The Republic of Tajikistan
Ministry of Transport

Preparatory Survey Report
On
THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR ROAD MAINTENANCE IN KHATLON REGION AND DISTRICTS OF REPUBLICAN SUBORDINATION IN THE REPUBLIC OF TAJIKISTAN

February, 2013

Japan International Cooperation Agency (JICA)
Katahira & Engineers International

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on the Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination 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 field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this 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.

February, 2013
MIURA Kazunori
Director General,
Economic Infrastructure Department
Japan International Cooperation Agency

SUMMARY

(1) Background and Outline of the Project

Tajikistan is an inland country, and the most of the freight and passenger transportation rely on roads. The domestic trunk road is the main economic infrastructure that supports the trade within the country and also with surrounding countries. The length of the road network is about 30,000 km, mostly constructed during the Soviet era. The civil war occurred after the independence in 1991, and years of negligence on maintenance caused severe damages to the road, leading in turn to increasing transportation costs. In 2011, the Tajikistan Government developed " National Target Development Strategy for Transport Sector of the Republic of Tajikistan to the Year 2025" to solve the abovementioned issue by constructing, repairing and properly maintaining the trunk roads.

In August 17, 2011, Tajikistan requested for Japanese Grant to procure the road maintenance equipment to improve the road maintenance capacity in Khatlon Region and Districts of the Republican Subordination. Project area covers the trunk road network connecting Dushanbe suburbs, Kurgan-Tyube city and Nijni-Pyanj city. This road is highly prioritized in the State Program mentioned above. Gissar SETM with its 9 subordinated SEHMs and Kurgan-Tyube SETM with its 13 subordinated SEHMs are responsible to operate and maintain these roads.

This Project aims to provide the road maintenance equipment to these 2 SETMs and their subordinated 22 SEHMs to achieve appropriate operation and maintenance of the road, and improving efficiency of the freight and passenger transportation.

(2) Survey Results and the Project Content

From July 29 to August 28, 2012, survey team members implemented site survey with cooperation of Ministry of Transport in the Republic of Tajikistan. Survey team studied institutional organization, availability of human resources, finance and budgeting, technical level, existing facilities and equipment, privatization trend, and candidate locations for the asphalt and crushing plants installation. Survey team also studied road maintenance works of 2 SETMs and surrounding conditions of the road in the project area. Special attention was paid to the condition of construction equipment, procured from China by EBRD funds in 2009. Experience of application and usage of this equipment was reflected in designing this Project.

Basic and other policies of the Project are described below:

Basic Policy

The equipment to be supplied by this Project should be applicable to the following works, which are implemented by SEHMs under the control of SETMs:

Table-1 Types of works implemented by SEHMs under SETMs

Work name	Detailed description
Road repair works(1)	Daily maintenance works, like pothole repairs, etc.
Road repair works(2)	Medium scale repair works, like surface overlaying and pavement renewal(replacement)
Snow cleaning and melting works	Snow clearing, snow removing, spreading salts and melting agents
Disaster recovery	Removing rock falls and landslides, recovery of damaged roads
Back up works	Transporting equipment, repairing construction equipment at workshops and on sites

On the relation of works Road repair (2): overlay and pavement renewal, the contractor is selected by the tender, in which the amount of works is established by MOT. The tender procedure is carried out by the State Construction Committee. Private civil engineering firms can also participate in tenders. But there are also difficult and remote road sites, in which the private sector would not be interested to participate. In these cases, works are imposed to the only bidder MOT. Considering this circumstance, equipment for overlay and pavement renewal will be also considered within the project.

For capital construction works and reconstruction of roads, MOT is attracting the donorship funds. In these cases the contractor is defined in the international tender. Therefore, these works will not be considered in this project.

Technical Specifications of the equipment

In defining technical specifications of the equipment, the Project will refer to the experience of equipment procurement project in Kyrgyzstan, "the Project for Improvement of Equipment for Road Maintenance in Issyk-kul and Chui region", where the natural and social conditions are similar.

Selecting Equipment Supplying Countries

The procurement plan of this project basically will be limited to Japanese products. For the products, that are not produced in Japan or in case the number of makers are limited, products of third countries with the same level of Japanese quality should be considered. As for the third countries, mainly European makers should be considered.

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, which is equivalent to 3000 motor/hours for construction machinery and 80,000 km run for vehicles. These parts should be used for periodical maintenance and changing wearing parts. (Changing oils will not be included).

Operation and maintenance

In case, the equipment should be delivered by this project, Tajikistan side should dispatch needed number of trainees, and Japanese side should provide trainers for start-up operation guidance for the each equipment. Trainings will be provided on operation and maintenance of equipment. Following the project, JICA is planning to introduce Road Maintenance Technical Cooperation project.

Content and scope

Table-2 List of equipment (M/D and Application) K: for Kurgan-Tyube, G: for Gissar

No	Name of equipment	Technical specification	M/D			Application	
			K	G	Sum	K	G
1	Asphalt Cutter	Cutting depth 150 mm	6	4	10	5	5
2	Vibration Compactor	Weight 70 kg	6	4	10	7	6
3	Hand Breaker	Weight 7 kg	6	4	10	5	
4	Air Compressor	Air blow capacity 5.1 m3/min.	3	2	5	3	
5	Asphalt Sprayer	Tank capacity 400 Litter class	3	2	5	3	
6	Hand Guide Roller	Weight 650 kg class	3	2	5	2	
7	Asphalt Distributer	Tank capacity 6,000 Litter class	1	1	2	Addition	
8	Asphalt finisher	Paving width 4.5m class	1	1	2	1	1
9	Road Roller	Weight10 ton class	1	1	2	1	1
10	Tire Roller	Weight15 ton class	1	1	2	1	1
11	Water Tank Truck	Tank capacity8000 Litter class	1	1	2	1	1
12	Motor Grader	Blade width3.7 m class	6	4	10	6	4
13a	Crawler Excavator	Bucket capacity0.8 m^3class	3	3	6	Change	
13b	Wheel Excavator	Bucket capacity0.8 m^3class	Change			3	3
14	Wheel Loader	Bucket capacity2.5 m^3class	2	1	3	2	1
15	Bulldozer	Weight 20 ton class	1	1	2	Addition	
16	Dump Truck	Loading weight 9.5 ton class	8	6	14	8	6
17	Asphalt plant	Production capacity35 ton/h class	1	1	2	1	1
18	Crushing plant	Production capacity35 ton/h class	1	1	2	1	1
19	Multi-Purpose Vehicle	4WD, with attachment PTO	1	1	2	1	1
19-1	Snow Plough	Blade width3.0 m class	1	1	2	1	1
19-2	Rotary Blower	Rotary diameter 750 mm class	1	1	2	1	1
19-3	Salt Spreader	Hopper volume 2.0 m^3 class	1	1	2	1	1
20	Truck with crane	Loading weight5 ton,2.8 ton with crane	1	1	2	1	1
21	Truck trailer	Loading weight 25 ton, low bedded	1	1	2	Addition	
22	Pickup truck	4WD, double cab	2	2	4	Addition	
23	Line Marker	Vehicle type	0	1	1	Addition	
24	Mobile Workshop	4 WD, load 8t class, aluminum box, with crane, repair tools and maintenance	1	1	2	1	1
25	Maintenance Equipment	Welder, generator, battery charger, lathe	2	2	4	1	1
26	Axis load and overall weight meter	Length of platform 16 m, Measure axis load and gross weight simultaneously	1	0	1	Addition	
	Total		66	52	118		

(3) Organization structure for the project implementation

The official counterpartner government organization and the implementing agency of this project is Ministry of Transport (MOT). MOT has enough qualification to implement this project, as it has experienced projects such as Japanese Assitance Project and Asian Development Bank (ADB). Construction and Road Management Department is under direct control of First Deputy Minister, which is responsible for construction works by MOT, and coordinates 6 regional road management offices (SETM). SETMs are responsible for transport traffic control (including public transport, like buses) and maintenance works. Each SETM is located at the central area of the region, and is supervising the operation and maintenance of the road infrastructure in each region. A national budget is allocated for operation SETMs and SEHMs in the region.

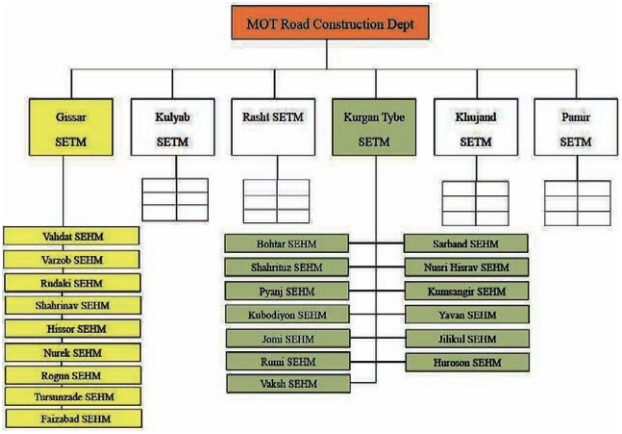

Figure-1 SETMs and SEHMs chart

In the case, when equipment shall be provided by this project, Tajikistan side should secure a necessary number of workers for training of initial operation for the each equipment provided by Japan. Equipment drivers and operators must learn to operate and maintain the equipment. Following the project, JICA is planning to introduce Road Maintenance Technical Cooperation project. It is recommended for members participated in start-up guidance to take a part in the following projects also.

MOT procured the construction machinery by utilizing EBRD fund and others in 2009, and acquired proper experiences for project execution, management and equipment operation and maintenance. As the implementing agency, MOT has complied for securing human resources and the budget within signed M/D. This project will require necessary budgeting to the regional offices for the road maintenance works by using provided equipment. Therefore, MOT is expected to properly execute the management, operation and maintenance of the procured equipment for this project.

(4) Project Validity Evaluation

Following are the main expected effects of the Project

1) Quantitative Effects

Table-3 Quantitative Effects

Index Name	Base Value (2012)	Target Value (2017)
Kurgan-Tyube SETM Annual area (m^2) of pothole repairs by hot asphalt mix	0	13,000
Gissar SETM Annual area (m^2) of pothole repairs by hot asphalt mix	0	6,000
Annual overlay repair length by hot asphalt mix (two lines equivalent, km)	0	10

Note) Currently, "cold asphalt" is manufactured by mixing local bitumen rich crude oil with crushed stone and sand by using motor grader. Cold asphalt is used for pavement repair and pothole repair. It is a temporary repair, and there are strength and durability problems of the repairs. The pothole repair area with cold asphalt (partially purchased) is 52,368m2 for Kurgan-Tyube SETM, and 26,487m2 for Gissar SETM in 2012.

2) Qualitative Effects

Qualitative effects of this project are as follows.

i. Improving strength and durability of repaired areas by repairing potholes and others by using asphalt concrete mix, manufactured in provided plants and pothole repair equipment sets.

ii. The period of a traffic disruption will be shortened by the efficiency of mechanizing the process of snow clearing, melting and spreading sands and agents during the winter time.

THE REPUBLIC OF TAJIKISTAN
THE PROJECT FOR IMPROVEMENT FOR ROAD MAINTENANCE
IN KHATLON DISTRICT AND DISTRICTS OF REPUBLICAN SUBORDINATION

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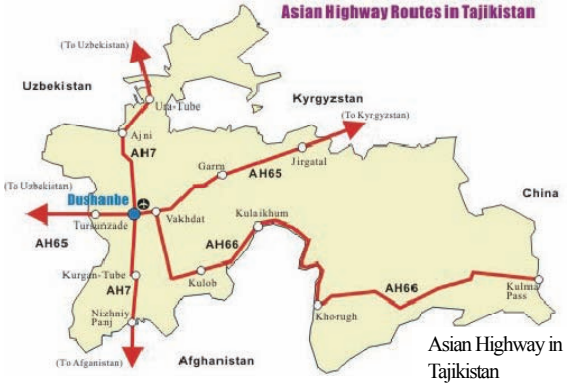
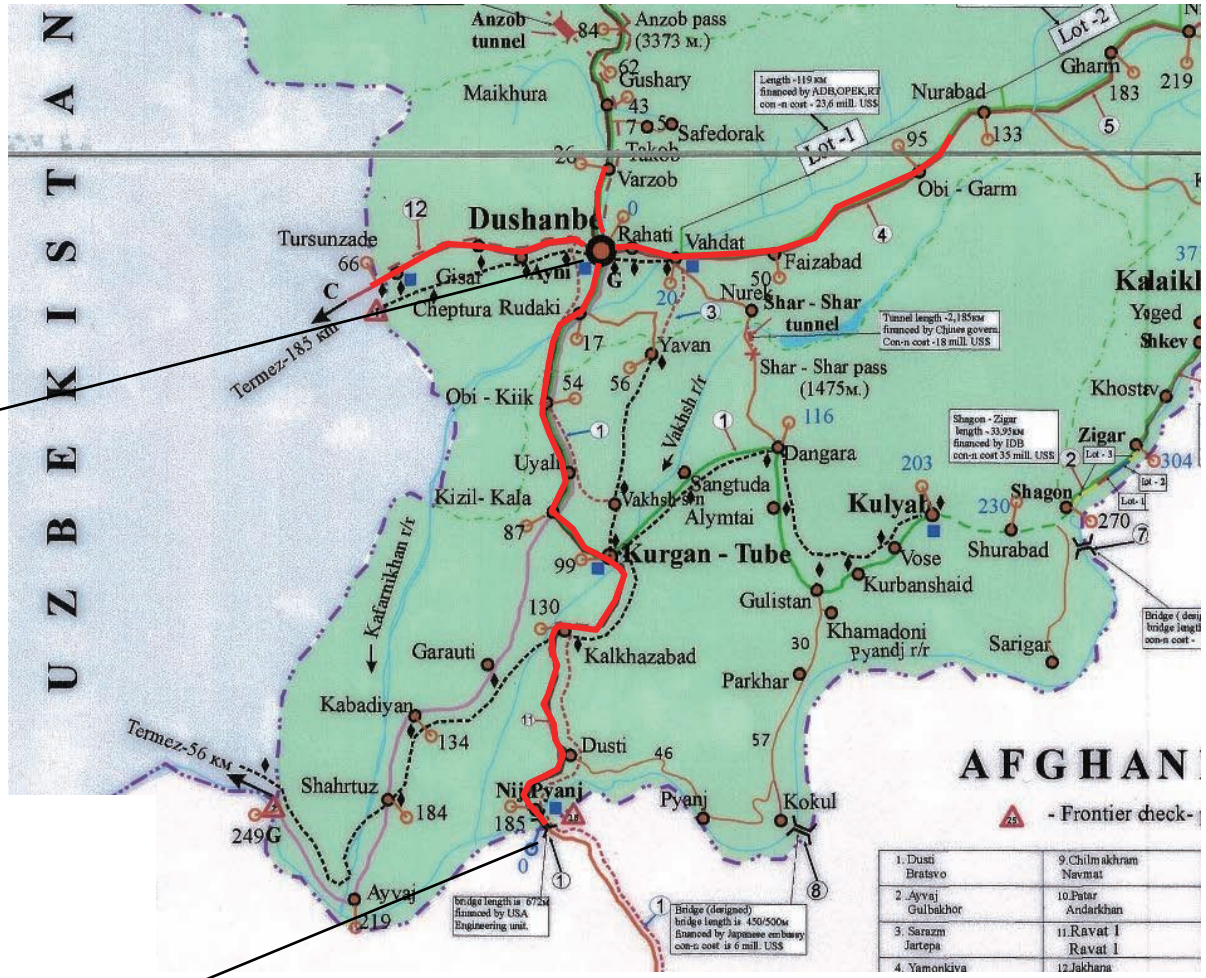


Asian Highway in Tajikistan



Dushanbe

93 km

Road Rehabilitation
from Dushanbe to Kurgan-Tyube
funded by ADB, completed in 2005

Kurgan-Tyube

17.9 km

Road Rehabilitation from Kurgan-Tyube to Dusti (Phase 2) to be completed in August 2013

42 km

Road Rehabilitation from Kurgan-Tyube to Dusti
Completed in November 2011

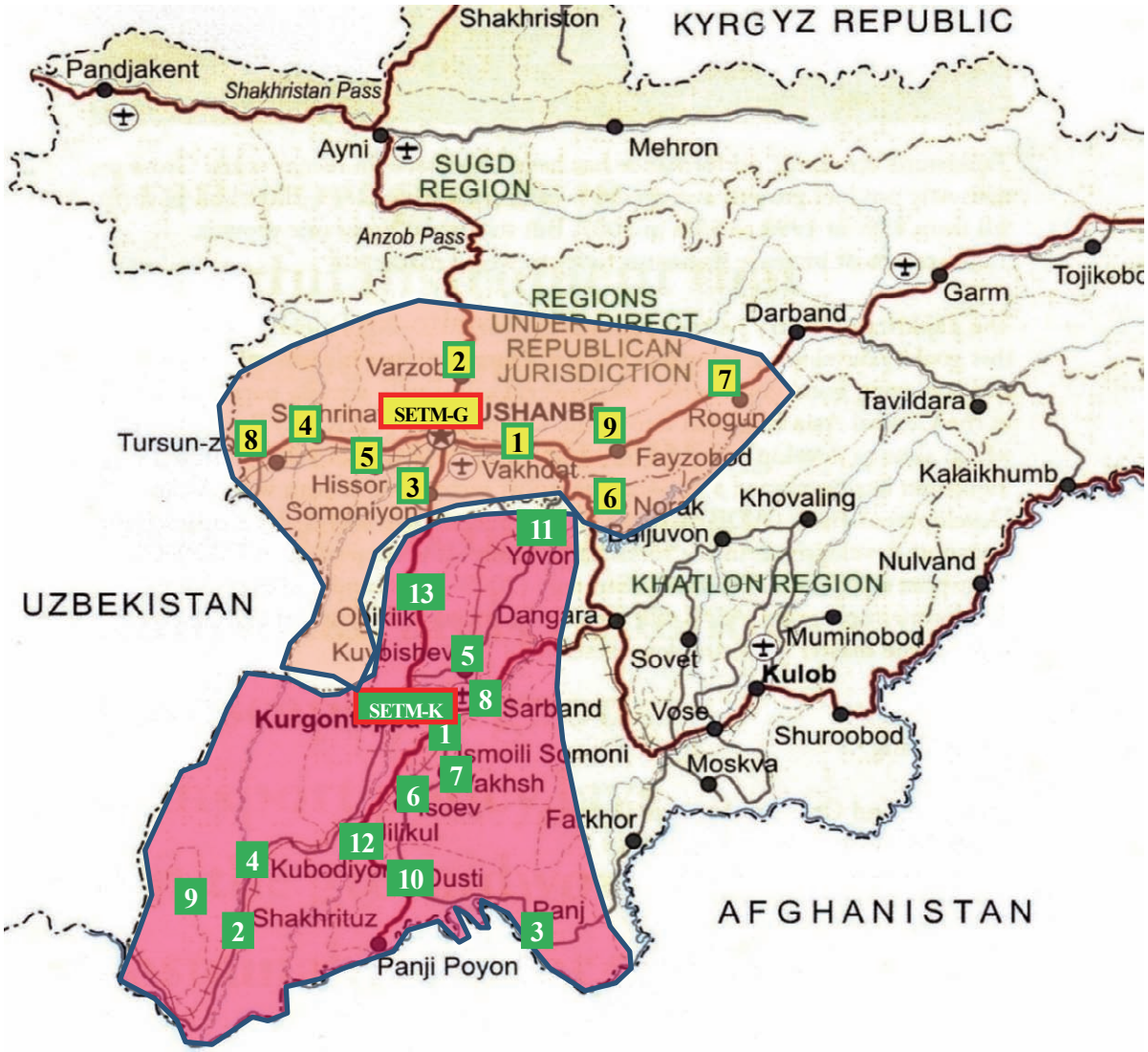
Dusti

23.7 km

Road Rehabilitation from Dusti to Nizhniy Pyandzh
8.34 km (Phase 1/2): completed in June 2008
15.36 km (Phase 2): completed in Nov. 2010

Nizhniy Pyandzh

Nizhniy Pyandzh Bridge funded by USA, completed in August 2008



Location map of State enterprises of transport management and State enterprises of highway management

DISTRICTS OF REPUBLICAN SUBORDINATION	
SETM-G	- State Enterprise of Gissar Transport Management (SEGTM)
State enterprise of highway management (SEHM)	
1	Vahdat
2	Varzob
3	Rudaki
4	Shahrinav
5	Hissor
6	Nurek
7	Rogun
8	Tursunzade
9	Faizabad

KHATLON DISTRICT (WESTERN REGION)	
SETM-K	- State Enterprise of Kurgan-Tyube Transport Management (SEKTM)
State enterprise of highway management (SEHM)	
1	Bohtar
2	Shakhrituz
3	Pyanj
4	Kubodiyon
5	Jomi
6	Rumi
7	Vaksh
8	Sarband
9	Nusri Hisrav
10	Kumsangir
11	Yavan
12	Jilikul
13	Huroson

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ABBRIVIATIONS

Abbreviations		Full name
ADB	:	Asian Development Bank
AH	:	Asian Highway
CAREC	:	Central Asia Regional Economic Cooperation Corridor
CIS	:	Commonwealth of Independent State
DBST	:	Double Bituminous Surface Treatment
EBRD	:	European Bank for Reconstruction and Development
EIA	:	Environmental Impact Assessment
EU	:	European Union
GNI	:	Gross National Income
GDP	:	Gross Domestic Product
IBRD	:	International Bank for Reconstruction and Development
IEE	:	Initial Environmental Examination
IMF	:	International Monetary Fund
IsDB	:	Islamic Development Bank
JICA	:	Japan International Cooperation Agency
M/D	:	Minutes of Discussion
MOT	:	Ministry of Transport, Tajikistan
MOTC	:	Ministry of Transport and Communication, Kyrgyz Republic
NDS	:	National Development Strategy
PBM	:	Performance Based Maintenance
ROW	:	Right of Way
RT	:	Republic of Tajikistan
SCEP	:	State Committee on Environmental Protection and Forest Industry
SCLM	:	State Committee for Land Management
SEHM	:	State Enterprise on Highway Maintenance
SETM	:	State Enterprise of Transport Management
TJS	:	Tajikistan Somoni
TRACECA	:	Transport Corridor Europe Caucasus Asia
UN	:	United Nation
WB	:	World Bank

CHAPTER 1. Background of the Project

1-1 Background and Outline of the Project

1-1-1 Background and Outline of the Project

After Basic Design Study for the Project of rehabilitation of Dusty-Nijiny Paynj Road in the Republic of Tajikistan in 2005, JICA implemented the reconstruction of 83.6 km road between Kurgan-Tyube – Dusti by Japan ODA. The reconstruction of about 18 km unfinished section of the road is planned to complete by August 2013, under the project for Rehabilitation of Kurgan-Tyube - Dusti Road (Phase 2).

On the other hand, MOT is currently controlling about 13,800 km of international and domestic trunk road network by SETMs (6 regions) and SEHMs (62 offices all over the country). SETMs manage and supervise SEHMs under their control, and SEHMs check and repair the road pavement, bridges and other constructions. But because of lack of necessary equipment, the road and facilities are not maintained properly, leading to damages and degradation of the road network.

Considering the situations, in August 17, 2011, Tajikistan Government made an application for grant aid to Japan for procurement of equipment necessary for maintenance of roads for Khatlon Region and Districts of Republican Subordination to increase road maintenance capacity. The objects of the project are Gissar SETM with its 9 SEHMs and Kurgan-Tyube SETM with its 13 SEHMs. (Refer to "Location map of State enterprises of transport management and State enterprises of highway management" in the beginning of this report)

The list of the equipment requested in 2011 is as shown in the table below.

Table 1-1-1 The list of requested equipment

ID	Equipment	Total	Kurgan-Tyube SETM	Gissar SETM
1	Asphalt Cutter,150 mm	10	5	5
2	Vibration Compactor,60 kg	13	7	6
3	Hand Breaker,7 kg	10	5	5
4	Air Compressor,5 m^3	5	3	2
5	Asphalt Sprayer,350 lite	6	3	3
6	Hand Guide Roller, 600 kg liter	4	2	2
7	Asphalt Finisher,4.4 m	2	1	1
8	Road Roller,9 ton	2	1	1
9	Tire Roller,8-12 ton	2	1	1
10	Water Tank Truck,8 KL	2	1	1
11	Motor Grader,3.7 m,100 kw	10	6	4
12	Wheel Excavator,0.8 m^3	6	3	3
13	Wheel Loader,2.5 m^3	3	2	1
14	Dump Truck,250 kw,14t	14	8	6
15	Asphalt Plant,35 t/h	2	1	1
16	Crushing Plant, 35 t/h	2	1	1
17	Multi-Purpose Vehicie, 4×4	2	1	1
17-1	Snow Plough Attachment	2	1	1
17-2	Rotary Blower Attachment	2	1	1
17-3	Salt Spreader Attachment	2	1	1
18	Truck with Crane, 5 ton	2	1	1
19	Mobile Workshop,4WD	2	1	1
20	Maintenance Equipment	1	0	1
	Total quantity	106	56	50

* spare parts included。

Followings are four types of road maintenance works:

(1) Patching (Pothole repair and crack sealing)

(2) Overlay and pavement renewal

(3) Snow clearing and melting works

(4) Disaster recovery works

1-1-2 Natural Conditions

The data of the temperature and the precipitation of Kurgan-Tyube in which Gissar STEM (Dushanbe city) and Kurgan-Tyube SETM are located is shown in the following figures respectively. Both of the sources are the data of World Meteorological Organization.

Each graph displays the mean maximum temperature and the mean minimum temperature by month, the difference is hardly seen. Especially, there is a little precipitation compared with Tokyo.

The Faizabad district called Tajikistan Siberia for its 1.5 m snow accumulation at the mountain pass located 1200 m above the sea level.

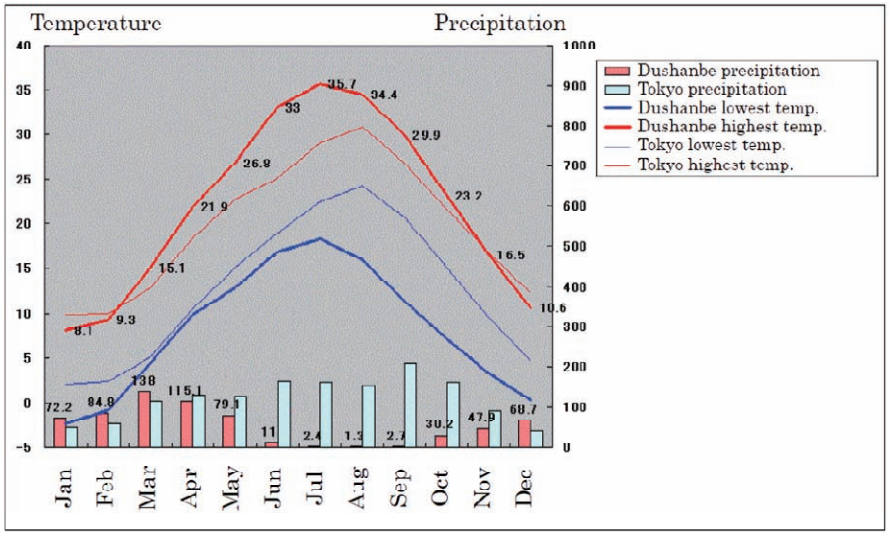


Figure 1-1-1 The temperature and the precipitation in Dushanbe

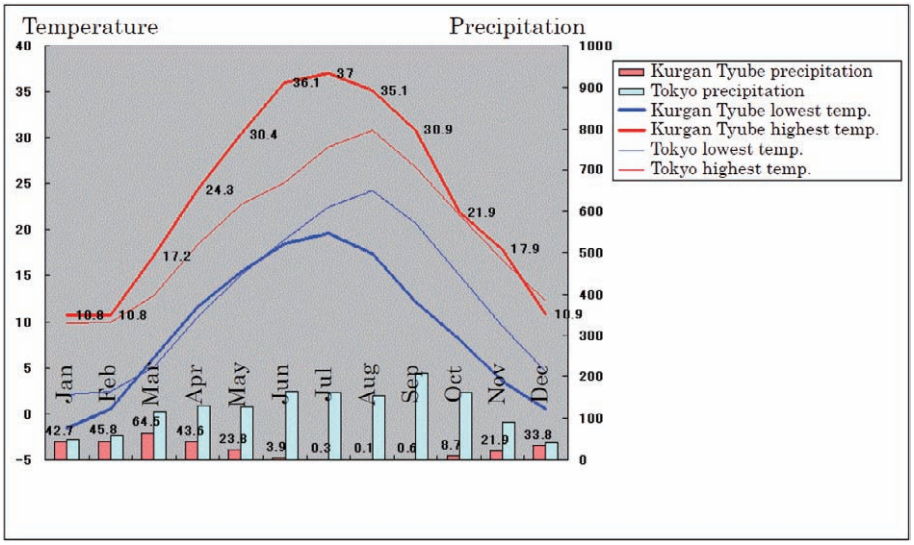


Figure 1-1-2 The temperature and the precipitation in Kurgan-Tyube

1-1-3 Environmental and Social Impact

This project is about providing the equipment, and JICA environmental category is C. Equipment include Asphalt Plant and Crushing Plant also. For the plants installation, an assessment equivalent to EIA (Environmental Impact Assessment) should be implemented by counterpart organization in accordance with the Laws of the Republic of Tajikistan. License procedures differ for Asphalt Plant and Crushing Plant installations. These procedures are described below for each type of plants.

(1) Installation license for stone quarry and crushing plant

Following table describes the procedures for acquiring installation license for stone quarry and crushing plant

Table 1-1-2 Installation license for stone quarry and crushing 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) equivalent. 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 RT.
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.

(2012/08/013, Interview to International Investment and Cooperation Department, MOT)

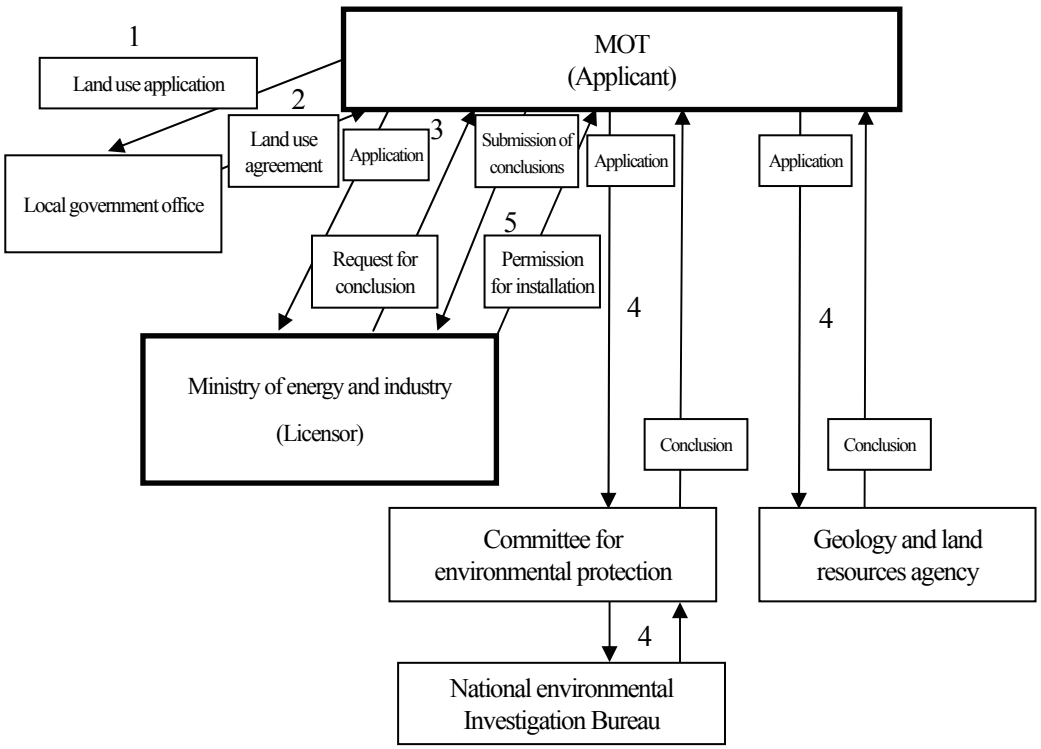


Figure 1-1-3 Flow of permission procedures for plant installation

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 the case of grant aid projects the cost of different conclusions is covered by Tajikistan side.

Detailed data of plants (location map, specifications, etc.) will be needed to issue conclusions. The consultant will provide MOT with plants' data, after the supplier will be decided at the tendership organized by the consultant. If needed, the consultant provides engineering and technical support. MOT should acquire installation permission for the stone quarry and the aggregate plant at least within six months after contracting for the procurement.

(2) Permission documents for A/P installation

In relation to installation of A/P, obtaining allowing documents also is required separately, but procedure takes place according to the simplified scheme comparing to the stone quarry and C/P. At the beginning of the project for Kurgan-Tyube - Dusti Road reconstruction, the Japanese company DaiNihonDoboku carried out the following procedures for obtaining permission of A/P installation.

i. MOT will send the letter about A/P installations to Kurgan-Tyube's corresponding SEHM.

ii. Representatives of the relevant state agencies form the commission and inspect a site of installation of A/P (A/P shouldn't be within the city).

iii. After consideration of all questions, the commission makes and signs the allowing protocol on installation.

Participants of the commission are local state agencies, land use committee, architecture committee, environment protection committee, Sanitary supervision doctor, fire safety service, electric power service, Tajiktelekom, water supply service, regional local road office, gas supply service.

After definition of the supplier in tenders organized by the consultant, specifications have to be provided to MOT immediately. If necessary the consultant will give technical support. MOT should obtain installation licenses for A/P within 6 months after signing the contract with a supplier.

CHAPTER 2. Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Overall Goal and Project Purpose

Tajikistan is an inland country, and the most of the freight and passenger transportation rely on roads. The domestic trunk road is the main economic infrastructure that supports the trade within the country and also with surrounding countries. The road network is about 30,000 km, mostly constructed during the Soviet era. The civil war after the independence in 1991, and years of neglect maintenance caused severe damages of the road leading to increase transportation costs. In 2011, the government developed "National Target Development Strategy for Transport Sector of the Republic of Tajikistan to the Year 2025" to face the issue by construction, repair, operation and proper maintenance of the trunk roads. This projects aims to provide with road maintenance equipment to 2 SETMs and their subordinated 22 SEHMs, those responsible for the magisterial roads connecting Dushanbe suburbs, Kurgan-Tyube and Nijni-Pyanj. This road is also highly prioritized in the State Program mentioned above. The objective is to achieve an appropriate operation and maintenance of the road and improving efficiency of the freight and passenger transportation.

2-1-2 Outline of the Project

In order to achieve the overall goal, this project aims to provide with road maintenance equipment to 2 SETMs and subordinated 22 SEHMs, those are responsible for maintaining the magisterial roads connecting Dushanbe suburbs, Kurgan-Tyube and Nijni-Pyanj, and provide initial operation guidance to the counterparts. As a result, the pothole repairing area and overlay road distance will increase. The usage of the pothole repair equipment for road maintenance works will improve the strength and the durability of the repaired parts and will increase the efficiency of snow clearing and melting works during winter time.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Basic Policy

In 2011, the Tajikistan Government developed "State Program on Transport Development for Tajikistan, 2010-2025". The object of the project are two SETMs (Gissar SETM and Kurgan-Tyube SETM), those control and maintain the trunk road network connecting Dushanbe suburbs, Kurgan-Tyube city and Nijni-Pyanj city. This road is highly prioritized in the State Program mentioned above. The part of the Kurgan-Tyube – NijniyPyanj Road was reconstructed under the Japanese Grant Aid, this project will contribute to proper maintenance of the reconstructed road.

The project should provide the equipment suitable for following road maintenance works, which are implemented by SEHMs under the supervision of SETMs.

Table 2-2-1 The types of works implemented by SEHMs under SETMs

Work name	Detailed description
Road repair works (1)	Patching・Crack sealing repair
Road repair works (2)	Overlay and pavement renewal
Snow cleaning and melting works	Snow cleaning, removing ice, spreading salts and melting works
Disaster recovery	Removing rock falls and landslides, recovery of damaged roads
Back up works	Transporting equipment, repair in workshops and at sites

In defining technical specifications of the equipment, the Project will refer to the experience of equipment procurement project in Kyrgyzstan, "the Project for Improvement of Equipment for Road Maintenance in Issyk-kul and Chui region", where the natural and social conditions are similar.

On the relation of works Road repair (2): overlay and pavement renewal, the contractor is defined at the tender auction, in which the amount of works is established by MOT. The tender procedure is carried out by the State Construction Committee. Private civil engineering firms can also participate in tenders. But there are also difficult and remote road sites in which the private sector would not be interested to participate. In these cases, works are imposed to MOT, without tendering. Considering this circumstance, equipment for overlay and pavement renewal will be also considered within the project.

For capital construction works and reconstruction of roads, MOT is attracting the donorship funds. In these cases the contractor is defined in the international tender auction. Therefore, these works will not be considered in this project.

2-2-1-2 Natural Conditions

Natural conditions in Khatlon region (State Enterprise of Kurgan-Tyube Transport Management) and the districts of republican subordination are as follows.

i. Temperature range : －25℃ ～＋45℃
ii. Altitude : 500 ～ 1,500 m
iii. Rainfall : about 650 mm annually
iv. Snowfall : 10 ～ 150 cm

In severe winter conditions, the equipment is used only for snow cleaning. The general technical characteristic of the equipment of Japanese and European producers fully corresponds to the working conditions. There is no need for introducing special measures.

2-2-1-3 Environmental Protection Policy

The project is about providing road repairing equipment to service existing roads, and classified as Category C for environmental and social consideration. The project has no interferences to the environmental and social aspects.

Currently, Tajikistan introduced Euro-2 standards for engine exhaust of construction equipment and vehicles. The country aims to transfer to Euro-3 standards toward April 2013. But because RT heavily relies on imported products, standards are not followed strictly.

From other hands, available fuel is consisting impurities, like water, oils, etc. The quality of the fuel is in question. Therefore, the main equipment should be equipped with fuel filters and water separators to protect engines from damages and to decrease exhaust gases to the atmosphere.

Considering the quality of the fuel in RT and contraction equipment used in surrounding countries, Euro 2- 3 standards will be applied for gas exhausts.

2-2-1-4 Maintenance and Operation Policy

As it is shown in **2-5-2 Operation and Maintenance Cost** of the equipment, annual expenses on operation and maintenance of the provided equipment according to this project will be about by 4,740 thousand somoni. This amount is about 10% of MOT annual budget for the maintenance of roads, equal to 46,800 thousand somoni. Considering a growth of MOT budget from last years, MOT is capable to allocate proper budgeting for the operation and maintenance of the provided equipment under to this project

Additionally for increasing operation frequency of the equipment, it is necessary to implement preventive maintenance to avoid breakdowns of equipment. Also when breakdowns occur on sites, it is important to implement quick repair. Repairing equipment, that can be transported and implement repair works on the site should be also provided.

The consultant will omit soft component in this project, as JICA is planning to implement the project of technological transfer for road maintenance after the equipment will be provided by this project.

However, there should be start-up guidance (limited mainly to operation, control and daily maintenance) for pothole repairing by using equipment set, surface pavement by using asphalt finisher, preventive maintenance and equipment repair by using mobile workshop and maintenance equipment. These trainings are usually provided by equipment makers and suppliers after the delivery. By the request of MOT, trainings for SETM and SEHM workers should be organized in two places – SEGTM and SEKTM.

2-2-1-5 Spare Parts Procurement Policy

For the construction equipment, procured by MOT at EBRD fund, spare parts and engine oils were also included for two years. The control of these spare parts was under SETM's responsibility, where the register books were held to record the conditions of the equipment, spare parts in and outs. Similar to EBRD project,

MOT has requested the same number of the spare parts. This project also will provide spare parts for two years according to the request of MOT. Engine and hydraulic oils will not be provided.

In Tajikistan, there are several service dealers represent the producers. Therefore, after the third year of service MOT has enough opportunity to obtain the spare parts of producers in Tajikistan.

i. Construction equipment: Zeppelin Company dealer representative of Caterpillar, Turkuaz Machinery Ltd Co. Dushanbe representative of HITACHI. For the equipment of KOMATSU and others, dealers from Russia and Turkey send the service agents to the site. Besides, there are many private suppliers of spare parts. There are also informal service centers for TEREX (UK), VOLVO (Switzerland), HYUNDAI (Korea).

ii. Truck vehicles: the main trucks are CINO Truck (China), KAMAZ (Russia). There are no official dealers of these producers in the country. By request, serving experts are sent from China, Russia, Turkey, etc. There are many private suppliers of spare parts.

2-2-1-6 Selecting Equipment Supplying Countries

Along with former soviet equipment, Chinese, European and Japanese machineries are also popular in RT. Implementing organization procured Chinese construction machineries by using EBRD funds. Comparing to CAT machineries Chinese equipment' engine power is lower and works ineffectively. Moreover with high fuel consumption, breakdowns occur frequently. As counterparts are disappointed with functionality and reliability of these equipment, implementing organization strongly requested to limit equipment only to Japanese makers.

Moreover, counterparts are aware of the way of spare parts procurement methods through the official dealer agents, acquiring information about proper repairing and maintenance methods of Japanese equipment.

Therefore, the procurement plan of this project will be concentrated to Japanese products. For the products, that are not produced in Japan or when the number of makers is limited, products of third countries with the same level of Japanese quality should be considered. As for the third countries, European makers should be mainly considered.

Currently, following 5 positions are possibly will be procured from European countries:

i. Multi-Purpose Vehicle
ii. Snow Plough (Snow cleaning blade) (Multi-Purpose Vehicle attachment)
iii. Rotary Blower (Multi-Purpose Vehicle attachment)
iv. Salt Spreader (Multi-Purpose Vehicle attachment)
v. Line Marker

Multi-Purpose Vehicle and its attachments or driving type Line Marker is not produced in Japan, and their delivery are planned from European makers. Currently these equipment are produced in Germany, France, Italy, Swiss and etc. These countries are members of European Union and DAC (Development Assistance Committee) of OECD (Organization for Economic Co-operation and Development). From above, equipment

should be delivered from Japan and EU countries, members of DAC.

Number of some Japanese vehicle makers is limited in Japan. Those vehicles should be delivered as below:

- Motor grader: Japan, Thailand
- Pickup truck: Japan, Thailand

2-2-1-7 Equipment Life Cycle Policy

There are no standards in RT that directly defines operating years of the equipment. But related regulations exist in following documentations of Soviet era.

(1) Construction standards for governmental agencies: Guideline for operating road construction equipment, VSN(BCH) 36-90

Table 2-2-2 Construction standards for governmental agencies: Guideline for operating road construction equipment, VSN (BCH) 36-90

Approved by Ministry of Automobile Roads, Russian Soviet Federative Socialist Republic, on December 19, 1989. Published on May 1, 1991.

(fragmented)

Removal from operation and write-off of equipment from balance of the enterprise

2.35 Equipment may be removed from operation and written-off from balance of the enterprise, including repair and maintenance means, and other parts which has fulfilled established amortization terms provided that their base details and the majority of units reached a limiting condition according to requirements of the maintenance instruction of manufacturer.

2.36 Removal from operation and write-off from balance of the enterprise is carried out taking into account implementation of the relevant provisions and requirements of existing instructions about an order of elimination, gratuitous drive and sale of buildings, constructions, the equipment, vehicles and other property which is registered as a part of fixed assets of the enterprises and regulations of car tires.

2.37 For implementation of removal from operation and write-off from balance, the commission is created as a part of heads and experts which is guided by instructions and the rules specified in item 2.36.

2.38 The commission on removal from operation and to write-off from balance is obliged to carry out all-round technical inspection of the equipment. If needed dismantling of separate units and gears is implemented for this purpose. Members of the commission bear personal responsibility for correctness of definition of a limiting condition of the equipment. Removal from operation and write-off from balance of the enterprise is made out by the act (appendix 7) - the standard OS-3 form. Write-off of equipment on the basis of vehicles (trailers and semi-trailers) is made out by the act (the appendix 8) - the standard OS-4 form.

2.39 In all cases of removal from operation by dismantling, premature wear or failure, copies of the documents explaining the reasons of breaks and wear should be attached to acts on elimination, with the indication of the measures accepted in relation to guilty, and also actions by the enterprise for prevention of premature removal of equipment out of operation.

2.40 After the adoption of the act of elimination of the fixed (motor transportation) assets, the equipment in case it was put on the account in the State traffic inspectorate and the Gospromatomnadzor, writes off the register in these organizations, and also from balance of the organization.

The equipment which have been removed from balance, assort, and their assembly units and details check. Suitable for application and repair of a detail and assembly units register for refill of the revolving fund created at the enterprises for repair of equipment.

(fragmented)

According to MOT above standards are expressed in vague, and are not applied within MOT. Also SETM is continuously applying for abandonment of old equipment, where MOT and Ministry of Finance should approve the abandonment. Currently, old equipment cannot be excluded from the equipment's registry list of SETM, and these equipment's are still counted as a capital.

(2) Cost calculation norms for road construction works (Construction State Committee of USSR, 1980)

This document is used for equipment cost calculation based on annual operation standard. There is also no definition of equipment life cycle in these documentations.

Within the scope of the survey, it was concluded that, Tajikistan does not have clearly stated standards on life operation periods of equipment.

(3) Japanese regulations regarding operation life periods of equipment.

1) Ministerial Decree on the operation life of cost depreciable property, 2012, Ministry of Finance. Attachment Table 2 (Table of operation life of equipment and tools)

Table 2-2-3 Attachment Table 2 (Table of operation life of equipment and tools) fragment

#	Purpose Specifications	Details	Operating years	Applied equipment
29	Equipment for mining, crushing industry, and gravel mining industry	Other equipment	6 years	Stone crusher
30	Common construction equipment	—	6 years	Asphalt plant, pavement equipment, engineering equipment, transporting equipment, etc.
53	Vehicle maintenance equipment	—	15 years	Equipment repair workshop

Above stated life of operation is set for capital depreciation purposes. In reality, equipment usually operates longer time at the sites.

2) Japan Construction Machinery and Construction Association (JCMA), Table of Construction Machinery Operation Cost (2012)

The table shows operation life of construction machinery listed I this project. The data is form the Table of Construction Machinery Operation Cost (2012) published by JCMA

Table 2-2-4 Standard operation life of construction machinery form Construction Machinery Operation Cost (2012) published by JCMA

Table of construction machinary operation cost (2012)

		Category code	Spec.	Power capacity kW	Equip. weght Ton	Standard operating years (Years)	1996 Standard operating years (Years)	2001 Standard operating years (Years)
1	Asphalt Cutter	1161-011	Cutting depth 15 cm	9	0.18	7.5	4.0	6.0
2	Vibration Compactor	0807-018	60 kg, gasoline	3.2	0.06	6.0	3.0	4.6
3	Hand Breaker	0603-067	20 kg	-	0.02	5.5	3.0	4.5
4	Air Compressor	1201-033	5 m^3/min	38	0.9	13.5	7.0	10.4
5	Asphalt Sprayer	1019-017	25 L/min	2.4	0.06	4.8	3.0	4.4
6	Hand Guide Roller	0804-014	0.5-0.6 t	3	0.6	13.5	6.2	10.6
7	Asphalt Distributer	1005-022	6000 L	146	2.9	11.0	7.0	10.4
8	Asphalt finisher	1003-011	2.4-4.5 m	39	6.7	12.0	8.0	10.8
9	Road Roller	0801-031	8-10 t, 1.7 m wide	77	9.4	15.5	8.0	12.2
10	Tire Roller	0802-021	8-20 t	71	14.8	15.0	8.0	12.2
11	Water Tank Truck	1108-012	8000 L	199	7.5	12.0	7.0	10.6
12	Motor Grader	0701-013	3.7 m	115	13.5	15.5	6.8	11.8
13	CrawlerExcavator	0202-113	0.8 m^3	104	19.8	9.0	5.2	7.2
14	Wheel Loader	0207-063	2.5-3.0 m^3	117	13.8	12.0	6.0	11.0
15	Bulldozer	0101-013	21 t	152	21.9	11.5	5.8	10.1
16	Dump Truck	0301-011	10 ton	246	9.7	11.0	5.0	8.1
17	Asphalt plant	1001-018	30 t/h	120	40	10.0	6.0	8.9
18	Crushing plant	4301-18	1000 x 1200 mm	130	59	10.7	8.0	8.8
19	Multi-Purpose Vehicle	5006-012	130 kw, 4 x 4	130	6.6	12.0	6.0	9.8
19-1	Snow Plough	5002-031				13.5		
19-2	Rotary Blower	5007-031				15.0		
19-3	Salt Spreader	5203-027				14.5		
20	Truck with crane	0302-021	5 t+load 2.9 t	148	5.4	12.0	5.0	9.1
21	Truck trailer	0303-011	25 t	235	17.2	12.0	6.0	9.1
22	Pickup truck	0302-011	2 t	98	2.5	12.0	6.0	9.1
23	Line Marker	1121-022	15･20 cm, 130 kg	71	4.8	10.5	5.0	7.6
24	Mobile Workshop	0302-021	5 t+load 2.9 t	148	5.4	12.0	6.0	9.1
25	Maintenance Equipment							
26	Axis load and overall weight meter	1701-018	60 t, 3 x 15 m	0.3	14.5	12.5	7.0	10.6
	Standard operating years（Simple mean value）					11.5	5.6	8.7

According to this table average standard operating years is about 11.5 years, from the shortest 4.8 years to the longest 15.5 years. These figures are decided to be appropriate for RT conditions and should be applied hereinafter as the standard operating years.

2-3 Basic Plan (Equipment Plan)

2-3-1 Overall Plan

Five types of works, implemented by MOT as a part of maintenance works, should be the target works in this project. Below is detailed description of these works and special notes that should be taken into account.

Table 2-3-1 Equipment combination for each type of works

Work type	Work content	Work order/ special notes/ applied equipment
Road repair works (1)	Patching	Work order: Cutting asphalt layer around patching area → asphalt crushing and removal → cleaning → primary coating → inserting asphalt mixture → compaction Special notes: repair area should be cut by perimeters and asphalt racks should be cleaned. Asphalt mix should be compacted properly. Applied equipment: Asphalt Cutter、Hand Breaker Air Compressor、Asphalt Sprayer、Hand Guide Roller、Vibration Compactor、Dump Truck
	Crack sealing	Work order: Cleaning the crack → inserting straight asphalt → sand treatment Special notes: Cleaning thoroughly the inner of cracks and inserting enough amount of straight asphalt are need. Applied equipment: Air Compressor、Asphalt Sprayer
Road repair works (2)	Overlay and pavement renewal	Work order: Cleaning the road surface (or compaction of road surface) → primary coating → paving asphalt mixture → rolling press and compaction Special notes: control of asphalt mixture paving thickness, and enough rolling press and compaction are required. Applied equipment: Asphalt distributor、Asphalt Finisher、Road Roller、Tire Roller、Water Tank Truck、Excavator、Wheel Loader、Motor Grader、Dump Truck Asphalt Plant、Crushing plant
Snow cleaning and melting works	Snow cleaning and ice removing	Work order: A. Removing fresh snow → removing compacted snow → removing frozen snow from the road surface B. Windblown snow and 50 cm snowfall or more Special notes: equipment should be selected depending on condition and amount of snow. Applied equipment: Snow cleaning truck、Snow Plough、Rotary Blower、Motor Grader
	Melting agents and spreading salts	Work order: Snow melting agent, sand and salt spreading Special notes: amount and composition of sand and melting agent should be adjusted depending on temperature, snow fall and road condition. Applied equipment: Melting agent Spreader
(3) Disaster recovery works	Removing falling stones and landslides	Work order: Removal and loading of stones and earth → transporting stones and earth Special notes: smooth and fast removal, loading and carrying out of earth and sand is required. Applied equipment: Excavator、Wheel Loader、Bulldozer、Dump Truck
	Recovery of damaged roads	Work order: Transportation of earth → ground recovery → compaction → surface pavement Special notes: Smooth and fast transportation of earth, ground recovery and compaction is required. Applied equipment: Excavator、Wheel Loader、Dump Truck、Pavement equipment set (same as for Overlay and pavement renewal)

Work type	Work content	Work order/ special notes/ applied equipment
Back up works	Transporting equipment, workers, etc.	Work order: Loading equipment → transporting → unloading equipment Special notes: weight and parameters of the equipment should be carefully considered for the safe loading and transportation. Applied equipment: : Truck with Crane、Truck trailer、Pickup truck、Line Marker
	Repairing at sites	Work order: Transportation → Repairing equipment → Transportation Special notes: mobile workshop should possess the tools able to repair small and medium damages at the site. It also should be able to run on roads with bad conditions (4WD vehicle) to reach the malfunctioning equipment on the site. Applied equipment: Mobile workshop
	Check and repair at Workshops	Work order: Accepting the equipment → checking, maintenance, repair → deployment Special notes: the workshop should be able to inspect, repair and maintain the accepted equipment. It should also be able to repair old equipment with producing some needed spare parts. Currently tools and equipment for maintenance are extremely lacking. Workshop tools and equipment will be limited to basic technical specifications, and installed in several SETMs. Applied equipment: Maintenance and repair equipment
Others	Overload control	Work order: Leading the vehicle to the scale→weighing axis and overall weight→unloading overloaded cargo Special notes: Control of overloaded vehicles is inevitable to secure the road surface from damages. Law establishment is also needed. Applied equipment: axis load and overall weight scale
	Lane marking, center lines, etc.	Work order: Cleaning the area to be marked→confirm the quality of materials→marking→open the traffic Special notes: During snow cleaning, line markers are erased. It is very important to remark the lines for traffic safety. Materials should fit the thermo-treatment. Applied equipment: Line marker

2-3-1-1 Setting Basic Technical Specifications of Equipment

Basic specifications of the equipment were defined with consideration of design principles, standard specifications stated in pavement and ground works cost calculations of Ministry of Transport, Land, Infrastructure and Tourism of Japan, existing machinery on the project site, local popularity, and equipment usage conditions in the similar project "the Project for Improvement of Equipment for Road Maintenance in Issyk-Kul and Chui region". Accepted basic specifications are described in the table below, as a result of the analysis.

Basically the content of this project is the same as Kyrgyz project. Moreover, the condition of the equipment delivered in Kyrgyz project is good, which shows that the specifications applied are properly fits the work conditions. Therefore, this project should apply almost the same specifications as in Kyrgyz project's equipment.

For the snow cleaning equipment, it should be multi-purpose vehicle with attachments like Snow Plough, Rotary Blower, Melting agent spreader, the same as in Kyrgyz project. By this way, the equipment can be used in both summer and winter time.

Table 2-3-2 Basic specifications of Equipment (Draft)

Works	Name of equipment	Projected works Selection reason	Basic specifications
	Asphalt Cutter	Cutting asphalt layer Pavement thickness 50 ～ 100 mm	Cutting depth 150 mm ※the same spec as for Kyrgyz
	Vibration Compactor	Surface compaction Common specifications	Weight 70 kg ※the same spec as for Kyrgyz
	Hand Breaker	Crushing asphalt Common specifications	Weight 7 kg ※the same spec as for Kyrgyz
	Air Compressor	Supply with air pressure (for Hand Breaker, etc.) Air nozzles for Hand Breaker × 2 units	Air blow capacity 5.1 m^3 ※the same spec as for Kyrgyz
	Asphalt Sprayer	Pre coating, spraying asphalt Common specifications	Tank capacity 400 Lit ※the same spec as for Kyrgyz
	Hand Guide Roller	Surface compaction Common specifications	Weight650 kg ※the same spec as for Kyrgyz
	Dump Truck	Transporting gravel, crushed stone, asphalt mixture Common specifications, Crushing plant's capacity	Loading weight14 t ※the same spec as for Kyrgyz
	Asphalt distributor	Spraying asphalt Common specifications	Tank capacity6,000 Lit ※the same spec as for Kyrgyz
	Asphalt Finisher	Paving asphalt mixture Width of one lane road	Pavement width 4.7 m ※the same spec as for Kyrgyz
	Road Roller	Surface compaction Common specifications	Weight 10 t ※the same spec as for Kyrgyz
Road repair (2)	Tire Roller	Surface compaction Common specifications	Weight 15 t ※the same spec as for Kyrgyz
	Water Tank Truck	Water spraying, water supply for rollers Common specifications, amount of water supply for rollers	Tank capacity 8,000 Lit ※the same spec as for Kyrgyz
	Crawler Excavator	Gravel excavation, loading Common specifications	Bucket capacity 0.8 m^3 ※the same spec as for Kyrgyz
	Wheel Loader	Transporting crushed stone Amount for plant supply	Bucket capacity 2.5 m^3 ※the same spec as for Kyrgyz
	Motor Grader	Road ground formation Common specifications, width of one lane	Blade width 3.7 m ※the same spec as for Kyrgyz
	Asphalt Plant	Production of asphalt mixture Minimum required amount 32.9 t/h ＝ 80 m/h × 3.5 m × 5 cm × 2.35 t/m^3	Production capacity 35 t/h ※the same spec as for Kyrgyz
	Crushing plant	Crushed stone production The same capacity as Asphalt Plant	Production capacity 35 t/h ※the same spec as for Kyrgyz

Works	Name of equipment	Projected works Selection reason	Basic specifications
Snow cleaning and melting	Snow cleaning truck (Multi-Purpose Vehicle ＋ Snow Plough)	Clearing fresh snow Equipment with different snow cleaning attachments	4WD,Snow Plough width 3.0 m
	Rotary Blower (Multi-Purpose Vehicle ＋ Rotary Blower)	Removing deep snowfalls Attachment for Multi-Purpose Vehicle	Rotary diameter 750 mm
	Melting agent Spreader (Multi-Purpose Vehicle ＋ Melting agent Spreader)	Spreading Snow melting agents and sand Attachment for Multi-Purpose Vehicle	Hopper volume 2.0 m^3
	Motor Grader	Removing frozen snow Complimentary with Road repair	Blade width 3.7 m ※the same spec as for Kyrgyz
Disaster recovery works	Excavator	Removing and Loading fallen stones and earth Complimentary with Road repair	Bucket capacity 0.8 m^3 ※the same spec as for Kyrgyz
	Wheel Loader	Removing and Loading fallen stones and earth Complimentary with Road repair	Bucket capacity 2.5 m^3 ※the same spec as for Kyrgyz
	Bulldozer	Removing fallen stones and earth Complimentary with snow removing	Weight 20 t
	Dump Truck	Transporting fallen stones and earth Complimentary with Road repair	Loading weight 14 t ※the same spec as for Kyrgyz
	Set of pavement equipment	—Same as Road repair equipment—	
Back up works	Truck with Crane	Transporting small size equipment (Patching) Total weight of Patching equipment about 3.5 t	Loading weight 4.0 ton, with crane 2.8 t ※the same spec as for Kyrgyz
	Truck trailer	Transporting large size equipment Weight of large size equipment about 21 t	Loading weight 25.0 t low bed ※the same spec as for Kyrgyz
	Pickup truck	Transporting melting agents, workers, etc. Common vehicle	4 WD, double cab
	Line Marker	Drawing white color line	Driven vehicle type
	Mobile Workshop	Repairing at sites Mounted with tools for repairing at sites	4WD, Load 8 t class, Aluminum box Repair tools, with crane ※the same spec as for Kyrgyz
	Equipment Maintenance Workshop	Check and maintenance within workshop Basic tools for Check and maintenance	Gantry crane, generator, welder, Air Compressor, etc.
	Axis load and overall weight meter	Overload control Measuring load 70 t	Ability to measure axis load and vehicle load

2-3-1-2 Setting Required Quantities

(1) Road repair works (1) (Patching, Crack sealing)

SEHM directly maintains the road under its responsibility. Kurgan-Tube SETM (as SEKTM below) controls 13 SEHMs and Gasser SETM (as SEGTM below) controls 9 SEHMs. Currently all SEHMs

implements patching and crack sealing works by 2-3 worker teams. But the works are mainly performed manually, because of the equipment shortage. Moreover, asphalt mixture is prepared in the SEHM yards using cold asphalt. The quality of the materials and the works are low, and the repaired sites do not last for long.

The equipment should be dispatched to the sites by composition sets. Asphalt Cutter, Hand Breaker should be dispatched in set with one air compressor to increase the work efficiency. The changing parts of this equipment are consumed intensely, and in case of sudden malfunctioning, the equipment can complement each other.

Taking into account the number of subordinated SEHMs and the length of the maintained road, fleet numbers will be allocated by ratio 3:2. Additionally, there are several SEHMs without motor graders in southwest region under Kurgan-Tyube SETM. Two motor graders should be allocated for those SETMs.

Table 2-3-3 Quantity of equipment for Road repair works (Patching, Crack sealing)

Name of equipment	Technical specifications	Quantity	
		SEKTM	SEGTM
Asphalt Cutter	Cutting depth 150 mm class	6	4
Vibration Compactor	Weight70 kg class	6	4
Hand Breaker	Weight7 kg class	6	4
Air Compressor	Air blow capacity 5.1 m^3/min class	3	2
Asphalt Sprayer	Tank capacity 400 litter class	3	2
Hand Guide Roller	Weight 650 kg class	3	2
Motor grader	Blade width 3.7 m	2	-

(2) Road repair works (2) (Overlay and pavement renewal)

1) Asphalt Plant: production capacity and quantity

Asphalt mixture should arrive to the site at temperature of more than 110℃. Taking into account temperature conditions, it is possible to transport to 100 km (max.150 km) in summer time. It is appropriate to install by one plant to each SETM. Crushing plant is basically attached to Asphalt Plant, therefore it is also should be provided and installed to each SETM. (Location of plants' installation will be discussed below)

Based on interviews with SETMs, planned pavement works are as follows. Width of road 3.75 m x 2 lanes ＝7.5 m, average thickness of pavement 10 cm, annual pavement distance 5 km. Therefore, Asphalt Plant production capacity should be as follow:

- Annual Production capacity : 7.5 m x 0.1 m x 5,000 m/year x 1.1 x 2.381 ton/m^3 = 9,822 t/year

Asphalt Plant daily operation is 4 hours, number of operation days in a year 6 months * 20 days = 120days/year. Therefore hourly Production capacity of the plant should be as follow.

- Required production capacity (for pavement renewal): 9,822 t/year ÷ (120 days x 4 h/days)＝ 20.5 t/h

Volume of cold asphalt mixture used for patching works is 8000 – 10000 tons. Assuming that 1/2 of that volume will be produced by the plant, production capacity required for patching works will be as follow.

- Needed Production capacity (for Patching): 5,000 t/year ÷ (120 days x 4 h/day)=10.4 t/h
- Therefore, hourly Production capacity of Asphalt Plant:
- Needed Production capacity ： 20.5 t/h + 10.4 t/h = 30.9 t/h

From above, Asphalt Plant's specification is set as 35 t/h type, selected form makers' standard products.

2) Crushing Plant

Crushing plant is for providing row materials to Asphalt Plant. The production capacity of the crushing plant should be 1.5 of Asphalt plant to avoid lack of materials. In this project working hours of Crushing plant is set as 1.5 (= 6 h/day), therefore production capacity of crushing plant should be the same as Asphalt Plant, which is 35 t/h.

3) Pavement Equipment

SETMs implements overlay and pavement renewal works by using asphalt mixtures produced by these two plants. Minimum one set of pavement equipment should be provided for each SETM. Currently, SEKTM utilizes about 8000-10000 ton of cold asphalt annually, and SEGTM utilizes about 4000-5000 ton annually. SEKTM is planning to renew the pavement of international and national roads by own resources. Local roads maintained by SEGTM have low pavement rate, and SEGTM is also expected to provide asphalt mixture to other SETMs. From above, one set of plants should be provided for each SETM.

Moreover, the area of the repaired pothole is calculated as follows when assuming that hot asphalt mixture of 5,000 tons is used annually for the patching.

The quantity consumed of asphalt mixture depends on the next expression.

Roadway, shoulder and pedestrian way

Used volume = Designed area (m^2) × thickness (mm) ／ 1,000 × density after compaction (t/m^3) × (1+loss rate)

Designed area is calculated as following:

$$\text{Designed area}(m^2) = \frac{\text{Used volume}}{\text{Thicknenss(mm)}/1{,}000 \times \text{density after compaction}(t/m^3) \times (1 + \text{Loss rate})}$$

Used volume ： 5,000 tons, Thickness ： 150 mm

Loss rate: + 0.10 for pedestrian way (smaller area - bigger loss)

Density of the asphalt mix after compaction: in case of asphalt mixture used for road and pedestrian

ways- 2.35t/m^3

$$\text{Design area}(m^2) = \frac{5{,}000}{150/1{,}000 \times 2.35 \times (1 + 0.10)} = 12{,}894m^2$$

The current state manufactures "Cold asphalt" by mixing the machine, and repairs the pothole by the yard as repairing materials by the motor grader etc. at gravel or sand and the summer high temperature a lot of crude oil that is for the asphalt of domestic Tadzhikistan. It is a temporary repair, and there is a problem in strength and durability to the last. The pothole repair results were confronted to Kurgan-Tyube Administration Bureau 52,368m2 in 2012 that used cold asphalt (a part of purchase asphalt), and [hissa-ru] Administration Bureau was 26,487m2 and about 1/2. Therefore, the targeted value in 2017 was made Kurgan-Tyube Administration Bureau 13,000m2 and [hissa-ru] Administration Bureau 6,000m2.

The number of the dump track needed to supply the As laminated wood to the pavement site is calculated as follows.

- asphalt mixture loading time: about 20 min (including waiting time)
- Round trip time: about 60 min (=(average distance 50 km / average speed 50 km/h) * 60 min)
- asphalt mixture delivery time: 15 min
- Total of loading to delivery time: 90 min
- Hourly transportation capacity of Dump Truck: (60 min/h ÷ 95 min) x load volume 10 t /truck = 6.3 t/(h*truck)
- Pavement speed of Asphalt Finisher: 35 m/h

35 m/h * pavement thickness 0.1m * pavement width 3.75 m * mixture density 2.381 t/m3 = 31.3 t/h

Therefore, required quantity of Dump Trucks is 31.3 t/h ÷ 6.3 t/(h・track) = 4.96 trucks ≒ 5 trucks

If we assume that transportation distance of the asphalt mixture is 100 km, 15 trucks would be needed to cope with the same scope of works. But this project should provide minimum required quantity needed. Therefore, 5 trucks for each plant should be allocated.

Candidate locations for Plant installation

In the area of Kurgan-Tyube SETM, there is only one privately owned Asphalt Plant in Sarband city, and there are not any plants around the Kurgan-Tyube city. Currently, Japanese construction company installed Asphalt plant and Crushing plant for its construction works under the grant aid project "Rehabilitation of Kurgan-Tube - Dusti Road, 2nd phase". After the completion of construction works by August, 2013, both plants should be removed. After plants removal, MOT is planning to install new own plants instead.

11Currently, crushing plant is located besides the river in 15 km. For the safety purpose, new crushing plant should be installed near the Asphalt plant. In that case row stones from the river should be transported 15 km to the plants. Basically, the crushing plant must operate, when asphalt plant is stopped, during non-summer time, when there are no pavement works. Taking into account the distance to the source of row stones, two trucks should be allocated to the plant for transportation. These two trucks also should participate in Disaster recovery works.

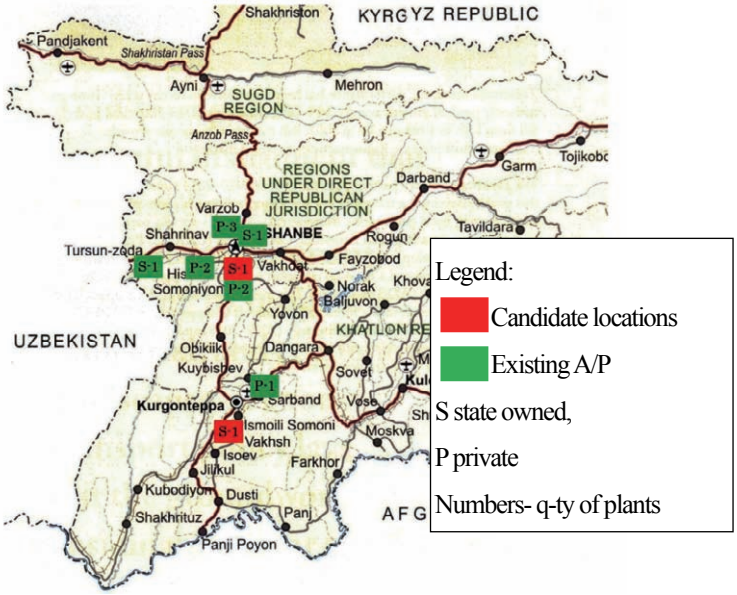


Figure 2-3-1 Plant Location

In the region of Gissar SETM, Chinese company installed its asphalt plant for its own construction works, which is located along Harnihon River on the east-north side of Dushanbe city. Chinese plant will be removed in December, 2012. Distance between Asphalt Plant and crushing plant is 1 km, row stone for crushing is available within 500 m in the bank of river.

Basically, the crushing plant must operate, when asphalt plant is stopped, during non-summer time, when there are no pavement works. There is no need for trucks to be allocated for transporting row stones for crushing.

There are existing facilities in both candidate locations, and both are distanced for several kilometers from populated areas. Therefore, there should not be any serious environmental problems.

Table 2-3-4 Quantity of the equipment for road repair works (Overlay and pavement renewal)

Name of equipment	Specifications	Q-ty	
		K	G
Asphalt finisher	Pavement width 4.5 m	1	1
Asphalt distributor*	Tank capacity6,000Litterclass	1	1
Road Roller	Weight 10 ton class	1	1
Tire Roller	Weight 15 ton class	1	1
Water Tank Truck	Tank capacity 8,000 Litter class	1	1
Motor Grader	Blade width 3.7 m class	2	2
Crawler type Excavator**	Bucket capacity 0.8 m^3 class	1	1
Wheel Loader**	Bucket capacity 2.5 m^3 class	1	1
Dump Truck**	Loading weight 14 ton class	5	5
Asphalt Plant	Production capacity35 t/h class	1	1
Crushing plant	Production capacity 35 t/h class	1	1

*- not included in Application. Quantity is added during discussion with MOT

** - equipment to operate plants

(3) Snow cleaning and melting works

There are 3 mountain pass within the Kurgan-Tyube SETM region. Especially in northern regions, Hurasan SEHM (18 km, 30-40 cm snowfalls) and Yavan SEHM (16 km, 30-50 cm snowfalls), snow cleaning works are implemented under extreme weather conditions.

- (mountain pass length (18km+16km) * 2 lanes) / (8 h/day * 10 km/h *units) ＝ 0.85 ≒ 1 unit

Snowfalls are all over the Gissar SETM regions. The deepest snowfalls are in Fayzabad SEHM (1.5 m snowfalls in mountain pass), and scope of snow cleaning works are as follow.

- (International Road 48 km * 2 lanes) / (8 h/day * 10 km/h *units) = 1.2 ≒ 1 unit

One set of the multipurpose vehicle with attachments should be allocated for each SETM. It is necessary to clear snow over the wide area, which can be done by a motor grader without disturbing the traffic. One motor grader for each SETM should be allocated for snow cleaning purposes in addition to the motor graders from China granted by the EBRD. Kurgan-Tyube SETM (13 SEHMs) already possess 9 Chinese motor graders, and additionally 4 motor graders should be supplied.

Figure 2-3-2 Snow cleaning works

Table 2-3-5 Quantity of the equipment for snow cleaning and melting works

Name of equipment	Specifications	K	G
Multi-Purpose Vehicle	4WD, with PTO for attachments	1	1
Snow Plough	Width 3,000 mm class	1	1
Rotary blower	Rotor diameter 750 mm class	1	1
Melting agent Spreader	Hopper capacity 2 m^3 class	1	1
Motor Grader	Blade width3.7mclass	4	2

(4) **Disaster recovery**

There are disaster areas caused by snow and rains in both SETMs' regions. The equipment in possession of SEHMs on sites are very old and will become nonfunctional in few years, except Chinese Motor grader and Wheel Loader.

Dump Truck and Excavator: In the North, the South and the West of the Kurgan-Tyube region there are roads damages occurring by natural disasters. Because of no even private companies nearby, currently it is impossible to take quick measures in case of emergency situation. 3 sets of Dump truck + loading equipment (Excavator and Wheel loader) have to be allocated for these purposes. In Gissar SETM possess some quantity of truck vehicles, only one set of Dump Truck and Excavator will be allocated for this region.

Therefore, following equipment should be allocated for Disaster recovery works.

Table 2-3-6 Quantity of equipment required for Disaster recovery works

Equipment for disaster recovery	K	G
Dump truck	3	1
Excavator	2	1
Wheel Loader	1	—*
Buldozer	1	1

* The equipment already is available, and can be allocated for recovery work

Bulldozers were not included into the request list of MOT. But bulldozers are multifunctional and used for snow cleaning, disaster recovery, construction works. For this reason bulldozers are added into the procurement list.

Initially, wheel excavator was not requested on the application. After the several discussions MOT requested to change a wheel excavator with crawler Excavator. Without any means of transportation such as truck trailers, currently, breakdowns happen frequently to wheel loaders. Wheel type excavators are not suitable to run on soft soil lands and for disaster recovery works, the scope of application is limited. MOT proposed to change from the wheel type to the crawler type, which has the higher usage rate throughout the year. This proposal was considered as appropriate and accepted.

(5) Backup 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 could also be used for transporting water, crushed stone or other materials.

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. Initially, Truck trailer was not requested on the application. But the transportation mean enables MOT to use the construction equipment effectively and properly. It will help to avoid self-running the equipment to the site. These matters were explained to MOT and Truck trailer is included into the procurement list.

3) Pickup truck

The main work during winter time is snow cleaning works in all SETMs. As mentioned above, snow

cleaning equipment will be provided by the project, but manual snow cleaning works should also be continued. The snow cleaning work continues from mid night till early morning by 3 shifts. 2 pickups should be allocated to each SETM to ease the burdens of the workers.

4) Line Marker

Except for Dushanbe city, the road central line is rarely visible across the all Tajikistan. As a result of snow cleaning works during the winter period, and using non-thermoplastic materials, road marking lines are quickly erased. For the sake of traffic safety, every year it is necessary to remake markings. For this purpose one Line marker should be allocated to Gissar SETM, which has to be used together with others SETMs.

5) Mobile Workshop

Existing Maintenance Equipment of SEHMs are mainly hand tools, which are enough for daily maintenance. Equipment is transported back to SEHM's yard, when small or bigger repairs needed, or orders repairs to 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 to workshops for repairs, and other multiple functions. One unit should be allocated for each SETMS.

6) Equipment Maintenance Workshop (For road maintenance equipment)

As mentioned above, existing maintenance equipment of SEHMs are mainly hand tools. One SEHM should be selected for SETM area, which can function as a repairing center. Maintenance Equipment Workshop should be allocated to the selected SEHM, and the systematic plan for effective usage should be developed. Below is allocation plan for 4 sets of Maintenance Equipment Workshops.

7) Axis load and gross weight meter

Scales of axial and general load should be installed along the road which was rehabilitated by Japanese Grant Assistance. The equipment has to be installed about the Afghan border, along Nijni Pyanj Road which serves as an entrance from Afghanistan to Tajikistan.

Weight and dimensional control is strictly carried out in Uzbekistan. The overloaded transport mainly arrives from China, Kyrgyzstan and Afghanistan. Form Afghanistan cargo transports with the loaded cement from Pakistan which cause damages to roads Dusti-NijniPyanj. For preservation of roads, it is necessary to introduce weight and dimensional control for the cargo vehicles.

Currently, weight control is executed by daily shift basis (2 employees/shift/day with two-day rest). Considering growth of the traffic flow, provided scaling equipment should be capable to measure axial and overall load simultaneously.

It is difficult to find high-quality construction companies in Tajikistan which are capable to construct base boxes for the equipment and road entry/exit pocket (with a concrete pavement) along the main road. It is necessary to perform large-scale works of the foundation base construction with sizes of 18.8 m ×3.8 м×2.1 m for Axis load and gross weight meter. Also, there hard conditions of the construction site near the border to Afghanistan. Therefore these works will be carried out by the Japanese construction

company now participating in reconstruction of the Kurgan-Tyube - Dusti road under the Japan Grant Aid. Construction stationary scales of an axial load was planned in two points of the Kurgan-Tyube – Dusti road (Mobile scales of an axial load were designed as a stationary scale under the budgetary restrictions).

An installation location was decided to be NijniPyanj at the Afghan border by the request from the first vice minister of MOT dated on January, 2013. MOT has already acquired the site necessary for the installation from the local government in January, 2013.

(6) Spare Parts

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 80,000 km run for vehicles. These parts should be used for periodical maintenance and changing wearing parts (engine oil and other type of oils are not included).

Table 2-3-7 Spare parts (Draft)

Items		Quantity
Periodical maintenance parts	Fuel filter	Quantity differs depending on equipment type and makers. The quantity should be reconsidered after collecting technical specifications from makers.
	Air filter	
	Engine Oil Filter	
	Circulating Oil Filter	
Wear-out parts	Bucket tooth	
	Cutting edge	
	Tires	
	Brake shoes	
	V-belt	
Others	Head lamps	
	Brake lamps	
	Fuse	
	Oil pressure hose	
	Other maker's recommended parts	

2-3-1-3 Equipment List (Draft)

Table 2-3-8 represents the considered list of equipment's to be supplied.

Table 2-3-8 List of equipment (M/D and Application) K: for Kurgan-Tyube, G: for Gissar

No	Name of equipment	Technical specification	M/D			Application	
			K	G	Sum	K	G
1	Asphalt Cutter	Cutting depth 150 mm	6	4	10	5	5
2	Vibration Compactor	Weight 70 kg	6	4	10	7	6
3	Hand Breaker	Weight 7 kg	6	4	10	5	
4	Air Compressor	Air blow capacity 5.1 m^3/min.	3	2	5	3	
5	Asphalt Sprayer	Tank capacity 400 Litter class	3	2	5	3	
6	Hand Guide Roller	Weight 650 kg class	3	2	5	2	
7	Asphalt Distributer	Tank capacity 6,000 Litter class	1	1	2	Addition	

No	Name of equipment	Technical specification	M/D			Application	
			K	G	Sum	K	G
8	Asphalt finisher	Paving width 4.5 m class	1	1	2	1	1
9	Road Roller	Weight10 ton class	1	1	2	1	1
10	Tire Roller	Weight15 ton class	1	1	2	1	1
11	Water Tank Truck	Tank capacity 8000 Litter class	1	1	2	1	1
12	Motor Grader	Blade width 3.7 m class	6	4	10	6	4
13a	Crawler Excavator	Bucket capacity 0.8 m^3class	3	3	6	Change	
13b	Wheel Excavator	Bucket capacity 0.8 m^3class	Change			3	3
14	Wheel Loader	Bucket capacity 2.5 m^3class	2	1	3	2	1
15	Bulldozer	Weight 20 ton class	1	1	2	Addition	
16	Dump Truck	Loading weight 9.5 ton class	8	6	14	8	6
17	Asphalt plant	Production capacity 35 ton/h class	1	1	2	1	1
18	Crushing plant	Production capacity 35 ton/h class	1	1	2	1	1
19	Multi-Purpose Vehicle	4WD, with attachment PTO	1	1	2	1	1
19-1	Snow Plough	Blade width 3.0 m class	1	1	2	1	1
19-2	Rotary Blower	Rotary diameter 750 mm class	1	1	2	1	1
19-3	Salt Spreader	Hopper volume 2.0 m^3class	1	1	2	1	1
20	Truck with crane	Loading weight 5 ton, 2.8 ton with crane	1	1	2	1	1
21	Truck trailer	Loading weight 25 ton, low bedded	1	1	2	Addition	
22	Pickup truck	4WD, double cab	2	2	4	Addition	
23	Line Marker	Vehicle type	0	1	1	Addition	
24	Mobile Workshop	4 WD, load 8t class, aluminum box, with crane, repair tools and maintenance	1	1	2	1	1
25	Maintenance Equipment	Welder, generator, battery charger, lathe	2	2	4	1	1
26	Axis load and overall weight meter	Length of platform 16 m, Measure axis load and gross weight simultaneously	1	0	1	Addition	
	Total		66	52	118		

2-3-2 Implementation Plan

2-3-2-1 Implementation Policy

(1) Project implementation organizations

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

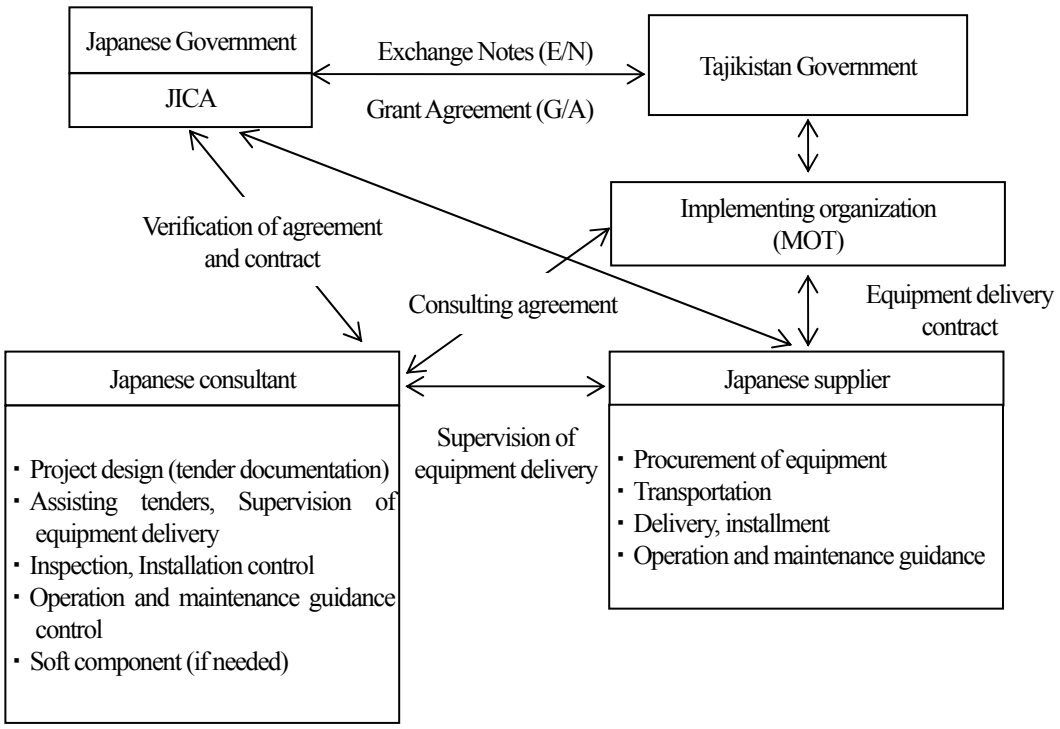


Figure 2-3-3 Project Implementation Scheme

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

(2) Consultant

After the signature of E/N and G/A, Japanese consultant with recommendation of JICA will make Consulting Agreement with MOT. The 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 completion of equipment delivery and training.

(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.

2-3-2-2 Implementation Conditions

Supplied equipment will be transported to Nahotka port, Russia. Transportation will continue by railways passing Russia and Uzbekistan, with destination to 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.

i. All equipment, except plants, will be delivered to MOT warehouse in Dushanbe city.

ii. Candidate locations for A/P and C/P are shown in the picture on the right side.

iii. Axis load and overall weight meter will be installed in NijniyPyanj, near the border with Afghanistan.

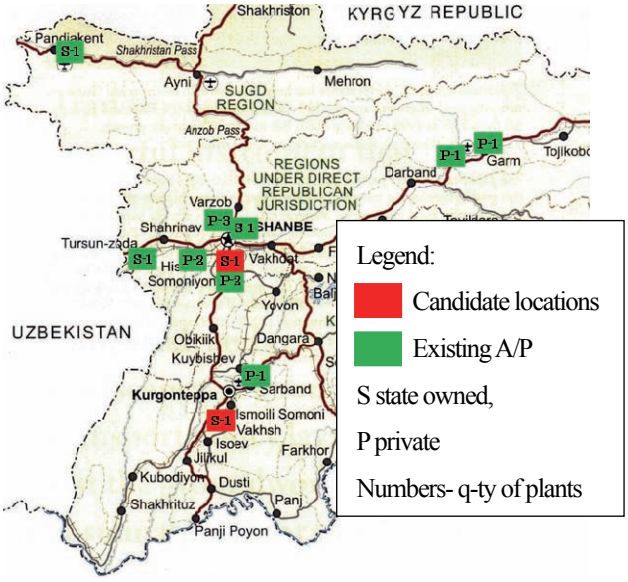


Figure 2-3-4 Plant location

The supplier will check functionality of all equipment after the equipment will be delivered to a defined warehouse. After test of all equipment about the correct functioning, the supplier will report the equipment to MOT. After equipment arrival, MOT distribute the equipment between two SETMs. Supplier has to carry out training on initial operation to the contents in Vakhdat SEHM for Gissar SETM, and Rumi's SEHM for Kurgan-Tyube SETM.

Final allocation of the equipment will be 22 SEHMs in two SETMs regions, shown in "Location map of State enterprises of transport management and State enterprises of highway management". These further allocations should be decided by the implementing organization.

2-3-2-3 Scope of Works

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

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 plant 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 allocation plan, foundation drawings

ii. Scheme of water supply and drainage

iii. Required electric power parameters

Table 2-3-9 Expense burdens of both sides (A/P, C/P)

Items	Contents	Burdening side		Notes
		Japan	Tajikistan	
Equipment delivery	Equipment delivery	○		
	Sea and land transportation	○		To custom zone
	Custom clearance		○	Freeing from customs duty
	Transportation within the country	○		After custom's zone
	Equipment delivery to site		○	To equipment destination
	Operation guidance	○		
	Maintenance guidance	○		
	Providing warehouse		○	
	Equipment maintenance		○	
Plant installation	Securing land, cleaning the territory		○	
	Foundation works	○		
	Installation	○		
	Water supply and drainage		○	
	Electric power supply		○	

2-3-2-4 Consultant Supervision

(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 Inspector)
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

2-3-2-5 Quality Control Plan

Following inspections to be carried out by the Consultant 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 makers

iii. Pre-shipment inspection (by third independent Inspector arranged by the Consultant)

iv. Inspection during plant installations

v. Inspection during transferring the equipment to counterparts

2-3-2-6 Procurement Plan

(1) Procurement destination

Refer to **2-2-1-6 Selecting Equipment Supplying Countries**.

(2) Transportation routes

In case of procurements in Japan, followings are possible routes of transportation: 1) From Nahotka Sea Port, by Siberian railway passing Russia and Uzbekistan to Duhsanbe city, 2) From Karachi Sea Port, by land transportation passing Afghanistan to Dushanbe city.

Currently, it is difficult to formulate transportation plan, because of internal unrest in Afghanistan and Karachi, custom clearance are not functioning. Therefore, priority route is 1) Nahotka route. Transportation time is estimated about 60 days (2 months).

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

(3) Production and delivery period

All equipment is produced after the supplier's orders were placed. Equipment makers 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 manufacturerer.

Table 2-3-10 Delivery periods for different equipment

Delivery period	Name of equipment
3 months	4 Air Compressor、23 Line Marker※、26 Axis load and overall weight meter
4 months	1 Asphalt Cutter、2 Vibration Compactor、3Hand Breaker、6 Hand Guide Roller、17 Asphalt plant、18 Crushing plant、22 Pickup truck、25 Maintenance Equipment
5 months	5 Asphalt Sprayer、7 Asphalt Distributer、8 Asphalt finisher、11 Water Tank Truck、12 Motor Grader、16 Dump Truck、24 Mobile Workshop
6 months	9 Road Roller、10 Tire Roller、13 Crawler Excavator、14 Wheel Loader、15 Bulldozer、20 Truck with crane、21 Truck trailer
7 months	19 Multi-Purpose Vehicle※

Note) Transportation period: ※: Europe → Dushanbe: 1 month
no mark: Japan / Thailand → Dushanbe 2 months

(4) Pre-shipment inspection

Third independent party will implement pre-shipment inspection for each equipment, transported from the makers' 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 documents and cargo content, the inspector will issue the report and inspection certificate.

The equipment will be shipped according to the output time of each maker. As it would be difficult to stock all equipment in makers' plants or ports, pre-shipment inspections will also be implemented each time the equipment arrives to the port. A table below shows the frequency of pre-shipment inspections.

Table 2-3-11 Expected pre-shipment inspection frequency

Name of equipment	Q-ty of inspection
Asphalt Plant	1
Crushing plant	1
Axis load and overall weight meter	1
Small sized equipment (container)	1
Maintenance Equipment (container)	1
Spare parts (container)	1
As Finisher, As Distributor, etc.	1
Road Roller, Tire Roller, Motor grader	1
Excavator, Wheel Loader, Bulldozer	1
Water Tank Truck, Dump Truck, Truck with crane	1
Truck trailer	1
Pickup truck (abroad)	1
Multi-Purpose Vehicle, attachments (abroad)	1
Line Marker (abroad)	1
Total	14

(5) Transportation time

Equipment procured in Japan expected to be shipped at the ports of Yokohama and Kobe, near the makers' plant. Afghanistan route and Siberian railway route are two possible transportation routes. But current unrest in Karachi port and confusion within Afghanistan leaves little room for consideration and Siberian Railway route is only safer route. Time needed for sea transportation is 10 days, and land transportation 60 days. In total it will take about 60 days for transportation.

(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.

2-3-2-7 Operational Guidance Plan

(1) Adjustments and test operations

At the same time when equipment arrives, the supplier should dispatch engineers for test driving and adjustments to assure the equipment function properly. 23 types of equipment from several makers will be supplied under this project. One engineer is able to check several types of equipment, 3-4 engineers should be dispatched, who can also implement start-up operation and maintenance guidance. (1 engineer for construction machineries and vehicles, 2 engineers for plants, 1 engineer load scale).

(2) Start-up operation guidance plan

MOT, as an implementing organization, has already an experience of using Russian and Chinese equipment. Local engineers are aware of basic knowledge about equipment maintenance. But local engineers are not used to a new type of equipment. Moreover, the knowhow of using the different type of equipment in composition needs to be explained.

Therefore, the content of start-up operation (1) and (2) should be as follow.

i. Training of the initial operation (1), carried out by the supplier and the producer

ii. Training of the initial operation (2), carried out by the supplier

Training of the initial operation (1), carried out by the supplier and the producer, will be carried out on a place of delivery reception and transfer.

According to strong request from MOT, Training of initial operation (2) will be carried out in each SETM after equipment distribution (it will be carried out two times). Training will engage into pothole repair and pavement renewal with the provided equipment on the site. The program of training is divided into construction planning and equipment maintenance.

Table 2-3-12 Required time for Start-up operation guidance (1)

No	Name of equipment	Supply Q-ty	Time	Engineer
1	Asphalt Cutter	10	1day	A
2	Vibration Compactor	10		
3	Hand Breaker	10		
4	Air Compressor	5		
5	Asphalt Sprayer	5		
6	Hand Guide Roller	5		
7	Asphalt distributor	2	0.5 day	A
8	Asphalt finisher	2	1 day	A
9	Road Roller	2	0.5 day	A
10	Tire Roller	2	0.5 day	A
11	Water Tank Truck	2	0.5 day	A
12	Motor Grader	10	1 day	A
13	Crawler Excavator	6	0.5 day	A
14	Wheel Loader	3	0.5 day	A
15	Dump Truck	14	1 day	A
16	Asphalt Plant	2	5 day	B
17	Crushing plant	2	5 day	C
18	Multi-Purpose Vehicle	2	1 day	D
18-1	Snow Plough	2		
18-2	Rotary Blower	2		
18-3	Salt Spreader	2		
20	Truck with crane	2	0.5 day	A
21	Truck trailer	2	0.5 day	A
22	Pickup truck	4	0.5 day	A
23	Line maker	1	0.5 day	A
24	Mobile Workshop	2	0.5 day	A
25	Maintenance Equipment	4	0.5 day	A
26	Axis load and overall weight meter	1	3 days	E
	Total		24.0 days	

Table 2-3-13 Required time for Start-up operation guidance (2)

	Planned works	Applied equipment	Place / Contents	Construction planning	Equipment planning
1	Patching Crack sealing	Asphalt Cutter, Hand Breaker, Air Compressor, Asphalt Sprayer, Hand Guide Roller, Vibration Compactor, Dump Truck	SEHMs' yard, Repaired road under SEHM Repair works by using equipment	3 days	3 days
2	Overlay pavement renewal	Asphalt Distributor, Asphalt finisher, Road Roller, Tire Roller, Water Tank Truck, Excavator, Wheel Loader, Motor Grader, Dump Truck Asphalt Plant, Crushing 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	Snow cleaning truck, Rotary Blower, Motor Grader, Melting agent spreader	SEHMs' yard, Checking the functions of the equipment, changing attachments	1 days	1 days
4	Removing stone falls and landslides, 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's and workers	Truck with Crane, Truck trailer, Pickup truck	SEHMs' yard Checking functions and operation of the equipment, loading and unloading construction machineries	1 days	1 days
6	Repair works on sites, inspection and repair at workshops Others	Mobile Workshop, Maintenance Equipment Line marker	SEHMs' yard Repair works by the equipment, unloading main component parts (Using guide for Mobile Workshop)		2 days
Total				12 days	12 days

※no trainings for Axis load and overall weight meter in Start-up operation guidance (2)

Operation guidance will be in Rumi SEHM for Kuragn-Tyube SETM region and Vahdat SEHM for Gissar SETM region. 24 days will take for guidance to complete.

2-3-2-8 Soft Component Plan

Soft component will not be implemented.

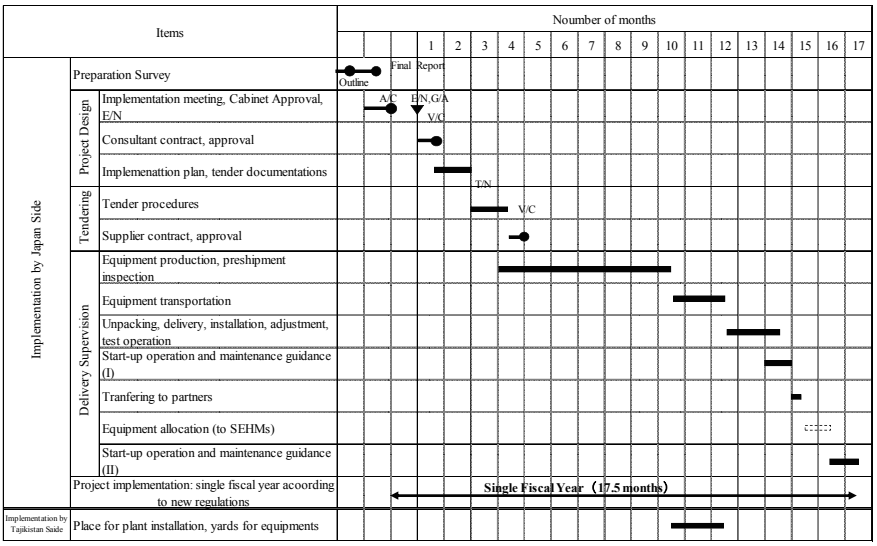
2-3-2-9 Implementation Schedule

Considering the time needed for project design, tender procedures, delivery supervision after E/N, G/A as a part of burdens borne 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 2-3-14 Implementation Schedule



Legend A/C: Cabinet Approval, E/N : Exchange Note, G/A : Grant Agreement, V/C : Contract Verification, T/N : Tender Note

2-4 Obligations of Recipient Country

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

(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. Securing location for Axis load and gross weight meter, electric wiring for Axis load and gross weight meter and building facilities for workers

※ For the above 4 items, it should be accomplished within 6 months after signing the contract with suppliers, except building facilities for workers

i. Issuing B/A and Authorization to Pay

ii. Following B/A, commission payment to Japanese bank

iii. Tajikistan side should clear immigration and site visiting procedures, and make appointments with governmental organizations for Japanese experts dispatched for this project

iv. Exemption Japanese experts and companies from taxes, duties or other obligations within the country

v. Exemption and clearance the equipment, delivered under the project, from customs duties

vi. Dispatching required number of personnel for start-up operation guidance and covering their daily needs.

vii. All other expenses, that are not covered by Japanese Grant Aid

(2) Expenses after the equipment's delivery

i. Implementation of road maintenance works, which is the actual result of this project. Proper budget allocation and human resources for this purpose.

ii. Effective and proper usage of supplied equipment's and their maintenance.

2-5 Project Operation Plan

In case, the equipment should be delivered under this project, Tajikistan side should dispatch needed number trainees, Japanese side should provide trainers for start-up operation guidance for the each equipment. Trainings will be provided on operation and maintenance of equipment. Following the project, JICA is planning to introduce Road maintenance Technical Cooperation project. It is recommended for members participated in start-up guidance to take a part in the following projects.

MOT has procured the equipment in 2009 by EBRD funds. MOT has already a proper experience on operating and maintaining the construction equipment's. The project requires budget allocation for road maintenance works with 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 these project also. In case, the equipment should be delivered under this project, **Table 2-5-1** shows required number of workers.

Table 2-5-1 Required personnel for the project implementation

Work type	Equipment No.	K	Note	G	Note
Operators of small sized equipment	No.1-6	18	6unit × 1person / unit × 3 teams	12	6 unit × 1 person / unit × 2 team
Operators for construction machineries	No.7-15	17	17 unit × 1person / unit	14	14 unit × 1 person / unit
Plant operators	No.17-18	6	3 person / plant × 2 plant	6	3 person / plant × 2 plant
Vehicle operators (drivers)	No.16,19, 20-24	14	14 unit × 1 person / unit	13	13 unit × 1 person / unit
Mechanics'	No.25	4	2 person / set × 2set	4	2 person / set × 2 set
Operators for Axis load and overall weight meter	No.26	9	4 person / shifts × 2 shifts ＋ manager		
Total		68		49	
Grand total (persons)		117			

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.

(1) Expenditures by Tajikistan

Table 2-6-1 Counterparts Expenditures

Item	Expenditures	
	Thousand Somoni	Thousand Yen
Land acquisition and leveling	40.0	681.5
Plant installation	40.0	681.5
B/A fees	61.0	1040.0
Axis and Weight Scale Installation	10.0	170.3
Total	151.0	2573.0

(2) Parameters of Cost Estimation

This plan will be put into execution in accordance with the grant aid scheme of the Government of Japan

i. Date of calculations August, 2012

ii. Currency rate US$1.00＝81.06 Yen
1Somoni ＝ 17.037 Yen

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

2-6-2 Operation and Maintenance Cost

After the delivery of the equipment, the estimated cost of equipment's operation, i.e. fuel and oil expenditures, will be about 4,240 thousand Somoni annually (about 72,230 thousand Yen), referring to. Additionally, annual maintenance cost is estimated as 500 thousand Somoni (about 8,520 thousand Yen), referring to

(1) The 2012 yearly road maintenance budget of MOT is 46,800 thousand Somoni. Annual expenditure for this project is 4,740 thousand Somoni, about 10.1% of annual budget. Taking into account increasing tendency in the budget, it was concluded that the budget possibly can be allocated.

(2) As for the expenditure that hangs to the execution of international program of assistance, it should be a system distributed by priority.

(3) MOT has details that procured construction equipment according to the EBRD capital in 2009. When the investigation committee confirmed the driving time from the record of each machine parts during the year of the machine parts (made in China), the driving time number was almost the same as the standard driving time of Japan during the year. Moreover, badgeting is increased by 31.2% (7.8 million somoni), comparing to 2009 and 2008.

Table 2-6-2 Countries Budget, MOT Budget and Budget for road maintenance works

(mln.Somoni)

	2006	2007	2008	2009	2010	2011	2012
Countries Budget	2,510	3,195	4,478	6,008	6,537	8,292	10,860
MOT Budget	54.0	58.1	78.1	616.0	638.0	918.9	936.2
Budget for road maintenance works	21.5	22.2	25.2	33.0	34.0	39.0	46.8
Growth rate to previous year	－	103.3%	113.5%	131.0%	103.0%	114.7%	120.0%

Table 2-6-3 Fuel and oil costs (new budget)

No.	Name of equipment	Spec. (kw)	Q-ty	Operation hours (h／yr)	Fuel consumption (L／kw・h・unit)	(L／h・unit)	(L／yr・unit)	(L／yr)
1	Asphalt Cutter	8.0	10	240	0.227	1.8	435.8	4,358
2	Vibration Compactor	2.5	10	360	0.301	0.8	270.9	2,709
3	Hand Breaker	−	10	280	-	-	-	-
4	Air Compressor	35.0	5	320	0.189	6.6	2,116.8	10,584
5	Asphalt Sprayer	3.0	5	280	0.227	0.7	190.7	953
6	Hand Guide Roller	4.0	5	320	0.201	0.8	257.3	1,286
7	Asphalt Distributer	145.0	2	400	0.090	13.1	5,220.0	10,440
8	Asphalt finisher	45.0	2	400	0.152	6.8	2,736.0	5,472
9	Road Roller	55.0	2	360	0.108	5.9	2,138.4	4,277
10	Tire Roller	65.0	2	380	0.100	6.5	2,470.0	4,940
11	Water Tank Truck	145.0	2	630	0.040	5.8	3,654.0	7,308
12	Motor Grader	100.0	10	380	0.108	10.8	4,104.0	41,040
13	CrawlerExcavator	100.0	6	690	0.175	17.5	12,075.0	72,450
14	Wheel Loader	125.0	3	520	0.153	19.1	9,945.0	29,835
15	Bulldozer	152.0	2	720	0.175	26.6	19,152.0	38,304
16	Dump Truck	250.0	14	830	0.050	12.5	10,375.0	145,250
17	Asphalt plant	−	2	400	−	250.0	100,000.0	200,000
18	Crushing plant	230.0	2	600	0.170	39.1	23,460.0	46,920
19	Multi-Purpose Vehicle	80.0	2	550	0.077	6.2	3,388.0	6,776
19-1	Snow Plough	-	2	200	-	-	-	-
19-2	Rotary Blower	-	2	190	-	-	-	-
19-3	Salt Spreader	-	2	200	-	-	-	-
20	Truck with crane	125.0	2	760	0.050	6.3	4,750.0	9,500
21	Truck trailer	250.0	2	630	0.075	18.8	11,812.5	23,625
22	Pickup truck		4					
23	Line Marker		1					
24	Mobile Workshop	145.0	2	760	0.050	7.3	5,510.0	11,020
25	Maintenance Equipment	-	4	-	-	-	-	-
26	Axis load and overall weight meter	-	1					
	Total		118					677,048

Calculation base:

: Fuel consumption is refered to Table of construction machinary operation cost (by Japan Construction Machinary and Construction Association)

: Price of diesel fuel 6.2 TJS／Litter＝105.6 Yen／Litter

: Oil price 1% of the fuel cost

: 1TJS＝17.037 Yen (stated rate)

Fuel cost (annual)	677,048L×6.2TJS／L＝4,197,697TJS	about 71 510 Thousand Yen
Oil cost (annual)	4,197,697×1%＝41,976TJS	about 720 Thousand Yen
Total	4,239,673TJS	about 72 230 Thousand Yen

Table 2-6-4 Maintenance and operation cots (new budget)

No.	Name of equipment	Spec. (kw)	Q-ty	Rate of maintenance (%)	Japanese standart operation period (yrs)	RT standart operation period (yers)	Annual maintenance rate (%)	Manitenance cost / year・unit (10 thousand yen)	Manitenance cost / year (10 thousand yen)
1	Asphalt Cutter	8.0	10	7.0%	7.5	7.5	0.93%	0.3	2.5
2	Vibration Compactor	2.5	10	7.0%	6.0	6.0	1.17%	0.1	1.1
3	Hand Breaker	−	10	7.0%	5.5	5.5	1.27%	0.1	0.8
4	Air Compressor	35.0	5	7.0%	13.5	13.5	0.52%	0.9	4.7
5	Asphalt Sprayer	3.0	5	7.0%	4.8	4.8	1.46%	4.7	23.3
6	Hand Guide Roller	4.0	5	7.0%	13.5	13.5	0.52%	0.4	2.0
7	Asphalt Distributer	145.0	2	9.0%	11.0	11.0	0.82%	7.9	15.7
8	Asphalt finisher	45.0	2	9.0%	12.0	12.0	0.75%	13.5	27.0
9	Road Roller	55.0	2	9.0%	15.5	15.5	0.58%	7.0	13.9
10	Tire Roller	65.0	2	9.0%	15.0	15.0	0.60%	4.9	9.8
11	Water Tank Truck	145.0	2	9.0%	12.0	12.0	0.75%	5.5	11.0
12	Motor Grader	100.0	10	9.0%	15.5	15.5	0.58%	7.5	75.5
13	CrawlerExcavator	100.0	6	9.0%	9.0	9.0	1.00%	12.0	72.0
14	Wheel Loader	125.0	3	9.0%	12.0	12.0	0.75%	11.3	33.8
15	Bulldozer	152.0	2	9.0%	11.5	11.5	0.78%	18.8	37.6
16	Dump Truck	250.0	14	12.0%	11.0	11.0	1.09%	10.5	146.6
17	Asphalt plant	−	2	9.0%	10.0	10.0	0.90%	86.4	172.8
18	Crushing plant	230.0	2	6.0%	10.7	10.7	0.56%	26.4	52.7
19	Multi-Purpose Vehicle	80.0	2	9.0%	12.0	12.0	0.75%	11.3	22.5
19-1	Snow Plough	-	2	9.0%	13.5	12.0	0.75%	0.8	1.5
19-2	Rotary Blower	-	2	9.0%	15.0	12.0	0.75%	3.5	7.1
19-3	Salt Spreader	-	2	9.0%	14.5	12.0	0.75%	2.3	4.7
20	Truck with crane	125.0	2	12.0%	12.0	12.0	1.00%	5.9	11.8
21	Truck trailer	250.0	2	12.0%	12.0	12.0	1.00%	18.0	36.0
22	Pickup truck	98.0	4	12.0%	10.5	10.5	1.14%	2.9	11.4
23	Line Marker	71.0	1	9.0%	12.0	12.0	0.75%	0.7	0.7
24	Mobile Workshop	145.0	2	12.0%	12.0	12.0	1.00%	16.0	32.0
25	Maintenance Equipment	-	4	7.0%	15.0	15.0	0.47%	3.7	14.9
26	Axis load and overall weight meter	-	1	7.0%	12.5	12.5	0.56%	6.7	6.7
	Total								851.9

Calculation base:

: Table of construction machinary operation cost (by Japan Construction Machinary and Construction Association)
: Equipments' cost: base cost, or stated cost (CIF)
: RT standart operation period = Japanese standart operation period is applied
: Annual rate of maintenance = rate of manitetnance cost ÷RT standart operation period
: Annual rate of maintenance cost = equipment cost ×annual rate of maintenance
: 1TJS＝17.037Yen

Annual rate of maintenance cost	500.029TJS	8 519 Thousand Yen

※ Regardless of Japanese standard for operation years, operation life for attachments of multi-purpose vehicle, Snow plow, Rotary blower, Melting agent spreader, is counted as 12.o years, same as for Multi-Purpose vehicle.

CHAPTER 3. Project Evaluation

3-1 Preconditions

Land acquisition, installation permission, environmental-social consideration and counterpart's expenses are as shown in the table 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. For Kurgan-Tyube SETM, the space for A/P will be the land used by Japanese company for Kurgan-Tyube - Duty Road reconstruction Project Phase II. For the Gissar SETM, currently Chinese company using the land for A/P and C/P. After the withdrawal of Chinese company, MOT is planning to use the land for A/P and C/P installation.	
Installation permission	For both installation locations, there are already operating A/P and C/P on sites. No problems are foreseen for installation permissions.	Refer to Environmental and Social Consideration
Counterparts Expenses	Confirmed by M/D, etc.	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 expenses.

Table 3-2-1 Counterparts expenses

#	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 were workers because of equipment shortages.
4	Allocation of mechanics to maintain the construction equipment	Relocating ex-mechanics back to the equipment, who were workers because of equipment shortages.
5	Budget allocation to repair the equipment.	

It is scheduled that after the initial operation guidance (1) and (2) executed in this project, JICA will begin Technical Cooperation Project in road maintenance sector. It is important that the Technical Cooperation Project and the Road Maintenance Equipment Supply Project produce the synergy effect for smooth acquiring

the knowledge of road maintenance and repair by using provided equipment. The operators and mechanics that will attend initial operation guidance (1) or (2) of this project, should also participate in the Technical Cooperation Project as a counterpart.

During execution of this project, consultants closely adjust the activities with planned Technical Cooperation 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 increase in the project area and in the Republic of Tajikistan	
Project Purpose	Proper maintenance of the road in the project area	➢ Trained operators and mechanics continue to work in MOT ➢ JICA Technical Cooperation project is implemented as planned
Outputs	Road maintenance equipment will be properly delivered to the project area	
Activities	➢ Supply of Road maintenance equipment ➢ Guidance on road maintenance and repair by using the provided equipment	

3-4 Project Evaluation

3-4-1 Relevance

This project grants construction equipment for the road maintenance to Kurgan-Tyube SETM and Gissar SETM that has responsibility for the road described below.

- The governments gives high priority to the international trunk road, Asian Highway (AH-7), connecting Dushanbe city through Afghanistan with the Karachi seaport in Pakistan, and suburb national and local roads
- International trunk road Asian Highway (AH-65), from the border of Uzbekistan to the border of Kyrgyz Republic, passing Dushanbe city, suburb national and local roads

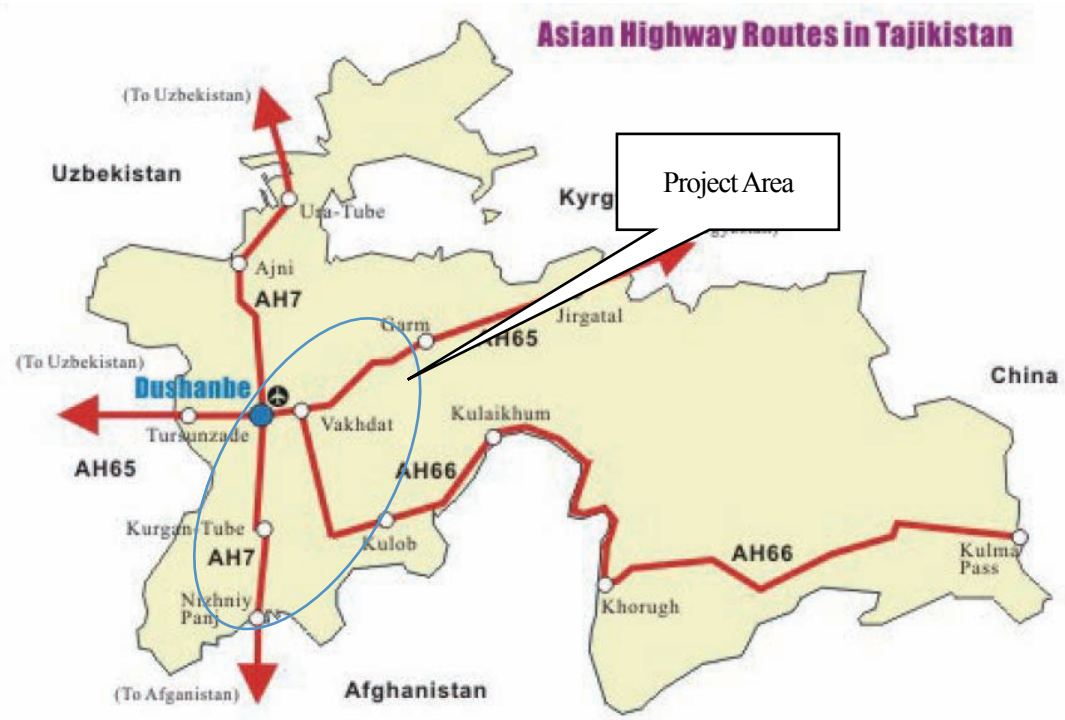


Figure 3-4-1 Project area

Safe and smooth traffic flow will be secured by properly maintaining the international trunk road (AH-7) from Dushanbe City to the Afghanistan, including Kurgan-Tyube - Nijniy-Pyanj section, reconstructed by Japanese Aid Grant.

The international trunk road (AH-65), from Dushanbe City to the Kyrgyz border, passes the heavy snowfall area, such as Rogun and Nurek. This Faizabad region is called as Siberia of Tajikistan. Currently snow cleaning and melting works are mainly performed manually, and using motor graders. Providing multipurpose vehicle with attachments will help to perform the works mechanically and increase efficiency.

Therefore, 7.1 million residents in Tajikistan are expected to benefit from the project effect.

This project aims is "appropriate and maintenance of the road in the project area". This will contribute to "Construction of transportation network infrastructure to satisfy demand the economic and social demand with safety priority", the goal stated in the State Program on Transport Development for Tajikistan, 2010-2025 (2011).

Moreover, the direct contribution will be possible to the maintenance from Kurgan-Tyube – Nijini Pyanj road, reconstructed by the Japanese Grant Aid.

From the above circumstances, realization of this project under the Japan Grant Aid scheme will be appropriate.

3-4-2 Effectiveness

(1) Quantitative Effects

Table 3-4-1 Quantitative Effects

Index Name	Base Value (2012)	Target Value (2017)
Kurgan-Tyube SETM Annual area (m^2) of pothole repairs by hot asphalt mix	0	13,000
Gissar SETM Annual area (m^2) of pothole repairs by hot asphalt mix	0	6,000
Annual overlay repair length (two lines, km)	0	10

Note) Currently, "cold asphalt" is manufactured by mixing local bitumen rich crude oil with crushed stone and sand by using motor grader. Cold asphalt is used for pavement repair and pothole repair. It is a temporary repair, and there are strength and durability problems of the repairs. The pothole repair area with cold asphalt (partially purchased) is 52,368m^2 for Kurgan-Tyube SETM, and 26,487m2 for Gissar SETM in 2012.

(2) Qualitative Effects

Qualitative effects of this project are as follows.

i. Improving strength and durability of repaired areas by repairing potholes and others by using asphalt concrete mix, manufactured in provided plants and pothole repair equipment sets.

ii. The period of a traffic stop will be shortened by the efficiency of mechanizing the process of snow cleaning, melting and spreading sands and agents during the winter time.

Reference Attachments

1. Survey Teams Members List
2. Survey Schedule
3. Counterparts List
4. Minutes of Discussion (M/D)
5. Reference Materials

Attachment 1－Survey Members List

Name	Position	Organization
Mr. TANAKA Kenshiro (August, 2012)	Team Leader	JICA
Mr. TANAKA Fusato (December, 2012)		Ditto
Mr. SHIMADA Aya	Program Management	Ditto
Mr.OHASHI Gaku	Road Administration Advisor	Ditto
Mr. MITANI Katsuaki	Chief Consultant /Road Plan	Katahira & Engineers International
Mr. BABA Hideaki	Equipment Plan/ Operation and Maintenance Plan	Ditto
Mr. ABDUKADIROV Rasulbek	Procurement Plan/Cost Estimation	Ditto
Mr. ASANO Tom	Translator	Ditto

Attachment 2－Survey Schedule

(1) First Survey (July 29 ～ August 28, 2012)

Days count	Month	Date		JICA			Consultant		
				Mr. Tanaka (Team Leader)	Ms. Shimada (Programme Management)	Ms. Ohashi (Road Expert)	Mr. Mitani (Chief Consultant/ Road Planning)	Mr. Baba (Plant Planning/ O&M Planning)	Mr. Rasul (Procurement Planning/ Cost Estimation)
1	JULY	29	Su				11:40 Narita TK051→17:45 Istanbul 21:10 TK254→		
2		30	Mo				03:45 Dushanbe: Internal Meeting⇒13:30 JICA Meeting		
3		31	Tu				AM: 11:00 Visit to Japan Embassy, PM: MOT Meeting and Explanation		
4	AUGUST	1	We				Site Study (SE TM Gissar, Asphalt Plant, Crushing Plant planned site)		
5		2	Th				Site Study (SE TM Khatlon、A/P, C/P planned site)		
6		3	Fr				Collecting data and Supplementary survey		
7		4	Sa				***ditto***		
8		5	Su				***ditto***		
9		6	Mo				Site Study 9 SE HMs under SE TM Gissar Accomodation: Dushanbe	Site Study 13 SE HMs under SE TM Khatlon Accomodation: Kurgan Tyube	
10		7	Tu						
11		8	We						
12		9	Th						
13		10	Fr						
14		11	Sa				Reserve for Site Study		
15		12	Su				Report preparation and Supplementary survey		
16		13	Mo				***ditto***		
17		14	Tu				***ditto***		
18		15	We				***ditto***		
19		16	Th				***ditto***		
20		17	Fr				Discussion with MOT		
21		18	Sa			Bishkek→TF749 10:00 Dushanbe	Report preparation and Supplementary survey		
22		19	Su	11:40 Narita TK051→ 17:45 Istanbul 21:10 TK254→			***ditto***		
23		20	Mo	03:45 Dushanbe: Internal Meeting with Consultant⇒Sight Inspection for Road conditions					
24		21	Tu	AM: Vist JICA Tajikistan Office, MOT meeting and Explanation PM: Site Study SE TM Gissar : Visit to Embassy…Pending					
25		22	We	Site Study SE HM Khatlon					
26		23	Th	Discussion of the contents of Minutes with MOT ⇒ Signing of the Minutes					
27		24	Fr	⇒ Report to JICA Tajikistan/ Empassy of Japan					
28		25	Sa	Reserve for supplementary survey		Dushanbe→TF750 11:30 Bishkek	Reserve for supplementary survey		
29		26	Su	Report preparation and Supplementary survey					
30		27	Mo	05:40 Dushanbe TK255→09:05 Istanbul 18:55 TK050→					
31		28	Tu	→10:10 Narita					

Note: SE TM; State Enterprize on Transport Management, SE HM; State Enterprize on Highway Maintenace

(1) Second Survey (Draft Explanation, December 2 ～December 12, 2012)

No days	Month	Day	Week day	JICA		Consultant		
				Mr. Tanaka (Team Leader)	Ms. Shimada (Programme Management)	Mr. Mitani (Chief Consultant/ Road Planning)	Mr. Baba (Plant Planning/ O&M Planning)	Mr. Rasul (Procurement Planning/ Cost Estimation)
1	12	2	Sun	12:55 Tokyo TK051→18:10 Istanbul 20:45 TK254→				
2		3	Mon			04:30 Dushanbe: Consultant Internal Meeting ⇒14:00 Visiting JICA Tajikistan Office		
3		4	Tue			AM: Visiting MOT, PM: Observing Candidate Plant location at SETM Gissar, 16:00 DFR and M/D content explanaition to Mr.Yatimov O., Head of International Department		
4		5	Wed	12:55 Tokyo TK051→ 18:10 Instanbul 20:45 TK254→		10:30 Land securing meeting at Nijni-Pyanj Representatives of Kusangir district, Transport Control Department DaiNihon Doboku (K-D contractor)	Preparing Project Implementation Schedule Confirming M/D contents and additional explanation to Mr.Yatimov	
5		6	Thu	04:30 Dushanbe				
				10:00 Internal meeting with Mission members, 14:00 Discussion M/D with Mr.Yatimov, confirming budget allocation				
6		7	Fri	9:00 Signing of M/D				
						10:00 Report to Mr.Fakhriddinov F., Head of Internal Transport Control Department, 13:00 Observing Vehicle Weight Scale on IRS Toll Road		
7		8	Sat			Consultant Internal Meeting, Survey content arrangments, Report corrections		
8		9	Sun			Material analysis, Report corrections, etc.		
9		10	Mon			TK255 Delayed. 15:00 Dushanbe TK255 →18:00 Istanbul		
10		11	Tue			17:10 Istanbul TK050→		
11		12	Wed			11:30 Narita		

Attachment 3－Counterparts List

(1) Ministry of Transport

Mr. Hakimov N.H.	Minister
Mr. Zuhurov J.Z.	The First Deputy Minister
Mr. Yatimov O.M.	Head of Department on Cooperation with Foreign Investigation
Mr. Hayotov B.	Head of Main Division on Road Construction and Maintenance
Mr. Anoyatshoev A.	Deputy Head of Main Division on Road Construction and Maintenance
Mr. Fakhriddinov F.	Head of Main Division on Inland Transport
Mr. Bahrombekov G.	Chief Engineer of the Board of Management for Construction Enterprises

(2) State Enterprise for Transport Management, SETM

SETM of Kurgan-Tyube Region

Mr. Nurulloev B.	Head
Mr. Yakubov N.	Deputy Head
Mr. Kholikov M.	Chief Engineer
Mr. Davlatov M.	Chief Mechanic

SETM of Gissar Region

Mr. Mirzoev O.	Chief Engineer
Mr. Odinaev C.	Head of Production and Technical Department
Mr. Toirov O.	Chief Mechanic

(3) State Enterprise on Highway Maintenance, SEHM

SEHMs under SETM of Kurgan-Tyube Region

Mr. Karimov I.	Head of SEHM of Bohtar,
Mr. Bolotov Z.	Chief Engineer of SEHM of Bohtar,
Mr. Sobirov L.	Head of SEHM of Shakhrituz
Mr. Gulyamov F.	Chief Engineer of SEHM of Shakhrituz
Mr. Aliev F.	Head of SEHM of Pyanj
Mr. Salamatov B.	Head of SEHM of Pyanj
Mr. Hurshidov Z.	Head of SEHM of Kubodiyon
Mr. Zafarov H.	Chief Engineer of SEHM of Kubodiyon
Mr. Ilyasov G.	Head of SEHM of Jomi
Mr. Ghaniev L.	Chief Engineer of SEHM of Jomi
Mr. Khamidov F.	Head of SEHM of Rumi
Mr. Ghubanaliev Ch.	Chief Engineer of SEHM of Rumi
Mr. Ziyodov J.	Head of SEHM of Vaksh
Mr. Ghoipov F.	Chief Engineer of SEHM of Vaksh
Mr. Alimardonov M.	Head of SEHM of Sarband
Mr. Jumaboev F.	Chief Engineer of SEHM of Sarband
Mr. Safarboev M.	Head of SEHM of Nusri-Hisrav
Mr. Mahmatov B.	Chief Engineer of SEHM of Nusri-Hisrav
Mr. Zoirov T.	Head of SEHM of Kumsangir
Mr. Qurbanov M.	Chief Engineer of SEHM of Kumsangir
Mr. Apsamatov R.	Head of SEHM of Yavan
Mr. Hamidov K.	Chief Engineer of SEHM of Yavan
Mr. Shamshodov S.	Head of SEHM of Jilikul
Mr. Rakhmatillaev D.	Chief Engineer of SEHM of Jilikul
Mr. Juraev Sh.	Head of SEHM of Huroson
Mr. Holiqov M.	Chief Engineer of SEHM of Huroson

SEHMs under SETM of Gissar Region

Mr. Rasulov K.	Head of SEHM of Vahdat
Mr. Gulov T.	Head of SEHM of Rudaki
Mr. Ismatov J.	Head of SEHM of Varzob
Mr. Kalandarov S.	Chief Engineer of SEHM of Varzob
Mr. Abdulaev S.	Head of SEHM of Tursunzade
Mr. Narzulloev H.	Chief Engineer of SEHM of Tursunzade
Mr. Muhamedov Sh.	Chief Engineer of SEHM of Nurek
Mr. Bahodurov N.	Head of SEHM of Faizabad
Mr. Kodirov Sh.	Chief Engineer of SEHM of Faizabad
Mr. Shirinov A.	Head of SEHM of Rogun

(4) State Agency on Control and Regulation of Transportation

Mr. Rakhimov M.	Deputy Head of International Automobile Transportation Division
Mr. Kurbonov Kh.	Director of State Unitary Enterprise "Center of Certification, Work and Service in Transport Section

(5) Resident Mission Office, Asia Development Bank

Ms. Chyngysheva A.	Portfolio Management Specialist
Mr. Nuriddinov F.	Project Officer

(6) Resident Mission Office, European Bank for Reconstruction and Development

Mr. Aliev S.	Senior Analyst

(7) Japan Side

Embassy of Japan in Tajikistan

Mr.Imahashi Keisuke	Ambassador
Mz.Sato Akiko	Second Council

JICA Tajikistan Office

Mr.Iida Jiro	Resident Representative
Mr. Tojiddin Najmedinov	Program Officer

Dai Nippon Construction	Contractor of the Project for Rehabilitation of Kurgan-Tyube – Dusti Road (Phase II)
Mr.Nonogaku Koichiro	Construction Site Manager
Mr.Yatsuka Toshiyuki	Construction Manager
Mr.Tojo Masayuki	Construction Manager

World Kaihatsu Kogyo Co., Ltd.

Mr.Kazama Mitsuyoshi	Site Manager (Office Head)

MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY
ON THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR ROAD MAINTENANCE IN KHATLON REGION AND DISTRICTS OF REPUBLICAN SUBORDINATION IN THE REPUBLIC OF TAJIKISTAN

On the basis of the discussions and field survey in the Republic of Tajikistan (hereinafter referred to as "Tajikistan") in July and August 2012, and the subsequent technical examination of the results in Japan, 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 Khatlon Region and Districts of Republican Subordination (hereinafter referred to as "the Project").

JICA sent a Preparatory Survey Team (hereinafter referred to as "the Team") to Tajikistan, headed by Mr. Fusato Tanaka, Director, Transportation and ICT Division 3, Economic Infrastructure Department of JICA, to explain to and consult with officials concerned of the Government of Tajikistan on the contents of the draft Preparatory Survey Report from December 6 to 7, 2012.

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

Dushanbe, December 7, 2012

Fusato TANAKA
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Nizom Hojievich HAKIMOV
Minister
Ministry of Transport
the Republic of Tajikistan

ATTACHMENT

1. Components of the Draft Preparatory Survey Report
   The Tajikistan side agreed and accepted in principle the contents of the draft Preparatory Survey Report including draft technical specifications of equipment explained by the Team. The list of equipment to be procured is indicated in Annex-1.

2. Confidentiality of the Cost Estimation
   The both sides agreed that the Project Cost Estimation, as attached in Annex-2, and the specifications of equipment in the draft Preparatory Survey Report are confidential and should never be duplicated or disclosed to any third parties until all the contracts for the Project were concluded.

3. 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 August 24, 2012 continue to be valid unless information is updated by the draft Preparatory Survey Report.

4. Japan's Grant Aid Scheme
   The Tajikistan side fully understood the scheme of the Japan's Grant Aid and the necessary measures to be undertaken by the Tajikistan side as explained by the Team and described in Annex-4 and Annex-5 of the Minutes of Discussions signed on August 24, 2012.

5. Undertakings of the Tajikistan Side
   The Tajikistan side shall undertake the following arrangements for the Project at its expense based on the contents of the draft Preparatory Survey Report.
   5-1. Administrative Arrangements
      1) Commission for Banking Arrangement (B/A) and Authorization to Pay (A/P)
      2) Tax exemption and custom clearance (at the time of equipment procurement)
      3) Acquisition of permission and completion of necessary environmental impact assessment for installation of asphalt plants, aggregate plants and quarries in each of Rumi District, Khatlon Region and Rudaki District, Districts of Republican Subordination (to be completed within 5 months from the date of Contract with the Supplier for the Project)
   5-2. Civil Works
      1) Clearing and leveling of the installation sites for asphalt plants and aggregate plants in each of Rumi and Rudaki Districts (to be completed within 5 months from the date of signing Contract with the Supplier for the Project)
      2) Securing electricity, water and drainage for asphalt plants and aggregate plants in each of Rumi and Rudaki Districts (to be completed within 5 months from the date of Contract with the Supplier for the Project)
      3) Securing land and electricity for the installation of an axle load / vehicle scale (to be completed by the end of March 2013) and construction of an operators' house for its operators at Nizhniy Pyandzy along the road lane from Afghanistan to Tajikistan (to be coordinated with the time of

installation of an axle load / vehicle scale)

6. Maintenance and Utilization of the Equipment
   The Tajikistan side shall secure enough budget and personnel necessary for operation and maintenance of the equipment, procured by the Project and for maintenance of the roads in the Project site through effective utilization of the equipment procured by the Project after the completion of the Project.

7. Schedule of the Study
   JICA will complete the final Preparatory Survey Report in Russian, in accordance with the confirmed items and send it to the Government of Tajikistan around March 2013.

Annex-1: List of Equipment to be Procured
Annex-2: Project Cost Estimation
Annex-3: Tentative Project Implementation Schedule

Annex-1

LIST OF EQUIPMENT TO BE PROCURED

The equipment to be procured by the Project will be handed over to and magaged by State Enterprise of Kurgan-Tyube Transport Management (SEKTM), Khatlon Region and State Enterprise of Gissar Transport Management (SEGTM), Districts of Republican Subordination. The number of each equipment procured for SEKTM and SEGTM respectively is as follows;

Name of Equipment		Gissar	Kurgan-Tyube	Total
Asphalt Cutter, 150mm	No.	4	6	10
Vibration Compactor, 70kg	No.	4	6	10
Hand Breaker, 7kg	No.	4	6	10
Air Compressor, 5.1m^3/min	No.	2	3	5
Asphalt Sprayer, 400 liter	No.	2	3	5
Hand Guide Roller, 650kg	No.	2	3	5
Asphalt Distributer, 6,000 liter	No.	1	1	2
Asphalt Finisher, 4.5m	No.	1	1	2
Road Roller, 10t	No.	1	1	2
Tire Roller, 15t	No.	1	1	2
Water Tank Truck, 8,000 liter	No.	1	1	2
Motor Grader, 3.7m	No.	4	6	10
Crawler Excavator, 0.8m^3	No.	3	3	6
Wheel Loader, 2.5m^3	No.	1	2	3
Bulldozer, 20t	No.	1	1	2
Dump Truck, 14t	No.	6	8	14
Asphalt Plant, 35t/h	No.	1	1	2
Aggregate Plant, 35t/h	No.	1	1	2
Multi-Purpose Vehicle, 4x4	No.	1	1	2
Snow Plough Attachment	No.	1	1	2
Rotary Blower Attachment	No.	1	1	2
Salt Spreader Attachment	No.	1	1	2
Truck with Crane, 5t	No.	1	1	2
Truck Trailer, 25t	No.	1	1	2
Pick-Up, double cabin	No.	2	2	4
Line Marker	No.	1	0	1
Mobile Workshop, 4x4	No.	1	1	2
Maintenance Equipment	Set	2	2	4
Axle Load/Vehicle Scale	No.	0	1	1

Annex-2

CONFIDENTIAL

PROJECT COST ESTIMATION

1. Cost Borne by the Government of Japan

CONFIDENTIAL

2. Cost Borne by the Government of Tajikistan

Cost items	Sum	
	Thousand Somoni	Thousand Yen
Acquisition, cleaning and leveling of the installation sites for asphalt plants and aggregate plants	40	681.5
Providing infrastructure for plants	40	681.5
Banking commissions	61	1040.0
Providing infrastructure for axle load / vehicle scale	10	170.3
Total	151	2573.0

3. Conditions of Cost Estimation

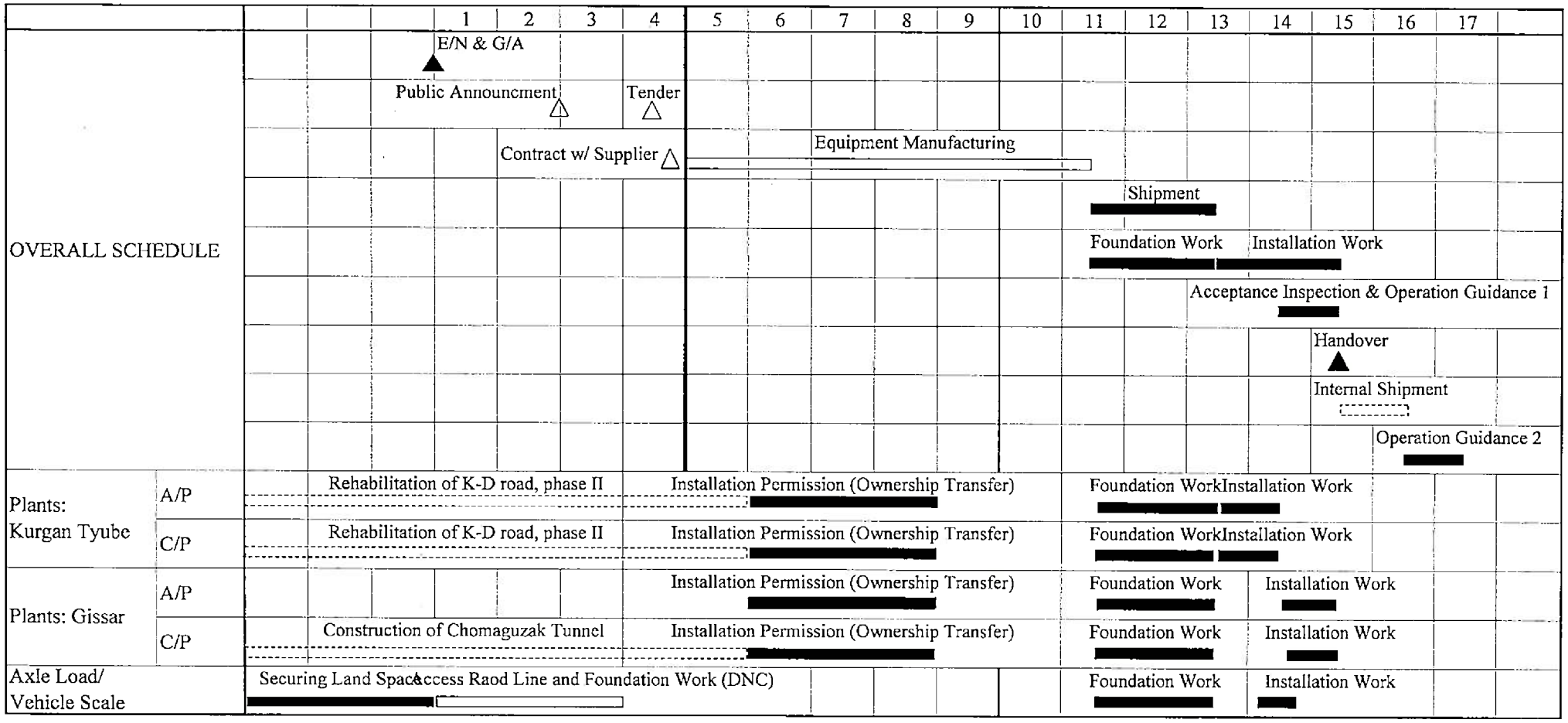
3-1. Estimated timing: July 2012

3-2. Exchange rates: US$ 1.00 = Yen 81.06, Tajikistan Somoni 1= Yen 17.037

3-3. Others: The project is implemented in accordance with the system of Japan's Grant Aid. The above cost estimation does not assure the ceiling cost on the Exchange of Notes and shall be reviewed by the Government of Japan before signing of the Exchange of Notes between the two (2) Governments.

Annex-3

TENTATIVE PROJECT IMPLEMENTATION SCHEDULE



MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY
ON THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR ROAD MAINTENANCE IN KHATLON REGION AND DISTRICTS OF REPUBLICAN SUBORDINATION IN THE REPUBLIC OF TAJIKISTAN

In response to a request from the Government of the Republic of Tajikistan (hereinafter referred to as "Tajikistan"), 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 Khatlon Region and Districts of Republican Subordination (hereinafter referred to as "the Project").

JICA sent the Preparatory Survey Team (hereinafter referred to as "the Team") to Tajikistan, headed by Mr. Kenshiro TANAKA, Advisor, Grant Aid Project Management Division 1, Financing Facilitation and Procurement Supervision Department of JICA, and was scheduled to stay in the country from July 30 to August 27, 2012.

The Team held a series of discussions with officials concerned of the Government of Tajikistan and conducted a field survey in the study area.

In the course of discussions and field survey, both sides confirmed the main items described in the attached sheets. The Team will prepare a Preparatory Survey Report.

Dushanbe, August 24, 2012

Kenshiro TANAKA
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Nizom Hojievich HAKIMOV
Minister
Ministry of Transport
the Republic of Tajikistan

ATTACHMENT

1. Objective of the Project

The both sides confirmed that the objective of the Project is to improve the operation and maintenance of the roads in Khatlon Region and Districts of Republican Subordination by modernizing road maintenance equipment.

2. Project Sites

The sites of the Project are shown in Annex-1.

3. Responsible and Implementing Organizations

3-1. The responsible organization is the Ministry of Transport (MOT).

3-2. The implementing organizations are State Enterprise of Gissar Transport Management (SEGTM) and State Enterprise of Kurgan-Tyube Transport Management (SEKTM).

3-3. The organization chart of MOT is as shown in Annex-2.

3-4. The organization chart of SEGTM and SEKTM are as shown in Annex-3.

4. Items Requested by the Government of Tajikistan

4-1. As a result of discussions, the both sides confirmed that the items finally requested by the Government of Tajikistan are as follows:

(1) Road Maintenance Equipment,

Original Request in Application Form

Name of Equipment		Gissar	Kurgan-Tyube	Total
Asphalt Cutter, 150mm	No.	4	6	10
Vibration Compactor, 60kg	No.	4	6	10
Hand Breaker, 7kg	No.	4	6	10
Air Compressor, $5m^3$	No.	2	3	5
Asphalt Sprayer, 350 liter	No.	2	3	5
Hand Guide Roller, 600kg	No.	2	3	5
Asphalt Finisher, 4.4m	No.	1	1	2
Road Roller, 9t	No.	1	1	2
Tire Roller, 8-12t	No.	1	1	2
Water Tank Truck, 8,000 liter	No.	1	1	2
Motor Grader, 3.7m, 100kw	No.	4	6	10
Crawler Excavator, $0.8m^3$ (*1)	No.	3	3	6
Wheel Loader, $2.5m^3$	No.	1	2	3
Dump Truck, 250kw, 14t	No.	6	8	14
Asphalt Plant, 35t/h (*2)	No.	1	1	2
Aggregate Plant, 35t/h (*2)	No.	1	1	2
Multi-Purpose Vehicle, 4x4	No.	1	1	2
Snow Plough Attachment	No.	1	1	2
Rotary Blower Attachment	No.	1	1	2

Salt Spreader Attachment	No.	1	1	2
Truck with Crane, 5t	No.	1	1	2
Mobile Workshop, 4x4	No.	1	1	2
Maintenance Equipment	Set	2	2	4
Additional Request				
Name of Equipment		Gissar	Kurgan-Tyube	Total
Pick-Up, double cabin	No.	2	2	4
Asphalt Distributer, 8,000 liter	No.	1	1	2
Truck Trailer, 25t	No.	1	1	2
Axle Lord/Vehicle Scale	No.	0	1	1
Bulldozer, 20t	No.	1	1	2
Line Marker	No.	1	0	1

(*1) The both sides agreed to change wheel excavators in the original request to crawler excavators based on the request of the Tajikistan side.

(*2) Asphalt plants and aggregate plants will be installed 1) at the former airport of Rumi District in Khatlon Region and 2) in the suburbs of Dushanbe along Kafirnigan River in Districts of Republican Subordination.

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

(3) Soft Component (e.g. trainings for maintenance of equipment mentioned in (1)), if necessary.

4-2. JICA will assess the appropriateness of the request and will report the findings to the Government of Japan. The final specifications and quantities of the road maintenance equipment shall be decided by the Japanese side and be described in the draft Preparatory Survey Report, which will be prepared around December 2012, in consideration of necessity, technical viability, sustainability, cost-effectiveness, and budget availability. The Tajikistan side understood that all the requested items, therefore, may not be accepted as final components of the Project.

5. Japan's Grant Aid Scheme

5-1. The Tajikistan side understands the Japan's Grant Aid scheme explained by the Team, as described in Annex-4.

5-2. The Tajikistan side will take the necessary measures, as described in Annex-5, to facilitate the smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

6. Schedule of the Study

6-1. JICA will prepare the draft Preparatory Survey Report in English and send a mission team in order to explain its contents to the Tajikistan side around December 2012.

6-2. When the contents of the draft Preparatory Survey Report are accepted in principle by the Government of Tajikistan, JICA will complete the final report and send it to the Government of Tajikistan around March 2013.

7. Other Relevant Issues

7-1. The Tajikistan side requested lubricating oil to be considered for procurement as a part of the Project. The Japanese side took note of this request.

7-2. The Tajikistan side shall secure enough budget and personnel necessary for maintenance of the equipment procured by the Project and for operation and maintenance of the roads in the Project site through effective utilization of the equipment procured by the Project after the completion of the Project.

7-3. The Tajikistan side shall provide security measures for all concerned Japanese nationals working for the Project, if deemed necessary.

7-4. The Tajikistan side shall provide the Japanese side with the map and land photos of the proposed location of an asphalt plant and an aggregate plant in the suburbs of Dushanbe along Kafirnigan River in Districts of Republican Subordination by September 30, 2012.

7-5. The Tajikistan side shall take all the necessary measures for the installation of asphalt plants and aggregate plants in each of Rumi and Rudaki Districts as follows:

for asphalt plants

- securing the land for the asphalt plant
- obtaining all the necessary licenses and/or permissions to install and operate the asphalt plant
- clearing and levelling the site
- securing electricity and water

for aggregate plants

- securing the land for the aggregate plant
- obtaining all the necessary licenses and/or permissions to operate a quarry and the aggregate plant
- clearing and levelling the site
- securing electricity and water

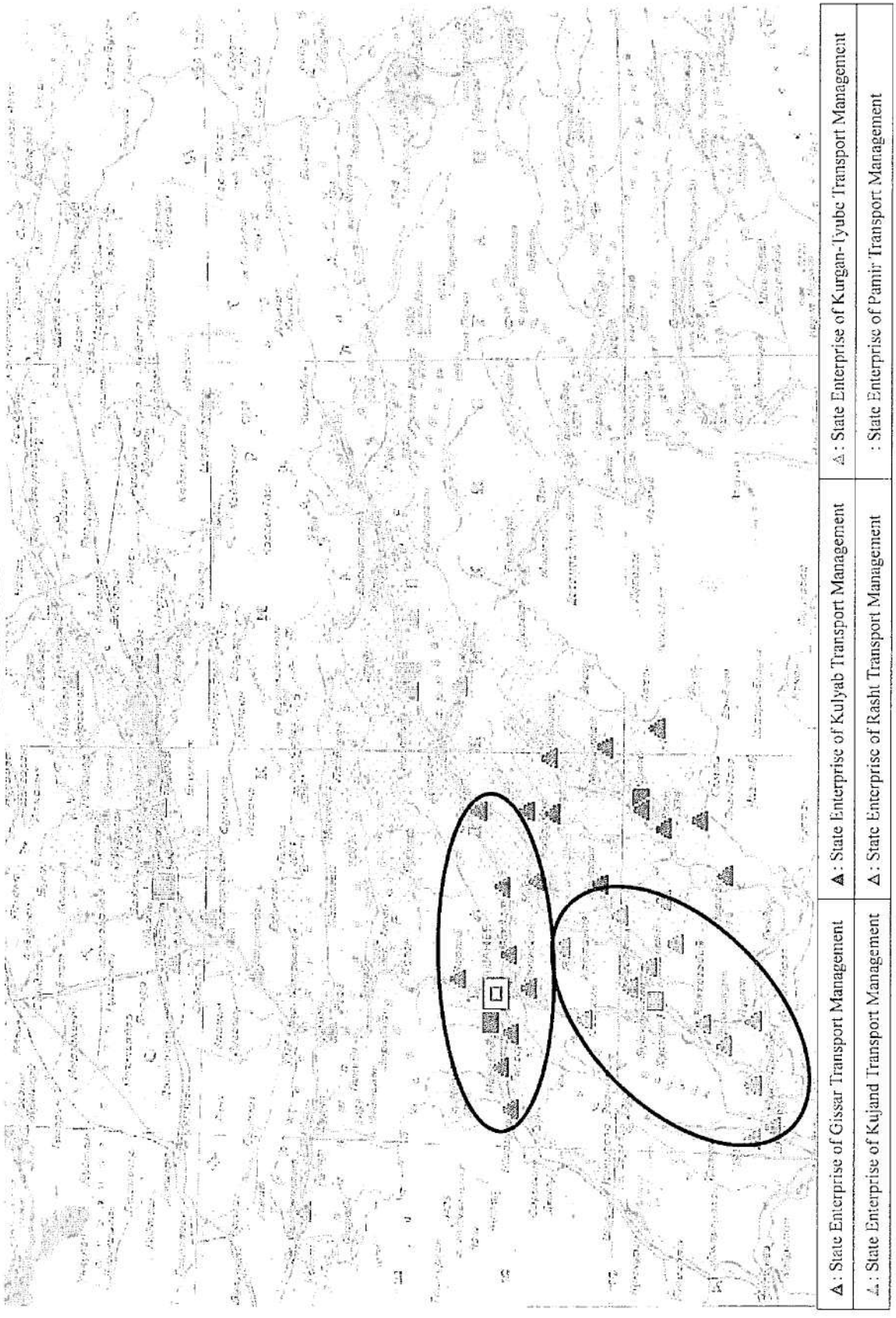
7-6. All the equipment procured by the Project, except for asphalt plants and aggregate plants, will be handed over from the Japanese side to the Tajikistan side at one designated place in or around Dushanbe. The Tajikistan side shall take the responsibilities for the transportation of the equipment to the designated place. After handing-over and installation of the equipment, soft component will be implemented in Rumi District, Khatlon Region and in Vakhdat District, Districts of Republican Subordination, if deemed necessary.

Annex-1: Project Sites
Annex-2: Organization Chart of MOT
Annex-3: Organization Chart of SEGTM and SEKTM
Annex-4: Japan's Grant Aid Scheme
Annex-5: Major Undertakings to be Taken by Each Government

12/17

Annex-1

PROJECT SITES



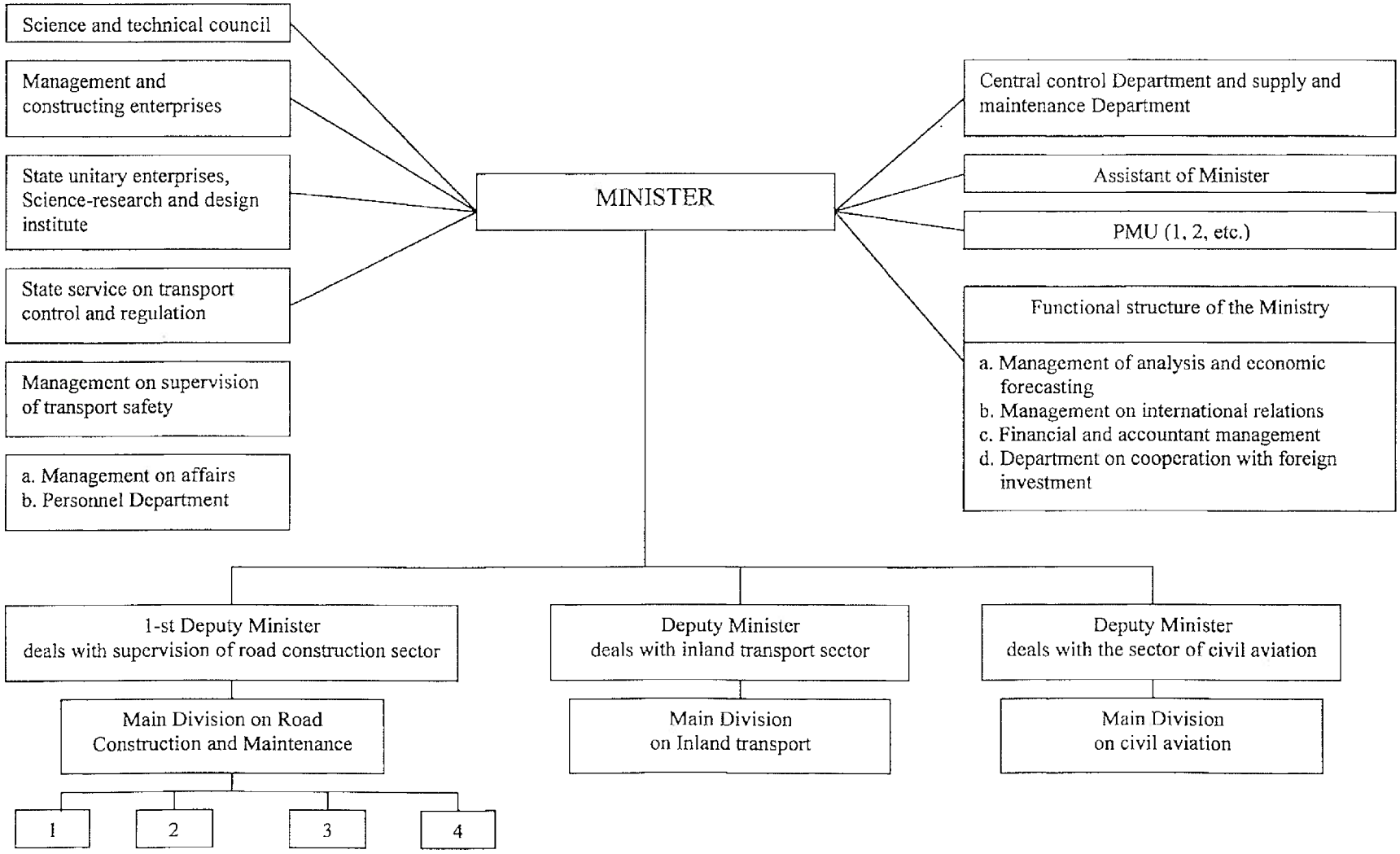
▲: State Enterprise of Gissar Transport Management	▲: State Enterprise of Kulyab Transport Management
△: State Enterprise of Kujand Transport Management	△: State Enterprise of Rasht Transport Management

▲: State Enterprise of Kurgan-Tyube Transport Management

: State Enterprise of Pamir Transport Management

Annex-2

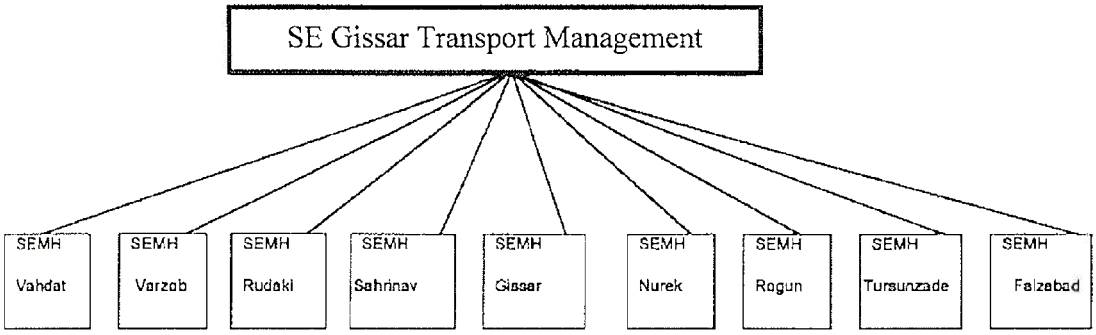
ORGANIZATION CHART OF MOT



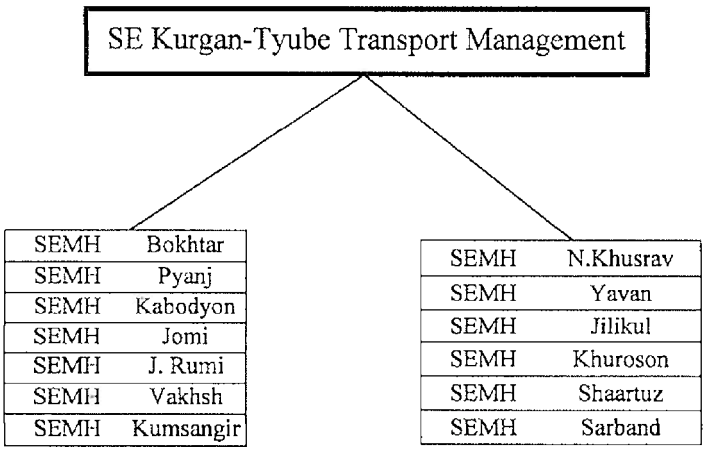
Annex-3

ORGANIZATION CHART OF SEGTM & SEKTM

State Enterprise of Gissar Transport Management



State Enterprise of Kurgan-Tyube Transport Management



SEMH	Bokhtar
SEMH	Pyanj
SEMH	Kabodyon
SEMH	Jomi
SEMH	J. Rumi
SEMH	Vakhsh
SEMH	Kumsangir

SEMH	N.Khusrav
SEMH	Yavan
SEMH	Jilikul
SEMH	Khuroson
SEMH	Shaartuz
SEMH	Sarband

Annex-4

JAPAN'S GRANT AID

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.

- 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 singed 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.

(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

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.

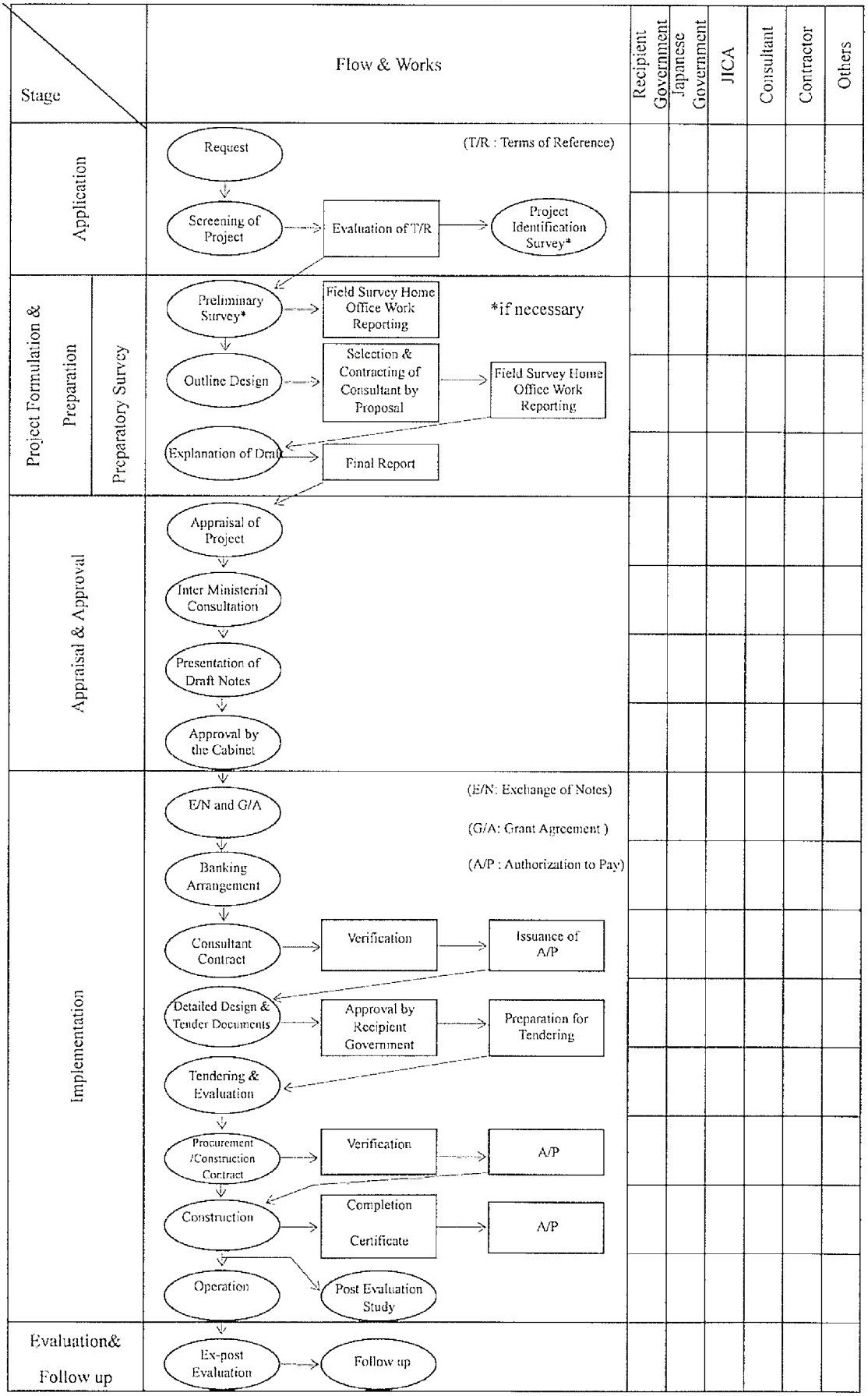
(9) Authorization to Pay (A/P)

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.

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-5

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)

Attachment 5－ Reference Materials

#	Name	Form	Original / Copy	Publishing organization	Publishing Year
1	Asian highway classification and design standards	WEB : http://www.unescap.org/ttdw/common/tis/ah/AnnexII-E.pdf	Original	UNESCAP	2012
2	Presidential Degree #569, about seasonal limitations for cargo transportation	Print	Copy	President Office	Nov 8, 2011
3	Presidential Degree #250, about MOT	Print	Copy	President Office	Apr 6, 2011
4	Presidential Degree #779, about oversized and overweighed transportation	Print	Copy	President Office	Dec 29 2006
5	MOT Organization Chart	Print	Copy	MOT	2012
6	Inception Report: CAREC Regional Road Corridor Improvement Project	Print	Copy	ADB, Tajikistan Government	Apr, 2012
7	MOT, Fuel consumption table for 2007-2011	Print	Copy	MOT	2011
8	National development strategy of the republic of Tajikistan for the period to 2015: Draft edition	WEB : http://amcu.gki.tj/eng/images/stories/nds_en.pdf	Original	Tajikistan Government	Aug, 2006
9	National target development strategy for transport sector of the republic of Tajikistan to the year 2025: Draft edition	Print	Copy	Tajikistan Government	2011
10	Transport sector master plan: Developing Tajikistan's Transport Sector	Print	Copy	ADB, Tajikistan Government	2011
11	SETM Kuragn-Tyube, Equipment list	Print	Copy	MOT	2012
12	SETM Gissar, Equipment list	Print	Copy	MOT	2012
13	SETM Kuragn-Tyube, Annual Budget for road maintenance	Print	Copy	MOT	2012
14	SETM Gissar, Annual Budget for road maintenance	Print	Copy	MOT	2012