Road Funds Agency and the City Administration to request the budget for road maintenance	Plan																	JICA	AACRA	Internal Communication has been improved dramatically since restructuring of AACRA, which is confirmed through the answer of questionnaire. Further discussion will be made for the needs of further strengthening of institution and communication at the 7th JCC		
1.6 Promote public relations (PR) activities on road maintenance in the City	Plan																	JICA	AACRA	Leaflet on Activity 2 was prepared and distributed. One seminar was held in Apr. 2017. Developing Video clip is currently under discussion.		
Output 2: The process for formulating road maintenance plans is established.																						
2.1 Revise the road maintenance cycle of AACRA, compile the PDCA checklist, and revise the checklist if needed	Plan																	JICA	AACRA	Checklist version 1 was developed. Version will be updated as necessary through the operation.		
2.2 Conduct road inspections in the City	Plan																	JICA	AACRA	Visual Inspection Support System is developed and updated to ver.4. The 3rd round Visual Inspection was completed in May 2018 and currently preparing for the 4th round from November 2018. Emergency and Schedule Inspection is currently planned to start Oct. 2018. Full scale automatic inspection was completed 2017 Nov.-2018 Mar. Next survey is scheduled for 2018 Nov.-2018 Mar.		
2.3 Develop and update the road inventory (database) of AACRA, including road condition, traffic volume, unit costs, etc.	Plan																	JICA	AACRA	Basic Inventory Information and Framework of Road Inventory Database was set in Mar. 2016. Database Structure was prepared in Dec. 2016. Repair Information and Visual Inspection Results are inputted every year and 2017 data input was completed in July 2018.		
2.4 Prepare and revise Medium/Long term Road Maintenance Plan based on the above inventory data	Plan																	JICA	AACRA	Mid/Long term Road Maintenance Plan will be formulated in Oct. 2018.		
2.5 Prepare Annual Road Maintenance Plan	Plan																	JICA	AACRA	Planning procedure has been agreed. The Annual Road Maintenance Plan for 2017/2018 was developed in Jul. 2017, and for 2018/2019 in Jul. 2018.		
Output 3: The maintenance skills and knowledge of AACRA technical staff are improved.																						
3.1 Select pilot projects for maintenance works from the annual road maintenance plan	Plan																	JICA	AACRA	Completed. The 1st pilot project was selected in Sep. - Oct. 2016, and the 2nd pilot project was selected at the end of Oct. 2017.		
3.2 Share the information of pilot projects between/within Road Asset Management Process and Construction and Maintenance Process	Plan																	JICA	AACRA	Completed. Information on 1st and 2nd (pavement replacement) pilot project was shared before and after the implementation.		
3.3 Conduct the detailed investigations and design specifications of the pilot projects	Plan																	JICA	AACRA	Completed. Selection of locations, test using DCP and design of 2nd Pilot Project were completed in Nov. 2017.		
3.4 Assist AACRA to execute pilot projects	Plan																	JICA	AACRA	1st pilot project was implemented Nov. 2016 - Feb. 2017, the 2nd pilot project (pavement replacement) was implemented in Dec. 2017 - Jan. 2018. Pilot project for Cutting Overlay planned in April 2018 was cancelled and postponed to Dec. 2018.		
3.5 Feedback achievements and experiences of pilot projects into the next annual road maintenance plan	Plan																	JICA	AACRA	Feedback of the 1st and the 2nd pilot project (pavement replacement) was provided.		
3.6 Organize a workshop/seminar of the pilot projects for ERA and road agencies at regional and municipal level	Plan																	JICA	AACRA			
Project Duration / Phasing	Plan																					
Monitoring Plan	Actual	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	Remarks	Issue	Solution		
Monitoring																						
Joint Coordinating Committee	Plan																					
Set-up the Detailed Plan of Operation	Plan																					
Submission of Monitoring Sheet	Plan																					
Monitoring Mission from Japan	Plan																					
Joint Monitoring	Plan																					
Reports/Documents																						
Project Work Plan	Plan																					
Project Completion Report	Plan																					

■ Activities with fixed period
 ■ Activities to be continuously conducted, or with tentative schedule