

**The Republic of Tajikistan
Ministry of Transport**

**THE PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF EQUIPMENT
FOR ROAD MAINTENANCE
IN SUGHD REGION AND
THE EASTERN PART OF KHATLON REGION
IN
THE REPUBLIC OF TAJIKISTAN**

January 2016

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

KATAHIRA & ENGINEERS INTERNATIONAL

EI
CR(1)
16-017

Preference

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on the Project for Improvement for Road Maintenance in Sughd Region and Eastern Part of Khatlon Region in the Republic of Tajikistan and entrust the survey to KATAHIRA & Engineers International.

The survey team held a series of discussions with the officials concerned of the Government of Tajikistan, and conducted a field investigation from March, 2015 to November, 2015. As a result of further study in Japan, the present report was finalized.

I hope that the report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Tajikistan for their close cooperation extended to the survey team.

January, 2016

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Summary

(1) Background and History

Since the Republic of Tajikistan (hereinafter called “Tajikistan”) is a landlocked country, the inland physical distribution in both people and goods very depends on the transportation through the road network, and the major roads is the key economic infrastructure for both inland and cross border physical distribution. In Tajikistan, around 30,000km road network has been provided. As, however, most of the road network were constructed in the former Soviet Union era, they have been damaged due to the aging and the civil war after the independence in 1991 and, therefore, the cost of transportation and distribution has been increased. In order to solve these problems, in 2011 the Government of Tajikistan provided the “State Program on Transport Development for Tajikistan, 2010-2025” and set up in the program the “Construction of transportation networks, that meets the economic and social needs of the nation, with high level of safety” as the overall goal in the road sector.

In July 18, 2014, the Government of Tajikistan requested Government of Japan to apply a Grant Aid for procurement project of road maintenance equipment for Sughd Region and Eastern Part of Khatlon Region. The targeted offices are composed of 2 SETMs and 24 SEHMs such as Sughd SETM located in the 2nd biggest city Khujand and 14 SEHMs under its control, and Kulyab SETM located in south eastern part of the capital city Dushanbe and 10 SEHMs under its control.

The purpose of the Project is “to enhance the road maintenance capacity of Sughd Region and Kulyab SETM (Eastern part of Khatlon Region) by procuring road maintenance equipment and delivering it to 24 SEHMs under the jurisdiction of both SETMs”.

(2) Outline of Survey Results and Contents of Project

Through the site survey conducted from March 23rd to April 27th, 2015 with the cooperation of Tajikistan Ministry of Transport, Organization and Staff Component, Financial Condition, Technical Level, Existing Resources (facility and Equipment), Trend of Privatization, Candidate Locations for Asphalt and Aggregate Plant, and roads condition which are managed by both SETMs were confirmed. The usage condition of China-made equipment which were supplied to 6 SETMs in Tajikistan by the fund from EBRD in 2009 and future equipment supply plan of other donors were also investigated.

Information was obtained from the JICA Technical Assistance Project for Improvement of the Road Maintenance Capacity in Western Khatlon District and in Republican Subordination (2013 Oct.-2016 June) and was reflected in this survey.

Based on the survey results, the basic principal of the Project can be summarized as follows.

Basic Principals

Equipment which is required for the implementation of road maintenance works carried out by the targeted 24 SEHMs under the jurisdiction of Sughd and Kulyab SETMs is to be procured and to be delivered to them. The maintenance works are composed of following activities.

Table-1 The Types of Activities Implemented by SEHMs under SETMs

Activity	Detailed Description
Road repair and maintenance (1)	Pothole Repair and Crack sealing repair Overlay and pavement renewal
Road repair and maintenance (2)	Overlay and pavement renewal
Snow cleaning and melting	Snow cleaning, removing ice, spreading salts and melting works
Disaster recovery	Removing rock falls and landslides, recovery of damaged roads
Back up	Transporting equipment, repair in workshops and at sites

As for the works of Road repair (2): overlay and pavement renewal, the contractor is selected through the tender, of which amount is decided by MOT and of which procedure is conducted by the State Construction Committee. Both private contractor and SEHM can participate in tenders. In the remote areas, however, where no private contractor exists or where private contractor is reluctant to participate in the tender due to the lack of budget, tender itself is not effected. In these cases, SEHM is obliged to undertake the works. Therefore, the equipment required for overlay and pavement renewal will be also considered within the project.

For full scale rehabilitation works and new construction works of roads, as MOT has to get the financial assistance from Donors or International Institutes and international bidding procedure is to be carried out, the equipment required for the implementation of these works is not included in the Project.

Technical Specifications of the Equipment

In defining technical specifications of the equipment, the Project will refer to the experience of equipment procurement project under the Japan Grant Aid Scheme in 2013 “The Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination”, new requirement from MOT and recommendations from the technical assistance project being underway.

Selecting Equipment Supplying Countries

The Japan-made equipment is basically selected in the Project. For the equipment, which is not produced in Japan or in case the number of Japanese manufactures are limited, equipment made in third countries with the same quality level as Japan-made equipment be considered. As for the third countries, mainly European countries are to be selected.

Spare Parts Procurement

Periodical maintenance parts and wearing parts will be supplied for the starting period of operations. The set of parts should be supplied in a quantity enough for 2 years usage, considering the difficulty in the budget preparation for first 2 years in Tajikistan. These parts should be used for periodical maintenance and changing wearing parts (Lubricant oil is not included).

Operation and Maintenance

In addition to the start-up operation guidance which is to be conducted by the equipment supplier and manufacturer after the equipment delivery to the designated site, practical training for basic technique for prevention measure and for equipment repair including pothole repair, operation of asphalt finisher and so on will be conducted. These training will be carried out at both SETMs and employee from targeted 24 SEHMs will participate in the training as trainee.

However, master trainers for the equipment operator and repair works will be cultivated through the training carried out in the Technical Assistance Project being underway, soft component will not be conducted in this Project.

Contents and Scope

Table-2 List of Equipment to be Procured

	Name of Equipment	Unit	Number of Equipment Supplied by JICA		
			Sughd	Kulyab	Total
1	Vibration Compactor	No.	12	8	20
2	Hand Breaker	No.	24	16	40
3	Air Compressor	No.	12	8	20
4	Asphalt Sprayer	No.	12	8	20
5	Hand Guide Roller	No.	12	8	20
6	Asphalt Finisher	No.	1	1	2
7	Road Roller	No.	1	1	2
8	Tire Roller	No.	1	1	2
9	Motor Grader	No.	5	7	12
10	Wheel Excavator	No.	1	3	4
11	Crawler Excavator	No.	1	1	2
12	Wheel Loader	No.	6	7	13
13	Dump Truck	No.	10	10	20
14	Asphalt Plant	No.	1	1	2
15	Aggregate Plant	No.	1	1	2
16	Truck with Crane	No.	12	8	20
17	Mobile Workshop	No.	1	1	2
18	Pickup Truck	No.	2	2	4
19	Tractor with Trailer	No.	1	1	2
20	Bulldozer	No.	1	2	3
21	Line Marker	No.	1	1	2
22	Laboratory Equipment	No.	1	0	1
Total			119	96	215

(3) Project Implementation Schedule and Project Cost

In case this project is implemented under the Japanese Grant Aid scheme, period for detail design, and for equipment procurement needs 4.5 months and 14.5 months respectively, and, therefore, total project implementation period will become 18 months.

The estimated total project costs will be 2.02 billion Yen (Japan side 1.978 billion Yen and Tajikistan side 42.2 million Yen respectively). It should be noted that the total cost does not show the limit of donation in Exchange Note.

(4) Project Validity Evaluation

Project validity will be evaluated as follows.

Quantitative Effect

Table-3 Quantitative Effect

Effect	Base Value (2014)	Increase Rate	Target Value (2020)
Sughd SETM Area of Pothole annually repaired by cold-mix asphalt (m ²)	71,000	1.54	109,000
Sughd SETM Length of Pavement annually overlaid by hot-mix asphalt (equivalent 2 lanes) (km)	8	1.4	11.2
Kulyab SETM Area of Pothole annually repaired by cold-mix asphalt (m ²)	24,000	2	48,000
Kulyab SETM Length of Pavement annually overlaid by hot-mix asphalt (equivalent 2 lanes) (km)	7	1.25	8

Note: The increased rate is obtained from the increment in number of dump truck (pothole repair) and in number of road roller (overlay) respectively. The base value is obtained from the total value of the targeted SEHMs.

Qualitative Effect

- Because the cold-mixed asphalt is able to be produced in the asphalt plant as well as hot-mixed asphalt and proper equipment is to be utilized for pothole repair, the quality of the repaired area is to be improved and the life of the area is to be extended.
- Due to the production of the hot-mixed asphalt in the self-owned plant instead of procurement from outside, and usage of proper equipment, both cost and quality in the asphalt overlay work can be improved.
- By the equipment procured for disaster recovery, the less frequency of the traffic stoppage by disasters (flood and/or avalanche) can be expected.

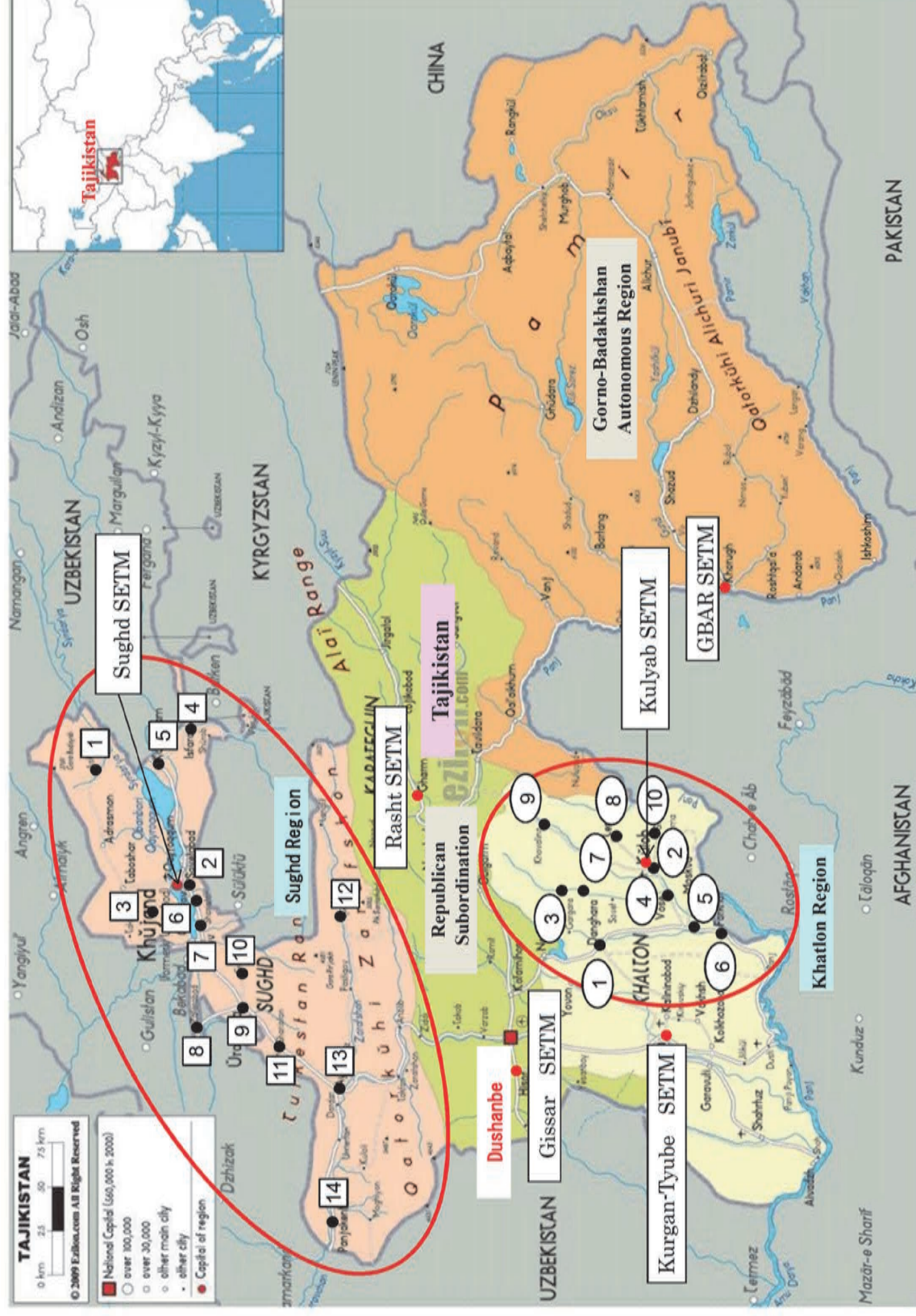
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No.	SEHMs under the Sughd SETM
1	Asht
2	Gafurov
3	Mastcha
4	Isfara
5	Kanibadam
6	Rasulov
7	Spitamen
8	Zafarabad
9	Istaravshan
10	Ganchi
11	Shakhristan
12	K. Mastcha
13	Ayni
14	Pendzhikent

No.	SEHMs under the Kulyab SETM
1	Dangara
2	Kulyab
3	Baljuvan
4	Vose
5	Hamadoni
6	Farhar
7	Temurmaliq
8	Muminabad
9	Hovaling
10	Shurabad



Images of Equipment



1. Vibration Compactor



2. Hand Breaker



3. Air Compressor



4. Asphalt Sprayer



5. Hand Guide Roller



6. Asphalt Finisher



7. Road Roller



8. Tire Roller



9. Motor Grader



10. Wheel Excavator



11. Crawler Excavator



12. Wheel Loader



13. Dump Truck



14. Truck with Crane



17. Mobile Workshop



18. Pick-up Truck



15. Asphalt Plant



16. Aggregate Plant



19. Truck Trailer



20. Bulldozer



21. Line Marker



22. Asphalt Test Equipment

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Abbreviations

<u>Abbreviations</u>	<u>Official Name</u>
ADB	: Asian Development Bank
AH	: Asian Highway
CAREC	: Central Asia Regional Economic Cooperation
CIS	: Commonwealth of Independent States
EBRD	: European Bank for Reconstruction and Development
EIA	: Environmental Impact Assessment
GNI	: Gross National Income
GDP	: Gross Domestic Product
IMF	: International Monetary Fund
IsDB	: Islamic Development Bank
JICA	: Japan International Cooperation Agency
M/D	: Minutes of Discussion
MOT	: Ministry of Transport
NDS	: National Development Strategy
OPEC	: Organization of the Petroleum Export Countries
SEHM	: State Enterprise on Highway Maintenance
SETM	: State Enterprise of Transport Management
TJS	: Tajikistan Somoni
US\$: United States Dollar
A/P	: Asphalt Plant
C/P	: Crushing Plant (Aggregate Plant)

Chapter 1 Background of Project

1.1 Background and Outline of the Project

Republic of Tajikistan (hereinafter called “Tajikistan”) has 143,000km² of land and a population of 8.2 million, and is a landlocked country surrounded by China, Kirgыз, Uzbekistan and Afghanistan. Tajikistan has approx. 30,000km of road network. Domestic material flow and passenger travelling largely depend on road transport. In this regard, arterial highways in Tajikistan play an important role in its economy as infrastructure for transportation. Since Tajikistan locates at the hub of Central Asia and South Asia, it is expected that improvements of these international arterial highways and proper maintenance of them contributes to the development of regional economy of countries in Central Asia and Afghanistan.

Ministry of Transport (MOT), who is responsible agency for the project, is responsible for approx. 13,800km of road networks which includes international arterial highways and domestic arterial highways. Actual works for road maintenance throughout the country are undertaken by six State Enterprises of Transport Management (SETM) and 62 State Enterprises on Highway Maintenance (SEHM) under the control of each SETM.

As most of road networks in Tajikistan were constructed during Soviet Union era, deterioration of road networks is being in progress due to the damages made during civil war after independence from Soviet Union in 1991 and due to aging. Because mountainous area exceeds 90% of national land of Tajikistan, there are many roads where road traffic is often closed by natural disasters, i.e. avalanche, mudslide and rock fall. These disruptions of traffic network and increases in transportation time caused by the unfavorable road condition have become disincentives to economic development of Tajikistan and surrounding area. In addition, the fact that proper road maintenance works have not been carried out due to lack of road equipment, has been also speeding up the deterioration of road network in turn.

In order to overcome the above problems, Government of Tajikistan compiled the paper of “State Program on Transport Development for Tajikistan to 2025” in 2011, identified construction, rehabilitation and maintenance of arterial roads as main issue to be tackled, and defined enhancing the quality of the equipment and human resources as the first priority in the paper.

Taking into account the above situation, JICA implemented two projects to improve the ability of road maintenance in TAJIKISTAN, these are “The Project for Improvement for Road Maintenance in Khatlon District and Districts of Republican Subordination” in 2013, which provided road maintenance equipment and “Technical Cooperation for Project for Improvement of Capacity for Road Maintenance” for 2013-2016.

In Sughd and Eastern Khatlon regions that are the object regions of the Project, approximate 3.6 million people of Tajikistan are living and SETMs of both regions to which equipment for road maintenance will be supplied, cover 5,600 km road networks in total which are connecting

domestic regions with surrounding countries. The road networks play the important role in both international and domestic material flow, however, the unfavorable road condition caused by deterioration of roads and insufficient road maintenance works due to the lack of equipment for maintenance is an obstacle to the smooth material flow in the object regions and surrounding areas. Under these circumstances mentioned above, the Government of Tajikistan requested the Government of Japan to apply the Grant Aid for supply of equipment required for road maintenance, snow clearance and repair of damages caused by natural disaster.

This survey is carried out for checking the necessity and appropriateness of the contents of application, for compiling proper outline design as the project under grant aid scheme, for making project plan (deciding specification and quantities of equipment to be purchased) and operation & maintenance plan, and for estimating outline project cost.

The list of equipment requested by MOT is shown in Table 1.1-1.

Table 1.1-1 List of Equipment Requested by MOT

No.	Name of Equipment	Technical Specification	unit	Location		Total
				Sughd Region	Eastern Khatlon Region	
1	Asphalt Cutter	Max. Cutting Depth, 150mm	Unit	8	10	18
2	Vibration Compactor	Weight 60kg	Unit	8	10	18
3	Hand Breaker	Weight 7kg	Unit	8	10	18
4	Air Compressor	Air Delivery 5m ³ /min	Unit	8	10	18
5	Asphalt Sprayer	Asphalt Tank Capacity 350L	Unit	8	10	18
6	Road Maintenance Truck	With asphalt heating tank	Unit	3	3	6
7	Hand Guide Roller	Weight 600kg	Unit	8	10	18
8	Asphalt Finisher	Laying width 4.4m	Unit	1	1	2
9	Road Roller	Weight 9t	Unit	2	2	4
10	Tire Roller	Weight 8-12t	Unit	1	1	2
11	Water Tank Truck	Tank Capacity 8,000L	Unit	1	1	2
12	Motor Grader	Blade width 3.7m	Unit	3	10	13
13	Wheel Excavator	Bucket capacity 0.8m ³	Unit	3	10	13
14	Wheel Loader	Bucket capacity 2.5m ³	Unit	6	5	11
15	Dump Truck	Load capacity 14t	Unit	12	10	22
16	Asphalt Plant	Production Capacity 35t/h	Unit	1	1	2
17	Aggregate Plant	Production Capacity 35t/h	Unit	1	1	2
18	Multi-Purpose Vehicle	4WD	Unit	2	2	4
19	Snow Plough Attachment	-	Unit	2	2	4
20	Rotary Blower Attachment	-	Unit	2	2	4
21	Salt Spreader Attachment	-	Unit	2	2	4
22	Truck with Crane	Load capacity 5t	Unit	4	1	5
23	Mobile Workshop	4WD	Unit	1	1	2
24	Maintenance Equipment	-	Set	2	2	4

No.	Name of Equipment	Technical Specification	unit	Location		Total
				Sughd Region	Eastern Khatlon Region	
25	Pick up Truck	4WD, Diesel engine	Unit	2	2	4
26	Asphalt Distributor	Tank capacity 6000L	Unit	1	1	2
27	Truck Trailer	Load capacity 25t	Unit	1	1	2
28	Bulldozer	Weight 18t	Unit	2	2	4
29	Line Marker	-	Unit	1	1	2
Total						228

1.2 Natural Conditions

Tajikistan has 143,100 km² land area which corresponds to 40% of Japan land area, 8 million and 400 thousand people (WB in 2014) are living. Tajikistan is a land locked country located in Pamirs Central Asia, and 90% of its land is in the mountainous area. The trunk roads connecting capital city and big cities with neighboring countries fulfill a very important function in its economy and trade.

In the targeted areas, Sughd Region and Eastern Part of Khatlon Region, 2.4 million and 1.07 million people are living respectively and both areas belong to the continental climate. Very big temperature difference between day and night, and summer and winter can be observed. The maximum annual temperature difference will reach around 60°C. As for the precipitation in these areas, relatively little rainfall can be observed.

In Table 1.2-1 and 1.2-2, the temperature and precipitation of each Khujand (Sughd) and Kulyab (Eastern Khatlon) are shown.

Table 1.2-1 Temperature and Precipitation in Khujand

Climate data for Khujand													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	15.7 (60.3)	19.5 (67.1)	28.8 (83.8)	36.5 (97.7)	39.9 (103.8)	43.5 (110.3)	45.9 (114.6)	43.8 (110.8)	38.2 (100.8)	33.8 (92.8)	24.4 (75.9)	18.6 (65.5)	45.9 (114.6)
Average high °C (°F)	3.5 (38.3)	6.2 (43.2)	13.8 (56.8)	21.9 (71.4)	28.6 (83.5)	34.2 (93.6)	35.5 (95.9)	32.4 (90.3)	28.8 (83.8)	20.6 (69.1)	12.3 (54.1)	5.6 (42.1)	20.28 (68.51)
Daily mean °C (°F)	-0.4 (31.3)	2.2 (36)	8.2 (46.8)	15.7 (60.3)	21.7 (71.1)	26.8 (80.2)	28.7 (83.7)	26.4 (79.5)	20.9 (69.6)	13.6 (56.5)	6.6 (43.9)	1.5 (34.7)	14.33 (57.8)
Average low °C (°F)	-3.2 (26.2)	-1.8 (28.8)	4.2 (39.6)	10.7 (51.3)	15.5 (59.9)	19.6 (67.3)	21.2 (70.2)	18.8 (65.8)	13.6 (56.5)	8.1 (46.6)	3.4 (38.1)	-0.5 (31.1)	9.13 (48.45)
Record low °C (°F)	-22.8 (-9)	-22.2 (-8)	-13.6 (7.5)	-3.9 (25)	0.8 (33.4)	8.7 (47.7)	10.5 (50.9)	7.0 (44.6)	1.4 (34.5)	-6.8 (19.8)	-18.8 (-1.8)	-20.0 (-4)	-22.8 (-9)
Average precipitation mm (inches)	15.1 (0.594)	15.4 (0.606)	24.9 (0.98)	26.8 (1.055)	20.1 (0.791)	8.6 (0.339)	3.9 (0.154)	1.2 (0.047)	3.2 (0.126)	14.9 (0.587)	15.7 (0.618)	17.3 (0.681)	167.1 (6.578)
Average precipitation days	11.4	11.0	12.7	12.6	12.0	6.3	4.1	2.6	3.2	6.8	7.4	10.4	100.5
Average relative humidity (%)	77.8	75.4	64.0	56.3	48.7	34.8	33.8	38.4	43.3	55.4	75.2	76.4	56.63
Mean monthly sunshine hours	124.0	127.1	167.4	210.0	294.5	357.0	381.3	359.6	300.0	223.2	156.0	102.3	2,802.4
Source #1: World Meteorological Organisation (UN) ^[9]													
Source #2: climatebase.ru (temperature mean & extremes, humidity) ^[10]													

Table 1.2-2 Temperature and Precipitation in Kulyab

Climate data for Kulob													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily mean °C (°F)	2.2 (36)	4.8 (40.6)	10.4 (50.7)	16.9 (62.4)	21.2 (70.2)	26.0 (78.8)	28.3 (82.9)	26.6 (79.9)	21.8 (71.2)	16.2 (61.2)	10.0 (50)	5.0 (41)	15.8 (60.4)
Average precipitation mm (inches)	53.8 (2.118)	64.6 (2.543)	94.2 (3.709)	82.5 (3.248)	59.0 (2.323)	6.1 (0.24)	3.7 (0.146)	0.5 (0.02)	1.3 (0.051)	24.0 (0.945)	33.9 (1.335)	44.8 (1.764)	468.4 (18.441)
Average precipitation days (≥ 0.1 mm)	7.7	9.2	12.3	11.8	9.6	2.6	1.1	0.0	0.7	4.2	5.7	7.9	72.8
Average relative humidity (%)	75.5	72.2	68.0	63.6	55.0	39.1	34.0	35.1	38.4	49.4	62.4	71.8	55.4
Source: "The Climate of Kulob". Weatherbase. Retrieved 2 August 2014.													

1.3 Environmental and Social Impact

This project is equipment supply and is ranked as “C” in JICA environmental category.

Asphalt plants and aggregate plants will be included in the list of equipment supply. For these

plants installation, EIA (Environmental Impact Assessment) should be implemented by counterpart organization with accordance to the Laws of Tajikistan. Table 1.3-1 shows the procedural implementation order.

Table 1.3-1 Permission Procedures for Stone Quarry and Aggregate Plant

#	Procedures
1	MOT selects the proper location for Stone quarry and Crushing plant
2	MOT inquires and receives the consensus letter from the local governmental authority about planned location to be used for Stone quarry and Crushing plant.
3	MOT submits an application to Ministry of Energy and Industry (attached the consensus letter from the local governmental authority). Ministry of Energy and Industry checks the documents and sends back to MOT, and gives directions to inquire to orders to Committee for environmental protection and Geology and land resources agency.
4	MOT submits application documents to Committee for environmental protection and Geology and land resources agency. State Environmental Inspection under the Committee for environmental protection and Geology and land resources agency issue the conclusions and returns with documentations to MOT. ※State Environmental Inspection makes the report of EIA (Environmental Impact Assessment). Then, according to this report, Committee for environmental protection issues the conclusion. ※In case of grant projects, the cost of the report should be covered by the government of Tajikistan.
5	MOT submits conclusions form Committee for environmental protection and Geology and land resources agency to Ministry of Energy and Industry. Provided there is no problem, Ministry of Energy and Industry issues a license for plant installation.

(Based on the information in Aug., 2012 from, and reconfirmation in April, 2015 with, International Investment and Cooperation Department, MOT)

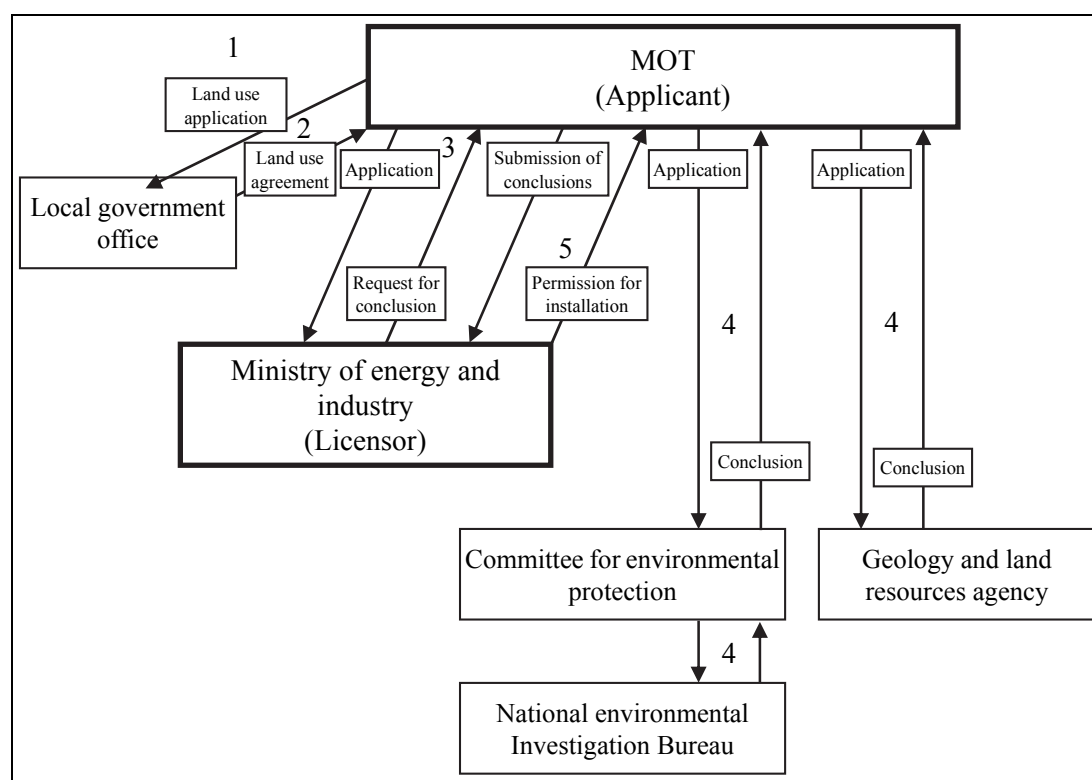


Figure 1.3-1 Flow of Permission Procedures for Plant Installation

It takes about one month for MOT to select the place, and to take permissions from Local government and Ministry of Energy and Industry (from 1 to 3). Another one month takes to acquire reports and conclusions from State Environmental Inspection and Geology and land resources agency. Lastly, one month takes for MOT to submit complete documentation and get the license from Ministry of Energy and Industry. In total it takes about 3 months.

In case of grant projects, government of Tajikistan should bear the issuance costs for conclusions.

Detailed data of plants (location map, specifications, etc.) will be needed when conclusions are acquired. The consultant provides plants' data to MOT immediately after the decision of supplier through bidding conducted by the consultant. Consultant supplies the engineering and technical advice if required.

Installation license for Asphalt Plant is also required. But procedure is much simpler compared to Stone quarry and Aggregate plant.

Chapter 2 Contents of Project

2.1 Basic Concept of the Project

In this project, the targeted offices and areas are composed of Sughd SETM located in northern side of Tajikistan and in Khujand City second largest city in the Tajikistan, 14 SEHMs under control of the Sughd SETM, Kulyab SETM located in south east of Dushanbe, 10 SEHMs under control of the Kulyab SETM, and the area covered by all these offices.

This project aims to increase the area of pothole repair and of asphalt overlay through procurement of the equipment required for the maintenance and implementation of initial training for equipment operation, to improve the durability of the road and to make the works more efficient in the snow clearance and de-icing, and finally to contribute for the efficiency improvement in the proper road maintenance and transportation.

2.2 Outline Design of the Japanese Assistance

2.2.1 Basic Policy

As mentioned previously, in this Project, road maintenance equipment is to be supplied and to be delivered to 24 SEHMs under the jurisdiction of Sughd and Kulyab SETMs.

Activities carried out in the road maintenance works can be classified as follows. Based on the activities the list of equipment to be supplied will be decided.

Table 2.2-1 The Types of Activities Implemented by SEHMs under SETMs

Activity	Detailed Description
Road repair and maintenance	Patching Crack sealing repair Overlay and pavement renewal
Snow cleaning and melting	Snow cleaning, removing ice, spreading salts and melting works
Disaster recovery	Removing rock falls and landslides, recovery of damaged roads
Back up	Transporting equipment, repair in workshops and at sites
Quality control	Design mix of asphalt pavement

As shown in Table 2.2-2 the total length of road under the jurisdiction of the subject SETMs is 5,569km and 1,568km, 28% of total length are International and/or National Road that play an important part for the inland and cross border physical distribution.

Table 2.2-2 Length of Road per SETM

Region	SETM	No. of SEHM	Road Length (km)				Total
			International	National	District	Sub Total	
District of Republican Subordination	Gissar	9	291.5	382.2	1,204.8	1,878.5	2,797.5
	Rasht	7	319.0	147.0	453.0	919.0	
Khatlon Region	Kurgan Tyube	13	427.7	321.2	1,999.2	2,748.1	5,080.8
	Kulyab	10	292.4	372.3	1,668.0	2,332.7	
Sughd Region	Sughd	14	533.3	370.1	2,333.3	3,236.7	3,236.7
Gormo-Badakhshan Autonomous Region	GBAR	9	1,291.5	383.5	1,015.0	2,690.0	2,690.0
Total	6	62				13,805.0	13,805.0

Number of equipment which each subject SETM owns is shown in Table 2.2-3 below. Number of equipment within 10 years after newly manufactured including the equipment supplied by EBRD fund in 2009 is ranging from 3-5. The equipment within 10 years is considered the fully workable equipment. Based on the workable equipment, the additional equipment is decided so as to set up maintenance unit in each SEHM.

Table 2.2-3 Number of Equipment Each SETM Owns

	Number of Equipment	Fully Workable Equipment
Sughd SETM (14 SEHMs)	187 units	45 units (3.2 units)
Kulyab SETM (10 SEHMs)	78 units	54 units (5.4 units)

() shows the average number of equipment each SEHM owns.

Notably, it is informed by ADB that ADB will supply following equipment shown in Table 2.2-4 to SETMs in Sughd region after completion of a road rehabilitation work which is being carried out in Sughd region and, therefore, the number of equipment supplied by ADB will be deducted from the required number of equipment supplied by this Project to SEHMs in Sughd Region.

Table 2.2-4 List of Equipment Supplied by ADB

No.	Description	Quantity
1	Front Loader, bucket capacity 3 m3	2
2	Bulldozer 160 KW / 220 HP, 20 t operating weight	2
3	Wheel Excavator 108 KW / 148 HP, bucket capacity 0,8 m3, operating weight 21 t	2
4	Motor Grader 120 KW / 165 HP, blade dimension of 3.9 to 4.3m	2
5	Vibroroller, 10 t static weight	2
6	Dual Drum Roller, 10 t, minimum power rating 200 Kw	2
7	Crane-manipulator	1
8	Dump Truck 20t 6x4 200 KW / 275 HP	4
9	Prime Mover and 60t Trailer	1 set
10	Snow Crab	4
11	Excavator – Loader, excavator bucket capacity 0,2 m3, Loader bucket capacity 1,0 m3	2
12	Mobile Weighing Machine for axle load control	2 set
13	Goudronator, Bitumen Sprayer, tank volume > 10 m3	1
14	Drilling Rig	1
15	Sand/Salt Distributor to be mounted to Position 8	4

Specification for each equipment will be properly decided based on the characteristic of each activity, the specification utilized in the previous equipment supply projects and findings in this study.

2.2.2 Natural Conditions

Natural conditions in Sughd Region and Eastern part of Khatlon region can be summarized as follows.

- i. Temperature range: -20°C ~ +40°C
- ii. Altitude: 400 ~ 2,500m
- iii. Annual Rainfall: 160mm (Sughd), 460mm (Eastern part of Khatlon)
- iv. Snowfall: 30 ~ 200cm

2.2.3 Environmental Protection Policy

As mentioned previously, this project is equipment supply and is ranked as “C” in JICA environmental category. No impact that affects natural and social environment is expected through the implementation of the Project.

Currently, Tajikistan aims to introduce Euro-2 standards for engine exhaust of construction equipment and vehicles but has not been put in statutory form. However Tajikistan has national standard for engine exhaust based on GOST52160 (Russian Standard) in 2003 and, therefore, Tajikistan standard will be applied for the equipment to be supplied in this Project. The comparison of permissible concentration of gases contained in engine exhaust among Euro 0 – Euro 6 and GOST52160 (2003) is shown in Table 2.2-5.

Table 2.2-5 Comparison of Emission Control

	EURO-0	EURO-1	EURO-2	EURO-3	EURO-4/5	EURO-6	GOST52160
Unit	g/kW·h	g/kW·h	g/kW·h	g/kW·h	g/kW·h	g/kW·h	g/kW·h
Carbon Monoxide	12.30	4.90	4.00	2.10	1.50	1.50	25.50
Carbon Hydride	2.60	1.23	1.10	0.66	0.46	0.46	8.20
Nitrogen Oxide	15.80	9.00	7.00	5.00	2.50	0.50	38.80
Particulate Matter	-	0.40	0.15	0.10	0.02	0.002	1.0
Diesel Smoke	-	-	-	0.8m-l	0.5m-l	-	5.1m-l

The fuel officially imported from Russia satisfies the EURO-3 standards, but the fuel containing impurities such as water and oil is still also selling in the market and its quality is in question. Therefore, the major equipment to be supplied should be equipped with fuel filters and water separators to protect engines from damages and to decrease exhaust gases to the atmosphere.

2.2.4 Policy on Operation and Maintenance

Each SEHM that equipment will be delivered to, has a sufficient capacity for the repair and maintenance on the Russian made equipment including engine, transmission, power-train and overhaul of hydraulic unit. As a lot of China made equipment was supplied by EBRD in 2009, each SEHM got a capability to repair and fix the China made equipment and, in recent years, he is outsourcing some repair works to private workshops in addition to fixing by himself.

Once this project is implemented, basic training including the initial operation guidance of the equipment supplied is to be carried out in the SETMs and SEHMs concerned in order to develop their self-sustainability.

In order to improve the machine availability of the equipment, preventive maintenance before the break down happening and prompt action for fixing once it happens are required, and, therefore, mobile workshop is to be procured.

2.2.5 Policy for Spare Parts

Spare parts procurement is to be carried out in the similar manner which was adopted in the Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination in 2012, namely spare parts are to be supplied focusing on the parts exchanged regularly during first 2 (two) years operation. Based on this policy, MOT can start to manage the spare-parts procurement by himself from 3rd year operation through the budget request in the 2nd year operation based on the actual result of spare-parts consumption in the first year operation.

Detailed supply schedule of the spare-parts is to be finalized through the data gathering from manufactures of the equipment.

2.2.6 Policy for Selection of Eligible Counties

Majority of equipment which is popular in Tajikistan is Japan made, China made and European made other than the equipment made in former Soviet Union. MOT owns a lot of China made equipment but he is not satisfied with its quality and performance, such as 1) bad work efficiency due to output shortage, 2) bad fuel consumption and 3) high frequency of breakdown. According to the past experiences through the Japan Grant Aid Scheme, MOT trusts the quality and performance of the Japan made equipment and desires the Japan made equipment to be supplied in this Project. On the other hand, however, MOT is willing to accept the equipment made in Euro countries because of the ease in spare-parts procurement and good after care maintenance.

Based on the above understandings, the selection of equipment in the procurement plan is to be carried out through focusing on the Japan made equipment, and, in case there is an equipment for which no Japanese manufacture is available or number of Japanese manufacture is limited, the equipment, which has equivalent quality and performance with Japan made equipment and has service network in Tajikistan, is to be procured from 3rd countries, mainly Euro countries.

Only 2 manufactures exist in Japan for the asphalt and aggregate plant but Japan made plants are to be selected as done in the Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination in 2012 considering their quality and performance. At this moment, prospective eligible countries from which equipment is to be procured are shown in the table below.

Table 2.2-6 List of Eligible Countries for Equipment Procurement

Type of Equipment	Eligible Country for Procurement
Hand Breaker	Japan
Air Compressor	Japan
Asphalt Sprayer	Japan
Hand Guide Roller	Japan
Asphalt Finisher	Japan, Germany, France
Road Roller	Japan
Tire Roller	Japan
Water Truck	Japan, Germany, France, Italia
Motor Grader	Japan Thailand, Brazil
Wheel Excavator	Japan, Germany, UK, France
Crawler Excavator	Japan
Wheel Loader	Japan
Dump Truck	Japan, Germany, France, Italia
Asphalt Plant	Japan
Aggregate Plant	Japan
Truck with Crane	Japan, Germany, France, Italia
Mobile Workshop	Japan, Germany, France, Italia
Pickup Truck	Japan, Thailand
Truck Trailer	Japan, Germany, France, Italia
Bulldozer	Japan, Thailand
Line Marker	Germany, Denmark
Asphalt Test Instrument	Japan

2.2.7 Basic Plan (Plan of Equipment Supply)

2.2.7.1 General Plan

(1) Road Repair and Maintenance

a. Pothole patching

- Asphalt cutting around the pothole → Break out and removal of asphalt → Cleaning → Prime coat coating → Place asphalt concrete → Compaction

Points to keep in mind: proper cutting around the pothole, cleaning after removal of asphalt and adequate compaction of asphalt concrete placed.

In Tajikistan, however, asphalt cutting by concrete breaker which is more simplified method than using cutting saw is commonly used because there are too many potholes to be patched.

In fact, MOT has not requested any cutting saw for asphalt and, therefore, no cutting saw is included in the equipment supply list.

b. Crack sealing

- Cleaning of crack surface → filling of the seal material (like straight asphalt) → covered with sand (curing)

Points to keep in mind: proper cleaning of crack surface, and adequate filling of seal material

c. Overlay and repaving

- Cleaning of the asphalt surface to be overlaid (or proper compaction of base course) → Prime coat coating → Placing asphalt concrete → Compaction

Points to keep in mind: Thickness control of the asphalt concrete placed, and adequate compaction on the paved surface

2 (two) asphalt sprayers to be utilized for the prime coat coating are arranged for each asphalt finisher in order to supply sufficient amount of prime coat even in the large scale overlay or repaving work.

During no overlay or repaving work, asphalt sprayer is to be employed in prime coat coating for pothole patching.

A road roller and a tire roller which are minimum required are to be arranged for each asphalt finisher.

d. Treatment of shoulder and road surface

- Bumpy surface of shoulder and road is leveled by motor grader through cutting and filling.

Points to keep in mind: Proper blade control of motor grader and adequate selection of motor grader with respect to the width of blade (more than 1 lane (3.5m)) and travelling performance

(2) Snow Clearance and Melting

Proper equipment selection depending on the snow coverage is required.

Snow coverage in the targeted area can be divided into 2 (two) categories, such as heavy coverage in the mountain area and light coverage in the plain area. Bulldozer is required for the snow clearance in the mountain area covered with heavy snow in addition to motor grader and, on the other hand, a set of motor grader and truck with snow plough is suitable for the snow clearance in the plain area.

In compliance with demand from MOT, bulldozers and motor graders which have high versatility are to be supplied instead of the multi-purpose vehicle which was supplied in the Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination in 2012. The snow melting agent (sand with salt) is to be spread out from dump truck by man power as before.

(3) Disaster Recovery

a. Removal of fallen rocks and landslide

- Removal and loading the fallen rocks and landslide → Hauling the material

Points to keep in mind: Rapid action is required in removal, loading and hauling, and at least 20 ton class bulldozer is required.

b. Recovery of fallen road

- Hauling filling material → Filling the material → Compaction → Surface pavement

Points to keep in mind: Rapid action in hauling and filling the backfill material, and adequate compaction is required.

(4) Back Up

a. Transportation of heavy equipment

- Loading the equipment → Transportation → Unloading

Points to keep in mind: Considering the weight and body size of equipment to be supplied, trailer which can load and transport the equipment safely. As the equipment to be transported, asphalt finisher, road roller, tire roller, and other crawler driven equipment are assumed.

b. Repair at site

- Move → Repair → Move

Points to keep in mind: Mobile workshop with sufficient tools and facilities required for fixing the small and medium scale breakdown of the equipment must be selected.

Mobile workshop which can be also utilized in workshop is to be supplied.

(5) Quality Control

a. Quality control of asphalt concrete

- Instruments for quality control of asphalt concrete

Points to keep in mind: Minimum necessity number of instruments required for routine quality control of asphalt concrete must be selected. The same lineup of instruments as

supplied in the JICA's Technical Assistance Project in 2014 is to be supplied because master trainers who are staff of MOT are cultivated in JICA's Technical Assistance Project in 2014 using the instruments. A laboratory hut is to be built in the asphalt plant area.

One set of instruments is supplied to Kurgan-Tube SETM in JICA's Technical Assistance Project in 2014 being currently in progress. As the distance between Kulyab SETM and Kurgan-Tube SETM is around 150km which is the distance within 1 day trip, the instruments in Kurgan-Tube can be used by Kulyab as well. Instruments for quality control of asphalt concrete, therefore, are not to be supplied to Kulyab SETM.

2.2.7.2 Setup of Equipment

List of equipment required for each activity described previous sub-section is shown below.

Table 2.2-7 Equipment Line Up for Each Activity

Activity	Work Description	Line up of Equipment
Road Repair 1	Pothole Patching	Hand Breaker, Air Compressor, Asphalt Sprayer, Hand Guide Roller, Vibration Compactor, Dump Truck, Truck with Crane
	Crack Sealing	Air Compressor, Asphalt Sprayer
Road Repair 2	Overlay or Re-pavement, and Leveling of shoulder and road surface	Asphalt Sprayer, Asphalt Finisher, Road Roller, Tire Roller Excavator, Wheel Loader, Motor Grader, Dump Truck Asphalt and Aggregate Plant
Snow Clearance and Melting	Snow Clearance	Motor Grader, Bulldozer, Excavator, Wheel Loader, Dump Truck
	Spreading of Snow Melting Agent	Wheel Loader, Dump Truck
Disaster Recovery	Removal of Fallen Rock and Landslide	Excavator, Wheel Loader, Bulldozer, Dump Truck
	Recovery of Fallen Road	Asphalt Sprayer, Asphalt Finisher, Road Roller, Tire Roller, Water Sprinkler Asphalt and Aggregate Plant
Backup	Transportation of Equipment and Workers	Truck with Crane, Trailer Truck, Pickup Truck
	Repair on Site	Mobile Workshop
Quality Control	Routine Quality Control of Asphalt Concrete	Test Instruments for Asphalt Concrete and Raw Material

2.2.7.3 Setup of Basic Specification of Each Equipment

Based on the design principle and the Standard Specification shown in the Standard Estimation Method for Pavement and Earth Work issued by Ministry of Land, Infrastructure, Transport and Tourism of Japan, the basic specification for equipment is set up. In the basic specification, popularization of the equipment in Tajikistan and the equipment supplied through past similar project are considered. The draft of basic specifications for equipment set up is shown in the

following table.

Table 2.2-8 Basic Specification (Draft)

Activity	Equipment	Target work	Basic Specification
		Selected Condition	
Road Repair 1	Hand Breaker	Crush asphalt General Spec.	Weight: 7kg or over
	Air Compressor	Supply Compressed Air to Hand Breaker Capacity to supply 2 hand breakers	Air Outlet Volume: 5.0m ³ or over
	Asphalt Sprayer	Spread Prime Coat, Tack Coat and Asphalt General Spec.	Tank Capacity: 200Lit or over
	Hand Guide Roller	Surface Compaction General Spec.	Weight: 600kg or over
	Vibration Plate	Surface Compaction (Small Area) General Spec.	Weight: 60kg or over
	Dump Truck	Transportation of Gravel, Aggregate and Asphalt Concrete General Spec., Capacity of Aggregate Plant	Mobile Load: 14ton or over
Road Repair 2	Asphalt Sprayer	Spread Prime Coat, Tack Coat and Asphalt General Spec.	Tank Capacity: 200Lit or over
	Asphalt Finisher	Spread and Compaction of Asphalt Concrete One Lane Width	Blade Width: 4.4m or over
	Road Roller	Surface Compaction General Spec.	Weight: 13ton or over
	Tire Roller	Surface Compaction General Spec.	Weight 12ton or over
	Excavator (Crawler and Wheel Type)	Gravel Collection and loading Popular Equipment	Bucket Capacity: 0.8m ³ or over
	Wheel Loader	Gravel Transportation Plant Capacity	Bucket Capacity: 2.5m ³ or over
	Motor Grader	Leveling Shoulder, Road Surface and Base Course General Spec., Width for 1 Lane	Blade Width: 3.7m or over
	Asphalt Plant	Production of Asphalt Concrete Minimum Necessity Production Rate 34.5t/h = 70m/h × 3.5m × 6cm × 2.35t/m ³	Production Capacity: 35ton/h
	Aggregate Plant	Production of Aggregate Equivalent to Asphalt Plant	Production Capacity: 35ton/h, Washing Device Attached ^(Note 1)

Activity	Equipment	Target work	Basic Specification
		Selected Condition	
Snow Clearance	Motor Grader	Removal of Ice	Blade Width: 3.7m or over
		Dual purpose with Road Repair	
	Bulldozer	Removal of Heavy Snow	Weight: 18ton or over
		General Spec.	
Disaster Recovery	Excavator (Crawler and Wheel)	Loading of Fallen Rock and Landslide	Bucket Capacity: 0.8m ³ or over
		Dual Purpose with Road Repair	
	Wheel Loader	Loading of Fallen Rock and Landslide	Bucket Capacity: 2.5m ³ or over
		Dual Purpose with Road Repair	
	Bulldozer	Removal of Fallen Rock and Landslide	Weight: 18ton or over
		Dual Purpose with Snow Clearance	
	Dump Truck	Transport. of Fallen Rock and Landslide	Mobile Load: 14ton or over
		Dual Purpose with Road Repair	
	Equipment for Pavement	——Same as road repair 2——	
Backup	Truck with Crane	Transportation of Equip. For Pothole Repair	Mobile road 5ton, with 3ton Crane or over
		Weight of Pothole Equip. 3ton	
	Truck Trailer	Transport of Heavy. Equipment	Mobile Load: 25.0ton or over, Low Floor or over
		Max Heavy Equipment : 21ton	
	Mobile Workshop	Repair on Site	Mobile Load 8ton or more, Aluminum Board, Repair Instrument, Tools, Crane
		Equipped with necessary facilities	
	Pickup Truck	Transport of Workers and Material	Mobile Load 900kg, 4WD, Dual Cabin
		General Spec.	
Quality Control	Test Instruments for Asphalt and raw Material	Minimum Necessity for Test	Core-drill, Asphalt Compaction Instru. Marshall Test, Constant Temperature Oven, Sieve for Grain Size Analysis, Electronic Balance, Dryer, Laboratory
		General Spec.	

(Note 1) In the plant alongside river, washed aggregate are normally used for asphalt concrete mix and MOT requires to install a washing facility with aggregate plant. In the Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination in 2012, the water washing facility was additionally supplied to aggregate plant.

The aggregate plant in Kulyab SETM is to have a water washing facility because of its river side location and sufficient water supply. As the re-use of washing water is not required, washing water can be directly drained to the river without usage of coagulant agent which may cause environmental trouble. Since the candidate area for aggregate plant in Sughd, however, locates in the mountain area where it is very difficult to secure a sufficient water supply, water washing facility is not to be installed due to the following un-economic reasons.

1. As 100 ton water is require for washing aggregate an hour, an amount of 800 m³ which is require for 1 day operation must be stored at the plant in mountain or hillside area. 2. Further, a sediment pond, coagulant agent, removal of deposited material approx. 35 ton per day in the pond and supply of washing water approx. 350 ton per day are required to operate the water re-cycling system.

Even in Japan it is difficult to find aggregate plant having water washing facility in the mountain area.

2.2.7.4 Quantity of the Equipment

(1) Road Repair Works 1 (Patching, Crack Sealing)

SEHM directly maintains the road under its responsibility. Sughd SETM controls 14 SEHMs and Kulyab SETM controls 10 SEHMs. Currently all SEHMs implements patching and crack sealing works by 2-3 work teams. But all the works are performed manually mainly, because of lack of equipment. Moreover, asphalt mixture is prepared in the SEHM yards using cold asphalt. The quality of the materials and the works are poor, and the repaired sites do not last for long.

Currently, in both SETMs, the procedure of cutting road surface by asphalt cutter which is the first procedure for pothole repair is omitted because of too many potholes to be repaired but the surface around potholes are cut by hand breakers. After the cutting, filling the cold mix asphalt and compaction are conducted. There is the case that the prime coat is omitted. Considering the actual situation, therefore, asphalt cutter is not included in the list of equipment to be supplied. In order to shorten the procedure of surface cutting by hand breaker which is the critical activity in the pothole patching, 2 hand breakers are to be allocated for 1 compressor.

(Allocation plan)

Sughd SETM: The equipment shall be allocated to 12 of 14 SEHMs. K.Mastcha SEHM and Shahrstan SEHM is excluded as these SEHMs maintain roads in mountainous region and have short paved roads.

Kulyab SETM: The equipment shall be allocated to 8 of 10 SEHMs. Baljuvan SEHM and Shurabad SEHM is excluded as these SEHMs maintain roads in mountainous region and have short paved roads.

**Table 2.2-9 Required Quantity of Equipment for Road Repair Works 1
(Patching, Crack Sealing)**

Name of Equipment	Technical Specifications	Quantity	
		Sughd SETM	Kulyab SETM
Vibration compactor	Weight 60kg or over	12	8
Hand Breaker	Weight 7kg or over	24	16
Air Compressor	Air blow capacity 5m ³ /min. or over	12	8
Hand Guided Roller	Class: Weight 600kg or over	12	8
Asphalt Sprayer	Class: Tank capacity 200L or over	12	8

Allocation plan is proposed as following.

Sughd SETM:

Asht SEHM , Gafurov SEHM , Mastcha SEHM, Isfara SEHM, Kanibadam SEHM, Rasulov SEHM, Spitamen SEHM, Zafarabad SEHM, Istaravshan SEHM, Ganchi SEHM, Ayni SEHM, Pendzhikent SEHM

Kulyab SETM:

Dangara SEHM, Kulyab SEHM, Vose SEHM, Hamadoni SEHM, Farhar SEHM, Temurmali SEHM, Muminabad SEHM, Hovaling SEHM

(2) Road Repair Works 2 (Overlay and Pavement Renewal, Shoulder and Surface Leveling)

1) Equipment related to Asphalt Plant

a. Asphalt Plant and Aggregate Plant

Asphalt mixture should be delivered to the site at a temperature of higher than 130°C. Taking into account temperature conditions, it is possible to transport to 100km (max. 150km) in summer time.

Each SETM has carried out the very limited procurement of the hot mix asphalt concrete from private plants because of the expensive of the procurement cost, lower priority of the order to MOT than to private company and minimum limit of quantity of order and, therefore, it desires to own an asphalt plant by itself.

It is appropriate to install by one plant to each SETM. Crushing plant is basically bind to Asphalt Plant, therefore it should also be provided and installed to each SETM. (Location of plant installation sites will be discuss below)

Each SETM expects to carry out 10km¹ length of overlay or repaving of asphalt surface per year as the road repair works. Assuming that width of road 3.5m x 2lanes = 7.0m, average thickness of pavement 6cm, annual pavement distance 10km, 10% material loss and density of asphalt concrete 2.35, the asphalt plant production capacity should be as follow:

Annual Production capacity: $7.0m \times 0.06m \times 10,000m \times 1.1 \times 2.35 = 10,857 \text{ t/ year}$

Asphalt Plant daily operation is 5 hours, number of operation days in a year 7 months * 15 days = 105 days/year. Therefore hourly Production capacity of the plant should be as follow.

Required production capacity (for pavement renewal): $10,857t/yr \div (105 \text{ days} \times 5h/day) = 20.7t/h$

Volume of cold asphalt mixture used for patching works in Sughd is around 10,000 ton (more than Kulyab). Assuming that the half of the volume is produced in the plant, production capacity required for patching works will be as follow.

Required Production capacity (for Patching): $5,000 \text{ t/yr} \div (105days \times 5h/day) = 9.5t/h$

Therefore, required hourly Production capacity of Asphalt Plant: $20.7t/h + 9.5 \text{ t/h} = 30.2t/h$

From above, the asphalt plant with the production capacity of 35t/h is to be selected from common specification for products.

As crushing plant supplies materials to Asphalt Plan, to road base and to concrete mixing plant,

¹ According to the hearing results to SEHMs, Sughd SETM implements 8.4km of pavement work, Kulyab SETM implements 7km of pavement work. Survey team assumes, SETM will implement up to 10 km of pavement work each year.

it is common to design the crushing plant capacity with 1.5 times of the asphalt plant. In this project, working hours of Crushing plant is set as 1.5 (= 7.5 h/day), therefore production capacity of crushing plant should be the same as the asphalt plant, which is 35 t/h.

b. Dump truck

Required quantity of dump trucks needed for transportation of asphalt mixture to pavement site is calculated as following:

Asphalt mixture loading time: about 20 min (including waiting time)

Round trip time: about 60 min (= (averaged travel distance 50km/ average speed 50km/h) * 60 min)

Asphalt supply to finisher: 15 min

Total of loading to delivery time: 95 min

Hourly transportation capacity of Dump Truck: $(60\text{min./h} \div 95\text{min.}) \times \text{mobile load } 10\text{t/truck} = 6.3 \text{ t/(h*truck)}$

Pavement speed of Asphalt Finisher: 70m/h

$70\text{m/h} \times \text{pavement thickness } 0.06\text{m} \times \text{pavement width } 3.5\text{m} \times \text{mixture density } 2.35 \text{ t/m}^3 = 34.5 \text{ t/h}$

Therefore, required quantity of Dump Trucks is, $34.5\text{t/h} \div 6.3 \text{ t/(h*truck)} = 5.46 \text{ truck} \approx 6 \text{ truck}$

If we assume that transportation distance of the asphalt mixture is 100km, 16 trucks would be needed to cope with the same scope of works.

2 dump trucks are allocated for transportation of gravel in the aggregate plants only. Other trucks are to be allocated to SEHMs respectively and, therefore, these trucks allocated to SEHMs have to be shared with each other when asphalt pavement works are carried out.

c. Locations for Plants installation

After the discussions with MOT, Locations for Plants installation selected as follow.

Table 2.2-10 Installation Sites for Asphalt Plant and Aggregate Plant

SETM	Installation sites for Asphalt Plant and Aggregate Plant	Installation Site Condition
Sughd	Sughd region, Gafurov district, Dehmoy village (3.9km from the village)	New site (hilly area)
Kulyab	Khatlon region, Vose district, Kaftarhona village, along Yakhsu river (0.4km from village)	New site (farmland)

There will be new installation sites for both SETMS. Land is owned by the government of Tajikistan and regulated by the local government (province). Both of the local governors already agreed to the usage of land for plant, and promised to complete the formalities of installation of plant and leveling work of the site by the time of plant installation. The distance between proposed plant side and private houses is 3.9km in Sughd region and there is no

problem. The distance between proposed plant side and private houses is 400m in Kulyab region, existing Chinese Aggregate Plant is not causing any problems, and it is considered that there will be no problems for the plant from this project also.

After the approval of the local governor, it takes about one month for MOT to select the site, and to take permissions from Local government and Ministry of Energy and Industry. Another one month takes to acquire reports and conclusions from State Environmental Inspection and Geology and land resources agency. Lastly, one month takes for MOT to submit complete documentation and get the license from Ministry of Energy and Industry. In total it takes about 3 months.

2) Dump truck

Each SETM procured 2 units after 2005, Dump Truck was not included in EBRD equipment procurement project. For this reason every SEHMs pay the highest priority for the Dump Truck. Dump Truck is the mostly rented equipment from the private sector. Taking into account the current situation, Dump truck should be allocated to all SEHMs.

Table 2.2-11 Allocation Plan for Dump Trucks

	Sughd SETM	Kulyab SETM
Required quantity (SEHM)	14 units	10 units
Quantities provided by ADB Project (decreasing units)	4 units	0 unit
Quantities to be procured by this project	10 units	10 units
Allocation plan for plants' needs	2 units	2 units
Allocation plan (for SEHMs)	8 units	8 units

Allocation plan is proposed as following.

Sughd SETM: Asht SEHM , Mastcha SEHM, Isfara SEHM, Kanibadam SEHM, Spitamen SEHM, Zafarabad SEHM, Istaravshan SEHM, Ganchi SEHM
(Equipment will be provided by ADB project to: Shahrstan SEHM, K.Mastcha SEHM, Ayni SEHM, Pendzhikent SEHM. Further, Gafurov SEHM, Rasulov SEHM are near to the plant site. These SEHM should also use dump trucks allocated to the plant.)

Kulyab SETM: Dangara SEHM, Baljuvan SEHM, Hamadoni SEHM, Farhar SEHM, Temurmali SEHM, Muminabad SEHM, Hovaling SEHM, Shurabad SEHM
(Kulyab SEHM, Vose SEHM are near to the plant site. These SEHM should also use dump trucks allocated to the plant.)

3) Motor Grader

Two Motor Graders should be provided for the SEHMs in mountainous areas for snow clearance works and to repair gravel roads. And one Motor Grader should be provided for SEHMs in plane areas. Final proposed quantities for allocation are as following.

Table 2.2-12 Allocation Plan for Motor Grader

	Sughd SETM	Kulyab SETM
Required quantity	20 units	16 units
Quantity of existing and operating equipment	13 units	9 units
Quantity of additionally required equipment	7 units	7 units
Quantities provided by ADB Project (decreasing units)	2 units	0 unit
Quantities to be procured by this project	5 units	7 units

Allocation plan is proposed as following SEHMs.

Sughd SETM: Gafurov SEHM, Ganchi SEHM, Shahrستان SEHM, K.Mastcha SEHM, Pendzhikent SEHM
(Equipment will be provided by ADB project to: K.Mastcha SEHM, Ayni SEHM)

Kulyab SETM: Baljuvan SEHM, Temurmali SEHM (2), Muminabad SEHM, Hovaling SEHM, Shurabad SEHM (2)

4) Road roller, Tire roller

Road roller, Tire roller will be allocated to each SETM by one unit to meet minimum demand. ADB project is planning to provide two Road rollers, Tire rollers for western port of Sughd SETM, however, these site is far from plant site. MOT's request in mind, each one unit of Road roller and Tire roller is to be allocated in Sughd SETM.

5) Wheel Excavator

Wheel Excavator and Wheel Loader are both needed as mobile loading equipment. It planned to allocate two units for each SEHM in total.

There commonly short road distances under Sughd SETM management. One unit will be allocated to Mastcha SEHM, Spitamen SEHM, Zafarabad SEHM, Ganchi SEHM, Shahrستان SEHM, K.Mastcha SEHM.

Loading equipment was strongly requested for Kulyab SETM to cope with frequent natural disasters and long road distances. Total 3 units will be allocated to Dangara SEHM and Hovaling SEHM.

Table 2.2-13 Allocation Plan for Wheel Excavators

	Sughd SETM	Kulyab SETM
Required quantity	3 units	5 units
Quantity of existing and operating equipment	0 unit	2 units
Quantity of additionally required equipment	3 units	3 units
Quantities provided by ADB Project (decreasing units)	2 units	0 unit
Quantities to be procured by this project	1 unit	3 units

Allocation plan is proposed as following SEHMs.

Sughd SETM: Gafurov SEHM,

(Equipment to be provided by ADB project: Kanibadam SEHM, Pendzhikent SEHM)

Kulyab SETM: Dangara SEHM, Farhar SEHM, Hovaling SEHM

6) Crawler Excavator

Crawler Excavator will be allocated to each SETM by one unit to operate in Aggregate Plant and stone pit site.

7) Wheel Loader

Together with Wheel Excavator, allocation should be as following.

Table 2.2-14 Allocation Plan for Wheel Loader

	Sughd SETM	Kulyab SETM
Required quantity	19 units	16 units
Quantity of existing and operating equipment	11 units	9 units
Quantity of additionally required equipment	8 units	7 units
Quantities provided by ADB Project (decreasing units)	2 units	0 unit
Quantities to be procured by this project	6 units	7 units

Allocation plan is proposed as following.

Sughd SETM: Asht SEHM , Mastcha SEHM, Kanibadam SEHM, Rasulov SEHM, Spitamen SEHM, Zafarabad SEHM

(Equipment will be provided by ADB project to: Istaravshan SEHM, Ganchi SEHM)

Kulyab SETM: Kulyab SEHM, Baljuvan SEHM, Vose SEHM, Farhar SEHM, Temurmalik SEHM, Muminabad SEHM, Hovaling SEHM

**Table 2.2-15 Required Quantity of Equipment for Road Repair Works #2
(Overlay and Pavement Renewal, Leveling the Road Shoulders and Surface)**

Name of Equipment	Technical Specifications	Sughd SETM	Kulyab SETM
Asphalt Sprayer	Class: Tank capacity 200L	12	8
Asphalt Finisher	Class: Paving width 4,4m	1	1
Road Roller	Class: Weight 13t	1	1
Tire Roller	Class: Weight 12t	1	1
Motor Grader	Class: Blade width 3,7m	5	7
Wheel Excavator	Class: Bucket capacity 0,8m ³	1	3
Crawler Excavator	Class: Bucket capacity 0,8m ³	1	1
Wheel Loader	Class: Bucket capacity 2,5m ³	6	7
Dump Truck	Class: Loading weight 14t	10	10
Asphalt Plant	Class: Production capacity 35t/h	1	1
Aggregate Plant	Class: Production capacity 35t/h	1	1

(3) Snow Clearance and Removing Works

1) Motor Grader

All SEHM maintain roads at the mountainous area, and snow cleaning is the big issue for each SEHM. Motor grader will be allocated to high priority SEHMs, and quantities will be distributed as shown above.

2) Bulldozer

Bulldozers will be allocated to 3 SEHM, where snow falls by a huge volume.

Table 2.2-16 Allocation Plan for Bulldozers

	Sughd SETM	Kulyab SETM
Required quantity	3 units	2 units
Quantity of existing and operating equipment	0 unit	0 unit
Quantity of additionally required equipment	3 units	2 units
Quantities provided by ADB Project (decreasing units)	2 units	0 unit
Quantities to be procured by this project	1 unit	2 units

Allocation plan will be as follow.

Sughd SETM: K. Mastcha SEHM

(Equipment will be provided by ADB project to: Shahrستان SEHM, Ayni SEHM)

Kulyab SEHM: Dangara SEHM, Hovaling SEHM, Shurabad SEHM

(4) Disaster Recovery Works

There are disaster areas caused by snow and rains in both SETM. SEHMs possess very old equipment and will become nonfunctional in few years. These cause the difficulties for smooth operations during the disaster recovery works. In addition to the existing equipment, disaster recovery potential will be increased by the equipment procured by this project. The equipment basically will be allocated to Asphalt Plant or SEHMs. During emergency situations, the equipment allocated to Asphalt Plant or SEHMs will be used in priority. The equipment quantities were not defined for disaster recovery works.

(5) Back-up Works

1) Truck with crane

One unit should be delivered for each SETM. Truck with crane will be used for transportation small sized equipment used in Road repair works 1. such Patching and Crack sealing. It can also be used for transporting water, crushed stone or other materials.

Table 2.2-17 Quantity of Trucks with Crane

	Sughd SETM	Kulyab SETM
Quantities to be procured by this project	12 units	8 units

Allocation plan is same as Table 2.2-9.

2) Truck trailer

Pavement work equipment will be transported all over SETM regions. Some pavement work equipment such as Asphalt finisher, Road Roller, Tire Roller and others, are unable to run for long distance. One truck trailer for each SETM should be allocated for transportation of such equipment. Truck trailer will also transport Excavators and Wheel Loaders during snow clearance and disaster recovery works.

Though one Truck trailer is to be procured by ADB project for Sughd region, considering the practical situation that the trailer supplied by ADB will be located far from Khujand, one trailer is to be provided to each SETM.

3) Mobile workshop

Existing Maintenance Equipment of SEHMs are mainly hand tools, which are enough for daily maintenance. Equipment are transported back to SEHM's yard, when small or bigger repairs needed, or repaired by service shops. Mobile Workshop should be allocated to SETM, which will run around all SEHMs for equipment maintenance, small repairs at sites, bring machine parts/component to workshops for repairs, and other multiple functions. One unit should be allocated for each SETMs.

4) Pickup truck

Two pickups should be allocated to each SETM to transport workers, materials and equipment.

(6) Asphalt Test Equipment

Basically, quality test equipment allocated at the plant site. But, Kulyab SETM is able to use laboratory equipment of Kurgan-Tube SETM, which is located not far from both SETMs. As for Sughd SETM, it is located in Northern Tajikistan. One set of test equipment will be provided at the Asphalt Plant site of Sughd SETM.

2.2.7.5 Procurement Plan (Survey Team's Proposal)

Based on above policy, quantities and technical specifications of the equipment for each type of works (as a Survey Team's Proposal) summarized as follows.

Table 2.2-18 The List of Equipment

No	Name of Equipment	Specification	Sughd SETM	Kulyab SETM	Total
1	Vibration compactor	Weight 60kg or over	12	8	20
2	Hand Breaker	Weight 7kg or over	24	16	40
3	Air Compressor	Air blow capacity 5m ³ /min. or over	12	8	20
4	Asphalt Sprayer	Tank capacity 350L or over	2	2	4
5	Hand Guided Roller	Weight 600kg or over	12	8	20
6	Asphalt Finisher	Paving width 4.4m or over	1	1	2
7	Road Roller	Weight 13t or over	0	1	1
8	Tire Roller	Weight 12t or over	0	1	1
9	Water Tank Truck	Tank capacity 8000L or over	1	1	2
10	Motor Grader	Blade width 3.7m or over	5	7	12
11	Wheel Excavator	Bucket capacity 0.8m ³ or over	1	3	4
12	Crawler Excavator	Bucket capacity 0.8m ³ or over	1	1	2
13	Wheel Loader	Bucket capacity 2.5m ³ or over	6	8	14
14	Dump Truck	Loading weight 14t or over	10	10	20
15	Asphalt Plant	Production capacity 35t/h	1	1	2
16	Aggregate Plant	Production capacity 35t/h	1	1	2
17	Truck with Crane	Loading weight 5 ton, with 3 ton crane	12	8	20
18	Mobile Workshop Van	6x4, load 5 ton class, aluminum box, with crane, repair tools and maintenance	1	1	2
19	Pickup Truck	Double cab, 4x4	2	2	4
20	Truck Trailer	Loading weight 25 ton, low bedded	0	1	1
21	Bulldozer	18t or over	1	3	4
22	Line Marker	One crew type	1	1	2
23	Asphalt Test Equipment	Test equipment for asphalt material and gravel	1	0	1
	Total		107	93	200

2.2.7.6 Procurement Plan (Finally Agreed)

When the Survey Team showed their proposal to MOT at Dushanbe during the second survey trip in November, 2015, Tajikistan side made request in change of number and specifications of some equipment, and for additional equipment. Based on the request, both parties discussed and negotiated in a serious manner. Finally, Survey Team prepared and proposed the following list of equipment taking into account the request from Tajikistan side and the constraint of the estimated budget of Japan side and Tajikistan side agreed the proposal.

Table 2.2-19 The List of Equipment

No	Name of Equipment	Specification	Sughd SETM	Kulyab SETM	Total
1	Vibration compactor	Weight 60kg or over	12	8	20
2	Hand Breaker	Weight 7kg or over	24	16	40
3	Air Compressor	Air blow capacity 5m ³ /min. or over	12	8	20
4	Asphalt Sprayer	Class: Tank capacity 200L or over	12	8	20
5	Hand Guided Roller	Class: Weight 600kg or over	12	8	20
6	Asphalt Finisher	Class: Paving width 4.4m or over	1	1	2
7	Road Roller	Class: Weight 13t or over	1	1	2
8	Tire Roller	Class: Weight 12t or over	1	1	2
NA	Water Tank Truck	Class: Tank capacity 8000L or over	0	0	0
9	Motor Grader	Class: Blade width 3.7m or over	5	7	12
10	Wheel Excavator	Class: Bucket capacity 0.8m ³ or over	1	3	4
11	Crawler Excavator	Class: Bucket capacity 0.8m ³ or over	1	1	2
12	Wheel Loader	Class: Bucket capacity 2.5m ³ or over	6	7	13
13	Dump Truck	Class: Loading weight 14t or over	10	10	20
14	Asphalt Plant	Class: Production capacity 35t/h	1	1	2
15	Aggregate Plant	Class: Production capacity 35t/h	1	1	2
16	Truck with Crane	Loading weight 5 ton, with 3 ton crane	12	8	20
17	Mobile Workshop Van	6x4, load 5 ton class, aluminum box, with crane, repair tools and maintenance	1	1	2
18	Pickup Truck	Double cab, 4x4	2	2	4
19	Truck Trailer	Loading weight 25 ton, low bedded	1	1	2
20	Bulldozer	18t or over	1	2	3
21	Line Marker	One crew type	1	1	2
22	Asphalt Test Equipment	Test equipment for asphalt material and gravel	1	0	1
Total			119	96	215

*As the water tank truck is omitted from the list of equipment procured at the final discussion, no equipment number (#) is given.

2.2.7.7 Spare Parts Supply Plan

Periodical maintenance parts and wearing parts will be supplied for starting periods of operations. The set of parts should be supplied enough for 2 years usage, which is 3000 hours for construction machinery and 60,000km run for vehicles.

Table 2.2-20 Spare Parts

Items		Quantity
Periodical maintenance parts	Fuel filter	Parts quantity differs depending on equipment type and manufactures. The quantity considered in reference to technical specifications from manufactures.
	Air filter	
	Engine Oil Filter	
	Circulating Oil Filter	
Tear and Wear Parts	Bucket teeth	
	Cutting edge	
	Brake shoes	
	V-belt	
Others	Head lamps	
	Brake lamps	
	Huse	
	Oil pressure hose	
	Other manufacture's recommended parts	

2.2.8 Procurement Plan

2.2.8.1 Procurement Policy

(1) Project Implementation Organization

In case, the project should be implemented under Japanese Grant Aid Scheme, following figure shows the relationship between both country parts.

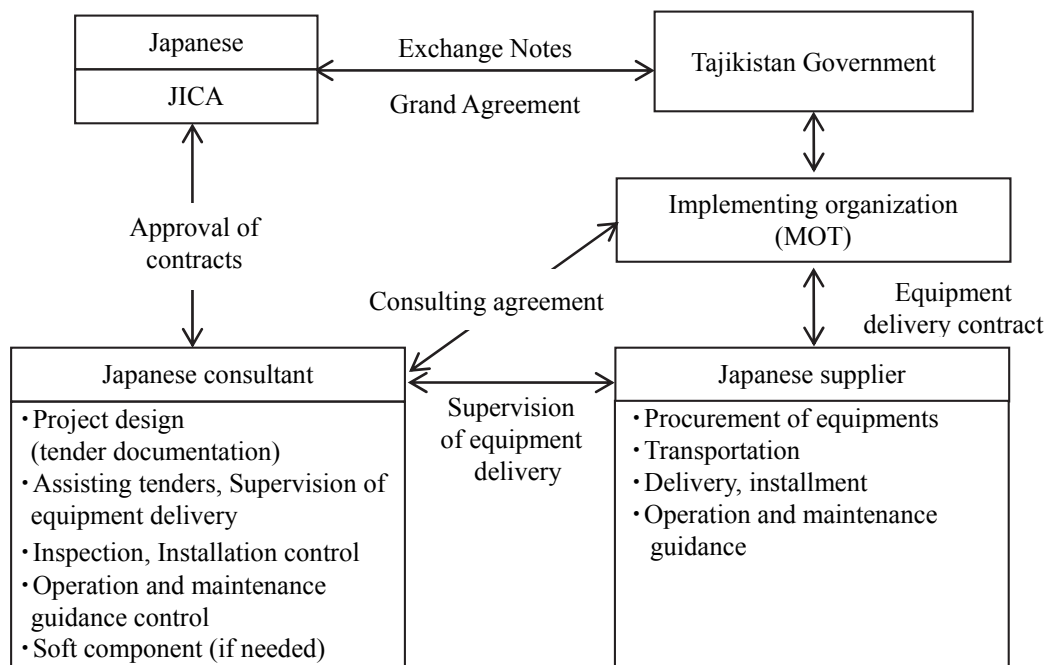


Figure 2.2-1 Project Implementation Scheme

MOT is project implementing organization from Tajikistan side. Following the rules of Japanese Grant Aid, Japanese consultant should be responsible for project design and delivery supervision.

Equipment should also be delivered by Japanese supplier.

(2) Consultant Company

After the signature of E/N and G/A, MOT should contract with Japanese consultant as soon as possible (Consulting Agreement). Contracted consultant will provide engineering services, like project design, preparation tender documentations, organizing tenders, supply supervision etc. The consultant will be in charge of the project until the delivery completion.

(3) Equipment Supplier

Only qualified bidders, satisfying the quality and technical specification requirements, may participate in the tender. MOT will contract with successful bidder for the supply of equipment under the project.

2.2.8.2 Implementation Conditions

Supplied equipment will be transported by sea to Russian Nahotka port and Lianyungang port of China. Transportation will continue by railways passing Russia and Uzbekistan, with destination to Khujand city and Dushanbe city. Customs clearance will be performed at Dushanbe city. After the custom clearance, transportation will continue within the country, and delivered to following destinations.

All equipment, except plants, will be delivered to MOT warehouse in Khujand city and Kulyab city.

Candidate locations for A/P and C/P are shown in the table below.

SETM	Installation sites for Asphalt Plant and Aggregate Plant
Sughd	Sughd region, Gafurov district, Dehmoy village (3.9km from the village)
Kulyab	Khatlon region, Vose district, Kaftarhona village, along Yakhsu river (0.4km from village)

Supplier will check operations of all equipment after the equipment will be delivered to the defined warehouse. After testing all equipment for proper operation, supplier will transfer the equipment to the counterpart. Moreover, after the transfer, supplier should implement operation guidance and maintenance guidance as soon as possible.

Proposed allocations of the equipment will be 24 SEHMs in two SETMs regions. Further final allocations should be decided by the implementing organization.

2.2.8.3 Scope of Works

Japan side will cover all expanses related to transportation, loading and unloading supplied equipment till delivery destination. All customs clearance procedures should be performed by

Tajikistan side. Table 2.2-21 shows responsibilities of both sides to burden expenses.

Moreover, followings are responsibilities of both sides for Asphalt Plant and Crushing plant installation.

- i. Tajikistan side should be responsible for securing land space for plant installation, cleaning the area, provide electricity, water supply and drainage.
- ii. Japan side should provide foundation and installation works.
- iii. Tajikistan side should remove existing facilities and building that might disturb the installation works.

Following documents will be prepared by Japan side and presented to Tajikistan side.

- i. Plant installation plan, foundation drawings
- ii. Scheme of water supply and drainage
- iii. Required electric power

Table 2.2-21 Expense Burdens of Both Sides

Items	Contents	Burdening side		Notes
		Japan	Tajikistan	
Equipment delivery	Equipment delivery	○		To the custom clearance zone Freeing from customs duty After customs' zone Transport to installation sites
	Sea and land transportation	○		
	Custom clearance		○	
	Transportation within the country	○		
	End user delivery		○	
	Operation guidance	○		
	Daily maintenance guidance	○		
	Warehouse space		○	
	Maintenance works		○	
Plant installation	Securing land, cleaning the territory		○	
	Foundation works	○		
	Installation	○		
	Water supply and drainage		○	
	Primary Electric power supply		○	

2.2.8.4 Consultant Supervision Plan

(1) Basic Principles

After the signing E/N and G/A, Japanese consulting company will contract with Tajikistan Government for consulting services. The scope of works will be defined in the framework of Japan Grant Aid. The consultant will be responsible for delivery supervision. It is very important for the consultant clearly understand the project backgrounds, basic design principles and preconditions in preparing cooperation contents.

(2) Scope of Work

The main contents of delivery supervision are as follow.

- i. Kick off meeting, checking local condition
- ii. Review of technical specifications
- iii. Preparation of tender documents
- iv. Explanation and approval of tender documents
- v. Assisting tender procedures (public note, documents' distribution, results' evaluation)
- vi. Assisting contracts (contract negotiations, contract approval procedures)
- vii. Checking equipment production orders
- viii. Plant and pre-shipment inspections
- ix. Pre-shipment inspections (by third independent party)
- x. Confirmation meeting at sites (delivery, installation schedule, custom clearance, outline of startup operation)
- xi. Installation supervision
- xii. Inspection, transfer
- xiii. Operation guidance, daily maintenance guidance
- xiv. Preparing certificate of completion

2.2.8.5 Quality Control Plan

Following inspections should be implemented in each stages of suppliers work to ensure the proper quality and technical specifications according to the supply contract.

- i. Checking production order list issued by supplier
- ii. Plant inspection and pre-shipment inspection at the plant of the equipment manufactures
- iii. Pre-shipment inspection
- iv. Inspection during plant installations
- v. Inspection during transferring the equipment to counterparts

2.2.8.6 Equipment Procurement Plan

(1) Eligible Source Countries

Please refer the sub section “2.2.6 Policy for Selection of Eligible Counties”.

(2) Transportation Route

As described in the sub section 2.2.8.2. most of equipment will be transported to the designated place by train through Russia.

Some equipment may be procured from European countries. In that case, Siberian railway should be the proper route of transportation to Tajikistan.

(3) Production and Delivery Period

All equipment are produced after the supplier's orders were placed. Equipment manufactures were surveyed to calculate the time needed from placing the order to production, pre-shipment inspection and delivery. Assuming there are no special preconditions for production time to be delayed, followings are the production time required for equipment manufactures.

Table 2.2-22 Delivery Periods for Different Equipment

Name of Equipment	Delivery Period
Small size equipment	4 months
Asphalt sprayer, Asphalt finisher	8 months
Road Roller, etc.	7 months
Trucks, etc.	6 months
Motor graders, Excavator, Bulldozer, etc.	8 months
Asphalt plant, Crushing plant	7 months

(4) Pre-shipment Inspection

Third independent party will implement pre-shipment inspection for each equipment, transported from the manufactures' plant to the port. Inspection will be implemented by checking the shipment documents, such as packing list and other, with shipped equipment. Provided full matches of documents and cargo content, the inspector will issue the report and inspection certificate.

The equipment will be shipped according to the time of the output of each manufacture. As it is difficult to stock all equipment in manufactures' plant or ports, pre-shipment inspections will be implemented each time the equipment arrives to the port.

(5) Transportation period

Equipment procured in Japan expected to be shipped at the ports of Yokohama, Kobe, and Kita-Kyushu near the manufactures' plant. China route and Siberian railway route are two possible transportation routes. Small size equipment shall be transported in cargo containers to avoid theft possibilities. Other equipment should be transported by Siberian railway as usual. In that case, back mirrors and others should be put in driver's cabin and spare tires and batteries should be bind by chain to avoid theft possibilities. Time needed for sea transportation is 10 days, and land transportation 50 days. In total it will take about 60 days for transportation.

Cargo from Europe usually arrives by railway.

(6) Inspection and Transfer Procedures

Supplier (trading company) and Tajikistan side implement the inspection of delivered equipment

after the equipment arrive to the designated destination. The inspection regarding all equipment will consist of checking quantity, overall look, functioning, attachments and spare parts. Due to land transportations some equipment may arrive by different times. In addition, quantity of spare parts is large and it will take about 15 days for inspection and transfer procedures.

2.2.8.7 Installation Implementation Planal

Within the scope of this project Japan side will bear all works for installation of two Asphalt Plants (A/P) and two Aggregate Plants (C/P).

Construction works will be implemented by local contractor under the supervision of manufacture's engineer, dispatched by the supplier. Works for concrete foundations should begin 60 days before the plant parts arrive to the sites. This period is needed for foundation to reach enough strength until the beginning of plant parts installation. Below table shows required days for installation of one plant.

**Table 2.2-23 Number of Days Required for Plant Foundation and Installation
(as for each A/P and C/P)**

Engineers	Days	Location	Work Description
Manufacture's engineer (A)	30 days	Plant site	Asphalt Plant parts installation (adjustment and test run)
Manufacture's trainer (B)	20 days	Plant site	Aggregate Plant parts installation (adjustment and test run)
Local construction company	30 days	Plant site	Asphalt Plant concrete installation, water pool for dust collector
	30 days	Plant site	Aggregate Plant concrete installation, material supply route
	30 days	Plant site	Asphalt Plant installation
	20 days	Plant site	Aggregate Plant installation

Foundation contraction works for 4 plants should begin with 10 days difference to shorten overall construction period to 60 days. Furthermore, installation works should be implemented in a set of one A/P and one C/P simultaneously, to finish installation works in 60 days.

Overall delivery schedule for construction equipment, vehicles and plants is presented below.

Table 2.2-24 Overall Equipment Delivery Schedule

	Item	Section	Level	Days	-60days	-30days	0	+30 days	+60days	+90days	+120days	+150days
Construction equipment and vehicles	Adjustment, Start-p and operation guidance	Sughd SETM		44				Adjust, Test, Start-up guidance				
				12					Operation guidance			
				7					Inspection and transfer			
		Kulyab SETM		36				Adjust, Test, Start-up guidance				
				12					Operation guidance			
				7					Inspection and transfer			
	Manufacturer's engineer (Adjustment, Start-p and operation guidance)		Japanese A	—	120							
	Site delivery supervision	Site delivery manager (I) (Construction equipment and vehicles, overall and delivery management)	Japanese B	3	180							
		Site delivery manager (I) (Assistant)	Local 1	—	177							
		Site supervisor consultant (Construction equipment and vehicles, overall and delivery management)	Japanese	3	83							
		Site supervisor consultant (Assistant (Construction equipment and vehicle, plant))	Local	—	177							
Asphalt plant and Crushing plant	Adjustment, Start-p and operation guidance	Sughd SETM (Asphalt plant)		60	Foundation			Installation, Tesr, Start-up guidance				
		(Aggregate plant)		50	Foundation			Installation, Tesr, Start-up guidance				
		Kulyab SETM (Asphalt plant)		60	Foundation			Installation, Tesr, Start-up guidance				
		(Aggregate plant)		50	Foundation			Installation, Tesr, Start-up guidance				
		Manufacturer's engineer (Aphalt plant)		Japanese C	—	60		A/P				
		Manufacturer's engineer (Aggregate plant)		Japanese D	—	40		C/P				
		Manufacturer's engineer (Aphalt test equipment)		Japanese E	—	9						
		Plant's engineer (Plant delivery manager)		Japanese F	—	60						
		Delivery manager assistant		Local 2	—	60						

2.2.8.8 Initial Operation Training and Plan

(1) Adjustment and Trial Operation Plan

Adjustments, test operations and parts checking will be implemented by dispatched engineers at the delivery sites.

Adjustments and test operations for Asphalt Plant and Aggregate Plant will be implemented by manufactures' engineers during the installation works.

Table 2.2-25 Adjustment, Test Operations, Start-up Guidance for Construction Equipment, Vehicles and Plants

Sughd SETM											
No	Equipment	Units	Adjustment/ test	Parts check	Start-up guidance	Total	Manufacturer's engineer	0	30days	60days	80days
	Delivery and adjustment period					7.0		<div></div>			
1	Vibration compactor	12									
2	Hand breaker	24						<div></div>			
3	Air compressor	12	3.0	2.0	1.5	6.5	A	<div></div>			
4	Asphalt sprayer	12									
5	Hand guide roller	12									
6	Asphalt finisher	1	1.0	0.5	1.0	2.5	A	<div></div>			
21	Line marker	1									
7	Road roller	1									
8	Tire roller	1									
13	Dump truck	10	3.0	2.0	1.5	6.5	A	<div></div>			
16	Truck with crane	12						<div></div>			
18	Pick-up truck	2									
19	Track trailer	1									
17	Mobile workshop	1	0.5	0.5	1.0	2.0	A	<div></div>			
9	Motor grader	5									
10	Wheel excavator	1									
11	Crawler excavator	1	3.0	2.0	2.5	7.5	A	<div></div>			
12	Wheel loader	6									
20	Bulldozer	1									
	Holiday and spare days					3.0				<div></div>	
	Total	116	10.5	7.0	7.5	35.0					
15	Asphalt plant	1	24.0	0.5	5.5	30.0	B	<div></div>			
16	Aggregate plant	1	14.0	0.5	5.5	20.0	C	<div></div>			
23	Asphalt test equipment	1	1.0	0.5	7.5	9.0	D			<div></div>	
	total	3	39.0	1.5	18.5	59.0					

Kulyab SETM											
No	Equipment	Units	Adjustment/ test	Parts check	Start-up guidance	Total	Manufacturer's engineer	0	30days	60days	80days
	Delivery and adjustment period					7.0				<div></div>	
1	Vibration compactor	8									
2	Hand breaker	16									
3	Air compressor	8	3.0	2.0	1.5	6.5	A			<div></div>	
4	Asphalt sprayer	8									
5	Hand guide roller	8									
6	Asphalt finisher	1									
7	Road roller	1	2.0	0.5	1.0	3.5	A			<div></div>	
8	Tire roller	1									
21	Line marker	1									
13	Dump truck	10									
16	Truck with crane	8								<div></div>	
18	Pick-up truck	2									
19	Track trailer	1									
17	Mobile workshop	1	0.5	0.5	1.0	2.0					<div></div>
9	Motor grader	7									
10	Wheel excavator	3									
11	Crawler excavator	1	3.0	2.0	2.5	7.5	A				<div></div>
12	Wheel loader	7									
20	Bbulldozer	2									
	Holiday and spare days					3.0					<div></div>
	Total	94	8.5	5.0	6.0	29.5					
15	Asphalt plant	1	24.0	0.5	5.5	30.0	B			<div></div>	
16	Aggregate plant	1	14.0	0.5	5.5	20.0	C			<div></div>	
	Total	2	38.0	1.0	11.0	50.0					

(2) Start-up Operation Guidance

Start-up operation guidance and daily maintenance guidance will be provided for supplied equipment. In order to minimize delivery costs, trainers for construction equipment and vehicles will also implement adjustment and test operations for the equipment.

One special engineer will be dispatched separately for start-up operation guidance for Asphalt Test Equipment, as it requires special skills.

(3) Operation Guidance

MOT, as an implementing organization, has already an experience of using Russian and Chinese

equipment. Its engineers are aware of basic knowledge about equipment maintenance. But local engineers are not used to new type of equipment. Moreover, the knowhow of using the different type of equipment in composition needs to be explained. Operation guidance will be provided by a supplier and manufactures, as described below.

Operation guidance:

The training will mainly consist of pothole repair and pavement overlay works at real sites by using supplied equipment. The training program will include construction control and equipment management.

(Operation guidance with the same content will be implemented twice in Sughd and Kulyab regions)

Table 2.2-26 Implementation Plan for Operation Trainings

	Planned Works	Applied Equipments	Place Contents	Construction Planning	Equipments Planning
1	Patching Crack sealing	Hand Breaker, Air Compressor, Asphalt Sprayer, Hand Guide Roller, Vibration Compactor, Dump Truck	SEHMs' yard, Repaired road under SEHM Repair works by using equipments	3 days	3 days
2	Overlay pavement renewal	Asphalt finisher, Road Roller, Tire Roller, Excavator, Wheel Loader, Motor Grader, Dump Truck Asphalt Plant, Aggregate plant	SEHMs' yard, Repaired road under SEHM Works by equipment (or, using sand instead asphalt mixture)	5 days	3 days
3	Snow and frozen layer cleaning, Spreading melting agents and sand	Motor Grader,	SEHMs' yard, Checking the functions of the equipment, changing attachments	1 days	1 days
4	Removing stonefalls and land slides, Damaged road recovery	Excavator, Wheel Loader, Dump Truck	SEHMs' yard, Checking functions and operation of the equipment (Safety precautions etc.), malfunctioning measures	2 days	2 days
5	Transportation of equipment and workers	Truck with Crane, Truck trailer, Pickup truck	SEHMs' yard Checking functions and operation of the equipments, loading and unloading construction machineries	1 days	1 days
6	Repair works on sites, inspection and repair at workshops	Mobile Workshop	SEHMs' yard Repair works by the equipment, loading main components such as engine on to Mobile Workshop		2 days
Total				12 days	12 days

(4) Security Management for Japanese Expert

Plants are to be installed under the supervision of Japanese Expert seconded from the manufacturer. In order to secure the security of the Japanese Expert, security plan shall be compiled based on the updated information obtained from JICA Tajikistan Office and Japanese Embassy in Tajikistan before the commencement of the installation work.

2.2.8.9 Soft Component Plan

As master trainers having the sufficient knowledge for operation maintenance and repair of the similar type of equipment to this project are to be cultivated from staff of MOT in the JICA's Technical Assistance Project being carried out, soft component is not to be carried out in this Project.

2.2.8.10 Manufacture Inspection and Acceptance Inspection Plan

Before production of the equipment, consultant and supplier will inspect drawings of equipment. Furthermore, consultant and supplier will inspect dimensions, functions and quantities after the production of the each equipment.

Before shipping the equipment, consultant will organize with the third independent party a pre-shipment inspection with the supplier as a witness.

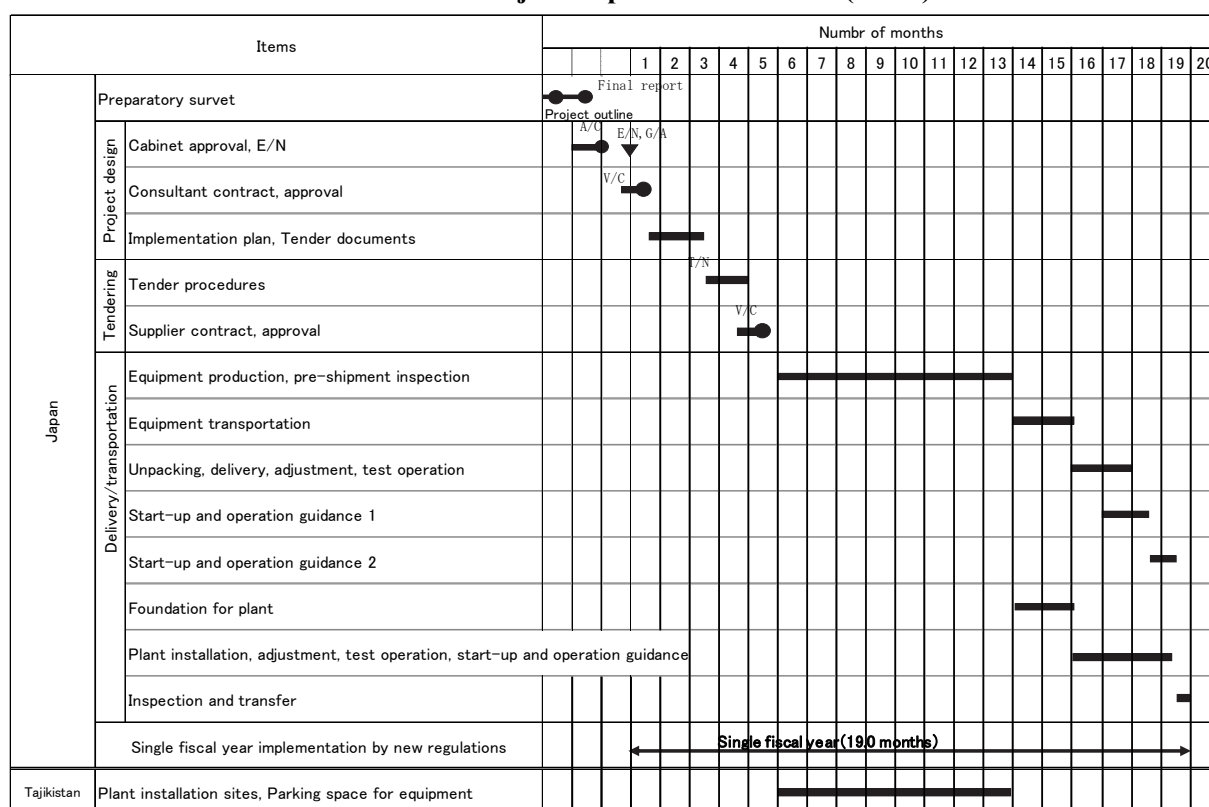
After the equipment arrive to the delivery sites, consultant and supplier will implement equipment inspection and acceptance inspection and transfer all equipment to implementing organization of Tajikistan side.

2.2.8.11 Project Implementation Schedule

Considering the time needed for project design, tender procedures, delivery supervision after E/N, G/A as a part of burdens by Japan side, it is recommended that the project should be implemented in Single Fiscal Year framework.

Draft project implementation plan is shown below. The project plan considers the time needed to implement main parts of the project, but depending Cabinet Approval, E/N, G/A timings, overall project time may change.

Table 2.2-27 Project Implementation Plan (Draft)



Legend A/C: Cabinet approval, E/N: Exchange Note, G/A: Grant agreement, V/C: Contract verification, T/N: Tender notice

2.3 Obligations of Recipient Country

In case, the project should be implemented under Japanese Grant Aid Scheme, the expenses of Tajikistan side are described below.

2.3.1 Expenses related to Equipment Delivery

- i. EIA or equivalent procedures for Crushing plant(C/P) and Asphalt Plant (A/P), which requires emission and drainage facilities and acquiring installation permissions
- ii. Securing location for A/P and C/P, removing existing structures and leveling grounds
- iii. Providing electric wiring, water supply, drainage for A/P and C/P operation
- iv. Banking Arrangements (B/A) and issuing Authorization to Pay
- v. Commission payments to Japanese bank according to B/A.
- vi. Tajikistan side should clear immigration and site visiting procedures, and make appointments with governmental organizations for Japanese experts, dispatched for this project
- vii. Exemption Japanese experts and companies, dispatched for this project, from taxes, duties or other obligations within the country
- viii. Tax exemption and free custom clearance for the equipment, delivered under the project

- ix. Dispatching required number of personnel for start-up operation guidance and covering their daily needs.
- x. All other expenses, that are not covered by Japanese Grant Aid

2.3.2 Expenses after the Equipment's Delivery

- i. Implementation of road maintenance works, which is the actual result of this project. Allocation of proper budgeting and human resources for this purpose.
- ii. Effective and proper usage of supplied equipment and their maintenance.

2.4 Operation and Maintenance Plan

In case, the equipment should be delivered under this project, Tajikistan side should dispatch required number of trainees to the delivery site. Japanese side should provide trainers for start-up operation guidance for the each equipment. Trainings also will be provided on operation and maintenance of equipment. In addition to the project, JICA is currently implementing Road maintenance Technical Cooperation (TC) project. It is recommended for TC project members to participate in start-up guidance also.

MOT had been provided with the road maintenance equipment in 2013 to improve the road maintenance capacity in Khatlon Region and Districts of the Republican Subordination by Japanese Aid Grant. MOT has already a proper experience on operating and maintaining the construction equipment. The project requires budget allocation for road maintenance works by using the supplied equipment. M/D deliberated that, implementing organization is responsible for securing enough budget and human resources for these purposes. Therefore, it is considered that MOT will properly operate and maintain the supplied equipment under this project also. In case, the equipment should be delivered under this project, Table 2.4-1 shows required number of workers.

Table 2.4-1 Required Personnel for the Project Implementation

	Sughd SETM	Kulyab SETM
Construction Equipment Operators	17	23
Vehicle Drivers	25	11
Plant Operators	12	10
Total for each region	54	54
TOTAL (men)	108	

2.5 Project Cost Estimation

2.5.1 Initial Cost Estimation

2.5.1.1 Japan Side Expenditure

(1) Targeted Fiscal Budget: Fiscal Year 2015

(2) Initial Cost Estimation

1) Summary of Initial Cost Estimation

The summary of initial cost estimation is shown in Table 2.5-1. It is assumed that the Project is to be implemented within the fiscal budget of 2015. It should be noted that the total cost does not show the limit of donation in Exchange Note.

Table 2.5-1 Summary of Initial Cost Estimation

Categories		Amount (Million Yen)	Remarks
Procurement Cost		1,942.1	
	Equipment Procurement	1,852.8	
	Supervise & Installation	84.0	
	Technical Training by Contractor	5.3	
Design		36.0	
	Detailed Design	18.2	
	Management for Procure & Implementation	17.8	
Total		1,978.1	

2) Contents of Equipment

Table 2.5-2 Contents of Equipment

(Unit : Thousand Yen)

No	Name of Equipment	Specification	Unit Price (FOB)	Quantity	Amount
1	Vibration compactor	Weight 60 kg	91	20	1,820
2	Hand Breaker	Weight 7 kg	98	40	3,920
3	Air Compressor	Air blow capacity 5m3/min.	1,920	20	38,400
4	Asphalt Sprayer	Class: Tank capacity 200 L	863	20	17,260
5	Hand Guided Roller	Class: Weight 600 kg	824	20	16,480
6	Asphalt Finisher	Class: Paving width 4,4 m	20,111	2	40,222
7	Road Roller	Class: Weight 13t	8,738	2	17,476
8	Tire Roller	Class: Weight 12 t	9,540	2	19,080
9	Motor Grader	Class: Blade width 3,7 m	15,184	12	182,208
10	Wheel Excavator	Class: Bucket capacity 0,8 m3	18,066	4	72,264
11	Crawler Excavator	Class: Bucket capacity 0,8 m3	10,622	2	21,244
12	Wheel Loader	Class: Bucket capacity 2,5 m3	13,950	13	181,350
13	Dump Truck	Class: Loading weight 14 t	8,250	20	165,000
14	Asphalt Plant	Class: Production capacity 35 t/h	80,250	2	16,500
15	Aggregate Plant	Class: Production capacity 35 t/h	55,575	1	55,575
	Aggregate Plant (with Washer)	Class: Production capacity 35 t/h	64,950	1	65,950
16	Truck with Crane	Loading weight 5 ton, with 3 ton crane	6,375	20	112,750
17	Mobile Workshop Van	6x4, load 5 ton class, aluminum box, with crane, repair tools and maintenance	20,475	2	40,950
18	Pickup Truck	Double cab, 4x4	3,794	4	1,176
19	Truck Trailer	Loading weight 25 ton, low bedded	19,125	2	38,250

No	Name of Equipment	Specification	Unit Price (FOB)	Quantity	Amount
20	Bulldozer	Class: 20t	21,000	3	63,000
21	Line Marker	One crew type	22,437	2	44,874
22	Asphalt Test Equipment	Test equipment for asphalt material and gravel	4,447	1	4,447

2.5.1.2 Tajikistan Side Expenditure

Table 2.5-3 Summary of Tajikistan Side Expenditure

Items	Cost Amount	
	Thousand USD	Thousand Yen
Cost of land acquisition and preparing the ground base	300.0	36,000.0
Plant installations costs	40.0	4,800.0
Bank transmitting commissions	11.6	1,400.0
Total	351.6	42,200.0

2.6 Project Cost Estimation

2.6.1 Initial Cost Estimation

The Project will be implemented in accordance with the Japan's Grant Aid scheme and the cost will be determined before concluding the Exchange of Note (E/N) for the Project.

(1) Cost to be Born by the Tajikistan Side

Table 2.6-1 Summary of Tajikistan Side Expenditure

Items	Cost Amount	
	Thousand USD	Thousand Yen
Cost of land acquisition and preparing the ground base	300.0	36,000
Plant installations costs	40.0	4,800
Bank transmitting commissions	11.6	1,400
Total	351.6	42,200

2.6.1.2 Base Data for Estimation

- i. Date of calculations March, 2015
- ii. Currency rate
 - US\$1.00 = 120.15Yen
 - €1.00 = 135.52Yen
 - 1somoni = 21.313Yen
- iii. Delivery period Design and equipment delivery schedules are shown at Project

	Implementation Schedule
iv. Others	The project should be implemented with accordance to Japan Grand Aid regulations

2.7 Operation and Maintenance Cost

After the delivery of the equipment, the annual cost of fuel and oil expenditures for the equipment and operation & maintenance cost can be estimated to 4,818 thousand Somoni (about 107.51 million Yen) and to 674 thousand Somoni (about 15.06 million Yen) respectively, and, therefore, the total annual cost for the equipment operation will be 5,492 thousand Somoni (around 122 million Yen) (please see Table 2.6-1 & Table 2.6-2). The operation cost is equivalent to 9.2% of 60 million Somoni that is the annual budget for road maintenance of MOT in 2015 (please see Table 2.6-3) and it can be reasonably concluded that the amount is to be secured in the annual budget of MOT.

Table 2.7-1 Cost Estimation for Fuel and Oil Consumption (Additional Costs)

No.	Equipment	Spec. (kW)	Units	Operation time	Fuel consumption			
				(h/year)	(L/ kW·h·unit)	(L/h·unit)	(L/year·unit)	(L/year)
1	Vibration compactor	3.2	20	360	0.301	1.0	346.8	6,935
2	Hand breaker	—	40	280	—	—	—	—
3	Air compressor	38.0	20	320	0.189	7.2	2,298.2	45,965
4	Asphalt sprayer	2.0	20	280	0.227	0.5	127.1	2,542
5	Hand guide roller	3.0	20	390	0.201	0.6	235.2	4,703
6	Asphalt finisher	39.0	2	400	0.152	5.9	2,371.2	4,742
7	Road roller	56.0	2	360	0.108	6.0	2,177.3	4,355
8	Tire roller	71.0	2	380	0.100	7.1	2,698.0	5,396
9	Motor grader	115.0	12	380	0.108	12.4	4,719.6	56,635
10	Wheel excavator	107.0	4	640	0.175	18.7	11,984.0	47,936
11	Crawler excavator	104.0	2	690	0.175	18.2	12,558.0	25,116
12	Wheel loader	117.0	13	520	0.153	17.9	9,308.5	121,011
13	Dump truck	246.0	20	830	0.050	12.3	10,209.0	204,180
14	Asphalt plant	—	2	450	—	250.0	112,500.0	225,000
15	Crushing plant	230.0	2	680	0.170	39.1	26,588.0	53,176
16	Truck with crane	148.0	20	760	0.050	7.4	5,624.0	112,480
17	Mobile workshop	148.0	2	760	0.050	7.4	5,624.0	11,248
18	Pickup truck	58.0	4	730	0.047	2.7	1,990.0	7,960
19	Truck trailer	235.0	2	630	0.075	17.6	11,103.8	22,208
20	Bulldozer	136.0	3	720	0.175	23.8	17,136.0	51,408
21	Line marker	38.0	2	410	0.068	2.6	1,059.4	2,119
22	Asphalt test equipment	—	1	—	—	—	—	—
	Total		215					1,015,115

Calculation data

- : Fuel consumption is referred to Table of construction machinery operation cost (by Japan Construction Machinery and Construction Association)
- : Diesel fuel price 4.7 TJS/Litter = 104.9 yen/Litter
- : Lubrication price 1% of the fuel cost
- : Average exchange rate of Jan – March, 2015: 1\$=120.15 yen, 1TJS=22.313 yen

Fuel cost (annual)	1,015,115 L × 4.7TJS/L = 4,771,040TJS	approx. 106.45mln. Yen
Lubricant cost (annual)	4,771,040 × 1% = 47,710TJS	approx. 1.06mln. Yen
Total	4,818,750TJS	Approx. 107.51mln. Yen

Table 2.7-2 Estimated Maintenance Cost (Additional Cost)

No.	Equipment	Spec. (kW)	Units	Maintenance ratio (%)	Operation period by Japan standards (year)	Operation period by Tajikistan standards (year)	Annual maintenance ratio (%)	maintenance cost /year*unit (10,000yen)	maintenance cost /year (10,000yen)
1	Vibration compactor	3.2	20	7.0%	6.0	6.0	1.17%	0.1	2.6
2	Hand breaker	—	40	7.0%	5.5	5.5	1.27%	0.2	6.2
3	Air compressor	38.0	20	7.0%	13.0	13.0	0.54%	1.3	25.9
4	Asphalt sprayer	2.6	20	7.0%	4.8	4.8	1.46%	1.6	31.5
5	Hand guide roller	3.0	20	7.0%	13.0	13.0	0.54%	0.6	11.8
6	Asphalt finisher	39.0	2	9.0%	11.0	11.0	0.82%	18.9	37.8
7	Road roller	56.0	2	9.0%	15.0	15.0	0.60%	6.8	13.6
8	Tire roller	71.0	2	9.0%	14.5	14.5	0.62%	7.5	14.9
9	Motor grader	115.0	12	9.0%	15.0	15.0	0.60%	9.6	115.3
10	Wheel excavator	107.0	4	9.0%	9.0	9.0	1.00%	21.4	85.8
11	Crawler excavator	104.0	2	9.0%	9.0	9.0	1.00%	15.5	30.9
12	Wheel loader	117.0	13	9.0%	11.5	11.5	0.78%	13.4	174.1
13	Dump truck	246.0	20	12.0%	10.0	10.0	1.20%	13.0	259.7
14	Asphalt plant	—	2	9.0%	10.0	10.0	0.90%	116.8	233.5
15	Crushing plant	230.0	2	6.0%	12.7	12.7	0.47%	40.1	80.2
16	Truck with crane	148.0	20	12.0%	12.0	12.0	1.00%	8.6	171.7
17	Mobile workshop	148.0	2	12.0%	12.0	12.0	1.00%	25.7	51.4
18	Pickup truck	58.0	4	9.5%	12.0	12.0	0.79%	3.3	13.0
19	Truck trailer	235.0	2	12.0%	11.5	11.5	1.04%	25.8	51.5
20	Bulldozer	136.0	3	9.0%	11.5	11.5	0.78%	19.7	59.2
21	Line marker	38.0	2	9.0%	10.5	10.5	0.86%	17.7	35.3
22	Asphalt test equipment	—	1	—	—	—	—	—	—
Total			215						1,506.0
Calculation data : Refer to Table of construction machinery operation cost (by Japan Construction Machinery and Construction Association) : Equipment cost: base cost or stated cost (CIF) : Operation period by Japan standards applied as Operation period by Tajikistan standards : Annual maintenance ratio = maintenance ratio / Operation period by Tajikistan standards : Annual maintenance cost = Equipment price × Annual maintenance ratio : 1TJS = 22,313 yen									
Annual maintenance cost			674,942TJS			15.06 mln. yen			

Table 2.7-3 Annual Budget in Recent 5 years

(Unit million Somoni)

	2011	2012	2013	2014	2015
National Budget	8,292	10,161	12,058	13,901	15,278
Total MOT Budget	1,013	1,003	1,159	1,141	964
Budget for Road Maintenance	39	47	58	57	60
Rate of Increase (from last year)	15%	21%	23%	-2%	5%

Chapter 3 Project Evaluation

3.1 Preconditions

Land acquisition, installation permission, environmental-social consideration and counterpart's expenses which are to be preconditions for the Project implementation are shown in Table 3.1-1 below.

Table 3.1-1 Preconditions for Project Implementation

Item	Content	Remarks
Land acquisition	The land space should be provided for A/P and C/P installation. The prospective location for Sughd Region proposed by Khujand SETM is in the hilly area and sophisticated brand new A/P and C/P owned by Taji Road (private company) exist nearby. The prospective location for Eastern Part of Khatlon Region proposed by Kulyab SETM locates near river and a Chinese plant is under operation in adjacent area. Both prospective locations recommended by Khujand and Kulyab SETMs obtained letters of consent from the head of district for plants development.	
Installation permission	For both installation locations, there are already operating A/P and C/P on sites. No problems are foreseen for installation permissions. However, it is required to obtain the official permit for plant development through the procedure described in sub-section 1.3.	Refer to Environmental and Social Consideration
Counterparts Expenses	Confirmed by M/D, etc. As MOT has several experiences in the JICA Grant Aid scheme, they well know the required procedure in the scheme.	Refer to Counterpart's Expenses

3.2 Necessary Inputs by Recipient Country

For the purpose of effective application of the provided equipment and achieving overall project goal, the counterpart should cover following inputs.

Table 3.2-1 Necessary Inputs by Recipient Country

No.	Content	Remarks
1	Budget allocation to buy materials necessary for running construction machineries, such as fuels and lubricants	
2	Budget allocation to buy materials necessary for overlay and pavement renewal works, like bitumen, etc.	
3	Allocation of operators and drivers to run vehicles and construction machineries.	Relocating ex-operators and ex-drivers back to the equipment, who are workers because of equipment shortages.
4	Allocation of mechanics to maintain the construction equipment	Relocating ex-mechanics back to the equipment, who are workers because of equipment shortages.
5	Budget allocation to repair the equipment.	

As master trainers having the sufficient knowledge for operation maintenance and repair of the similar type of equipment to this project are to be cultivated through experts of the JICA's Technical Assistance Project being carried out, the MOT staff who will learn the initial operation techniques through this project have to be trained further by the master trainers in order to keep the sustainability of the Project.

3.3 Important Assumptions

Important Assumptions of the project are as follows.

Table 3.3-1 Important Assumptions

Item	Content	Important Assumptions
Overall Goal	Mobility and transportation efficiency will improved in the project area and in the Republic of Tajikistan	
Project Purpose	Proper maintenance of the road in the project area	<ul style="list-style-type: none"> ➤ Trained operators and mechanics continue to work in MOT ➤ Master trainers are well cultivated in the JICA Technical Assistance project as planned
Outputs	Road maintenance equipment will be properly delivered to the project area	
Activities	<ul style="list-style-type: none"> ➤ Supply of Road maintenance equipment ➤ Guidance on road maintenance and repair by using the provided equipment 	

3.4 Project Evaluation

3.4.1 Relevance

Tajikistan has been achieving the high economic growth more than 7.0% from year 2000 to the present except 3.9% in 2009 affected by the Liman Shock. In order to maintain this high economic growth with keeping the economic balance among neighboring countries, it is very important to improve the major trunk road's network and to improve the capacity of the road maintenance.

The aid policy of Government of Japan to Tajikistan focuses on the improvement of the economic infrastructure to strengthen the domestic connection and connection with neighboring countries, and three Grant Aid projects and one Technical Assistance project have been continuously carried out.

Based on the background mentioned above, this Project will play the same important role as the Projects previously carried out and the equipment for road maintenance of four out of six SETMs in Tajikistan is to be improved through the implementation of this Project.

It can be reasonably expected that the improvement of road condition of the trunk roads and of the road maintenance capacity contribute to not only the Tajikistan's economic growth but also to the

dissolution of the unbalanced condition among neighboring countries.

Considering the circumstances mentioned above, it can be concluded that the implementation of the Project under the Japan's Grant Aid scheme is reasonable and proper.

3.4.2 Effectiveness

Major effects expected through Project implementation can be summarized as follows.

3.4.2.1 Quantitative Effect

(1) Increase of Pothole Area repaired

Base on the increased number of dump trucks which is the least increment in the equipment for pothole repairing, expected pothole area can be obtained.

Sughd SETM: Existing 22 trucks → To be 36 trucks. As 2 trucks are to be allocated in the plants area, actual increased rate is $(36-2)/22 = 1.54$.

Kulyab SETM: Existing 8 trucks → To be 18 trucks 18. Considering 2 trucks as above, actual increased rate is $(18-2)/8 = 2$.

(2) Extension of Length of Pavement overlaid

Based on the increased number of road roller which is the least increment in the equipment allocated for asphalt overlay, expected extension of asphalt overlay can be obtained.

Sughd SETM: Existing 5 rollers → To be 7 rollers, the increased rate is $7/5 = 1.4$

Kulyab SETM: Existing 4 rollers → To be 5. The rate of increment is $5/4 = 1.25$

The target value of expected quantitative effect in 2020 (three years after the project completion) can be obtained from the increased rate multiplied by actual quantity carried out in 2014.

Table 3.4-1 Quantitative Effect

Effect	Base Value (2014)	Increase Rate	Target Value (2020)
Sughd SETM Area of Pothole annually repaired by cold-mix asphalt (m ²)	71,000	1.54	109,000
Sughd SETM Length of Pavement annually overlaid by hot-mix asphalt (equivalent 2 lanes) (km)	8	1.4	11.2
Kulyab SETM Area of Pothole annually repaired by cold-mix asphalt (m ²)	24,000	2	48,000

Effect	Base Value (2014)	Increase Rate	Target Value (2020)
Kulyab SETM Length of Pavement annually overlaid by hot-mix asphalt (equivalent 2 lanes) (km)	7	1.25	8

3.4.2.2 Qualitative Effect

- i. Because the cold-mixed asphalt is able to be produced in the asphalt plant as well as hot-mixed asphalt and proper equipment is to be utilized for pothole repair, the quality of the repaired area is to be improved and the life of the area is to be extended.
- ii. Due to the production of the hot-mixed asphalt in the self-owned plant instead of procurement from outside, and usage of proper equipment, both cost and quality in the asphalt overlay work can be improved.
- iii. By the equipment procured for disaster recovery, the less frequency of the traffic stoppage by disasters (flood and/or avalanche) can be expected.

Appendices

1. Member List of the Study Team
2. Study Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions
5. References

1. Member List of the Study Team

Nama	Responsibility	Organization
Mr. Sakamoto Takema (1 st survey)	Team Leader	JICA Deputy Director General, and Group Director for Transportation and ICT Infrastructure and Peacebuilding Department
Mr. Naito Tomoyuki (2 nd survey)		JICA Special Advisor, Team 1, Transportation and ICT Infrastructure and Peacebuilding Department
Mr. Wakabayashi Kota (1 st survey)	Project Coordinator	JICA Planning and Coordination Division, Team 1, Transportation and ICT Infrastructure and Peacebuilding Department
Mr. Kuge Takahiro (2 nd survey)		JICA Road Engineer, Planning and Coordination Division, Team 1, Transportation and ICT Infrastructure and Peacebuilding Department
Mr. Honda Hiroshi	Chief Consultant/ Road Maintenance Plan/Equipment Plan II	Katahira & Engineers International
Mr. Baba Hideaki	Equipment Plan I/ Operation and Maintenance Plan	Katahira & Engineers International
Mr. Rasulbek	Procurement Plan/Cost Estimation	Katahira & Engineers International
Mr. Asano	Translator	Katahira & Engineers International

2. Study Schedule

(1) Survey Itinerary (March 21 – April 27, 2015)

Number of Days	Month	Day	Week Day	JICA		Consultant				Stay
				Mr. Sakamoto (Team leader)	Mr. Wakabayashi (Project coordinator)	Mr. Honda (Chief consultant / Road Maintenance Plan / Equipment Plan II)	Mr. Rasulbek (Procurement Plan/Cost Estimation)	Mr. Baba (Equipment Plan I/ Operation and Maintenance Plan)	Mr. Asano (Translator)	
1	March	23	Mon			09:00Narita(OZ107)→11:40Seoul, 13:00Seoul(KC910)→17:00Almaty				Almaty
2		24	Tue			10:10Almaty(KC131)→11:00Dushanbe (Holiday)				Dushanbe
3		25	Wed			Meeting with JICA Dushanbe Office, Meeting with MOT (Purpose of the survey, Confirmation of the MOT request, Progress of questionnaire, Coordination of survey schedule, etc.)				Dushanbe
4		26	Thu							Dushanbe
5		27	Fri							Dushanbe
6		28	Sat			Material analysis and additional survey, etc.				Dushanbe
7		29	Sun			Movement (Dushanbe→Kulab)				Kulab
8		30	Mon			Kulab SETM, 2.Kulab SEHM, 10.Shuroba SEHM				Kulab
9	31	Tue	4.Vose SEHM, Private A/P, 6.Farhor SEHM, 5.Hamadoni SEHM				Kulab			
10	April	1	Wed			8.Muninabad SEHM, 9.Khovaling SEHM				Kulab
11		2	Thu			7.Temurmalik SEHM, 3.Baljuvon SEHM, 1.Gandara SEHM, Movement(→Dushanbe)				Dushanbe
12		3	Fri			Material analysis, etc.				Dushanbe
13		4	Sat			Material analysis, etc.				Dushanbe
14		5	Sun			Movement (Dushanbe→Khujand)				Khujand
15		6	Mon			Sughd SETM, IRSHQ, 2.Gafurov SEHM, Private A/P, 5.Kanibadam SEHM, 4.Isfara SEHM				Khujand
16		7	Tue			H1.Asht SETM, 3.Mastcho SEHM, Private A/P				Khujand
17		8	Wed			8.Rasulov SEHM, 7.Spitamen SEHM, 10.ganchi SEHM				Khujand
18		9	Thu			(am) Khujand→J.Dushanbe (pm) Meeting with MOT Minister		8.Zafarabad SEHM, 9.Istaravshan SEHM, 11.Shakhristan SEHM, 14.Penjikent SEHM		Dushanbe/Pendjikent
19		10	Fri			Material analysis, etc.		12.K.Mastchoh SEHM, 13.Aini SEHM		Dushanbe/Ayni
20		11	Sat			Material analysis, etc.		IRS(Aini office) , Movement (→Dushanbe)		Dushanbe
21		12	Sun			10:25Narita(TK051)→17:15Istanbul 21:00Istanbul(TK254)→		Material analysis, confirmation for the work schedule,etc.		
22	13	Mon	→03:45Dushanbe (pm) Team internal meeting, Safety briefing by JICA, Courtesy call (Mr.Nazri, Deputy minister, Mr.Yatimov, MOT)							Dushanbe
23	14	Tue	(am/pm)M/D discussion(Mr.Yatimov, Head of Dept. on Cooperation with Foreign Investment)							Dushanbe
24	15	Wed	(am/pm)M/D discussion(Mr.Yatimov, Head of Dept. on Cooperation with Foreign Investment)							Dushanbe
25	16	Thu	(am)M/D discussion(Mr.Yatimov, MOT) , (pm) Report to JICA Tajikistan Office							Dushanbe
26	17	Fri	(am)Signing to M/D, (pm)Ministry of Finance, Ministry of Foreign Affairs							Dushanbe
27	18	Sat	05:40Dushanbe (TK255)→ 09:05Istanbul, 13:50Istanbul(TK050)	Material analysis, etc.	Preparation of Survey report, equipment list (with priority), etc. Meeting with other donors (ADB, WB)				Dushanbe	
28	19	Sun	→07:20Narita	11:35Dushanbe(KC132) →14:15Almaty					Dushanbe	
29	20	Mon							Dushanbe	
30	21	Tue			Dushanbe					
31	22	Wed			Meeting with MOT for equipment list (with priority), preparation for Technical Note, Information				Dushanbe	
32	23	Thu							Dushanbe	
33	24	Fri			(am) Signing to Technical Note, (pm) Report to JICA Tajikistan Office				Dushanbe	
34	25	Sat			Material analysis, preparation for returning				Dushanbe	
35	26	Sun			11:30Dushanbe(KC132)→14:15Almaty				(in the plane)	
36	27	Mon			01:05Almaty(KC909)→09:45Seoul, 15:10Seoul(OZ106)→17:20Narita					

(2) Survey for explanatin and discussion of Draft Preparatory Survey Report (November 22 – 29, 2015)

Number of Days	Month	Day	Week Day	JICA		Consultant			Stay
				Mr. Naito (Team leader)	Mr. Kuge (Project coordinator)	Mr. Honda (Chief consultant / Road Maintenance Plan / Equipment Plan II)	Mr. Baba (Equipment Plan I/ Operation and Maintenance Plan)	Mr. Asano (Translator)	
1	November	22	Mon	01:50Kigali (TK0612)→ 10:30Istanbul	10.25Narita (TK0051)→16:45Istanbul				Istanbul
2		23	Tue	10:00Istanbul (TK5854) →17:55Dushanbe					Dushanbe
3		24	Wed	Coutesy call (MOT Minister), Team internal meeting, Safety briefing by JICA, Explanation of DFR, M/D discussion					Dushanbe
4		25	Thu	Meeting with MOF, M/D discussion					Dushanbe
5		26	Fri	Courtesy call to MOFA, M/D discussion, Signing to M/D					Dushanbe
6		27	Sat	Meeting with ADB, Report to Emmbasy of Japan, JICA Tajikistan Office					Dushanbe
7		28	Sun	06:30Dushanbe (TK0255) →09:00Istanbul					(in the plane)
8		29	Mon	01:10Istanbul (TH0052) →19:55Narita					

3. List of Parties Concerned in the Recipient Country

Ministry of Transport (MOT)

Mr. GANJALZODA Sherali	Minister
Mr. NAZRI Shamsmuhammad	Deputy Minister
Mr. YATIMOV Olim	Head of Department on Cooperation with Foreign Investigation
Mr. HAKIMOV Faizimad	Head of Department on Ground Transport
Mr. ZIYOEV Begijon	Chief of Section of Automobile Transportation and Safety on Transport, Department on Ground Transport
Mr. ZIYOEV Abdullo	Head of Division on Road Construction and Maintenance
Mr. MAHMUDOV Firuz	Deputy Head of Division on International Cooperation

State Enterprise for Transport Management (SETM)

Ms. LATIPOVA Hojaroy	Head of Sughd SETM
Mr. MIRAMINOV Ayub	Chief Engineer of Sughd SETM
Mr. BOBOJONOV Nasim	Chief of Production and Technical Department of Sughd SETM
Mr. TOSHMATOV Akram	Chief Mechanic of Sughd SETM
Mr. VALIEV Rustam	Head of Kulyab SETM
Mr. AZIZOV Grez	Mechanic of Kulyab SETM
Mr. ABDULLOZODA Farkhot	Leading Specialist of Kulyab SETM

State Enterprise of Highway Maintenance (SEHM)

(Sughd Region)

Mr. HOSHIMOV Sodir	Chief Engineer of Asht SEHM
Mr. VALIEV Ravshan	Chief Mechanic of Asht SEHM
Mr. AVLIYOHJOAEV Zaftar Hoja	Head of Gafurov SEHM
Mr. ESHANKULOV Hikma	Chief Engineer of Gafurov SEHM
Mr. GOIBOV Komiljon	Chief Mechanic of Gafurov SEHM
Mr. ALINAZAROV Polvon	Head of Mastchoh SEHM
Mr. GAFUROV Husein	Chief Engineer of Mastchoh SEHM
Mr. ABDUSATTOROV Halok	Head of Isfara SEHM
Mr. ASHURBOEV Tolib	Chief Mechanic of Isfara SEHM
Mr. SAMIEV Karimjon	Head of Kanibadam SEHM
Mr. ZIKRIYAEV Shavkat	Head of Rasulov SEHM
Mr. MURRAHIMOV Abdusamat	Chief Mechanic of Rasulov SEHM
Mr. SAIDOV Sobir	Head of Spitamen SEHM

Mr. TOJIMURODOV Botirali	Mr. TOJIMURODOV Botirali
Mr. SHODMONOV Komil	Head of Zafarabad SEHM
Mr. AZAMOV Muazam	Chief Engineer of Zafarabad SEHM
Mr. AZAMOV Muazam	Chief Engineer of Zafarabad SEHM
Mr. SABUROV Neumon	Head of Istarafshan SEHM
Mr. MAMUROV Nabi	Head of Ganchi SEHM
Mr. ODILOV Sadriddin	Chief Mechanic of Ganchi SEHM
Mr. ORTIKOV Komiljon	Head of Shahrison SEHM
Mr. NOSIROV Hasan	Traffic Organization Engineer of Shahrison SEHM
Mr. KHOLIKOV Mulloabbos	Head of Kuhistoni Mastchoh SEHM
Mr. SAID Muhamadsodik	Chief Mechanic of Kuhistoni Mastchoh SEHM
Mr. SHERBUTAIEV Sadrikul	Head of Ayni SEHM
Mr. ISMATULLOEV Sattor	Chief Engineer of Ayni SEHM
Mr. KARIEV Ustobadal	Chief Mechanic of Ayni SEHM
Mr. MUMINOV Fakhridin	Head of Penjikent SEHM
Mr. HAIDAROV Amirkhon	Chief Mechanic of Penjikent SEHM
(Eastern Part of Khatlon Region)	
Mr. KHOLIKOV Amonullo	Head of Dangara SEHM
Mr. JOMAHMADOV Tojiddin	Chief Engineer of Dangara SEHM
Mr. ZIYOEV Nurmahmat	Chief Mechanic of Dangara SEHM
Mr. ZIYOEV Azizullo	Head of Kulyab SEHM
Mr. TOIROV Nurali	Head of Baljuvon SEHM
Mr. HABIBULLOEV Azizullo	Chief Mechanic of Baljuvon SEHM
Mr. HUKMATULLOEV Kurbon	Head of Vose SEHM
Mr. SAIDOV Saidkhon	Chief Engineer of Vose SEHM
Mr. RAHMONTALIEV Boron	Chief Mechanic of Vose SEHM
Mr. EGAMKULOV Jamshed	Head of Hamadoni SEHM
Mr. ODINAEV Hakim	Head of Farkhor SEHM
Mr. GIYOEV Abdulali	Chief Engineer of Farkhor SEHM
Mr. VALIEV Turakhon	Chief Mechanic of Farkhor SEHM
Mr. MURODOV Nurali	Head of Temurmali SEHM
Mr. ESANOV Boimuhamad	Chief Engineer of Temurmali SEHM
Mr. SHARIPOV Muzaffar	Chief Mechanic of Temurmali SEHM
Mr. HAYOTOV Bozorali	Head of Muninabad SEHM
Mr. KURBONOV Boboyor	Chief Engineer of Muninabad SEHM

Mr. HUSEINOV Saidakhmat	Head of Khovaling SEHM
Mr. KARIMOV Sulton	Chief Engineer of Khovaling SEHM
Mr. KAYUMOV Rahmon	Chief Mechanic of Khovaling SEHM
Mr. MIRZOEV Mirzo	Head of Shurabad SEHM
Mr. AZIZOV Fatkhullo	Chief Engineer of Shurabad SEHM
Ministry of Foreign Affairs (MFA)	
Mr. GOIBOV Khisrav	Head of Department of Asian and African States
Mr. RAJABOV Mahmudali	Head of Department of External Economic Cooperation
Mr. VOIVOV Khisarav	Head of Department of Asian and African States
Mr. RAJABOV Mahmudali	Head of Foreign Economic Cooperation Department
Ministry of Finance (MOF)	
Mr. ABIBULLOEV Nazullo	Head of the Main Department of the State Budgeting
Mr. AHLIDDIN Nuriddinzoda	Head of the State Debt and Investment Attraction Department
Local Government	
Mr. GAFURZODA Muso Zarif	Head of Vose District Administration
Mr. MANONZODA Abdusamad	Head of Gafurov District Administration
ADB	
Mr. NURIDDINOV Farrukh	Senior Project Officer
WB	
Mr. SANGINOV Faridun	Operational Officer
Private Enterprises	
Mr. KHOJAEV Mirzob	Manager of Sugd Region, Branch of “Innovative Road Solutions LTD”(IRS) in Republic of Tajikistan (Khujand)
Mr. KHOLIKOV Sodikbek	Manager of Zarafshan Region, Branch of “Innovative Road Solutions LTD” (IRS) in Republic of Tajikistan (Ayni)
Mr. ISUFOV Olim	Deputy Director of OOO “Bunyod Roh” (Asphalt Plant & Construction Company, Kulyab)
Mr. MUSOEV Anbar	Sales Manager of Zeppelin Tajikistan ASLL (Dushanbe)
Mr. ALIEV Gafur	Chief Engineer of OOO “Elitstroj” (Construction Company, Dushanbe)
Mr. SHOEV Mirzo	Engineer of OOO “Elitstroj”
Mr. AMIRBEKOV Ali	General Director of “Ramesh.K” (Construction Machinery Repair Company, Dushanbe)
Mr. ISMOILOV Bekhruz	Traffic Manager of M&M Militzer and Munch Tajikistan L.L.C. (Dushanbe)

4. Minutes of Discussions (M/D)
(April, 2015)

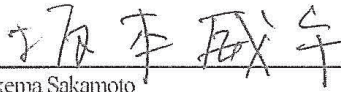
MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY
ON THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR ROAD MAINTENANCE
IN SUGH D REGION AND THE EASTERN PART OF KHATLON REGION
IN THE REPUBLIC OF TAJIKISTAN


In response to a request from the Government of the Republic of Tajikistan in July 2014, Japan International Cooperation Agency (hereinafter referred to as “JICA”) in consultation with the Government of Japan decided to conduct a Preparatory Survey (hereinafter referred to as “the Survey”) on the Project for Improvement of Equipment for Road Maintenance in Sughd Region and the Eastern Part of Khatlon Region (hereinafter referred to as “the Project”), and sent a Preparatory Survey Team (hereinafter referred to as “the Team”) to the Republic of Tajikistan, headed by Mr. Takema Sakamoto, Deputy Director General, Infrastructure and Peacebuilding Department, JICA, and the Team was scheduled to stay in the country from March 24th to April 26th, 2015.

The Team held a series of discussions with officials concerned of the Government of the Republic of Tajikistan and conducted field surveys in the Project area.

In the course of discussions and field surveys, both sides confirmed the main items described in the attachment, and that the Team would proceed to the Survey to prepare a Draft Final Report currently expected in the coming autumn.

Dushanbe, April 17th, 2015


Takema Sakamoto
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan


Ganjalzoda Sherali
Minister
Ministry of Transport
The Republic of Tajikistan

ATTACHMENT

1. Title of the Project

The Tajikistan side suggested changing the title of the Project from “The Project for Improvement of Equipment for Road Maintenance in Sughd Region and the Eastern Part of Khatlon Region” to “The Project for Improvement of Equipment for Road Maintenance in Sughd Region and the Kulyab Zone of Khatlon Region”. The Team took note of it and responded to consult with the Government of Japan and to feed back the Japanese side’s opinion at the earliest convenience, most likely at the timing of discussion of Draft Final Report.

2. Objective of the Project

Both sides confirmed that the objective of the Project is to establish the foundation for the better operation and maintenance of the roads under the jurisdiction of the Ministry of Transport (hereinafter referred to as ‘MOT’) in Sughd Region and the Eastern Part of Khatlon Region by modernizing road maintenance equipment and plants.

3. Project Sites

The Project Sites are shown in Annex-1. The road maintenance equipment and plants to be procured under the Project will be managed by Sughd and Kulyab State Enterprise Transport Management (hereinafter referred to as ‘SETM’) respectively.

4. Objective of the Survey

Both sides confirmed the objective of the Survey as follows:

- 4-1. To understand the background and objective of the Project and examine its impacts and appropriateness;
- 4-2. To identify the components, and conduct outline design and cost estimation of the Project under the possible Japan’s grant aid scheme, based on the data and information collected from and the results of discussions with the Tajikistan side; and
- 4-3. To study issues of environmental and social considerations through the Survey.

5. Responsible Organizations

- 5-1. The responsible organization is MOT. The road maintenance equipment and plants procured under the Project will be managed by Sughd SETM and Kulyab SETM for effective utilization in the areas under the jurisdiction of those two SETMs mentioned above.
- 5-2. The organization chart of MOT is as shown in Annex-2.
- 5-3. The organization chart of Sughd SETM and Kulyab SETM are as shown in Annex-3.

6. Items Requested by the Government of the Republic of Tajikistan

- 6-1. Both sides confirmed the proposed list of road maintenance equipment and plants from the Tajikistan side as Annex-4 which was submitted during the stay of the Team to reflect the current needs of Sughd SETM and Kulyab SETM. Both sides agreed to continue discussing the possible components



of the list during the stay of the JICA consultant team in the country, and to sort it out to describe in Technical Notes (T/N) to be concluded between the JICA consultant team and the Tajikistan side by 24th April, 2015. Both sides duly understood the necessity of the earliest consensus making on the possible components of the list including basic specifications for the smooth and earliest project formulation of the Project and also recognized the conclusion of T/N before April 24, 2015 is a must.

- 6-2. Both sides confirmed that an asphalt plant and an aggregate plant would be installed at the sites mentioned below respectively, considering the technical conditions and environmental and social considerations, based on the site survey results of the JICA consultant teams. The Tajikistan side committed to do every necessary internal coordination to secure the sites and to conduct appropriate preparation works, which were described in 14-4 below, based on the JICA consultant team's advices to be submitted with the cover letter of JICA, so that they could avoid any negative impact for smooth and earliest project formulation, such as significant delay or suspension of the Study.

Site 1 for Sughd SETM: Dehmoy village, Gafurov district, Sughd region

Site 2 for Kulyab SETM: Along Yakhsu river, Kaftarhona village, Vose district, Khatlon region

The Tajikistan side explained these sites for the installation of asphalt plants and aggregate plants were agreed to use between MOT and public administration of each district by letter, No.168, dated March 26th, 2015 and No.7/56, dated March 26th, 2015, respectively.

The Tajikistan side added that the sites belong to the Republic of the Tajikistan and they just needed to conduct necessary registration procedures which might take around two months. The Team requested an appropriate topographic map of the site 1 to calculate the scale of a preparation works as shown in 14-4, and the Tajikistan side agreed to submit it by the end of May, 2015.

- 6-3. Additionally, the Tajikistan side requested to add one more asphalt plant and an aggregate plant respectively in Dangara District under the jurisdiction of Kulyab SETM. The Team explained that the idea is not suitable for the moment, from several viewpoints, such as the expected demand/supply balance, additional plant operation and maintenance cost, budget restriction of the Japanese side, and undefined candidate site situation. In response to the above explanation of the Team, the Tajikistan side, however, still kept on emphasizing the necessity of an additional asphalt plant and an aggregate plant in Dangara District under the Project. Finally, both sides agreed to continue discussing this matter out of formulation process of the Project.
- 6-4. Both sides confirmed that the appropriateness of the request would be examined in accordance with the further studies and analysis in Japan and the final components including specifications and quantities of the road maintenance equipment shall be decided by the Japanese side and be described in the Draft Final Report, which will be prepared currently expected in the coming autumn, in consideration of necessity, technical feasibility, sustainability, cost-effectiveness, budget availability, and so on. The Tajikistan side understood that all the requested items, therefore, may not be accepted as final components of the Project.
- 6-5. Both sides confirmed that there was no duplication between the Project and activities to be conducted by other development partners or private enterprises.

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7. Japan's Grant Aid Scheme

- 7-1 . The Tajikistan side fully understood the Japan's Grant Aid scheme explained by the Team, as described in Annex-5.
- 7-2 . The Tajikistan side will take the necessary measures, as described in Annex-6, to facilitate the smooth implementation of the Project, as pre-conditions for the Japan's Grant Aid to be approved and implemented.

8. Environmental and Social Considerations

The Team explained that environmental and social considerations for the Project is currently categorized as "Category C" according to the JICA Guidelines for Environmental and Social Considerations (April 2010), since the components of the Project are likely to have little adverse impact on the environment and society. The Tajikistan side will prepare the sites for the installation of asphalt plants and aggregate plants without adverse impact on the environment and society such as land acquisition and involuntary resettlement. If it is found the prepared sites have the possibility to have adverse impacts on the environment and society, the Tajikistan side agreed to prepare other site(s) which meet the technical conditions without adverse impacts on the environment and society after the advance consultation with JICA.

9. Schedule of the Study

Both sides confirmed the schedule of the Survey as follows. The schedule may be subject to change.

- 9-1. The Team will continue further studies in the Republic of Tajikistan until April 26th, 2015.
- 9-2. The Team will prepare the Draft Final Report and explain the details of it including the final components and cost estimation to the Tajikistan side currently expected in the coming autumn.
- 9-3. The Team will finalize the Final Report and send it to the Tajikistan side currently expected in the coming winter.

10. Disclosure of Information

Both sides confirmed that the study results excluding the Project cost will be disclosed to the public after the completion of the Survey, and that all the study result including the Project cost will be disclosed to the public after the verification of all contracts for the Project by JICA.

11. Misconduct

If JICA receives information concerning suspected corrupt or fraudulent practices, the Government of the Republic of Tajikistan shall take necessary measures in accordance with the Procurement Guidelines in the competition for, or in execution of, the contract funded by the Grant:

- (1) to provide JICA with such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations of the Republic of Tajikistan.
- (2) not to treat unfairly or unfavorably the physical persons and juridical persons, that provide the information.

The Procurement Guidelines has been published on JICA's website below.

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http://www.jica.go.jp/activities/schemes/grant_aid/guideline/ku57pq00000sby3v-att/type01_en.pdf

12. Safety Issues

The Team explained that the “The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects” shall be applied to the works for the Project to ensure the safety of the Project Stakeholders during construction works at site and to protect nearby local residents, and any other third parties, from every potential accidental risk foreseen to arise from the construction works at site. The Tajikistan side is to assume the duty as “The Employer” to review and give suggestions on a construction safety plan and confirm the work being carried out in conformity with the safety plan.

The Guidance has been published on JICA’s website below.

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

13. Collaboration among Relevant Organizations

MOT agreed to work closely with relevant organizations, such as Ministry of Finance, Ministry of Foreign Affairs with mutual common understanding and cooperation for the Project.

14. Other Relevant Issues

14-1. The Tajikistan side agreed to provide tax exemption for equipment and plants under the Project if implementation of the Project is approved by the Government of Japan.

- (1) The Tajikistan side agreed that customs duties, internal taxes and other fiscal levies which may be imposed in the Republic of Tajikistan are exempted under mutual agreement of Exchange of Notes (E/N).
- (2) If any expenses stated above are caused by some reasons such as the delay of execution of tax exemption, the Tajikistan side shall pay for it temporarily except the cases the Tajikistan side shall be indemnified.

14-2. The Tajikistan side shall, at its own expenses, provide the Team with the following items.

- (1) Security-related information as well as measures to ensure the safety of the Team members;
- (2) Information as well as support in obtaining medical service;
- (3) Data and information related to the Preparatory Survey;
- (4) Counterpart personnel;
- (5) Office space;
- (6) Credentials or identification cards;
- (7) Entry permission necessary for the survey team members to conduct field surveys; and
- (8) Support in obtaining other privileges and benefits, if necessary.

14-3. The operation and maintenance plan which shows the operation and maintenance cost, necessary personnel and appropriate measures, including ones to avoid loss and theft of the equipment to be procured under the Project, will be prepared by the Team expected to be shown in Draft Final Report. The Tajikistan side agreed to follow and implement the operation and maintenance plan after the completion of the Project.

14-4. The Tajikistan side shall take all the following necessary measures including the preparation works

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for the installation of asphalt plants and aggregate plants in a timely manner, based on the respective layout plans which will be shown in Draft Final Report.

- (1) Securing the lands for asphalt plants and aggregate plants, which are free from damages of natural disaster and adverse impact on the environment and society;
- (2) Obtaining all the necessary licenses and/or permissions to install and operate plants;
- (3) Removing the soft ground of the farm land in the site and refilling the excavated area by selected material (Kulyab SETM);
- (4) Excavating a part of borrow area to open the required land space for the installation of the plants (Sughd SETM);
- (5) Securing electricity and water;
- (6) Providing security measures for the plants' sites including equipment to be procured; and
- (7) Access roads for conveying the materials and equipment for construction of asphalt plants and aggregate plants.

14-5. Both sides agreed that the Tajikistan side will submit the implementation plan of the necessary measures described in 14-4 for installation of asphalt plants and aggregate plants to the JICA Tajikistan office by the end of August 2015.

14-6. All the equipment to be procured under the Project, except for asphalt plants and aggregate plants, will be handed over from a contractor(s) to be employed under the Project to the Tajikistan side at Sughd SETM and Kulyab SETM respectively. The Tajikistan side agreed to take all the responsibilities for the inland transportation of the equipment from Sughd SETM and Kulyab SETM to the final designated places to be stored. The Tajikistan side agreed to report the progress of the inland transportation mentioned above to JICA Tajikistan office on a monthly basis until the completion of said inland transportation. As for asphalt plants and aggregate plants, they will be handed over at the site 1 and the site 2 as described in 6-2 respectively.

14-7. The Team explained and the Tajikistan side agreed that taking necessary actions to enhance the awareness/consciousness of the road users of respecting traffic regulations is fundamental, especially regarding the following issues, to maintain road facilities and to ensure road safety.

- (1) Overloading vehicles exceeding designed live load would cause earlier rehabilitation necessity and shorter life of the facilities.
- (2) Proper asset management, including daily/preventive check and repairs would impact positively on maintenance cost reduction and longer lifespan of the facilities.

Annex-1: Project Sites

Annex-2: Organization Chart of MOT

Annex-3: Organization Chart of Sughd SETM and Kulyab SETM

Annex-4: The List of Road Maintenance Equipment and Plants Proposed from the Government of the Republic of Tajikistan

Annex-5: Japan's Grant Aid Scheme

Annex-6: Major Undertakings to be Taken by Each Government

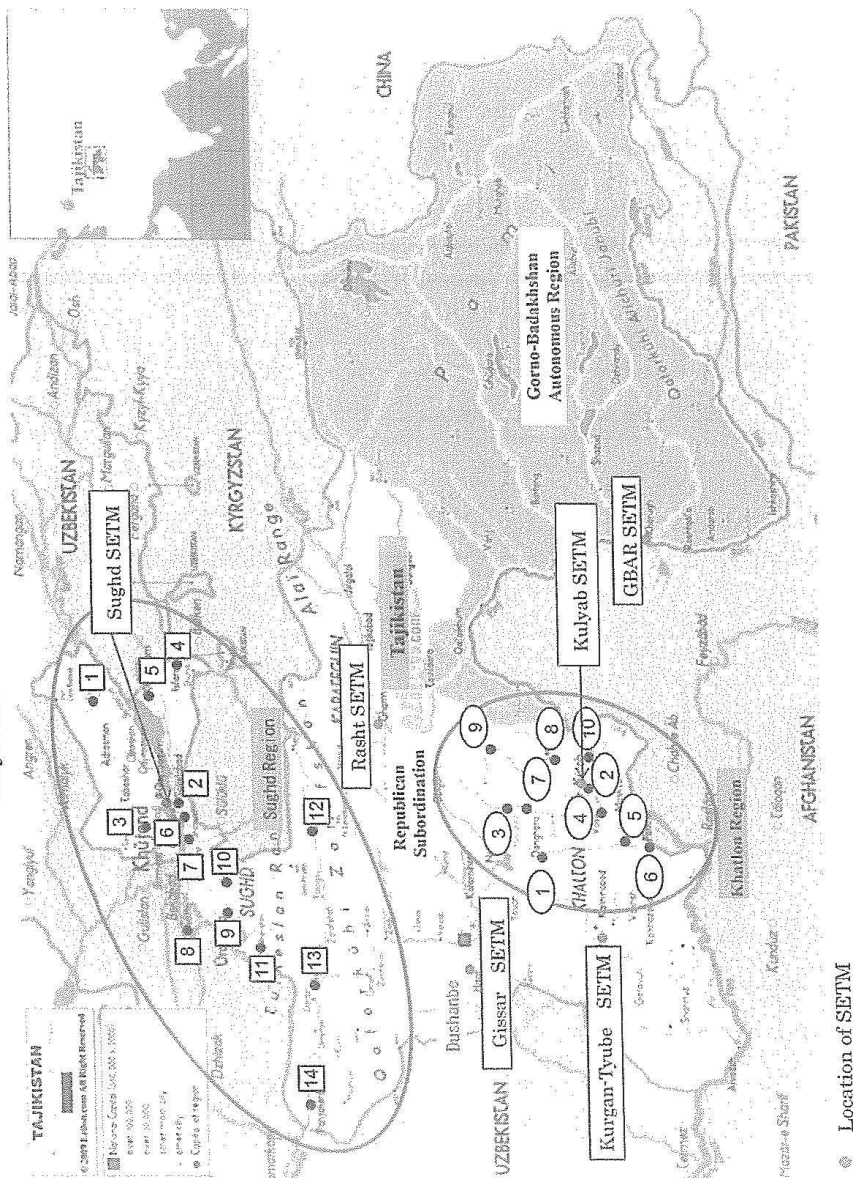
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Annex-1

Project Sites



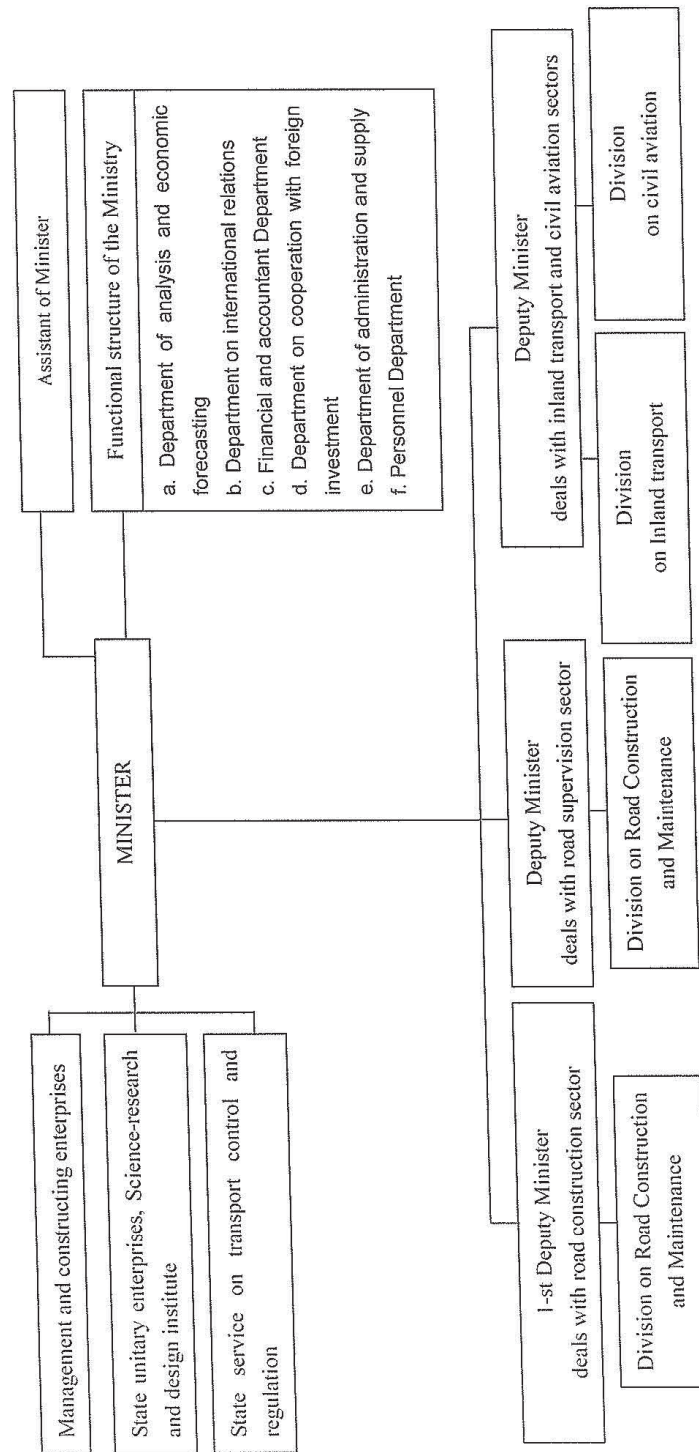
No.	SEHMs under the Sughd SETM
1	Asht
2	Cafurov
3	Mascha
4	Isfara
5	Kanibadam
6	Rasulov
7	Splamen
8	Zafarabad
9	Istaravshan
10	Ganchi
11	Shakhrastan
12	K. Mascha
13	Ayni
14	Penzhikent

No.	SEHMs under the Kulyab SETM
1	Dangara
2	Kulyab
3	Baljuvan
4	Vose
5	Hamidoni
6	Farhar
7	Tenurmaliq
8	Muminabad
9	Hovafing
10	Shurabad

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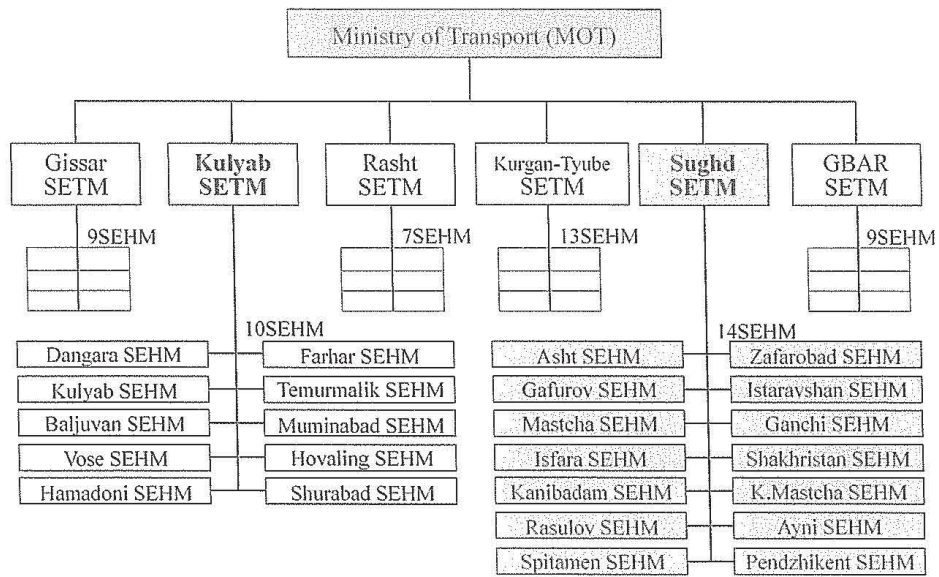
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Organization Chart of MOT



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Organization Chart of Sughd SETM and Kulyab SETM



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**The List of Road Maintenance Equipment and Plants Proposed from the
Government of the Republic of Tajikistan**

(1) Road Maintenance Equipment and Plants,

Name of Equipment		Sughd SETM	Kulyab SETM	Total
Vibration Compactor	No.	12	8	20
Hand Breaker	No.	12	8	20
Air Compressor	No.	12	8	20
Asphalt Sprayer	No.	12	8	20
Hand Guide Roller	No.	12	8	20
Motor Grader	No.	7	7	14
Wheel Loader	No.	8	8	16
Dump Truck	No.	14	10	24
Truck with Crane	No.	12	8	20
Line Marker	No.	1	1	2
Asphalt Finisher	No.	1	1	2
Road Roller	No.	2	2	4
Tire Roller	No.	1	1	2
Crawler Excavator	No.	1	1	2
Asphalt Plant	No.	1	1	2
Aggregate Plant	No.	1	1	2
Bulldozer	No.	3	3	6
Water Tank Truck	No.	1	1	2
Wheel Excavator	No.	3	3	6
Mobile Workshop	No.	1	1	2
Tractor with Trailer	No.	1	1	2
Pickup Truck	No.	2	2	4
Laboratory Equipment	No.	1	1	2
Tunnel Inspection Vehicle	No.	1	0	1

(2) Spare Parts for the Road Maintenance Equipment and Plants mentioned in (1).

The volume of spare parts will be decided considering the sustainability of the Project etc.

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Japan's Grant Aid Scheme

The Government of Japan (hereinafter referred to as “the GOJ”) is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

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

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

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

2. Preparatory Survey

(1) Contents of the Survey

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

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.

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- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

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

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

(2) Selection of Consultants

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

(3) Result of the Survey

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

3. Japan's Grant Aid Scheme

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

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

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(2) Selection of Consultants

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

(3) Eligible source country

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

(4) Necessity of "Verification"

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

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

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

(6) "Proper Use"

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

(7) "Export and Re-export"

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

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter

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referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

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

(9) Authorization to Pay (A/P)

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

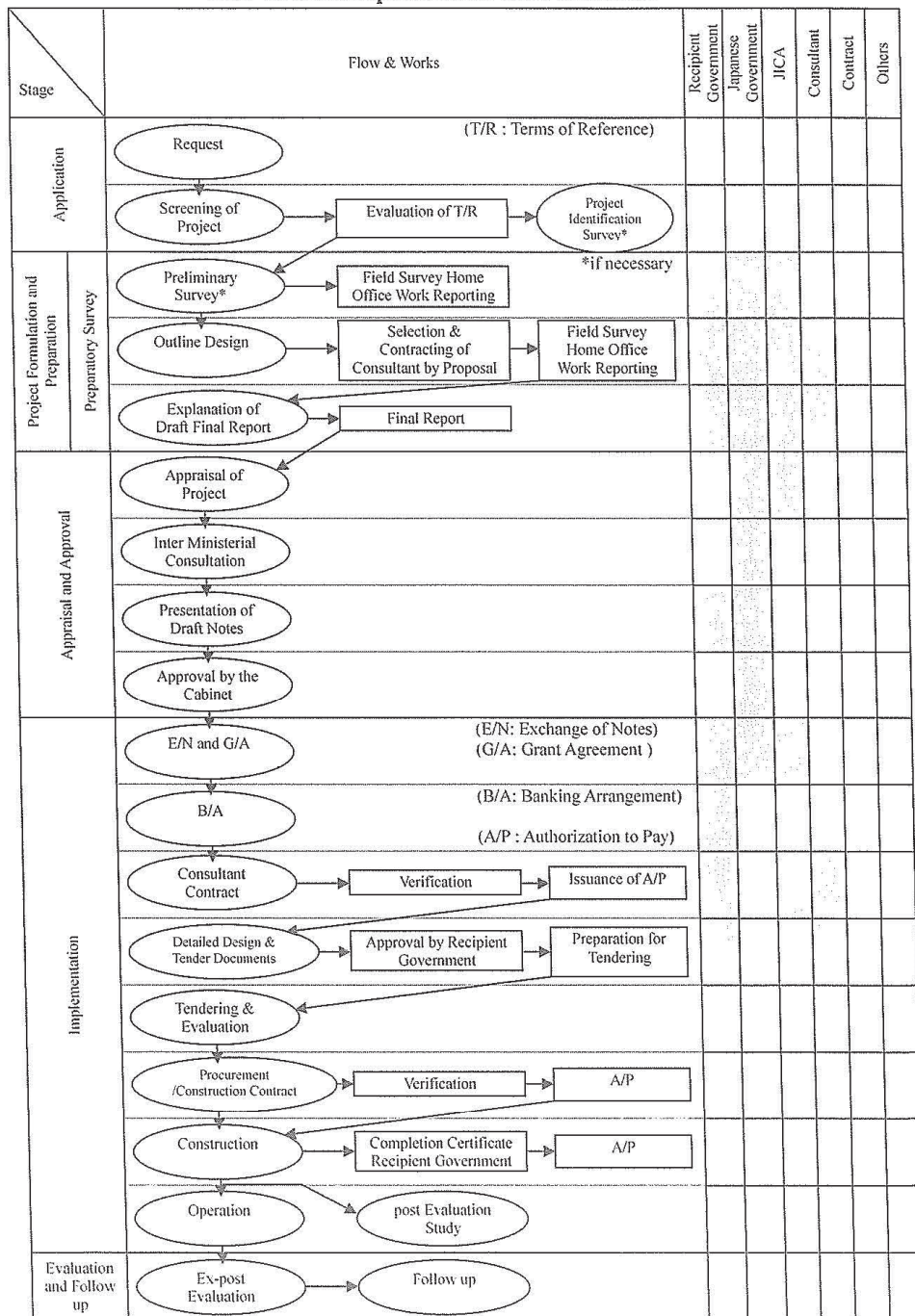
(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

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Flow Chart of Japan's Grant Aid Procedures



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Major Undertakings to be Taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient
1	To ensure prompt customs clearance of the products and to assist internal transportation of the products in the recipient country		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
2	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted		●
3	To accord Japanese nationals and / or nationals of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
4	To ensure that the products be maintained and used properly and effectively for the implementation of the Project		●
5	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
6	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●

(B/A : Banking Arrangement, A/P : Authorization to pay)

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Oki

(November, 2015)

**Minutes of Discussions
on the Preparatory Survey for the Project for
Improvement of Equipment for Road Maintenance
in Sughd Region and the Eastern Part of Khatlon Region
in the Republic of Tajikistan
(Explanation on Draft Preparatory Survey Report)**

On the basis of the discussions and field survey in the Republic of Tajikistan (hereinafter referred to as "Tajikistan") in April 2015, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report on the Project for Improvement of Equipment for Road Maintenance in Sughd Region and the Eastern Part of Khatlon Region (hereinafter referred to as "the Draft Report").

In order to explain the Draft Report and to consult with the concerned officials of the Government of Tajikistan on its contents, JICA sent to Tajikistan the Preparatory Survey Team for the explanation of the Draft Report (hereinafter referred to as "the Team"), headed by Mr. Tomoyuki Naito, Special Advisor, Infrastructure and Peacebuilding Department, JICA, and is scheduled to stay in the country from November 23 to 28, 2015.

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

Dushanbe, November 26, 2015



Tomoyuki Naito

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Japan



Sherazi Ganjalzoda

Minister

Ministry of Transport

The Republic of Tajikistan

ATTACHEMENT

1. Contents of the Draft Report

The Tajikistan side agreed and accepted in principle the contents of the Draft Report including its draft technical specifications of equipment explained by the Team. The list of equipment to be procured under the Japan's Grant Aid Scheme is indicated in Annex1.

2. Cost Estimation

Both sides confirmed that the cost estimation for the Project for Improvement of Equipment for Road Maintenance in Sughd Region and the Eastern Part of Khatlon Region (hereinafter referred to as "the Project") described in Annex 2 is provisional and will be examined further by the Government of Japan for its final approval.

3. Confidentiality of the Cost Estimation and Specifications

Both sides confirmed that the Project's cost estimation and its draft technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts of the Project are concluded.

4. Validity of the Previous Minutes of Discussions

Both sides confirmed that all the agreements in the Minutes of Discussions of the preceding Preparatory Survey signed on April 17, 2015 continue to be valid unless information is updated by the Draft Report.

5. Japan's Grant Aid Scheme

The Tajikistan side understands the Japan's Grant Aid Scheme and its procedures as described in Annex 3 and Annex 4 respectively, and necessary measures to be taken by the Government of Tajikistan.

6. Project Implementation Schedule

The Team explained to the Tajikistan side that the tentative project implementation schedule is as attached in Annex 5.



7. Expected Outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows;

[Quantitative Effect]

Effect	Base Value (2014)	Target Value (2020)
Sughd SETM Area of Pothole annually repaired by cold-mix asphalt (m ²)	71,000	109,000
Sughd SETM Length of Pavement annually overlaid by hot-mix asphalt (equivalent 2 lanes) (km)	8	11.2
Kulyab SETM Area of Pothole annually repaired by cold-mix asphalt (m ²)	24,000	48,000
Kulyab SETM Length of Pavement annually overlaid by hot-mix asphalt (equivalent 2 lanes) (km)	7	8

[Qualitative Effect]

- Because the cold-mixed asphalt is able to be produced in the asphalt plant as well as the hot-mixed asphalt and proper equipment are to be utilized for pothole repair, the road quality of the repaired area is to be bettered and the life of the repaired area would be extended.
- Due to the production of the hot-mixed asphalt in the self-owned plant instead of procurement from outside, and usage of proper equipment, both cost and quality in the asphalt overlay work are to be improved.
- By the equipment procured for disaster recovery, the less frequency of the traffic stoppage by disasters (flood and/or avalanche) would be expected.

The Tajikistan side has responsibility to monitor the progress of effects based on the above described indicators, as well as its achievement targeted by year 2020.

8. Undertakings Taken by Both Sides

Both sides confirmed the major contents of necessary undertakings described in Annex 6. The Tajikistan side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions for the implementation of the Project. It is further agreed that the described costs are all indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage. Contents of Annex 6 will be updated as the

Detailed Design progresses, and will finally be the Attachment to the Grant Agreement (G/A).

9. Monitoring during the Implementation

The Project will be monitored every 3 months by the executing agency and using the Project Monitoring Report (PMR) format as attached in Annex 7.

10. Ex-Post Evaluation

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

11. Schedule of the Study

JICA will complete the Final Report of the Preparatory Survey in accordance with the confirmed items and send it to the Tajikistan side around February, 2016.

12. Environmental and Social Considerations

The project is likely to have minimal adverse impact on the environment under the 'JICA Guidelines for Environmental and Social Considerations (April 2010)'.

13. Other Relevant Issues

13-1. Operation and Maintenance of the Equipment

The Team explained the importance of operation and maintenance of the equipments constructed by the Project considering that proper asset management impacts greatly on life-span of the facilities and its maintenance cost. Although the estimated required cost for the annual maintenance would be amounted to roughly ten percent of the current annual maintenance cost of the Ministry, the Tajikistan side understood the Team's explanation and mentioned that they shall secure enough staff and budgets necessary for appropriate operation and maintenance of the facilities. The annual operation and maintenance costs are estimated and shown in the Draft Report as well as in Annex 6.

13-2. Additional Aggregate and Asphalt Plant

Following the discussion during the last meeting between JICA and the Tajikistan side in April 17 2015, the Team investigated the necessity and appropriateness of the third aggregate and asphalt plant in Dangara which was additionally requested by the Tajikistan side at that time and concluded that the third plant is not feasible for the Project.

13-3. Disclosure of Information

Both sides confirmed that the study results excluding the Project cost will be disclosed to the public after completion of the Preparatory Survey. All the study results including the project cost will be disclosed to the public after all the contracts for the Project are concluded.

Annex 1	List of Equipment to be Procured
Annex 2	Project Cost Estimation
Annex 3	Japan's Grant Aid
Annex 4	Flow Chart of Japan's Grant Aid Procedure
Annex 5	Tentative Project Implementation Schedule
Annex 6	Major Undertakings to be taken by Each Government
Annex 7	Project Monitoring Report (PMR)

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Date