Ministry of Emergency Situations
The Republic of Armenia

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR THE IMPROVEMENT OF FIRE-RESCUE EQUIPMENT
IN
THE REPUBLIC OF ARMENIA

July, 2017

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)
INGEROSEC CORPORATION
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 Fire-Rescue Equipment and entrust to the joint-venture consisting of INGEROSEC CORPORATION and KATAHIRA & ENGINEERS INTERNATIONAL.

The survey team held a series of discussions with the officials concerned of the Government of the Republic of Armenia, 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 the Republic of Armenia for their close cooperation extended to the survey team.

July, 2017

NAKAMURA Toshiyuki
Director General,
Industrial Development and Public Policy Department
Japan International Cooperation Agency

Summary

1. Overview of Armenia

The Republic of Armenia (hereinafter referred to as "Armenia") is a landlocked country located in the Caucasus region, with a land area of 29,800 square meters (approximately one-thirteenth the size of Japan) and a population of approximately three million (2015 MOFA data). With little flatland, 90% of its land is situated at an altitude of between 1,000 and 3,000 meters. Low temperatures in the winter drop to -40°C, while high temperatures in the summer can reach up to 40°C. Snowfall in winter can also reach up to 1-2 meters.

Armenia's GDP suffered greatly due to the effects of the dissolution of the Soviet Union, falling by 42% in 1992 and 9% in 1993. However, the Armenian government's early shift to a market economy proved successful, bringing growth in 1994; a high rate of growth in the double digits was recorded for six consecutive years from 2002 to 2007. In 2009, GDP dropped by 14.1% compared to the previous year, due to the impacts of the global financial crisis, but this was turned around once again in 2010 (2.2% growth rate), continuing until 2015 with an average of 3% growth. Armenia's GDP in 2016 was approximately US$10 billion, making its real GDP growth rate 0.2% (World Bank, 2016). The breakdown of the GDP is 19.6% for the primary sector, 29.1% for the secondary sector, and 51.3% for the tertiary sector. The GDP per capita is US$3,525 (World Bank, 2016).

Primary industry in Armenia is agriculture (wheat, cotton, grapes, vegetables, etc.), precious stone processing including diamond-cutting, and machinery fabrication, with main exports being mineral resources and nonferrous metals such as aluminum, copper, and zinc. Conversely, the country is poor in energy resources and is highly dependent on foreign energy such as natural gas and petroleum. In terms of trade volume, imports vastly exceed exports with US$2.98 billion in exports and UD$4.2 billion in imports. Money and investments from the more than seven million Armenians living outside of the country (diaspora) is an important source for acquiring foreign currency.

2. Background and Overview of the Project

Japan has thus far implemented the Project for Improvement of Fire Fighting Equipment in Yerevan City (E/N concluded in 2009) for the capital city of Armenia. In addition to providing 28 fire vehicles, through the implementation of a soft component, manuals on effective fire fighting and rescue activities using fire tank engines (hereinafter referred to as "fire trucks") and ladder trucks were created and operational guidance was provided. This resulted in a great improvement of the fire fighting and rescue system for the capital city and surrounding area.

However, approximately 90% of the fire vehicles operating in the regions were deployed during the former Soviet Union era. More than 25 years have passed since these vehicles were manufactured, both vehicles and fire fighting equipment suffer from frequent malfunctions. In addition, fire fighting and rescue activities are hindered because outdated fire fighting equipment is used, which lacks the functions inherently needed as fire vehicles. Due to the continuation of the severe national financial conditions, these old and deteriorated fire vehicles cannot be replaced in regional FFRBs.

Among these regions, the ones targeted for the Project, Shirak (population 360,000), Lori (population 330,000), and Syunik (population 160,000) are home to the three largest cities in the nation, after the capital of Yerevan (Gyumri: population 160,000; Vanadzor: population 150,000; Kapan: population 45,000). In recent years, an influx of residents from rural areas into these regional cities has caused population growth and urbanization. In turn, there has been an increase in the number of fires, in connection with the rapid construction of houses and middle- to high-rise buildings. Combined with the high occurrence of bush fires, fire fighters are dispatched more often in these areas compared to other regions. Additionally, the fire vehicles currently in use show marked damage and deterioration due to operating in an environment with many areas of steep and narrow topography, as well as a climate with extreme temperature differences. Therefore, replacing these fire vehicles and improving the fire fighting system as soon as possible is a pressing issue.

Based on the background described above, the Government of Armenia has positioned the improvement of fire fighting and rescue in Shirak, Lori, and Syunik as a priority issue, and has requested Japanese grant aid for procuring fire vehicles (Project for the Improvement of Fire-Rescue Equipment, hereinafter referred to as “the Project”).

The upper-level plan for the Project is the National Strategy for Disaster Risk Reduction N-281, instituted by the Government of Armenia in 2012. As an important element in the advancement of sustainable development by the national government, through disaster mitigation measures, the plan aims to protect the country’s citizens and land during disasters and other emergencies. In addition, in order to achieve this aim and to effectively respond to disasters, including fires and accidents, “building fire fighting and rescue capacity and reinforcing fire-rescue equipment at fire fighting and rescue brigades across the country” has been positioned as a priority issue. Consistent with the policy targets described above, the objective of the Project is to ensure regional safety and security, protecting the lives and property of residents in the target areas from fire, etc. by improving fire fighting and rescue activities in Shirak, Lori, and Syunik by supplying fire vehicles to the implementing agency, Rescue Service (hereinafter referred to as “RS”).

3. Summary of the Survey Results and Outline of the Project

In respond to the request from the Armenian government, the Government of Japan decided to conduct a preparatory survey on providing aid for the improvement of fire-rescue equipment with RS as the implementing agency. JICA sent a team for the preparatory survey to Armenia two times: the First Field Survey from September 17 to October 13, 2016 and the Second Field Survey from December 5 to December 21, 2016. The team held discussions with the Armenian parties involved and conducted surveys in the target areas of the Project. After returning to Japan, the outline design of the Project was developed to include optimal contents, based on the results of the field surveys, and the resulting design was summarized into the draft Preparatory Survey Report. To present and explain the draft Preparatory Survey Report, JICA sent the survey team to Armenia from April 16 to April 23, 2017. The team held discussions and confirmed the contents of the report with the Armenian parties involved, and reached an agreement on April 21, 2017.

In the minutes of the meeting, the plan to deploy fire vehicles to 18 FFRBs in the Project's three target marzes of Shirak, Lori, and Syunik and a mobile workshop vehicle to the RS Maintenance Workshop in Yerevan City was confirmed.

The items and quantity of the equipment was decided according to the necessity of deploying the requested equipment, the specific number of vehicles to deploy, and the vehicle type and specifications for the fire-rescue equipment, based on the operation status of the current fire vehicles, the regional characteristics such as area size, population, number of fire incidents, water supply, mid- to high-rise buildings and the road gradients in each FFRB, and on the fire-rescue regulations in Armenia and fire vehicle deployment plans at the RS.

The marzes of Shirak (6 FFRBs), Lori (7 FFRBs), and Syunik (5 FFRBs) have the second- to fourth-largest cities in Armenia after the state capital of Yerevan, with populations of 360,000, 330,000, and 160,000 in the respective fire-fighting jurisdictions. Consequently, RS has positioned them as priority regions and is trying to speed up efforts to enhance and strengthen their fire and rescue services.

However, the following conditions exist in the three marzes, which are still lagging behind in fire and rescue services.

- Fire trucks and ladder trucks are decrepit.
- FFRBs are situated up to 30 kilometers apart from each other.
- No fire vehicle has been replaced since 1991 (excluding FFRBs No. 37, No. 48 and No. 54).
- Apart from three-story buildings, 80 to 150 mid- to high-rise buildings (six- to nine-story) exist.

Based on the above, two fire trucks will be deployed to each FFRB in the three marzes (total 36) and one ladder truck each to FFRB N. 37, 48, and 54 (total 3), with the aim of facilitating swift, efficient, and safe fire and rescue services. In addition, one mobile workshop vehicle carrying repair tools will be stationed in the RS Maintenance Workshop in Yerevan City for the maintenance of this equipment.

The deployment plan is shown in the Table below.

Table Equipment Deployment Plan

No.	Recipient FFRB	Marz	Quantity of Deployed Units		
			Fire Truck	Ladder Truck	Mobile Workshop Vehicle
1	No. 37 FFRB (Vanadzor)	Lori	2	1	---
2	No. 38 FFRB (Vanadzor)	Lori	2	---	---
3	No. 39 FFRB (Gugark)	Lori	2	---	---
4	No. 40 FFRB (Alaverdi)	Lori	2	---	---
5	No. 41 FFRB (Stepanavan)	Lori	2	---	---
6	No. 42 FFRB (Spitak)	Lori	2	---	---
7	No. 43 FFRB (Tashir)	Lori	2	---	---
8	No. 48 FFRB (Gyumri)	Shirak	2	1	---
9	No. 49 FFRB (Artik)	Shirak	2	---	---
10	No. 50 FFRB (Amasia)	Shirak	2	---	---
11	No. 51 FFRB (Maralik)	Shirak	2	---	---
12	No. 52 FFRB (Ashotsk)	Shirak	2	---	---
13	No. 53 FFRB (Akhuryan)	Shirak	2	---	---
14	No. 54 FFRB (Kapan)	Syunik	2	1	---
15	No. 55 FFRB (Goris)	Syunik	2	---	---
16	No. 56 FFRB (Meghri)	Syunik	2	---	---
17	No. 57 FFRB (Sisian)	Syunik	2	---	---
18	No. 58 FFRB (Kajaran)	Syunik	2	---	---
19	RS Maintenance Workshop (Yerevan)	Yerevan	---	---	1
Total			36	3	1

The target areas of the Project, which are the three marzes of Shirak, Lori, and Syunik, are located in mountainous regions at heights of 2,000 to 3,000 meters. Furthermore, most of the roads in these regions are unpaved, and include areas that suffer from heavy snowfall that may accumulate up to several meters in the winter.

Therefore, it is of crucial importance that the equipment has specifications that enable the operators to carry out fire and rescue operations even under severe conditions. The main specifications are shown below.

Table Equipment Specifications

Equipment	Main Specifications
Fire truck	・Drive system: Four-wheel drive (4 x 4) ・Tank capacity: 3,500 liters ・Gross vehicle mass: 13-ton class ・Cold-area specifications ・Seating capacity: 6 ・Cabin: Double ・Feeding pipe, firefighting hose, hose nozzles, rod cutter, firefighter suit, radio and other loaded equipment
Ladder truck	・Ladder performance: 25-meter class ・Gross vehicle mass: 16-ton class ・Cold-area specifications ・Seating capacity: 2 ・Single cabin ・Equipped with a basket ・Firefighting hose, hose nozzles, rod cutter, firefighter suit, radio and other loaded equipment
Mobile workshop vehicle	・Drive system: Four-wheel drive (4×4) ・Gross vehicle mass: 6-ton class ・Cold-area specifications ・Single cabin ・Equipped with a diesel-powered welder/power generator and work table ・Loaded equipment: electric air compressor, tool set, circuit tester, other measuring instruments and a work table

When fire vehicles were procured in the Project for Improvement of Fire Fighting Equipment in Yerevan City (E/N concluded in 2009), a soft component was also implemented. However, the soft component in this previous project primarily targeted the firefighters in Yerevan, and no technical transfers were made to those firefighters of the FFRBs in Shirak, Lori, and Syunik marzes, the target areas of the Project, except for some executive officers. In addition, the fire vehicles to be deployed through the Project are significantly different from those made in the former Soviet Union in terms of structure and performance, therefore, a soft component will also be implemented in the Project to ensure the safe and efficient utilization of the fire vehicles procured.

The soft component mainly comprise the following:

- Revision of manuals and teaching materials for firefighting and rescue operations using fire trucks and ladder trucks.
- Technical guidance for effective firefighting techniques and rescue operations using fire trucks and ladder trucks procured.

4. Project Evaluation

4.1 Relevance

The Project corresponds to a priority issue in the disaster risk reduction and fire fighting sector of Armenia. Replacing fire vehicles and equipment with new ones will protect the lives and property of residents from fires, etc., ensure safety and security in the region, and is expected to contribute to social and economic development. Swift response is necessary to prevent disaster damage from escalation, and from a human security aspect, it is necessary to respond to threats from natural disasters, etc. to the lives, livelihoods, and dignity of individuals. Additionally, the Government of Armenia formulated the National Strategy for Disaster Risk Reduction in 2012, which states the importance of building a system for disaster risk management for the development of a sustainable nation. Also, in the Mid-Term Expenditure Framework (2014-2016) formulated by the Ministry of Finance, capacity-building in fire fighting and rescue activities for lifesaving during emergency situations is given as a priority issue; this Project is in accordance with this policy.

Also from the aspect of managing the risk of disasters, including fires, the Government of Armenia has attached importance to the recent increase in fires connected with the urbanization of Gyumri, the country's second largest city, located in Shirak. In the other target areas of Lori and Syunik, sparks and flames from field burnings causing bush fires occurs frequently.

Meanwhile, fire vehicles used for fire fighting and rescue activities have deteriorated, and have impaired functionality in their engines, brakes, and hydraulic systems. Not being able to conduct fire extinguishing activities rapidly leads to escalated damage.

Improving fire vehicles and equipment through the Project will make swift and safe fire fighting and rescue activities possible, protect the lives and property of residents from fires, etc., ensure safety and security in the region, and is expected to contribute to social and economic development.

Therefore, the implementation of this Project is judged to have a high level of relevance.

4.2 Effectiveness

4.2.1 Quantitative effects

The quantitative effects of the Project are shown in Table below.

Table Quantitative Effects

Indicator	Baseline 【2016 Status quo】	Target (2022) 【3 years after project completion】
Average preparation time from issuance of dispatch order to dispatch of fire vehicle (in minutes)	10 minutes or longer	Below one minute
Ratio of fire vehicles that can be dispatched within one minute from issuance of dispatch order (%) Maintenance rate of fire vehicles (%)	0%	100%
Average time required from arrival on the scene to starting pumping water (in minutes)	5 minutes or longer	Below 5 minutes

※The indicators are measured only for the equipment provided in the Project.

4.2.2 Qualitative effects

The qualitative effects of the Project are described below.

- Enabling safe and effective and efficient firefighting operations
- Improving safety of local residents in the target areas as a result of enhanced firefighting capacities

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[Appendices]

1. Member List of the Study Team
2. Preparatory Study Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions (M/D)
5. Soft Component Plan
6. References

The Republic of Armenia

Capital: Yerevan
Population: 3,100,000
National Territory: 29,800km^2
Languages: Armenian
Ethnic groups: Armenian (97.9%)
Russian (0.5%)
Assyrian (0.1%)
Others (1.5%)

Religion: Christianity
GDP: US$11 billion
(IMF: 2014)
GDP per capita:
US$3,255.1
(IMF: 2014)

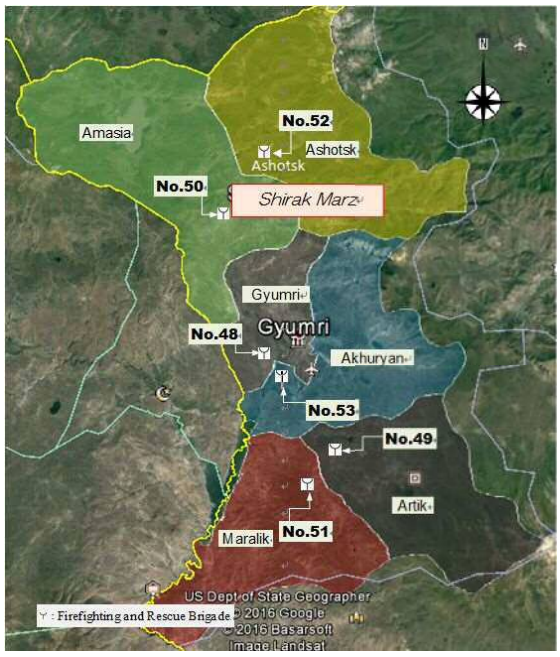

Figure Firefighting and Rescue Brigades in Shirak Marz and their Area Covered

Figure Territory of Armenia

Figure Firefighting and Rescue Brigades in Lori Marz and their Area Covered

Figure Firefighting and Rescue Brigades and their Area Covered

Province	FFRB	Area Covered
Shirak Marz	No.48	Gyumri＋12 areas
	No.49	Artik＋23 areas
	No.50	Amasia＋19 areas
	No.51	Maralik＋16 areas
	No.52	Ashotsk＋26 areas
	No.53	Akhuryan＋23 areas
Lori Marz	No.37	Vanadzor (east)＋4 areas
	No.38	Vanadzor (west)＋6 areas
	No.39	Gugark＋12 areas
	No.40	Alaverdi＋31 areas
	No.41	Stephanavan＋18 areas
	No.42	Spitak＋20 areas
	No.43	Tashir＋19 areas
Syunik Marz	No.54	Kapan＋32 areas
	No.55	Goris＋24 areas
	No.56	Meghri＋15 areas
	No.57	Sisian＋34 areas
	No.58	Kajaran＋19 areas

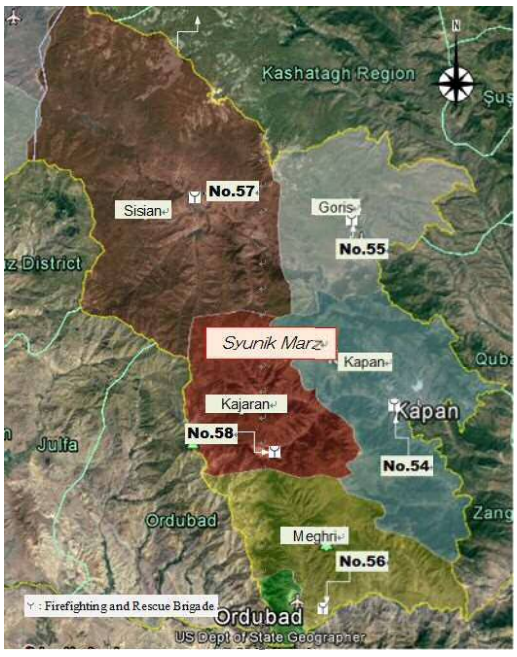

Figure Firefighting and Rescue Brigades in Syunik Marz and their Area Covered

Survey Site Locations

1. Fire truck

2. Ladder truck (folding-boom type or sliding-ladder type)

Folding-boom type ladder truck

Sliding-ladder type truck

3. Mobile workshop vehicle

※ The vehicle to be procured in the Project is unequipped with a crane and outrigger as shown in the photo.

Reference photographs of equipment to be procured in the Project

Lists of Figures and Tables

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Abbreviations

International Organizations・State Organ・Donor Organizations・Development Plan・Legislation	
ARS	Armenian Rescue Service
ARS Law	Law on the Republic of Armenia on Armenian Rescue Service
CMC	Crisis Management Centre
CMSA	Crisis Management State Academy
FFRB	Fire Fighting and Rescue Brigade
GIZ	German Federal Enterprise for International Cooperation
JICA	Japan International Cooperation Agency
MES	Ministry of Emergency Situations
MTEF	Mid-Term Expenditure Framework
NSDRR	National Strategy for Disaster Risk Reduction
NSS	National Security Strategy
OCHA	Office for the Coordination of Humanitarian Affairs
PRSP	Poverty Reduction Strategy Paper
RS	Rescue Service
SUDC	State Urban Development Committee
SDC	Swiss Agency for Development and Cooperation
UNDP	United Nations Development Programme
Administrative Unit	
Marz	
Unit Symbol	
Lit	Litter
m/s	Meter per second
Others	
AMD	Armenian Dram
A/P	Authorization to Pay
E/N	Exchange of Note
G/A	Grant Agreement
M/D	Minute of Discussion

1. Background of the Project

1.1 Background of the Request and Summary

The Republic of Armenia, (hereinafter referred to as “Armenia”), is promoting improvement in the fire fighting and disaster risk reduction field at the regional level through the National Strategy for Disaster Risk Reduction which is a national objective. However, since Armenia is currently experiencing severe financial conditions, the old and deteriorated fire vehicles deployed to regional fire fighting and rescue brigades under the jurisdiction of the Rescue Service (hereinafter referred to as “RS”) cannot be appropriately replaced with new ones. Therefore, fire fighting and rescue activities are not performed adequately during fires and/or disasters. In particular, Shirak, Lori, and Syunik, where the three largest cities after the Armenian capital of Yerevan are located, are in the same situation as other regional cities. It is an especially serious issue since they are experiencing population increases and urban growth, despite the fact they are facing the problem of aging and deteriorating fire vehicles.

In order to improve this situation, the Government of Armenia requested Japanese grant aid for the improvement of fire vehicles in Shirak, Lori, and Syunik.

The objective of the Project is to ensure regional safety and security, protecting the lives and property of residents from fires, etc. in the target areas by improving fire fighting and rescue activities in Shirak, Lori, and Syunik through the provision of these fire vehicles to RS, the implementing agency.

This survey was conducted to confirm the necessity and relevance of the request, creating an appropriate outline design as a grant aid project. A project plan (quantities and specifications, etc. of equipment to be procured) and an equipment maintenance management plan were also formulated, with the purpose of preliminary cost estimation for the Project. Discussed and confirmed through the survey, the requested equipment and deployments are shown in Table 1-1.

Table 1-1 List of Requested Equipment and Deployment Plan

No.	Recipient FFRB	Marz	Quantity of Deployed Units	
			Fire Truck	Ladder Truck
1	No. 37 FFRB (Vanadzor)	Lori	2	1
2	No. 38 FFRB (Vanadzor)	Lori	2	---
3	No. 39 FFRB (Gugark)	Lori	2	---
4	No. 40 FFRB (Alaverdi)	Lori	2	---
5	No. 41 FFRB (Stepanavan)	Lori	2	---
6	No. 42 FFRB (Spitak)	Lori	2	---
7	No. 43 FFRB (Tashir)	Lori	2	---
8	No. 48 FFRB (Gyumri)	Shirak	2	1
9	No. 49 FFRB (Artik)	Shirak	2	---
10	No. 50 FFRB (Amasia)	Shirak	2	---
11	No. 51 FFRB (Maralik)	Shirak	2	---
12	No. 52 FFRB (Ashotsk)	Shirak	2	---
13	No. 53 FFRB (Akhuryan)	Shirak	2	---
14	No. 54 FFRB (Kapan)	Syunik	2	1
15	No. 55 FFRB (Goris)	Syunik	2	---
16	No. 56 FFRB (Meghri)	Syunik	2	---
17	No. 57 FFRB (Sisian)	Syunik	2	---
18	No. 58 FFRB (Kajaran)	Syunik	2	---
Total			36	3

1.2 Natural and Environmental Conditions

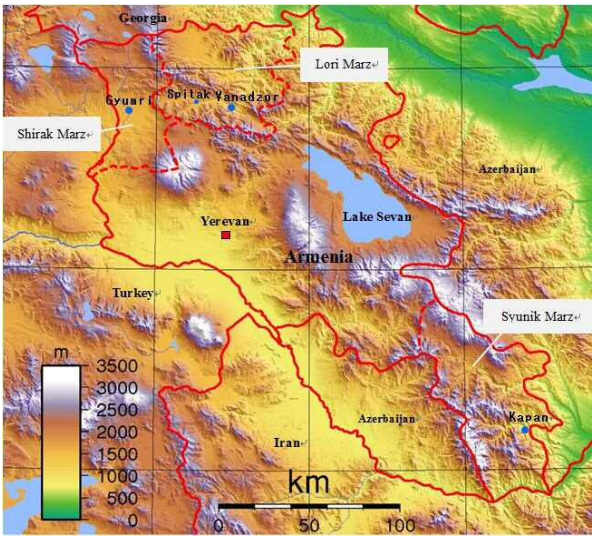
1.2.1 Overview of Armenia

Armenia is a mountainous country; covering approx. 29,800 square kilometers (approx. 1/13 of Japan), situated at the eastern tip of the Armenian Highlands, south of the Black Sea, west of the Caspian Sea and south of the Lesser Caucasus Mountains. With little flatland, 90% of the national land is situated at an altitude of between 1,000 and 3,000 meters, with many 3,000-meter-class mountains. The highest point is the summit of Mt. Aragac at 4,090 meters above sea level and the lowest point is the lower reaches of the Depet River at 380 meters above sea level. The Ararat Basin, home to the state capital of Yerevan, is fertile and the largest national plain. It is located above 800 meters above sea level, looking up Mount Ararat (5,165 meters above sea level, Turkish territory) and spreading on the left bank of the Aras River that runs on the border with Turkey.

The climate is steppe in lowland areas and a subpolar humid climate in highland areas, with more

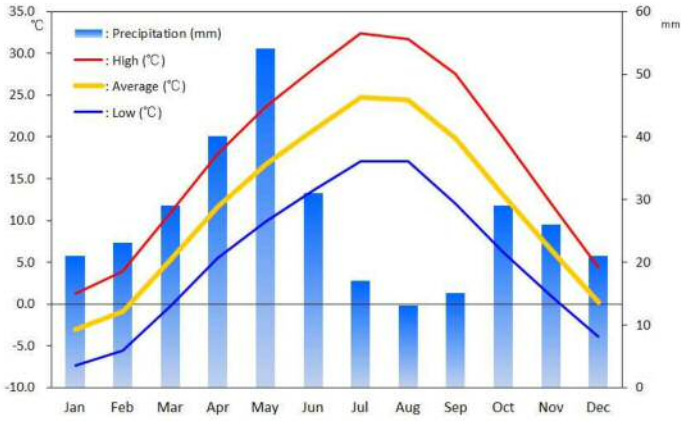
rainfall in the latter than the former. The annual average precipitation varies by area within a range of 200 and 900 millimeters. The temperature is subject to significant seasonal variation, dropping 40 degrees Celsius below zero in winter and exceeding 40 degrees Celsius in summer.

One to two meters of snow accumulates in winter.



Source: Prepared by the Survey Team based on a topographic map

Figure 1-1 Terrain of the Target Areas



Source: Prepared by the Survey Team based on Armenian weather data

Figure 1-2 Rainfall and Temperature in Yerevan

1.2.2 Shirak Marz

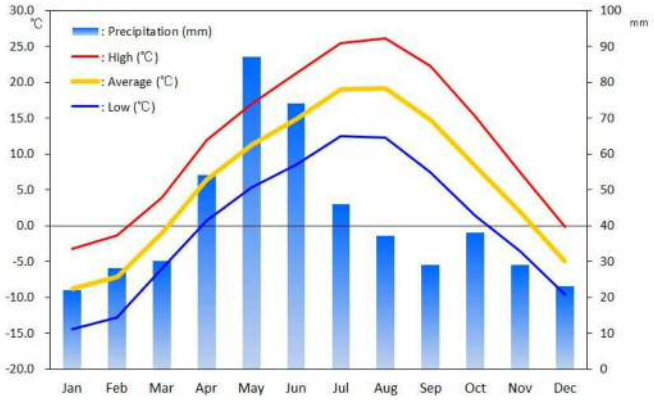
Shirak Marz is situated in the northwest of Armenia and its central city is Gyumri. It covers 2,681 square kilometers (9% of the national land) and is bordered by Georgia from the north and a logistical artery, highway (M1), traverses the region. It also shares the western national border with Turkey and the border on the international arterial highway (M7) is currently impassable (as of October 2016).

The Ashtsk Plateau (1,900 to 2,100 meters above sea level) to the north and Shirak Plain (1,400 and 1,800 meters above sea level) in the central and southern parts account for most of the region. The Shirak Plain is surrounded by mountains in all directions, excluding the west.

It is very cold in winter with considerable snow, but cool in summer and annual average precipitation is around 500 millimeters. The annual average wind velocity is approx. 2.5 m/s, with 4.0 m/s in summer and 1.0 m/s in winter.

Areas with peat layers below grassland, etc., are scattered around Shirak. When peat layers catch fire due to high summer temperatures and dryness, fire tends to proliferate and large-scale firefighting is required.

The earthquake in 1988 caused many fatalities and also claimed many houses in Shirak Marz, mainly Gyumri.



Source: Prepared by the Survey Team based on Armenian weather data

Figure 1-3 Rainfall and Temperature in Shirak Marz (Gyumri)

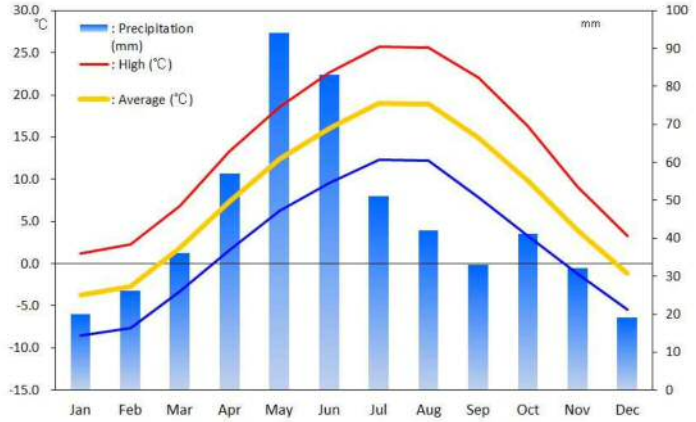
1.2.3 Lori Marz

Lori Marz is situated in the north of Armenia and the central city is Vanadzor. It covers 3,789 square kilometers (12.7% of national land). It is bordered by Georgia from the north and traversed by logistical arteries in the form of highways (M3 and M6).

It is mountainous, with an altitude ranging from the 380-meter-high Debet River to the 3,196-meter-high Mount Achkasar. Major rivers include Debet River and its tributaries, the Dzoraget and Pambak rivers.

It is very cold in winter with considerable snow, but cool in summer and annual average precipitation ranges between 500 and 600 millimeters. The annual average wind velocity is approx. 2.5 m/s, with 2.0 m/s in summer and 3.5 m/s in winter.

The earthquake on December 7, 1988, caused approx. 25,000 fatalities and led to more than 500,000 losing their homes; destroying most buildings, including high-rise (around 9-story buildings) in and around the epicenter of Spitak and Vanadzor. Instead of the traditional stone-built houses, wooden houses were preferred under the need for an urgent housing recovery and they remain in place today.



Source: Prepared by the Survey Team based on Armenian weather data

Figure 1-4 Rainfall and Temperature in Lori Marz (Vanadzor)

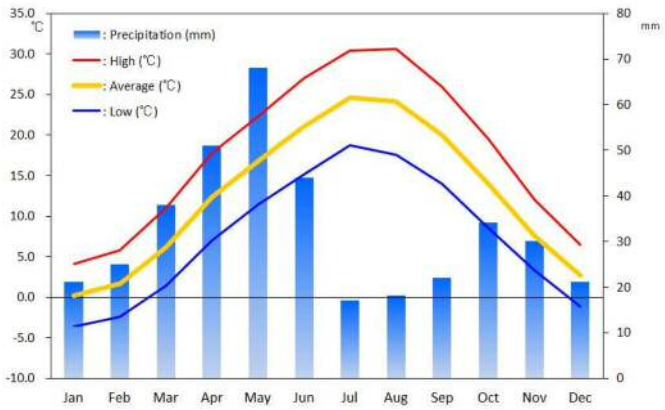
1.2.4 Syunik Marz

Syunik Marz is situated in southern Armenia and the central city is Kapan. It covers 4,506 square kilometers (15% of national land) and is bordered by Azerbaijan to the east and west and Iran to the south.

It is situated on the slope of Zangezur Mountains, with altitude ranging widely from the 380-meter-high Aras River to the 3,905-meter-high Mount Kaputjugh.

The Aras River to the south separates Armenia from Iran and has the Vochci and Vorotan rivers as its tributaries.

Temperatures exceed 40 degrees Celsius in summer in the lower southern areas as opposed to around 20 degrees Celsius in the mountains. In winter, it drops to 30 degrees below zero in the mountains, with considerable snow. The annual average wind velocity is approx. 1.7 m/s, with 1.2 m/s in summer and 2.4 m/s in winter.



Source: Prepared by the Survey Team based on Armenian weather data

Figure 1-5 Rainfall and Temperature in Syunik Marz (Kapan)

1.3 Environmental and Social Considerations

The Project constitutes equipment procurement to improve firefighting operations in Armenia and is likely to have a minimal adverse impact on the environment. Accordingly, it is classified as a Category C project in terms of environmental and social considerations.

It has been confirmed that the equipment procured under the Japanese Grant Aid scheme in the past and that is to be procured in the Project would be used for firefighting and rescue operations while taking all environmental and social impacts into consideration.

2. Contents of the Project

2.1 Basic Concept of the Project

2.1.1 Overall Goals and Project Objectives

The upper-level plan of the Project is the National Strategy for Disaster Risk Reduction; its policy objectives are listed below.

- Strengthening of organizational capacity at a national and local level to mitigate disaster risk.
- Quantitative evaluation and monitoring of disaster risks, strengthening of an early warning system to reduce disaster risk.
- Strengthening of resilience to disasters through disaster risk reduction education and activities at all organizational levels of the country.
- Coordination between government and private sector organizations, and between central and local governments for handling and monitoring emergencies, as well as for providing effective command and control. Creation of an effective system for disaster recovery.
- Compliance with laws for comprehensive disaster risk mitigation to maintain the territorial integrity of Armenia.

Strengthening the fire fighting and rescue sector in order to achieve these overall goals are included in the Mid-Term Expenditure Framework, which is the Government of Armenia's basic policy for the national budget. The positioning and guidelines for this are as shown below.

- Reduction of disaster risk and protection of the country's land and citizens during emergencies, including disasters.
- Improvement of technical capacity in fire fighting and rescue for fire fighting brigades, with bases placed in one city and ten regions.
- Upgrade and expansion of a nationwide transmission/warning system.
- Gradual improvement in the treatment of RS employees.

The Project is consistent with the policy objectives described above, and by replacing deteriorated fire vehicles allocated to the fire fighting and rescue brigades in Shirak, Lori, and Syunik, which have been positioned by the Government of Armenia as priority regions, and by improving their fire fighting and rescue systems, the Project will ensure regional safety and security, protecting the lives and property of residents in the target areas from fire, etc.

2.1.2 Basic Concept of the Project

Based on the current situation of FFRBs in Shirak, Lori, and Syunik, fire vehicles will be improved, and the Project will help firefighters acquire skills for effectively operating fire vehicles in order to achieve the goals described above. With this, the establishment of a reliable fire fighting and rescue system in the target areas can be expected.

For this, the Project will procure and deploy thirty-six 3,500L fire trucks and three ladder trucks to the

18 fire fighting and rescue brigades in Shirak, Lori, and Syunik. Additionally, to make more appropriate maintenance of the procured equipment possible, one mobile workshop vehicle with onboard repair equipment, etc. will be procured and deployed to the Repair Centre of Technical Equipment Service of RS in Yerevan. Furthermore, the soft component will be implemented with the purpose of creating manuals related to fire fighting and rescue activities, and to provide technical guidance on the effective operation of fire vehicles.

2.2 Outline Design of the Japanese Assistance

2.2.1 Design Policy

2.2.1.1 Basic Policy

The request from the Armenian government included the provision of 36 fire trucks and 3 ladder trucks.

The initial request for the Project planned to target 60 FFRBs across the country, but at the time of submitting the request document to Japan, prioritization was made taking into consideration the scale of aid from Japan in the past, and the target was narrowed down to 3 marzes and 18 FFRBs, which were determined to be the minimum necessary.

In Armenia, city planning by the State Urban Development Committee (hereinafter referred to as "SUDC") has rules defined on the number of FFRBs and fire vehicle deployment (The Regulation on Fire Truck Deployment (2014/263-N)), which requires each FFRB to have two fire trucks as a general rule. In addition, the Decree of RS Director (2015/N17/95) requires the deployment of one ladder truck in jurisdictions having buildings of three stories or higher.

Furthermore, as described in "Fire-fighting laws in Armenia (4) Fire-fighting tactics and operations standards", fire fighting and rescue operations in Armenia have the characteristics listed below.

- When dispatching fire vehicles, the basic rule is to have two vehicles operate together as a team.
- For small-scale fires, the water supply for fire fighting is secured for two fire trucks, and the trucks discharge water to put out the fire simultaneously.
- For mid-scale fires, one truck discharges water to put out the fire while the other truck acts as a relay to draw and send water from the fire-fighting water source.

Based on the above, the necessity and number of fire vehicles to be deployed were confirmed, taking into consideration the status of existing fire vehicles, the fire fighting rules and regulations in Armenia, and deployment plans at RS.

In the event of a large-scale fire, support for fire fighting operations is extended across jurisdictions from neighboring FFRBs.

From these considerations, it was concluded that the plan will be to deploy 2 fire trucks each to 18 FFRBs (36 in total) and 1 ladder truck to each marz (3 in total).

Meanwhile, although RS already has an established system using a mobile workshop vehicle for maintenance of fire vehicles mainly in the regional areas, the current vehicle was confirmed to be quite

old, so the Project will also procure a mobile workshop vehicle aimed at enhancing the maintenance system for the regional areas (the vehicle will be stationed in the RS Maintenance Workshop in Yerevan).

The specifications of the equipment procured in the Project for Improvement of Fire Fighting Equipment in Yerevan City are used as reference for developing the specifications for the Project, although the specifications will be finalized with consideration to the specific natural conditions in the target areas of the Project rather than the state capital of Yerevan.

2.2.1.2 Policy Towards Natural Environmental Conditions

As described in 1.2 Natural and Environmental Conditions, the Project target areas of Shirak, Lori and Syunik marzes share the following three conditions: steep terrain and cold winters with much snow. The harsh natural environmental conditions are taken into consideration when designing fire-rescue equipment, for optimally effective firefighting and rescue operations.

2.2.1.3 Operation and Maintenance Policy

Daily checkup, regular maintenance and minor repair of fire trucks and ladder trucks are conducted by operators (drivers) at each FFRB and thus it suggests that FFRBs possess sufficient capacity for maintenance of the existing fire vehicles as the latter are kept ready for immediate dispatch at any time.

The required capacity for maintenance refers to the ability of routine inspections and periodical maintenance of fire vehicles, including inspections, lubrication, discharging water from the air tank, oil change and replacing filters.

The RS Maintenance Workshop has repair mechanics who specialize in such areas as machinery, engines, electric components, welding, machining, bodywork and paint (Table 2-1) who are regularly stationed to perform maintenance for the entire vehicle.

To ensure that personnel at the RS Maintenance Workshop can fully service the fire vehicles, guidance will be given on equipment maintenance in the initial operation training, and the documents, including the manuals, will be prepared.

Table 2-1 Mechanics at the RS Maintenance Workshop

Classification	Number
Mechanical engineer	1
Mechanic	6
Welder	1
Lathe operator	1
Engine repairman	2
Electrician	2
Tinsmith	1
Crane operator	1
Total	15

Source: Prepared by the Survey Team based on RS document

2.2.1.4 Replacement and Consumables Procurement Policy

Generally the replacement parts and consumables recommended by equipment manufacturers for a period of approx. two years are to be procured, so as to maintain a high utilization rate of the equipment. When the Survey Team checked the spare parts inventory of the fire vehicles procured in the Project for Improvement of Fire Fighting Equipment in Yerevan City during the field survey, it was identified that the volume of filters slightly exceeded actual needs, therefore, the Survey Team will further confirm actual necessity and then determine the proper amount of these spare parts to be procured in the Project.

Unlike Yerevan City, the targeted regions are mountainous and the equipment is likely to frequently travel steep roads/terrain. Accordingly, the Survey Team will determine the proper quantity of replacement clutch and brake parts.

2.2.1.5 Equipment Grading Policy

The equipment grading policy will be defined as shown below, in order to maximize and sustain the effects of the Project.

- Fire trucks must be suitable for the occurrence of fire and other disaster incidents in the target areas and their roads, geography and weather conditions, have broad utility and be highly robust, while also being easy to operate and service.
- Ladder trucks must be suitable for the occurrence of fire and other disaster incidents in the target areas, have broad utility and be highly robust, while also being easy to operate and service.
- Considering the maintenance level at RS, the equipment will not be that with the latest features using highly sophisticated technology, but that with proven and reliable technology.
- The mobile workshop vehicle must have broad utility and be highly robust, while also being easy to operate and service.

2.2.1.6 Basic Specifications

The specifications of fire vehicles to be procured in the Project are standard with reference to those of the equipment procured in the Yerevan project, avoiding sophisticated technology and complicated structures entailing much maintenance cost taking RS's maintenance capacity into consideration.

The mobile workshop vehicle is equipped with a minimum level of on-vehicle equipment and its four-wheel drive which enables it to travel even harsh road conditions.

2.2.1.7 Policy on Procurement Method and Implementation Schedule

(1) Consideration of composition of lots

Three types of equipment are to be procured in the Project: fire truck, ladder truck and mobile workshop vehicle.

Competitive nature of procurement can be secured since there are more than two Japanese manufacturers which can produce fire trucks, ladder trucks and mobile workshop vehicle for Armenia. Therefore the bidding shall not be divided into multiple lots.

(2) Implementation schedule policy

Considering the factory production capacity of the Japanese manufacturers, it takes roughly 14 months to manufacture the 39 fire vehicles in the Project. During the 14th month, those manufactured fire vehicles are shipped in three separate shipments.

As there is only one mobile workshop vehicle, its shipment will be scheduled to coincide with the shipment of fire trucks.

Accordingly, a local procurement supervision plan will be made according to the three shipments.

2.2.1.8 Policy on Country of Origin of Equipment

RS has been maintaining the fire vehicles procured in the Project for Improvement of Fire Fighting Equipment in Yerevan City for over five years (at the time of the preparatory survey). Thus firefighters, operators and mechanic belong to FFRBs in Yerevan have well familiarized themselves with the handling of these equipment. RS has also shown a keen preference of Japanese products and equipment because of their durability and less costly for a maintenance. Considering these elements, the equipment for the Project shall be made in and procured from Japan.

2.2.2 Basic Plan (Equipment Plan)

2.2.2.1 Overall Plan

The Regulation on Fire Truck Deployment (2014/263-N) stipulates that two fire trucks shall be deployed at each FFRB, meanwhile the Decree of RS Director (2015/N17/95) stipulates that one ladder truck shall be deployed in any district where more than three stories buildings are situated.

The three marzes, Shirak (6 FFRBs), Lori (7 FFRBs) and Syunik (5 FFRBs) have the second- to fourth-largest cities after the state capital of Yerevan. In these three marzes, there are 18 FFRBs in total and serve a large population of 360,000, 330,000 and 160,000 citizens, respectively, as divided by fire department jurisdiction areas. Accordingly, RS views them as important regions for improving the fire service there.

These regions can also be characterized by the following conditions, based on which the deployment plan is considered:

- Fire trucks and ladder trucks are decrepit.
- FFRBs are situated up to 30 kilometers apart from each other.
- No fire vehicle has been replaced since 1991 (excluding FFRBs No. 37, No. 48 and No. 54).
- Apart from three-story buildings, 80 to 150 mid- to high-rise buildings (six- to nine-story) exist.

Based on the above, 2 fire trucks will be deployed to each FFRB in the 3 marzes (total 36) and 1 ladder

truck each to FFRBs No. 37, 48, and 54 (total 3), with the aim of facilitating swift, efficient, and safe fire and rescue services. In addition, one mobile workshop vehicle carrying repair tools will be stationed in the RS Maintenance Workshop in Yerevan City for the maintenance of this equipment.

2.2.2.2 Equipment Plan

(1) Quantity

As discussed in 2.2.2.1 Overall Plan, the amount of equipment to be procured will be 36 fire trucks, 3 ladder trucks, and 1 mobile workshop vehicle for the maintenance of these fire vehicles. Table 2-2 shows the number of vehicles to be procured and their deployment plan.

Table 2-2 Equipment Deployment Plan

No.	Recipient FFRB	Marz	Quantity of Deployed Units		
			Fire Truck	Ladder Truck	Mobile Workshop Vehicle
1	No. 37 FFRB (Vanadzor)	Lori	2	1	---
2	No. 38 FFRB (Vanadzor)	Lori	2	---	---
3	No. 39 FFRB (Gugark)	Lori	2	---	---
4	No. 40 FFRB (Alaverdi)	Lori	2	---	---
5	No. 41 FFRB (Stepanavan)	Lori	2	---	---
6	No. 42 FFRB (Spitak)	Lori	2	---	---
7	No. 43 FFRB (Tashir)	Lori	2	---	---
8	No. 48 FFRB (Gyumri)	Shirak	2	1	---
9	No. 49 FFRB (Artik)	Shirak	2	---	---
10	No. 50 FFRB (Amasia)	Shirak	2	---	---
11	No. 51 FFRB (Maralik)	Shirak	2	---	---
12	No. 52 FFRB (Ashotsk)	Shirak	2	---	---
13	No. 53 FFRB (Akhuryan)	Shirak	2	---	---
14	No. 54 FFRB (Kapan)	Syunik	2	1	---
15	No. 55 FFRB (Goris)	Syunik	2	---	---
16	No. 56 FFRB (Meghri)	Syunik	2	---	---
17	No. 57 FFRB (Sisian)	Syunik	2	---	---
18	No. 58 FFRB (Kajaran)	Syunik	2	---	---
19	RS Maintenance Workshop (Yerevan)	Yerevan	---	---	1
Total			36	3	1

(2) Specifications

1) Study of the fire truck specification

1)-1 Performance requirements for local road conditions

The project target areas of Shirak, Lori and Syunik marzes are mountainous with many 2,000- to 3,000-meter-class mountains as described in "1.2 Natural and Environmental Conditions". Many roads are not asphalt-paved and it is also snowy with several meters accumulating in winter.

Fire fighting operations are needed, even under such conditions, which means fire trucks must perform effectively in such local road conditions. The main specifications considered are as follows:

- Drive system: 4-wheel drive (poor road conditions, accumulated snow and gradability)
- Minimum ground clearance: as high as possible (as a countermeasure for poor road condition and accumulated snow)
- Power-to-weight ratio[1]: vehicle weight reduction (for improvement of speed and improved acceleration performance when climbing slopes)

1)-2 Tank capacity of the fire truck

The tank capacity of the fire truck is determined at 3,500 liters taking the following into consideration:

- A capacity allowing standalone firefighting operations on site until water is received from locally available water sources
  ⇒ Although the requirement is 2,000 liters or more, it should be as big as possible.
- The tank capacity should be as small as possible to minimize vehicle weight, taking mobility in mountainous areas into consideration.
  ⇒ around 4,000 liters or less
- A capacity allowing ordinary fires in rural areas to be extinguished with a single vehicle (2,000 liters or more according to the interview)
  ⇒ 2,000 liters or more
- It should not differ significantly from the tank capacity (2,000-liter-class) of currently owned vehicles for convenience.
  ⇒ around 2,000 liters

When these conditions are combined with the load capacity of the fire truck chassis and the weight of the rescue equipment mounted on the same, 3,500 liters is deemed a reasonable tank capacity.

Accordingly, the fire truck is equipped with a tank of capacity 3,500 liters.

1)-3 Cold-area specifications for the fire truck

As the Project target areas of Shirak, Lori and Syunik marzes are cold, with low annual average temperature and snow, as described in "1.2 Natural and Environmental Conditions", the specifications of the fire truck apply to cold areas, taking their antifreeze, engine start-up and rust-proof properties

[1] Power-to-weight ratio: It is the ratio of engine output and vehicle weight and it mainly provides acceleration performance. As the fire trucks to be procured in the Project are often used in mountainous areas, it is an important indicator.

into consideration. The main components of the cold-area specifications are as follows:

- Antifreeze of water pipes (heater installation)
- Increased battery capacity
- Enhanced rust-proof property (against road surface de-icing agent)

2) Study of ladder truck specification

2)-1 Maximum working height

In response to the request from the Government of Armenia, the ladder truck requires a maximum working height of 30 meters for firefighting operations performed on nine-story buildings. There are two types of ladder trucks - sliding-ladder and folding-boom types. Both are made in Japan and also exported. Although the maximum working height of the folding-boom type is 25 meters, firefighting operations can also be conducted for nine-story buildings. Although RS has been using the sliding-ladder type so far, it has been confirmed in discussions that the folding-boom type (25 meters) can be operated without complications and thus either the sliding type (30 meters) or folding-boom type (25 meters) is included in the specifications.

2)-2 Cold-area specifications for the ladder truck

The project target areas of Shirak, Lori and Syunik marzes are cold areas with low annual average temperature and snow as described in "1.2 Natural and Environmental Conditions", the specifications of the ladder truck are those for cold areas in consideration of their antifreeze, engine start-up and rust-proof properties. The main components of the cold-area specifications are as follows:

- Increased battery capacity
- Enhanced rust-proof property (against road surface de-icing agent)

2)-3 Other specifications

The ladder truck is used for lifesaving and firefighting operations in high-rise buildings and is thus equipped with a basket, monitor nozzle (water turret) and feeding pipe (but no pump).

3) Study of the mobile workshop vehicle specification

3)-1 Body

The body is made of aluminum to tolerate harsh natural environments and reduce weight. It is also relatively small – 6-ton class for improving performance and 4-wheel drive with high vehicle height.

3)-2 Loaded equipment

The loaded equipment have been minimized, but include items for simple sheet metal, repair, welding and painting work, tire air injection, simple inspection and parts disassembly.

(3) Replacement and consumable parts procurement plan

In accordance with the “2.2.1.4 Replacement and Consumables Procurement Policy”, the replacement and consumable parts to be procured are shown in Table 2-3.

Table 2-3 Main Replacement and Consumable Parts

Item		Quantity
Replacement parts	Fuel filter	Around 50% of the manufacturer's recommendation
	Air filter	Around 50% of the manufacturer's recommendation
	Engine oil filter	Around 50% of the manufacturer's recommendation
	Operating oil filter	Manufacturer's recommendation
	Packings	Manufacturer's recommendation
	Fuel injector	Manufacturer's recommendation
	Wiper blade	Manufacturer's recommendation
	Fan belt	Manufacturer's recommendation
	Clutch disc	200% of the manufacturer's recommendation
	Brake parts	200% of the manufacturer's recommendation
	Lamp bulbs	200% of the manufacturer's recommendation
	Fuse	Manufacturer's recommendation
	Body parts	Valve and O-ring: 200% of the manufacturer's recommendation
Consumable parts	Headlight unit	1 set (given frequent use in mountains and potential to break)
	Hose repair kit	1 set (as a broken hose and a lot of other damage was identified in the field survey.)

2.2.2.3 Equipment to Be Procured (draft)

The equipment specifications are as shown in Table 2-4 based on "2.2.2.2 Equipment Plan"

Table 2-4 Equipment Specifications

Equipment	Main Specifications
Fire truck	・Drive system: Four-wheel drive (4 x 4) ・Tank capacity: 3,500 liters ・Gross vehicle mass: 13-ton class ・Cold-area specifications ・Seating capacity: 6 ・Cabin: Double ・Feeding pipe, firefighting hose, hose nozzles, rod cutter, firefighter suit, radio and other loaded equipment
Ladder truck	・Ladder performance: 25-meter class ・Gross vehicle mass: 16-ton class ・Cold-area specifications ・Seating capacity: 2 ・Single cabin ・Equipped with a basket ・Firefighting hose, hose nozzles, rod cutter, firefighter suit, radio and other loaded equipment
Mobile workshop vehicle	・Drive system: Four-wheel drive (4×4) ・Gross vehicle mass: 6-ton class ・Cold-area specifications ・Single cabin ・Equipped with a diesel-powered welder/power generator and work table ・Loaded equipment: electric air compressor, tool set, circuit tester, other measuring instruments and a work table

2.2.3 Implementation Plan

2.2.3.1 Implementation Policy

(1) Project implementing organizations

The interrelations among the Japanese and Armenian organizations, which will engage in the implementation of the Project, if it is to be carried out using Grant Aid from the Government of Japan are shown in Figure 2-1.

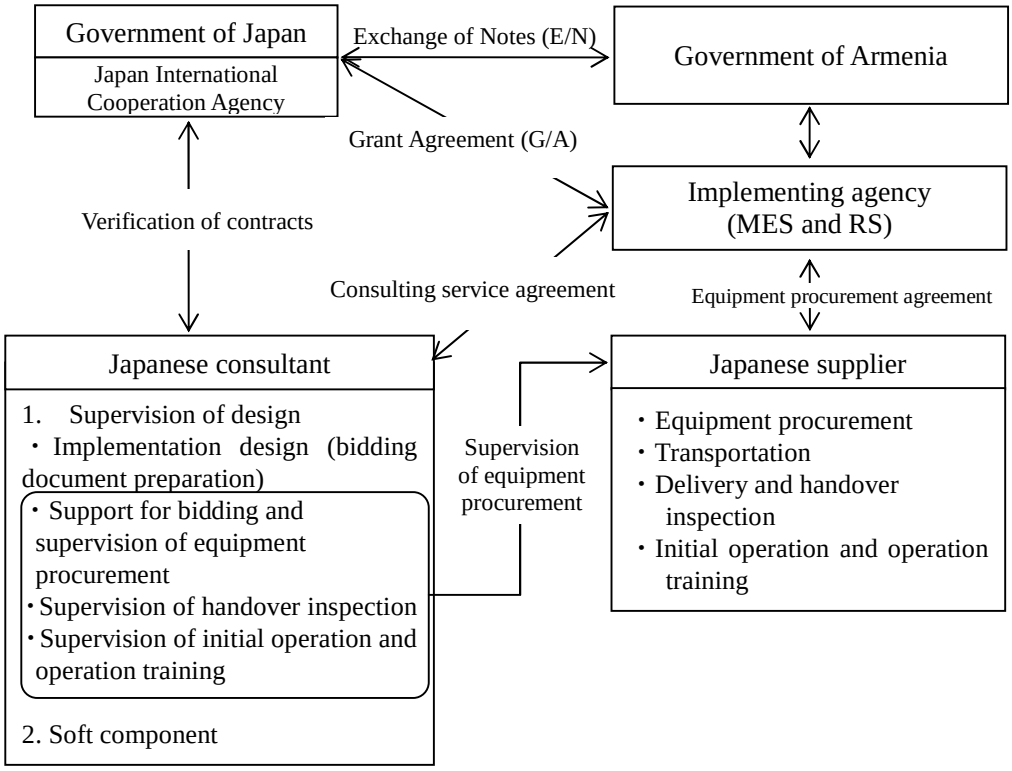


Figure 2-1 Organizational Chart of Project Implementation

(2) Government of recipient country

Fire vehicles are basically operated and maintained by 18 firefighting and rescue brigades (FFRBs) in Shirak, Lori and Syunik marzes where they are deployed. The implementing agency of RS is responsible for securing the required budget for this purpose as well as supplying fuel, lubricant and periodical replacement parts to the FFRBs.

The mobile workshop vehicle belongs to the RS Maintenance Workshop and is operated and maintained by the RS headquarter. Therefore, the required budget should be secured.

Repairing the garages at the FFRBs where the vehicles will be deployed is critical, and is the responsibility of RS. RS has promised to complete these repairs before the vehicles arrive.

(3) Consultant

RS shall conclude a service agreement (consulting service agreement) with a Japanese consultant promptly after concluding the E/N and G/A. The consultant is responsible for the project implementation design, bidding document preparation, support for bidding, supervision of equipment procurement and provision of engineering services for soft component until handover of equipment and completion of the

soft component.

(4) Equipment supplier

The supplier is decided in an open bidding.

It is a single-stage two-envelope bidding. The technical envelope is opened first, whereupon the consultant conducts technical screening of quality, specifications and quantity. Later, the price envelope of the bidders having passed the technical screening is opened by the consultant to assess and decide the final bid winner. The bid winner will conclude an agreement with an Armenian representative as the equipment supplier.

2.2.3.2 Implementation Conditions

(1) Grant-aid scheme

RS, the implementing agency, has experienced grant-aid equipment procurement in the Project for Improvement of Fire Fighting Equipment in Yerevan City and understands the implementation procedures. However, sufficient explanations must be provided and discussions included at each implementation stage to avoid delay or defaults.

(2) Defect liability during transportation

The equipment to be procured in Japan is transported by sea, landed at the Poti Port in Georgia and then transported inland to pass customs at the border between Georgia and Armenia. It is then transported inland to vehicle storage of RS in Yerevan and handed over to the Armenian side. The equipment supplier must pay attention and avoid problems with the Armenian side related to defect liability for damage or theft, etc., which may happen during sea and inland transportation and unloading/disembarkation.

The Armenian side is responsible for inland transportation of the equipment to 18 FFRBs in Shirak, Lori and Syunik marzes from Yerevan on completion of handover and particular attention should be paid to avoid related problems concerning defect liability for damage or theft during the transportation.

2.2.3.3 Scope of Works

The transportation cost to the designated equipment storage of RS in the capital of Yerevan and all the cost of equipment procurement, including assembly at unloading, are borne by the Japanese side. All the cost after unloading the equipment at the designated equipment storage of RS, which includes the transportation cost to 18 FFRBs in Shirak, Lori and Syunik marzes, is borne by the Armenian side. The allocation of costs between both countries is provided in Table 2-5.

Table 2-5 Cost Bearing of Both Governments

Item	Description	Division of Cost Bearing		Note
		Japan	Armenia	
Equipment procurement	Equipment procurement	●		
	Sea and land transportation	●		Up to customs
	Customs clearance procedures		●	Including tax exemption
	Inland transportation	●		Up to the designated equipment storage of RS in Yerevan after landing
Initial operation and operation training, etc.	Operation training	●	●	・Labor cost, accommodation cost and daily allowance of RS are borne by Armenia. ・Fuel cost, etc., necessary for the initial operation and operation training are borne by Armenia. ・The venue is provided by Armenia.
	Instruction of inspection and maintenance	●	●	
Soft component	Instructions for safe and efficient operation	●	●	・Labor cost, accommodation cost and daily allowance of RS are borne by Armenia. ・Fuel cost, etc., necessary for the soft component is borne by Armenia. ・The venue is provided by Armenia.
Maintenance	Forwarding the equipment		●	・Forwarding the equipment to 18 FFRBs in Shirak, Lori and Syunik marzes) ・Securing parking space for fire trucks ・Securing maintenance cost and providing safe equipment operation training
	Securing parking space		●	
	Equipment maintenance		●	

2.2.3.4 Consultant Supervision

(1) Basic policy

On conclusion of E/N and G/A, the Japanese consultant concludes a consulting service agreement with the Government of Armenia, develops the implementation design and supervises procurement within the scope of duties stipulated in E/N and based on the grant-aid framework. It is important for the consultant to perform their duties while fully aware of the background to the project implementation and development and the aim of the outline design to formulate the cooperation project.

The procurement supervisor must be well-versed in the details and operation method of the equipment and have experiences in instructing operations, inspections and maintenance. The

instruction of routine inspections and maintenance is particularly crucial to ensure Armenia uses the equipment effectively over an extended period of time and the supervisor must draw on knowledge and experiences when teaching maintenance.

(2) Implementation design

The implementation design mainly comprises the following:

- Discussions on the launch of the Project and site confirmation
- Review of equipment specifications
- Bidding document preparation
- An explanation of the bidding documents and obtaining approval for the same
- Support for the tender (announcement of bid, distribution of bidding documents, bid and result review)
- Support for concluding of the contract (negotiations on contract, witness of contract and verification procedures of contract)

(3) Procurement supervision

Procurement supervision mainly comprises the following:

- Confirmation of issuance of the equipment order form
- Confirmation of production drawings, shop inspection and pre-shipment inspection
- Arrangement of pre-shipment inspection (outsourced to a third party) and issuance of an inspection report
- On-site preparation meeting (delivery schedule, confirmation of tax exemption and gist of initial operation and operation training)
- Assembly, initial operation, operation training and witness
- handover inspection and witness of handover
- Preparation of the completion report
- Implementation of the soft component

2.2.3.5 Quality Control Plan

The following inspections will be performed by the consultant in each stage of procurement to confirm that the equipment to be procured meets the quality and specifications provided in the contract.

- Confirmation of the contents of the equipment order form issued by the Supplier
- Confirmation of production drawings, shop inspection at the factory where the equipment is manufactured and pre-shipment inspection
- Pre-shipment inspection
- Inspection at equipment handover

2.2.3.6 Procurement Plan

(1) Procurement Sources

Japanese fire-rescue equipment was procured in the Project for Improvement of Fire Fighting Equipment in Yerevan City and RS has maintained the equipment for over five years (as of the time of the preparatory survey). It was confirmed in the field survey that both operators and mechanic had familiarized themselves with handling such equipment. RS also hopes to receive equipment made in Japan or by Japanese manufacturers as it rarely breaks down and the maintenance cost is low. It shall also to be mentioned that there are no manufacturers who are able to produce fire vehicles in Armenia. In addition, there are a few Japanese manufacturers who are able mobile workshop vehicle.

Accordingly, Japan is designated as the country of origin of the equipment to be procured and all the equipment should be procured from Japan.

The division of the sources of equipment is shown in Table 2-6.

Table 2-6 Division of Source of Equipment

Equipment	Country of Origin			Reason
	Japan	Armenia	Third country	
Fire truck	●	---	---	Have been procured
Ladder truck	●	---	---	Have been procured
Mobile workshop vehicle	●	---	---	Have been procured

(2) Procurement route

1) Study of the procurement route

The equipment to be procured in the Project will be manufactured in Japan (excluding loaded equipment) and shipped from a major Japanese port to the final destination, the designated equipment storage of RS in Yerevan. RS is responsible for transporting it to FFRBs in the three target provinces from the storage.

Among three identified transportation routes as shown in Table 2-7, the route via the Port Poti in Georgia is considered most realistic and thus taken.

The route after disembarkation at the Port Poti to the final destination is shown in Figure 2-2.

The transportation requires up to 1.5 months. Equipment is shipped in three lots due to the production capacity of manufacturers.

Table 2-7 Transportation Route

1. Via Georgia (major port in Japan ⇒ Greece (transshipment) ⇒ Georgia ⇒ Armenia) Most viable route

Transportation route

The number of feeder boat service is small: only one in every 20 to 30 days

Major port in Japan ⇒  ⇒ Transshipped on to feeder boat at Port Pireas in Greece ⇒  ⇒ Port Poti in Georgia (provisional customs clearance) ⇒

30 to 60 days

⇒  ⇒ Border between Georgia and Armenia (customs clearance) ⇒  Final destination

1 to 3 days | 2 to 4 days

Required time: 40 to 70 days

Outline

Its advantage is the shorter inland transportation. However, sea transportation requires considerable time.
The cargo is transshipped in Greece and the service from the port of transshipment to the Port Poti is only once a month, so it may be stored there for some time and the transportation plan needs some time range.
However, it takes less time and is safer than other two routes and the transportation plan is easier. It is the most viable route at present.

2. Via Iran (major port in Japan ⇒ UAE (transshipment) ⇒ Iran ⇒ Armenia)
Route taken in the fire equipment improvement project in Yerevan

Transportation route

The number of feeder boat service is sufficient.
However, transshipment takes about 20 days

Major port in Japan ⇒  ⇒ Transshipped on to a feeder boat at Port Jebal Ali in the UAE ⇒  ⇒ Port Bandar Abbas in Iran (provisional customs clearance) ⇒

40 to 60 days

⇒  ⇒ Border between Iran and Armenia (customs clearance) ⇒  Final destination (land transportation)

1 to 3 days | 5 to 7 days

Required time: 45 to 70 days

Outline

It is the route taken in the Project for Improvement of Fire Fighting Equipment in Yerevan City. However, it is currently difficult to ensure safe transportation due to the unstable situation although it is physically available. It is inappropriate as a route given the difficulty of transportation. This is because of the time required to arrange various procedures and difficulty in arranging transport operators due to the security issues.

3. Via Turkey (major port in Japan ⇒ Turkey ⇒ Armenia) Difficult due to diplomatic relations between Armenia and Turkey

Transportation route

Major port in Japan ⇒  Major port in Turkey (provisional customs clearance) ⇒ 

⇒ Border between Turkey and Armenia (customs clearance) ⇒  Final destination (land transportation)

Outline

Inappropriate due to the diplomatic relations between Turkey and Armenia

2) Sea transportation

As shown in Table 2-7, it will take approx. 30 to 60 days from a major Japanese port to the Port Poti in Georgia. The equipment will be transshipped on to a feeder boat in Greece. It is assumed that the vehicles are shipped by a roll-on/roll-off ship and spare parts are shipped by a container vessel.

3) Inland transportation

The equipment will be transported inland by a trailer from the Port Poti to the final destination. The transportation route is shown in Figure 2-2.

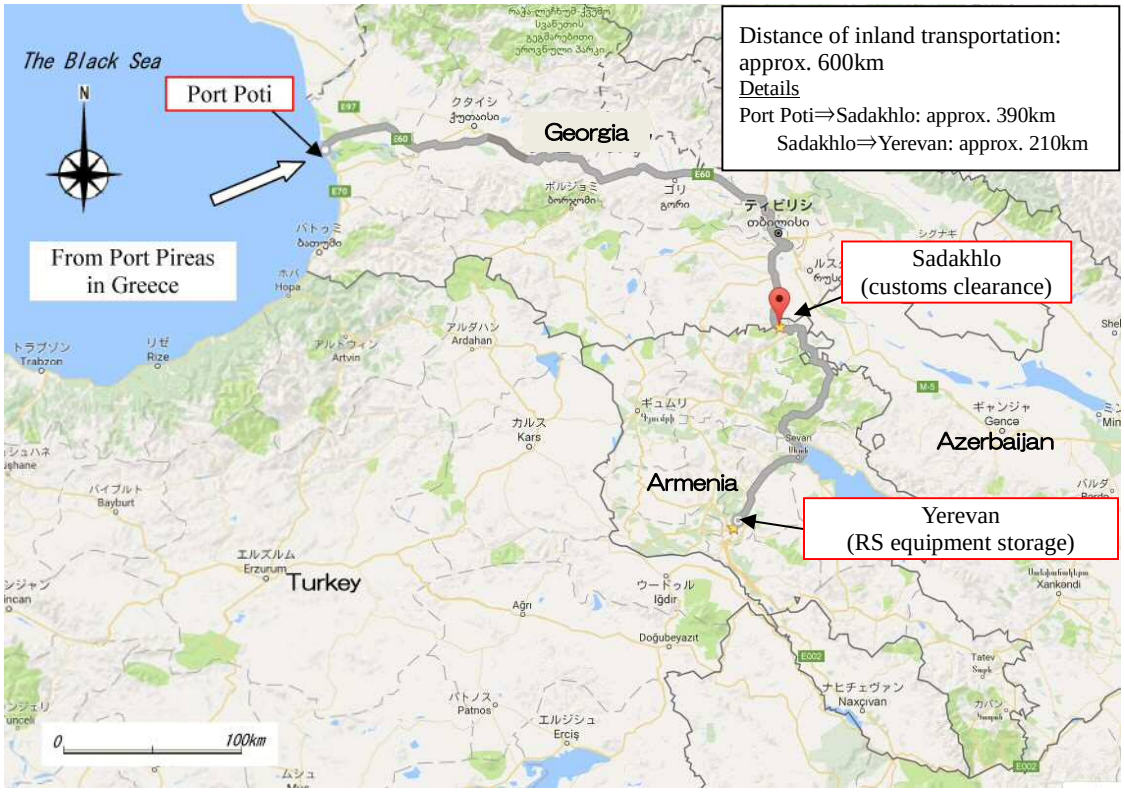


Figure 2-2 Inland Transportation Route to Final Destination via Georgia

4) In Georgia (provisional customs clearance and land transportation)

It takes up to two days at the Poti Port in Georgia for landing and provisional customs clearance and up to three days for land transportation from the port to Yerevan.

	
Cranes used for off/loading (Poti Port)	Roll-on/roll-off ship in harbor

Photo 2-1 Poti Port, Georgia

The road conditions of the arterial highway from Poti Port to the Armenian border are good, so there are no conditions (paving, narrow lanes, sharp turns and curves) that will cause damage to the cargo during transport.

	
Transportation route has good road conditions	Many trailers use the transportation route

Photo 2-2 Road Conditions in Georgia

（Photo was taken nearby the Poti Port）

5) Border between Georgia and Armenia (customs clearance)

The customs clearance on the border between Georgia and Armenia is carried out smoothly and efficiently.

For tax exemptions, the Japanese Supplier (trading company) submits the invoice, packing list, certificate of origin and insurance policy (all original copies) for each shipment to RS before the equipment arrives. RS prepares the Application for Import Duty Exemption based on the document and submits it to the Department of Revenue and Customs of the Ministry of Finance together with E/N and G/A. The tax to be levied on the equipment will be exempted when the Department of Revenue and Customs sends a certificate of tax exemption to the customs office. The procedures can be completed in a few days.

6) In Armenia

Regarding the road conditions, no any notable problems are found if chosen the transportation route of the equipment under the Project. An authorized dealer of a Japanese truck manufacturer in Armenia also uses this route to transport large-sized vehicles and have experienced no problem.

7) RS Headquarters in Yerevan (final destination) (temporary storage of equipment)

The final destination of the equipment is the site relatively close to the RS Headquarters in Yerevan (straight-line distance of about 10 kilometers) (Figure 2-3), where the equipment will be stored temporarily (this site was also used as the temporary storage space for the equipment procured in the Project for Improvement of Fire Fighting Equipment in Yerevan City).

As can be seen in Figure 2-4 (an aerial photo of the site), this site has a large area (Figure 2-5, 110 m × 110 m = 12,000 m^2). A single fire truck or ladder truck can fit into a space of about 2.5 m × 10 m, therefore the 36 fire trucks and 3 ladder trucks can temporarily be parked in this site.

Photo 2-3 RS's Designated Equipment Storage

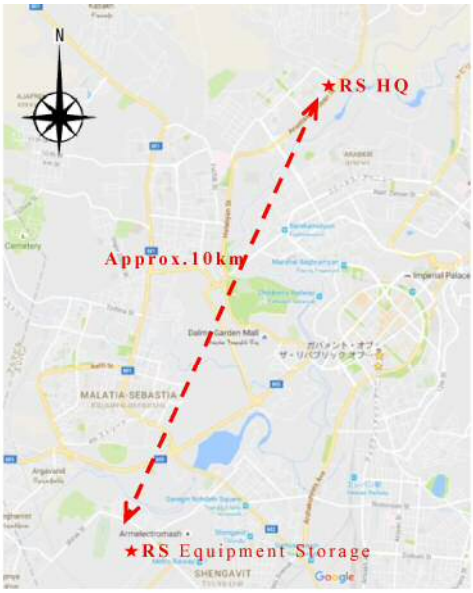


Figure 2-3 Locations of RS Headquarter and Equipment Storage

Figure 2-4 RS's Premises (Designated Equipment Storage)

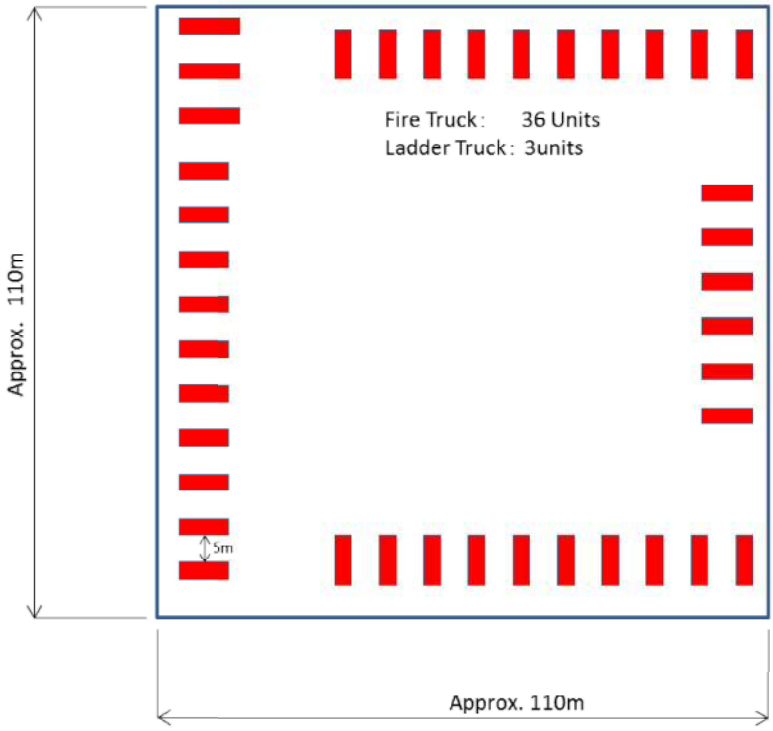


Figure 2-5 Designated Equipment Storage

2.2.3.7 Adjustment and Commissioning Plan

The manufacturer's designated engineers will perform commissioning and adjustment of the procured equipment together with RS employees to make sure that the equipment works normally. The engineers will split into teams for fire trucks, ladder trucks and the mobile workshop vehicle for adjustment and commissioning.

2.2.3.8 Operational Guideline Plan

(1) Outline of the initial operation and operation training

The manufacturer's designated engineers will provide training on the handling and operation of all equipment procured. The engineers will split into teams for fire trucks, ladder trucks and the mobile workshop vehicle for the initial operation training.

(2) Site for initial operation/operation training and the soft component

The main site for initial operation/operation training and the soft component will be the RS equipment storage area in Yerevan, which is the same as the site used for the Project for Improvement of Fire Fighting Equipment in Yerevan City.

(3) Site for initial operation/operation training and the soft component for ladder trucks

The main site for initial operation/operation training and the soft component for ladder trucks will be the training facility of the No. 6 FFRB or the training facility of the No. 13 Special FFRB in Yerevan. Note that the No. 6 FFRB was also used for the ladder truck training in the Project for Improvement of Fire Fighting Equipment in Yerevan City.

	
Ladder Truck Training Facility (1) Photo was taken at Yerevan City No. 6 FFRB	Ladder Truck Training Facility (2) Photo was taken at Yerevan City No. 13 Special FFRB

Photo 2-4 Ladder Truck Training Facility

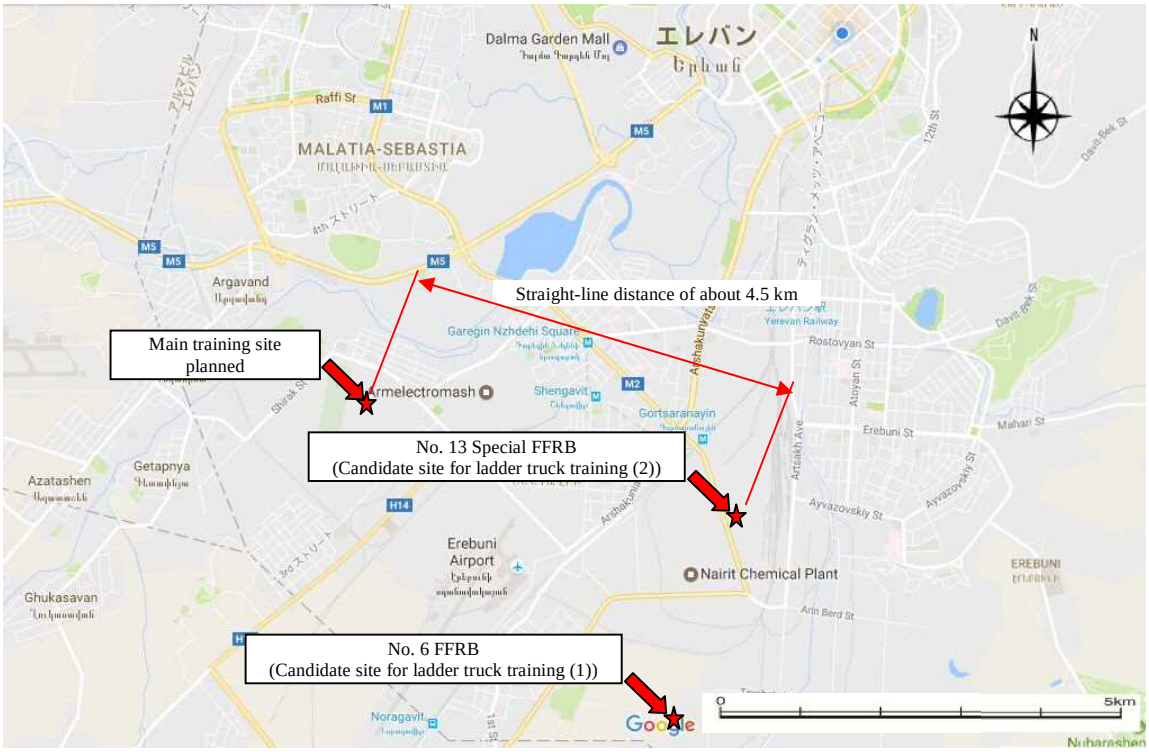


Figure 2-6 Location of Candidate Sites for Ladder Truck Training

2.2.3.9 Soft Component (Technical Assistance) Plan

(1) Needs for a soft component

The soft component implemented in the Project for Improvement of Fire Fighting Equipment in Yerevan City primarily targeted the fire fighters based in Yerevan and no technical transfer were made to those firefighters (except for some executive officers) based in Shirak, Lori and Syunik marzes. The latter lack experience of firefighting and rescue operations using Japanese fire vehicles; the soft component, targeted to the latter, is therefore necessary to ensure the safe and efficient utilization of the equipment when introduced.

(2) Contents of the necessary technical guidance

Roughly 90% of the exiting fire vehicles currently used in Shirak, Lori and Syunik marzes were manufactured more than a quarter of a century ago and their operation methods, fire pump performance, safety devices and driving performance differ significantly from the vehicles which will be procured in the Project. In particular, the use of basket and safety devices of ladder trucks requires different operational skills compared with those of the existing equipment.

Accordingly, the following technical guidance is to be provided to ensure a safe and effective use of the newly procured equipment:

- Revision of manuals for firefighting and rescue operations using fire vehicles and ladder trucks
- Technical guidance for effective firefighting techniques and rescue operations using fire trucks and ladder trucks procured in the Project.

(3) Objectives of the soft component

The outcomes of the soft component implemented in the Project for Improvement of Fire Fighting Equipment in Yerevan City diffused among and the firefighters based in Yerevan and the teaching staff of Crisis Management State Academy (hereinafter referred to as "CMSA"). Therefore the transfer of knowledge and techniques to the firefighters in the target three regions (Shirak, Lori and Syunik) aims to equip them with skills equivalent to those in the Yerevan project. The target group of the technical transfer is the total of approximately 120 firefighters in the three target marzes.

The three specific objectives are listed below:

- The manuals are revised (supplementary version) for continued use.
- Prompt and efficient firefighting operations can be performed using the fire trucks.
- Firefighting and rescue operations can be performed efficiently from high places using the ladder truck.

(4) Outcomes of the soft component

1) Manual revision for continuous firefighting and rescue operations

The following listed manuals were produced in the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City and are still used as official teaching materials at the CMSA.

- Fire equipment operation manual (fire tank engine)
- Fire equipment technical manual (fire tank engine)
- Fire equipment operation manual (ladder truck)
- Fire equipment technical manual (ladder truck)

As new functions have been added to the fire vehicles to be procured in the Project, the manuals must be partially revised by 2019 when the Project is completed.

Accordingly, in the soft component of the Project it is important to establish safe operation and firefighting techniques in RS through technical guidance using the revised manuals which contain the information on the new functions of the equipment.

2) Improvement of fire truck operations and firefighting techniques

RS personnel will acquire know-how of the technical routine inspections necessary to use fire trucks continuously, as well as acquire safe and efficient firefighting and rescue operation techniques including evacuation guidance for ordinary citizens on the fire scene, vehicle placement, collaboration with ladder trucks, securing a water source, firefighting and water discharging methods and specific rescue activities.

3) Improvement of ladder truck operation techniques

RS personnel will acquire know-how about the technical routine inspections necessary to use ladder trucks continuously, as well as safe and efficient firefighting and rescue operation techniques according to the type, scale, and risk level of the fire, including relaying firefighting water from the fire truck, raising/extending/turning the ladder on the ladder truck, discharging water or entering into buildings from the basket at the top of the ladder, and quickly rescuing people trapped on mid- to high-level floors.

Incorrect operation of ladder trucks may cause falls from heights or the truck toppling over, leading to serious accidents involving firefighters and citizens. Therefore certain steps can be taken to secure safety when operating the ladder (in particular, the series of operations to stabilize the vehicle when extending the ladder and setting the ladder against buildings). The operational limits should also be understood so that ladder operations can be performed safely, even when the safety devices fail.

(5) Soft component activities

The soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City is used as a reference and soft component activities will be conducted with the focus described below. The soft component is divided into manual revision and technical guidance.

1) Manual revision for continued firefighting and rescue operations

Four manuals (Fire equipment operation manual (fire tank engine), Fire equipment technical manual (fire tank engine), Fire equipment operation manual (ladder truck) and Fire equipment technical manual (ladder truck)) produced in the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City are to be revised to include new functions of fire vehicles procured in the Project. The revision is to be led by RS and the consultant is to provide technical support in order to encourage self-reliance of RS while ensuring that the revision is made in accordance with local conditions.

2) Fire truck operation and firefighting techniques

The existing fire trucks in Shirak, Lori and Syunik break down frequently and are incapable of conducting sufficient firefighting operations. In addition, a lack of fire protection devices exposes firefighters to danger. For example, given the low water-discharge pressure, firefighters need to approach the fire from close quarters in suits with poor fire resistance.

The fire trucks to be procured in the Project are capable of discharging water at high pressure and efficiently supplying water to other fire trucks. Both performance and functionality of mounted accessories are also superior to that of equipment owned by RS. Accordingly, technical guidance in the soft component is provided to ensure such fire trucks are used safely and efficiently, taking the differences of the equipment into consideration.

3) Ladder truck operation techniques

The safety devices and outrigger of the existing ladder trucks deployed to the target three regions are not functioning properly. Also, the ladders are not equipped with baskets on their tips, which makes it impossible to conduct firefighting and rescue operations safely. Baskets are not equipped with monitor nozzles and firefighters have to make efforts to use hose equipment when fighting fires, exposing themselves to the risk of falling caused by the push-back of the hose conveying water.

The ladder trucks to be procured in the Project are equipped with baskets, each with a monitor nozzle, and will improve the safety of firefighters significantly. Technical guidance will, thus, to ensure proper use and operation methods of these devices.

(6) Participants of the soft component (trainees)

1) Local firefighters in the three marzes

Trainees (approx. 120) will be chosen from 18 FFBRs in Shirak, Lori and Syunik marzes as the participants of the soft component. They will be divided into teams comprising the leader, fire truck operator, ladder truck operator and (6 to 7) firefighters in accordance with their actual firefighting operations.

Japanese experts specialized in fire service will provide technical guidance for RS instructors (several trainees of past soft component) for manual revision and provide assistance in technical training to secure RS’s self-reliance.

2) RS headquarter personnel and CMSA teaching staff

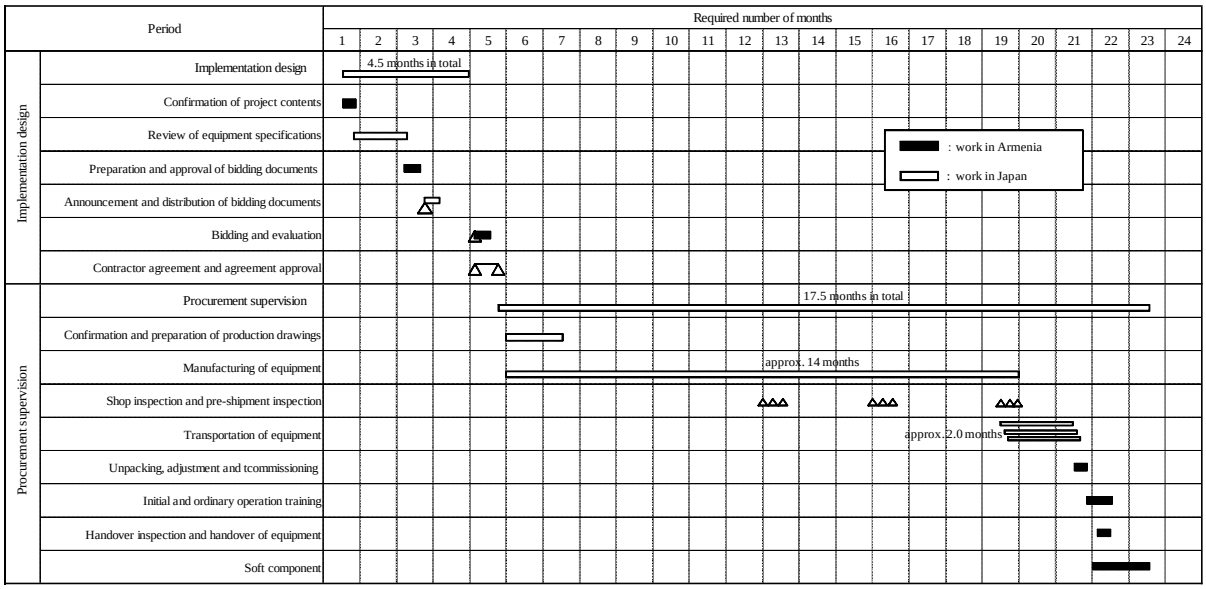
Among the members involved in the fire service education in Armenia, RS headquarter personnel and CMSA teaching staff who did not receive guidance under the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City (approx. 5 people) will be selected preferentially.

Instructing the CMSA teaching staff enables the use of revised manuals for training younger professionals who will be responsible for firefighting and rescue operations of Armenia in the future.

2.2.3.10 Implementation Schedule

The Project is implemented based on the grant aid scheme of Japan. The implementation schedule is shown in Table 2-8.

Table 2-8 Project Implementation Schedule



2.3 Obligations of Recipient Country

If this Project is to be implemented as a Grant Aid project of the Government of Japan, obligations which will be taken by the Armenian side will consist of the following.

2.3.1 Banking Arrangement and issuance of Authorization to Pay

The Armenian side shall open an account in the name of Armenia with a bank in Japan and issue Authorization to Pay to the bank. It is also responsible for paying the notification charge of the Authorization to Pay and charges pursuant to the Banking Arrangement.

2.3.2 Assistance

The Armenian side shall extend assistance to Japanese consultants engaged in the Project when they enter/stay in Armenia and visit relevant government agencies in order to perform their duties.

2.3.3 Tax Exemption

Exemptions of customs duties and other taxes in Armenia for Japanese citizens and corporations engaged in the Project as well as preparation of documents necessary for customs clearance of equipment to be procured in the Project, its tax exemption and facilitation of customs clearance.

2.3.4 Vehicle Registration

Promptly register the fire vehicles procured to relevant Armenian authorities.

2.3.5 Cost of Fuel, Lubricant, Extinguishing Agents and Other Consumables Necessary for Providing Technical Guidance and Travel Expenses of RS

Daily allowances, lodging costs and other travel expenses of RS personnel (both trainers and trainees) involved in the initial operation, operation training and the soft component as well as the cost of fuel, lubricant, extinguishing agents and other consumables necessary for providing technical guidance.

2.3.6 Transportation of the Equipment to Each FFRB

Japan is responsible for transportation of the equipment to the designated equipment storage of RS. After the handover, the Armenian side is responsible for forwarding the equipment to 18 FFRBs in Shirak, Lori and Syunik marzes.

2.3.7 Securing Land and Parking Space

Securing proper parking space for fire vehicles before they are forwarded to each FFRB.

2.3.8 Proper Equipment Maintenance

The Armenian side is responsible for maintaining fire vehicles properly and securing the required budget for it. It is also responsible for securing human resources and technical capacity to ensure the fire vehicles are used safely and properly.

2.3.9 Submission of a Project Monitoring Report

The Armenian side is responsible for submitting the Project Monitoring Report (four times in total) according to the submission schedule stipulated in M/D concluded on 21 April, 2017.

2.3.10 Other Obligations

The Armenian side bears all other costs except those covered by the Japanese Grant Aid.

2.4 Project Operation Plan

Routine maintenance will be ferformed by the FFRBs where the equipment will be deployed through the Project.

If there are any damages or breakdowns which cannot be handled by the FFRBs, the mobile workshop vehicle is, then, dispatched from the RS Maintenance Workshop to do the repairs or equipment is transported to the RS Maintenance Workshop in Yerevan. This system remains unchanged.

The budget for maintenance is allocated in the RS budget every year as shown in Table 2-9.

According to consultant estimates, the cost for maintenance, fuel and lubricants for 36 fire trucks, 3 ladder trucks and 1 mobile workshop vehicle is 29,590,000 AMD for a 5-year annual average and 47,144,000 AMD for a 10-year annual average (see 2.5.2.4 Calculation of Fuel, Lubricant and Maintenance Costs Necessary), which are 11% to 18% of the total cost of maintenance, fuel, and lubricants for 2016, as shown in Table 2-9.

Table 2-9 RS Budget for Maintenance and Fuel and Lubricant (2011-2016)

(Unit: AMD)

	2011	2012	2013	2014	2015	2016
Equipment maintenance cost	54,513,000	54,513,000	54,513,000	54,513,000	54,513,000	54,513,000
Cost for fuel and lubricant	111,579,200	111,579,200	111,579,200	118,421,200	188,421,200	210,349,900
Total	166,092,200	166,092,200	166,092,200	172,934,200	242,934,200	264,862,900

Source: Prepared by the Survey Team based on RS documents

The fire vehicles to be procured in the Project will replace the equipment currently used and thus the maintenance cost cannot exceed what it is needed now.

Rather, it will break down less frequently and its fuel efficiency is expected to outperform the old model of fire vehicles currently owned by RS, hence the cost of maintenance and fuel and lubricant is expected to decline.

2.5 Project Cost Estimation

2.5.1 Initial Cost Estimation

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

2.5.1.1 Costs to be borne by the Armenian side

Table 2-10 Costs to be borne by the Armenian side

Item	Amount (Unit: million yen)
Banking commission	0.1
Cost for securing parking space and modifying garages	1.2
Cost for fuel and lubricant and travel expenses of RS personnel for initial operation and operation training and soft component	3.1
Total	4.4

2.5.1.2 Estimation Conditions

- Time of estimation : December 2016
- Exchange rate : US$ to JPY: US$ 1.00 = 105.63 yen
- Procurement period : The period of implementation design and procurement is as provided in the implementation schedule.
- Others : The Project is to be implemented in accordance with the grant-aid scheme of the Government of Japan.

2.5.2 Operation and Maintenance Cost

The annual cost for fuel and lubricant necessary for equipment operation after its introduction is estimated as follows (*the estimation is made based on the exchange rate of 1AMD＝0.237JPY):

2.5.2.1 Calculation of the Annual Travel Distance

Annual travel distance is calculated to determine fuel and lubricant costs. Note that actual values from past records are used for average travel distance and number of dispatches per year.

(1) Fire truck (36 units)

The annual travel distance is estimated as follows:

27 km (average travel distance (round trip)) × 240 times (number of dispatches per year) × 18 FFRBs × 2 units (number of fire trucks per FFDB)

＝ Approx. 233,000 km/year

(2) Ladder truck (3 units)

The annual travel distance is estimated as follows:

10 km (average travel distance (round trip)) × 30 times (number of dispatches per year) x 3 units

＝ 900 km/year

(3) Mobile workshop vehicle (1 unit)

The annual travel distance is estimated as follows:

300 km (average travel distance (round trip)) × 120 times (number of dispatches per year) × 1 unit

＝ 36,000 km/year

*The travel distance to drive within Armenia is roughly 300 km.

2.5.2.2 Calculation of Annual Fuel and Lubricant Cost

Annual fuel cost for the equipment procured is calculated based on the travel distance calculated in 2.5.2.1 and the following conditions:

- Diesel per liter: 340 AMD/L
- Fuel efficiency: 6.0 km/L
- Fuel cost calculation formula: *average travel distance (round trip) × number of dispatches per year) ÷ fuel efficiency × diesel per liter*
- Lubricant cost: About 1% of fuel cost

2.5.2.3 Calculation of the Annual Maintenance Cost

The annual maintenance cost necessary for equipment operation after its introduction is estimated as follows:

(1) Fire Truck (per unit)

- Yearly inspection of each part: Lubrication of each area, replacement of oil filters
  (20,000 yen)
- 3-year inspection and maintenance: Yearly inspection of each part, inspection of pump and other areas, adjustment, lubrication, replacement of pump gland packing
  (Manufacturer estimates = 190,000 yen)
- Light maintenance: Necessary maintenance performed based on the vehicle condition, assumed that this takes place in the 9th year
  (Manufacturer estimates = 1,150,800 yen)
- Heavy maintenance: Necessary maintenance performed based on the vehicle condition, assumed that this takes place in the 15th year
  (Manufacturer estimates = 4,144,800 yen)

(2) Ladder Truck (per unit)

- Yearly inspection of each part: Operation inspection of each area, lubrication, replacement of oil filters
  (Manufacturer estimates = 177,200 yen)
- 4^{th} year: Yearly inspection of each part, replacement of major sensors
  (Manufacturer estimates = 237,000 yen)
- 5^{th} year: Yearly inspection of each part, replacement of wire ropes, major sensors and hydraulic oil
  (Manufacturer estimates = 1,271,000 yen)
- 7^{th} year: Yearly inspection of each part, replacement of slide pads and recommended electric equipment
  (Manufacturer estimates = 1,389,000 yen)
- 12^{th} year: Yearly inspection of each part, replacement of wire ropes, major sensors, hydraulic oil, slide pads and recommended electric equipment
  (Manufacturer estimates = 2,369,000 yen)

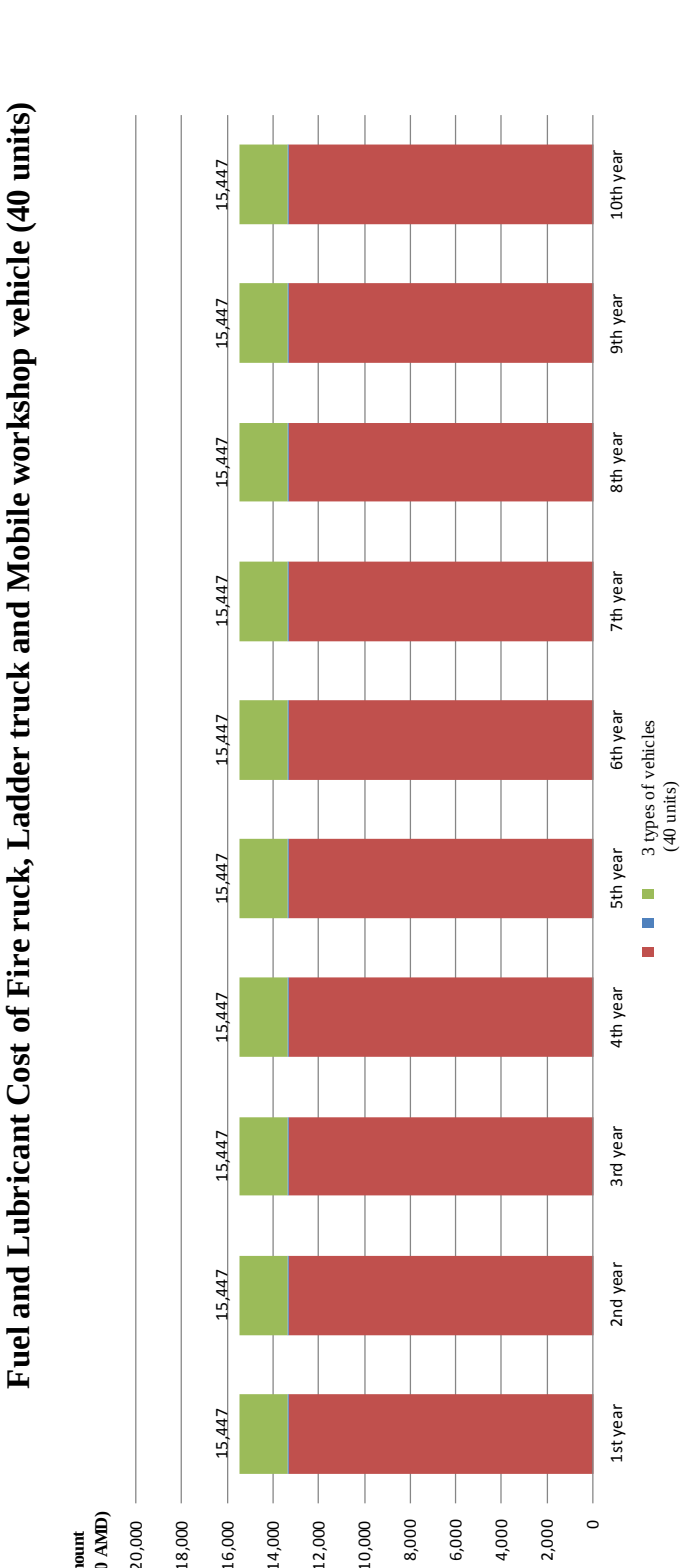
(3) Mobile workshop vehicle (per unit)

- Yearly: inspection of each part and replacement of oil filters
  40,000 yen×1 unit＝ 40,000 yen

2.5.2.4 Calculation of Fuel, Lubricant and Maintenance Costs Necessary

Based on the above conditions, the fuel, lubricant and maintenance costs for 36 fire trucks, 3 ladder trucks and 1 mobile workshop vehicle, the total of 40 vehicles including all three types, will be shown in the following pages.

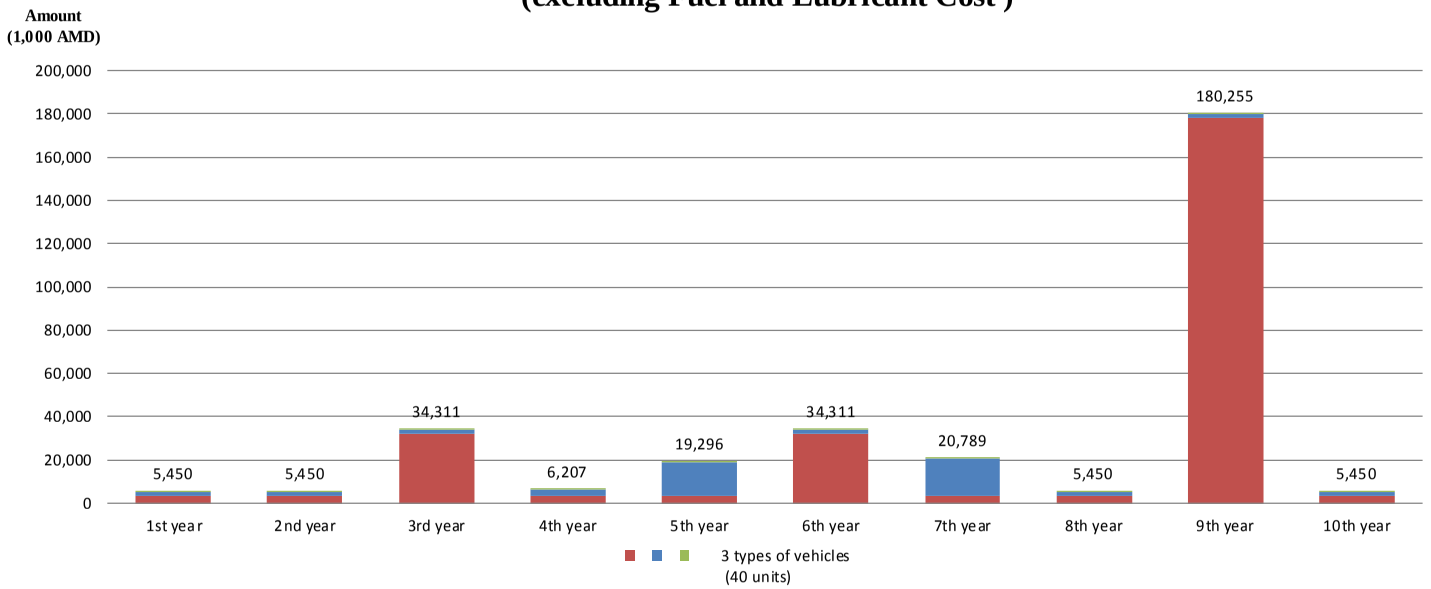
(1) Fuel and Lubricant Cost of Fire truck, Ladder truck and Mobile workshop vehicle (40 units)



Vehicle type	Currency unit	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
Fire truck (36 units)	1,000AMD	13,335	13,335	13,335	13,335	13,335	13,335	13,335	13,335	13,335	13,335
Ladder truck (3 units)	1,000AMD	52	52	52	52	52	52	52	52	52	52
Mobile Workshop vehicle (1 unit)	1,000AMD	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060
3 types of vehicles (40 units)	1,000AMD	15,447	15,447	15,447	15,447	15,447	15,447	15,447	15,447	15,447	15,447
	1,000JPY	3,661	3,661	3,661	3,661	3,661	3,661	3,661	3,661	3,661	3,661
	USD	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000

(2) Maintenance Cost of Fire truck, Ladder truck and Mobile workshop vehicle (40 units)

Maintenance Cost of Fire truck, Ladder truck and Mobile workshop vehicle (40 units)
(excluding Fuel and Lubricant Cost)



Vehicle type	Currency unit	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
Fire truck (36 units)	1,000AMD	3,038	3,038	31,899	3,038	3,038	31,899	3,038	3,038	177,843	3,038
Ladder truck (3 units)	1,000AMD	2,243	2,243	2,243	3,000	16,089	2,243	17,582	2,243	2,243	2,243
Mobile workshop vehicle (1 unit)	1,000AMD	169	169	169	169	169	169	169	169	169	169
3 types of vehicles (40 units)	1,000AMD	5,450	5,450	34,311	6,207	19,296	34,311	20,789	5,450	180,255	5,450
	1,000JPY	1,292	1,292	8,132	1,471	4,573	8,132	4,927	1,292	42,720	1,292
	USD	12,000	12,000	77,000	14,000	43,000	77,000	47,000	12,000	404,000	12,000
3 types of vehicles (40 units)	10 years average (1,000AMD)	31,697									
	10 years average (1,000JPY)	7,512									
	10 years average (USD)	71,000									

3. Project Evaluation

3.1 Preconditions

After the equipment is introduced, RS is required to perform “Registration of Vehicles”, “Transportation of Vehicles to Firefighting and Rescue Brigades”, “Securing Parking Space Fire Vehicles”, and “Proper Maintenance of Equipment”, as described above in “2.3. Overview of Obligations of Recipient Country”.

However, it is assumed that RS is capable of fulfilling these obligations as it has performed duties similar to the above smoothly in the Project for the Improvement of Fire Fighting Equipment in Yerevan City.

The Survey Team also confirmed in the field survey that the equipment provided in the Yerevan project is used without major complications, and as the fire vehicles that are to be procured in the Project are of a similar class, no complications are expected to arise.

3.2 Necessary Inputs by Recipient Country

The recipient country needs to provide inputs listed below for effective use of the equipment to be procured and successful implementation of the Project as a whole.

- Securing techniques, human resources and budget for fire vehicle maintenance
- Securing firefighters and other human resources, as well as ensuring appropriate technical level of RS (firefighters) necessary for safe firefighting operations
- Securing budget for fuel and lubricant and extinguishing agents necessary for firefighting operations
- Continued training of firefighting techniques

3.3 Important Assumptions

Important assumptions for realizing and sustaining the benefits of the Project are as shown in Table 3-1.

Table 3-1 Important Assumptions

Item	Description	Important Assumptions
Project goals	Improve safety and security for the people in the Shirak, Lori, and Syunik marzes	There is no change to Armenia's disaster risk reduction strategy or firefighting/disaster risk reduction plans
Results	Improvement of firefighting and rescue operations capacity	RS continues its firefighting and rescue operations
Activities	➢ Education/training for passing on firefighting and rescue techniques using the fire vehicles procured through the Project ➢ Equipment maintenance ➢ Procurement of fire vehicles and equipment	➢ Education/training in the field of firefighting and rescue at CMSA and at each FFRB are continued ➢ Necessary budget for RS is secured

3.4 Project Evaluation

3.4.1 Relevance

Implementation of the Project as a Japanese Grant Aid Project is considered to have a high level of relevance for the following reasons.

- Due to the malfunctions and decreased functionality of the old and deteriorated fire vehicles deployed to Shirak, Lori, and Syunik, where the three largest cities after Yerevan are located, it has become difficult to respond to disasters, including fires, that occur in these regions. The purpose of the Project is to provide a means of protecting the lives and property of citizens, thereby ensuring the safety and security of the approximately 850,000 people living in these regions, making it a project with a high level of urgency.
- Due to an influx of residents from rural areas, population growth and urbanization has progressed in the Gyumri, Vanadzor, and Kapan, which are the central cities in the targeted regions. This has brought an increase in the number of fires connected to the rapid construction of middle- to high-rise buildings. Despite this, the progressing deterioration of fire trucks and ladder trucks at a large portion of FFRBs in these regions has made it increasingly difficult to engage in firefighting and rescue activities. Additionally, the deployment of fire vehicles that can better operate on steep and narrow roads, making swift and safe fire fighting and rescue activities possible, will help build a fire fighting system in

these regions that will lead to a marked improvement in fire fighting capabilities.

- The Project is consistent with the National Strategy for Disaster Risk Reduction, the upper-level plan formulated by the Government of Armenia in 2012.

From the reasons above, it is considered that the implementation of the Project is highly relevant; effectiveness can also be expected from the viewpoint of improving capacity in firefighting and rescue activities in the targeted regions.

3.4.2 Effectiveness

(1) Quantitative effects

The quantitative effects of the Project are shown in Table 3-2.

Table 3-2 Quantitative Effects

	Baseline 【2016 Status quo】	Target (2022) 【3 years after project completion】
Average preparation time from issuance of dispatch order to dispatch of fire vehicle (in minutes)	10 minutes or longer	Below one minute
Ratio of fire vehicles that can be dispatched within one minute from issuance of dispatch order (%) Maintenance rate of fire vehicles (%)	0%	100%
Average time required from arrival on the scene to starting pumping water (in minutes)	5 minutes or longer	Below 5 minutes

※The indicators are measured only for the equipment provided in the Project.

(2) Qualitative effects

The qualitative effects of the Project are described below.

- Enabling safe and effective and efficient firefighting operations
- Improving safety of local residents in the target areas as a result of enhanced firefighting capacities

Appendices

1. Member List of the Study Team
2. Preparatory Study Schedule
   - 2.1 First Survey
   - 2.2 Second Survey
   - 2.3 Third Survey

3. List of Parties Concerned in the Recipient Country

4. Minutes of Discussions (M/D)
   - 4.1 First Survey
   - 4.2 Second Survey
   - 4.3 Third Survey

5. Soft Component Plan

6. References
   - 6.1 Photographs showing the Conditions of Garages in 18 Fire Fighting & Rescue Brigades in the Targeted Areas

1. Member List of the Study Team

Name	Responsibilities	Organizations
(1) JICA		
Mr. Hiroyuki HAYASHI	Team Leader (First & Second Survey)	JICA
Mr. Katsutoshi FUSHIMI	Team Leader (Third Survey)	JICA Uzbekistan Office
Ms. Mifumi NAKATANI	Project Coordinator	JICA
Mr. Hiromitsu MURAI	Project Monitoring	JICA Uzbekistan Office
Ms. Ruzan Khojikyan	Program Coordinator	JICA Uzbekistan Office
(2) Consultant		
Mr. Takefumi MAYUMI	Project Manager/ Fire Fighting System/ Equipment Maintenance Planning 2	INGEROSEC Corporation
Mr. Atsushi SANO	Deputy Project Manager/ Equipment Maintenance Planning 1	INGEROSEC Corporation
Mr. Kiyohito KOBAYASHI	Equipment Planner 1/ Procurement Planner 2/ Cost Estimation 2	Katahira & Engineers International
Mr. Nobuyuki KAMIHASHI	Equipment Planner 2/ Procurement Planner 1/ Cost Estimation 1	INGEROSEC Corporation
Ms. Varditer HARUTYUNYAN	Interpreter	INGEROSEC Corporation

2. Preparatory Study Schedule

2.1 First Survey

Schedule			JICA	Consultant					Accommodation	
			1,2,3,4	5	6	7	8	9		
No.	Date	Day	Mr. Hiroyuki HAYASHI / Team Leader Ms. Mifumi NAKATANI /Project Coordinator Mr. Hiromitsu MURAI / Project Coordinator Ms. Ruzan Khojikyan (JICA Uzbekistan Office)	Mr. Takefumi MAYUMI (ISEC) Project Manager/ Fire Fighting System/ Equipment Maintenance Planning 2	Mr. Atsushi SANO (ISEC） Deputy Project Manager/ Equipment Maintenance Planning 1	Mr. Kiyohito KOBAYASHI (KEI) Equipment Planner 1/ Procurement Planner 2/ Cost Estimation 2	Mr. Nobuyuki KAMIHASHI (ISEC) Equipment Planner 2/ Procurement Planner 1/ Cost Estimation 1	Ms. Varditer HARUTYUNYAN Interpreter	Consultant Team	
									5, 6 & 9	7 & 8
1	17-Sep.	Sat.		Narita (12:00) SU263→Moscow (16:10) Moscow (22:35) SU1866→				Translating documents Inception Report	On a plane	
2	18-Sep.	Sun.		Yerevan (02:25)				Translating documents Inception Report	Yerevan	
3	19-Sep.	Mon.		Courtesy Call to RS, Breifing about Inception Report, Questionnaire & Schedule Site Inspection: Yerevan Special Fire-Rescue Detachment ⇒ RS Maintenance Workshop ⇒ FFRB-8					ditto	
4	20-Sep.	Tue.		Yerevan ⇒ Move to Syunik ⇒ Syunik Suverying at FFRB-26/Ararat FFRB-57/Sisian ⇒ FFRB-55/Goris					Syunik	
5	21-Sep.	Wed.		Syunik Site Suverying at FFRB-58/Kajaran ⇒ High-rise buildings					ditto	
6	22-Sep.	Thu.		Returned to Yerevan ⇒ Yerevan FFRB-6					Yerevan	
7	23-Sep.	Fri.		Data Analysis					ditto	
8	24-Sep.	Sat.		Yerevan ⇒ Move to Lori ⇒ Lori Site Suverying at FFRB-42/Spitak ⇒ FFRB-37 & 38/Vanadzor ⇒ FFRB-39/Gugark					Lori	
9	25-Sep.	Sun.		Vanadzor ⇒ FFRB-41/Stephanavan ⇒ FFRB-43/Tashir ⇒ FFRB-40/Alaverdi ⇒Lori Regional Resque Department ⇒ High-rise buildings					ditto	
10	26-Sep.	Mon.		Vanadzzor Move to Shirak ⇒ FFRB-48/Gyumri ⇒ FFRB-50/Amasia ⇒ FFRB-52/Ashotsk					Shirak	
11	27-Sep.	Tue.		Shirak Regional Resque Department ⇒ FFRB-53/Akhuryan ⇒ FFRB-49/Artik ⇒ FFRB-51/Maralik ⇒ Return to Yerevan					Yerevan	
12	28-Sep.	Wed		Data Analysis & Discussion on Specs with RS					ditto	
13	29-Sep.	Thu		Data Analysis & Discussion on Specs with RS					ditto	
14	30-Sep.	Fri		Data Collection and Analysis, Interium Reporting and Meeting with RS,					ditto	
15	1-Oct.	Sat.	Narita (12:00) SU263→Moscow (16:10) Moscow (22:35) SU1866→	Data Collection and Analysis, Interium Reporting and Meeting with RS					ditto	
16	2-Oct.	Sun.	Yerevan (02:25) Internal Meeting	Data Processing & Analysis, Internal Meeting					ditto	
17	3-Oct.	Mon.	Meeting with C/P Mr. Pavael Gyozalyan at RS HQ ⇒ Courtesy Call at RS / H.E. Mushegh Ghazaryan (Director of RS) ⇒ Courtesy call / H.E. Armen Yeritsyan (Minister of MES) ⇒ Inspection at FFRB-15 & -8 ⇒ RS Maintenance Workshop ⇒ Courtesy Call at Japanese Embassy / H.E. Ambassador Taguchi						ditto	
18	4-Oct.	Tue.	Yerevan ⇒ Site Inspection in Lori ⇒ FFRB-42/Spitak ⇒ FFRB-37/Vanadzor ⇒ Lori Regional Resque Headquarter ⇒ High-rise buildings ⇒ Return to Yerevan						ditto	
19	5-Oct.	Wed	Discussion on M/D with RS						ditto	
20	6-Oct.	Thu	Discussion on M/D with RS, Internal Meeting						ditto	
21	7-Oct.	Fri	Signing M/D by H.E. Mushegh Ghazaryan (Director of RS) ⇒ Reporting to Japanese Embassy/H.E. Ambassador Taguchi			Yerevan (14:45) SU1861→ Moscow (16:45) Moscow (19:00) SU260 →		Accompanying PM	ditto	On a plane
22	8-Oct.	Sat.	[Mr. Hayashi] Yerevan (14:45) SU1861 → Moscow (16:45) Moscow (20:10 SU2093) → Beograd (22:05)	[Ms. Nakatani] Yerevan (14:45) SU1861→ Moscow (16:45) Moscow (19:00) SU260 →	Data Processing & Analysis	Narita (10:35)		Accompanying PM	ditto	
23	9-Oct.	Sun.		Narita (10:35)	Data Processing & Analysis			Accompanying PM	ditto	
24	10-Oct.	Mon.			Survey on Crisis Management State Academy ⇒ Aid Project by other donors			Accompanying PM	ditto	
25	11-Oct.	Tue.			Meeting with RS (Review on Specs of requested Equipment)			Accompanying PM	ditto	
26	12-Oct.	Wed			Yerevan (14:45) SU1861→Moscow (16:45) Moscow (19:00) SU262 →			Translating documents	On a plane	
27	13-Oct.	Thu			Narita (10:35)			Translating documents		

Note: MES: Ministry of Emergency Situations
RS: Rescue Service
ISEC: INGEROSEC
KEI: Katahira & Engineers International
FFRB : Fire Fighting & Rescue Brigade
PM: Project Manager

⇒ Land Travel
→ Air Travel

2.2 Second Survey

Schedule			JICA	Consultant					Accommodation	
			1, 2, 3	4	5	6	7	8		
No.	Date	Day	Mr. Hiroyuki HAYASHI / Team Leader Ms. Mifumi NAKATANI / Project Coordinator Ms. Ruzan Khojikiyan (JICA Uzbekistan Office)	Mr. Takefumi MAYUMI (ISEC) Project Manager/ Fire Fighting System/ Equipment Maintenance Planning 2	Mr. Atsushi SANO (ISEC) Deputy Project Manager/ Equipment Maintenance Planning 1	Mr. Kiyohito KOBAYASHI (KEI) Equipment Planner 1/ Procurement Planner 2/ Cost Estimation 2	Mr. Nobuyuki KAMIHASHI (ISEC) Equipment Planner 2/ Procurement Planner 1/ Cost Estimation 1	Ms. Varditer HARUTYUNYAN Interpreter	1,2,4,5	6, 7
1	5-Dec	Mon.				Narita (13:10) SU263→Moscow (17:35) Moscow (22:05) SU1892→				On a plane
2	6-Dec	Tue.				→Tbilisi (01:50)				Tbilisi, Georgia
3	7-Dec	Wed.				⇒Land transport ⇒(Surveying on transport route) ⇒ Poti, Conducting hearing from Georgian logistics firms				Batumi, Georgia
4	8-Dec	Thu.				Port Poti, Surveying on customs clearance				ditto
5	9-Dec	Fri.				Port Poti, Surveying on customs clearance ⇒Surveying on transport route ⇒ Return to Tbilisi				Tbilisi
6	10-Dec	Sat.				Tbilisi (16:30) Georgian Air A9725 → Yerevan (17:00)				Yerevan
7	11-Dec	Sun.				Internal meeting, translating documents, data analysis				ditto
8	12-Dec	Mon.				Discussion on Specs with RS Surveying on workshop & availability of spare-parts				ditto
9	13-Dec	Tue.	Narita (13:10) SU261→Moscow (17:35) Moscow (21:25) SU1866→			Discussion on Specs with RS Surveying on workshop & availability of spare-parts			On a plane	ditto
10	14-Dec	Wed.	Yerevan (01:20) Internal Meeting			Discussion on Specs with RS Internal Meeting			Yerevan	
11	15-Dec	Thu.	FFRB-8 ⇒Courtesy Call at and Discussion with RS on M/D						ditto	
12	16-Dec	Fri.	Discussion with RS on M/D						ditto	
13	17-Dec	Sat.	Discussion with RS on M/D, Collecting Questionnaires						ditto	
14	18-Dec	Sun.	Internal Meeting						ditto	
15	19-Dec	Mon.	M/D Signing ⇒ FFRB-15 ⇒ Crisis Management State Academy						ditto	
16	20-Dec	Tue.	Reporting to Japanese Embassy, Yerevan (16:15) SU1861→Moscow (18:25) Moscow (20:00) SU260 →						On a plane	
17	21-Dec	Wed.	Narita (11:40)							

RS: Rescue Service

2.3 Third Survey

Schedule			JICA		Consultant				Accommodation
			1, 2, 3	4	5	6	7	8	
No.	Date	Day	Mr. Katsutoshi FUSHIMI /Team Leader Mr. Hiromitsu MURAI / Project Coordinator Ms. Ruzan Khojikyan /Project Coordinator (JICA Uzbekistan Office)	Ms. Mifumi NAKATANI /Project Coordinator	Mr. Takefumi MAYUMI (ISEC) Project Manager/ Fire Fighting System/ Equipment Maintenance Planning 2	Mr. Atsushi SANO (ISEC) Deputy Project Manager/ Equipment Maintenance Planning 1	Mr. Nobuyuki KAMIHASHI (ISEC) Equipment Planner 2/ Procurement Planner 1/ Cost Estimation 1	Ms. Varditer HARUTYUNYAN Interpreter	
1	16-Apr	Sun.		Haneda (00:01) QR813 → Doha (05:50) Doha QR285 (20:55) →				Translating documents (M/D draft, other docs.)	On a plane
2	17-Apr	Mon.	<Murai>Taskent (04:45) SU1871 → Moscow (07:05) Moscow SU1860 (09:55)→Yerevan (13:45)	Yerevan (00:55) Internal Meeting (Discussion/modification on M/D (draft))				Translating documents (M/D draft, other docs.)	Yerevan
3	18-Apr	Tue.	Discussion with RS on M/D Explanation on Preparatory Survey Report Draft	Ditto					
4	19-Apr	Wed.	<Fushimi>Taskent (04:45) SU1871 → Moscow (07:05) Moscow SU1860 (09:55)→Yerevan (13:45)	Discussion with RS on M/D & Specs draft					Ditto
5	20-Apr	Thu.	Discussion with RS on M/D & Specs draft, Courtesy call at the Minister of MES	Ditto					
6	21-Apr	Fri.	M/D Signing, Reporting to Japanese Embassy	Ditto					
7	22-Apr	Sat.	Yerevan (14:45) SU1861 → Moscow (16:45) Moscow SU1870 (20:55) →Taskent (13:45)→	Yerevan (03:25) QR286→Doha (05:25) Doha (07:00) QR812 → Haneda (22:40)	Discussion with RS on Soft Component Plan			Translating documents (report, other docs.)	Ditto
8	23-Apr	Sun.	Taskent (02:45) →		Yerevan (03:25) QR286→ Doha (05:25) Doha (07:00) QR812 → Haneda (22:40)			Translating documents (report, other docs.)	On a plane

MES: Ministry of Emergency Situations

RS: Rescue Service

3. List of Parties Concerned in the Recipient Country

Organization & Name	Position
(1) Embassy of Japan in Armenia	
Eiji TAGUCHI	Ambassador
Megumi MAEKAWA	Second Secretary
(2) United Nations Development Planning (UNDP) Armenia Office	
Armen Chilingaryan	Program Coordinator
(3) Swiss Agency for Development and Cooperation	
Sergey Hovhannisyan	Program Coordinator
(4) Ministry of Emergency Situations (MES)	
Armen Yeritsyan	Minister (former)
Davit Tonoyan	Minister (incumbent)
Hamlet Hakobyan	Deputy Minister
Sofia Harutyunyan	Advisor to the Minister
Mariam Gevorggyan	Head of Department of Foreign Relations
Vahagn Ohanyan	Deputy Chief of Staff (financial)
Crisis Management State Academy (CMSA)	
Hamlet Matevosyan	Rector
Gharibyan Haykuhi	Deputy Rector
Gevorg Hovakimyan	Dean of Faculty of Rescue Studies
(5) Rescue Agency (Rescue Agency of the Ministry of Emergency Situations of the Republic of Armania: RS)	
Mushegh Ghazaryan	Director of RS
Vrezh Gabrielyan	Deputy Director of RS
Pavel Gyozalyan	Head of Centre of Humanitarian Response (former)
Saroyan Arsen	Head of Rescue Forces Department (former)
Hovhannes Yemishyan	Head of Rescue Forces Department (incumbent)
Sargis Kyureghyan	Section Head of Rescue Forces Department
Karen Babasyan	Senior Planning Officer, Population Protection and Disaster Consequences Elimination Management Department
Mkrtich Ulikyan	Deputy Head of Operative Management Department
Logistics and Maintenance Department	
Gagik Kirakosyan	Manager of RS Maintenance Workshop
Harutyunyan Mher	Manager of Equipment Storage
Yerevan City Rescue Department	
Kamo Woskanyan	Head, No. 8 FFRB
Havhannisyan Hrach	Ladder truck operator
Gharhamanyan Hevon	Ladder truck operator
Havhanninsyan Ashot	Ladder truck operator
Khachatryan Mushegh	Ladder truck operator
Midzoev Vitali	Ladder truck operator
Ghukasyan Anatoli	Ladder truck operator
Davtyan Harayr	Head, No. 15 FFRB
Hakobyan Gevorg	Ladder truck operator
Koroghlyan Hamlet	Ladder truck operator

Organization & Name	Position
Regional Rescue Department	
Shirak Marz	
Karapetyan Artur	Head, Rescue Headquarter of Shirak Marz
Kirakosyan Armen	Head, No. 48 FFRB (Gyumri)
Avetisyan Artur	Head, No. 49 FFRB (Artik)
Karapetyan Hovik	Head, No. 50 FFRB (Amasia)
Grigoyan Artavazd	Head, No. 51 FFRB (Maralik)
Danielyan Vahagn	Head, No. 52 FFRB (Ashotsk)
Hartyunyan Vardan	Head, No. 53 FFRB (Akhuryan)
Lori Marz	
Chatinyan Artur	Deputy Head, Rescue Headquarter of Lori Marz
Ghazaryan Sashik	Head, No. 37 FFRB (Vanadzor)
Sahakyan Havik	Head, No. 38 FFRB (Vanadzor)
Seyran Khachatryan	Head, No. 39 FFRB (Gugark)
Barseghyan Armen	Head, No. 40 FFRB (Alaverdi)
Nalbandyan Artur	Head, Sub-station of No. 40 FFRB (Alaverdi)
Gharakeshyan Sergeg	Head, No. 41 FFRB (Stephanavan)
Babrielyan Serob	Head, No. 42 FFRB (Spitak)
Arshakyan Hovsep	Head, No. 43 FFRB (Tashir)
Syunik Marz	
Zakaryan Bagrat	Head, Rescue Headquarter of Syunik Marz
Andranik Sahakyan	Head, No. 55 FFRB (Goris)
Hovseplyan Garik	Head, No. 57 FFRB (Sisian)
Mkrtechyan Araik	Head, No. 58 FFRB (Kajaran)
(6) State Urban Development Committee (SUDC)	
Aghsi Hovsepyan	Head, Department of Engineering and Industrial Standard
Ovsanna	Deputy Head, Department of Engineering and Industrial Standards
(7) Dealer / Maintenance Workshop (contract with RS)	
Vigen Gevorgyan	President, MBR LLC
(8) Dealder of Isuzu Motors	
Arshak Vardanyan	Sales Manager, Grand Avto LLC.
(9) Forwarder in Georgia	
Tobias Bohn	Project Manager, M.G. International

4. Minutes of Discussions (M/D)

4.1 First Survey

Minutes of Discussions
on the Preparatory Survey
for the Project for the Improvement of Fire-Rescue Equipment
in the Republic of Armenia

In response to the request from the Government of the Republic of Armenia (hereinafter referred to as "Armenia") and the Government of Japan decided to conduct a Preparatory Survey for the Project for the Improvement of Fire-Rescue Equipment (hereinafter referred to as "the Project") and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (first field survey) (hereinafter referred to as "the Team") to Armenia, headed by Mr. Hiroyuki HAYASHI, Senior Advisor to the Director General, Industry Development and Public Policy Department, JICA, and is scheduled to stay in the country from September 18 to October 12, 2016.

The Team held a series of discussions with the officials concerned of the Government of Armenia and conducted a field survey in the Project area. In the course of the discussions, both sides have confirmed the main equipment described in the attached sheets. JICA will send the Preparatory Survey Team for the Outline Design (second field survey) to Armenia around December 2016.

The language of this Minutes of Discussion is English, of which 2 authentic copies will be signed officially by both sides.

Yerevan, October 07, 2016

Mr. Hiroyuki HAYASHI	Mr. Mushegh GHAZARYAN
Leader	Director
Preparatory Survey Team	Rescue Service
Japan International Cooperation Agency	Ministry of Emergency Situations
Japan	Republic of Armenia

ATTACHMENT

1. Objective of the Project
   The objective of the Project is to improve the rescue performances for the scenes of emergency by procurement of the fire-rescue equipment, thereby contributing to economic and social development in the Project areas.

2. Title of the Project submitted by the Government of Armenia
   Both sides confirmed the title of the Project as "the Project for the Improvement of Fire-Rescue Equipment", modified from the Project title in the verbal note for request "the Project for the Improvement of Fire Equipments".

3. Project Sites in Armenia
   Both sides confirmed that the sites in Armenia will be as follows: Lori, Shirak, and Syunik Marzes, which are shown in Annex 1.

4. Line Agency and Executing Agency
   Both sides confirmed the line agency and executing agency to be as follows:

   4-1. The line agency is the Ministry of Emergency Situations, which would be the agency to supervise the executing agency.

   4-2. The executing agency is the Rescue Service. The executing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the Undertakings are taken by relevant agencies properly and on time. The organization charts are shown in Annex 2.

5. Equipment requested by the Government of Armenia

   5-1. As a result of discussions, both sides confirmed that the equipment requested by the Government of Armenia is as follows, of which details are provided in Annex 3:

   (1) 36 fire trucks and 3 ladder trucks,
   (2) spare parts, and
   (3) other equipment.

   5-2. The number of the fire trucks and ladder trucks to be provided by the Government of Japan will be examined through technical and financial analysis by the Japanese side and will be proposed to the Armenian side.

   5-3. JICA will assess the appropriateness of the above requested equipment through the survey and will report findings to the Government of Japan. The final list of equipment of the Project would be approved by the Government of Japan.

6. Japanese Grant Scheme

6-1. Both sides confirmed and the Armenian side accepted the Japanese Grant Scheme and its procedures as described in Annex 4, Annex 5 and Annex 6, and necessary measures to be taken by the Government of Armenia.

6-2. The Armenian side accepts the responsibility for the necessary measures as described in Annex 5, for smooth implementation of the Project, as a condition for the Japanese Grant to be implemented. The detailed contents of the Annex 5 will be worked out during the survey and shall be agreed no later than by the Explanation of the Draft Preparatory Survey Report.
The contents of Annex 5 will be used to determine the followings:
(1) The scope of the Project,
(2) The timing of the Project implementation, and
(3) Timing and possibility of budget allocation.
Contents of Annex 5 will be updated as the Preparatory Survey progresses, and will finally be the Attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey as Preparatory Survey Team for the Outline Design (second field survey) in Armenia in December 2016.

7-2. JICA prepares a draft Preparatory Survey Report in English and sends a mission to Armenia in order to explain its contents around April 2017.

7-3. If the contents of the draft Preparatory Survey Report is accepted in principle and the Undertakings are fully agreed with the Armenian side, JICA will complete the final report in English and send it to Armenia around July 2017.

7-4. The above schedule is tentative and subject to change.

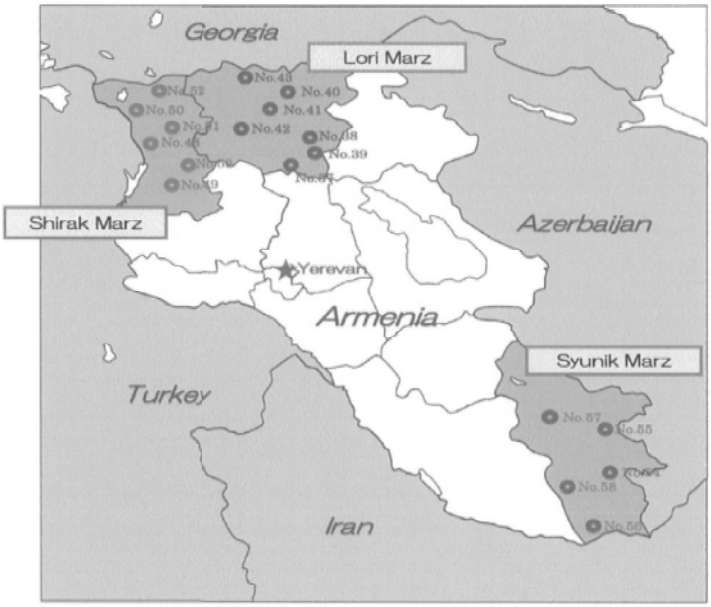
8. Other Relevant Issues

8-1. Rescue Service uses the mobile workshop (vehicle for on-site repairing works), which is the key element to provide the proper maintenance of the fire trucks in the project sites in Armenia.

Annex 1 Project Sites in Armenia
Annex 2 Organization Chart
Annex 3 List of equipment requested by the Government of Armenia
Annex 4 Japanese Grant
Annex 5 Flow Chart of Japanese Grant Procedures
Annex 6 Financial Flow of Japanese Grant

Annex 1

PROJECT SITES IN ARMENIA



Note

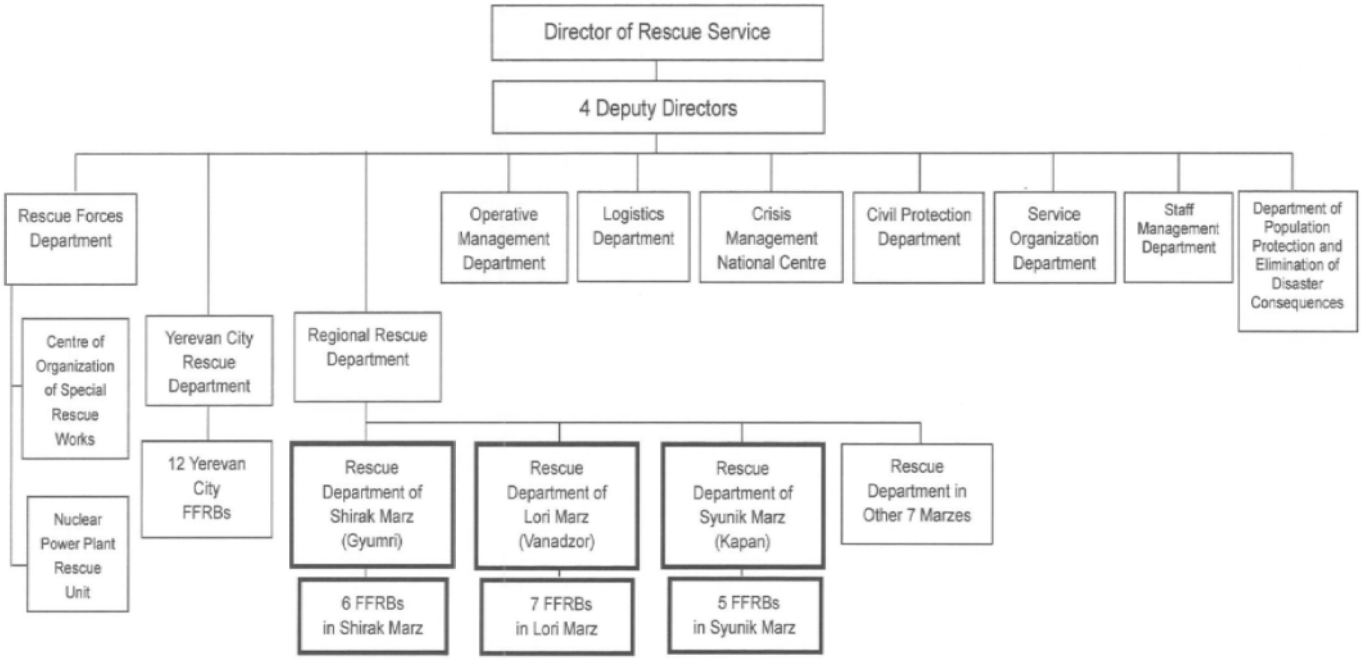
Lori Marz (7 Brigades)	Shirak Marz (6 Brigades)	Syunik Marz (5 Brigades)
No.37 Vanadzor FFRB	No.48 Gyumri FFRB	No.54 Kapan FFRB
No.38 Vanadzor FFRB	No.49 Artik FFRB	No.55 Goris FFRB
No.39 Gugarq FFRB	No.50 Amasia FFRB	No.56 Meghri FFRB
No.40 Tumanyan FFRB	No.51 Ani FFRB	No.57 Sisian FFRB
No.41 Stephanavan FFRB	No.52 Ashotsq FFRB	No.58 Qajaran FFRB
No.42 Spitak FFRB	No.53 Akhuryan FFRB	
No.43 Tashir FFRB		

Locations of Surveyed Fire Fighting & Rescue Brigade (FFRB)

Annex 2

ORGANIZATION CHART

Rescue Service of the Ministry of Emergency Situations of Republic of Armenia



Note: **FFRB** means Fire Fighting & Rescue Brigade

Marz(es) is Region(s) in Armenia.

Annex 3

LIST OF EQUIPMENT REQUESTED BY THE GOVERNMENT OF ARMENIA

No.	FFRB		City	Quantity of Original Request	
				Fire Truck	Ladder Truck
1	No. 37	Vanadzor	Lori	2	1
2	No. 38	Vanadzor	Lori	2	---
3	No. 39	Gugark	Lori	2	---
4	No. 40	Tumanyan	Lori	2	---
5	No. 41	Stepanavan	Lori	2	---
6	No. 42	Spitak	Lori	2	---
7	No. 43	Tashir	Lori	2	---
8	No. 48	Gyumri	Shirak	2	1
9	No. 49	Artik	Shirak	2	---
10	No. 50	Amasya	Shirak	2	---
11	No. 51	Ani	Shirak	2	---
12	No. 52	Ashotsk	Shirak	2	---
13	No. 53	Akhuryan	Shirak	2	---
14	No. 54	Kapan	Syunik	2	1
15	No. 55	Goris	Syunik	2	---
16	No. 56	Meghri	Syunik	2	---
17	No. 57	Sisian	Syunik	2	---
18	No. 58	Qajaran	Syunik	2	---
		Total		36	3

Annex 4

JAPANESE GRANT

The Japanese Grant (hereinafter referred to as the "Grant") 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 is not supplied through the donation of materials as such.
Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

1. Grant Procedures

The Grant 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 Scheme from a technical, financial, social and economic point of view.
- Confirmation of equipment agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant project. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant 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) 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. Japanese Grant 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, in accordance with the E/N, 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 Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. 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 Project, the recipient country is required to undertake such necessary measures as Annex 5. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant fund comes from the Japanese taxpayers.

(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, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

(7) "Export and Re-export"

The products purchased under the Grant 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"), in principle. JICA will execute the Grant 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) Environmental and Social Considerations

The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010) .

(11) Monitoring

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

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

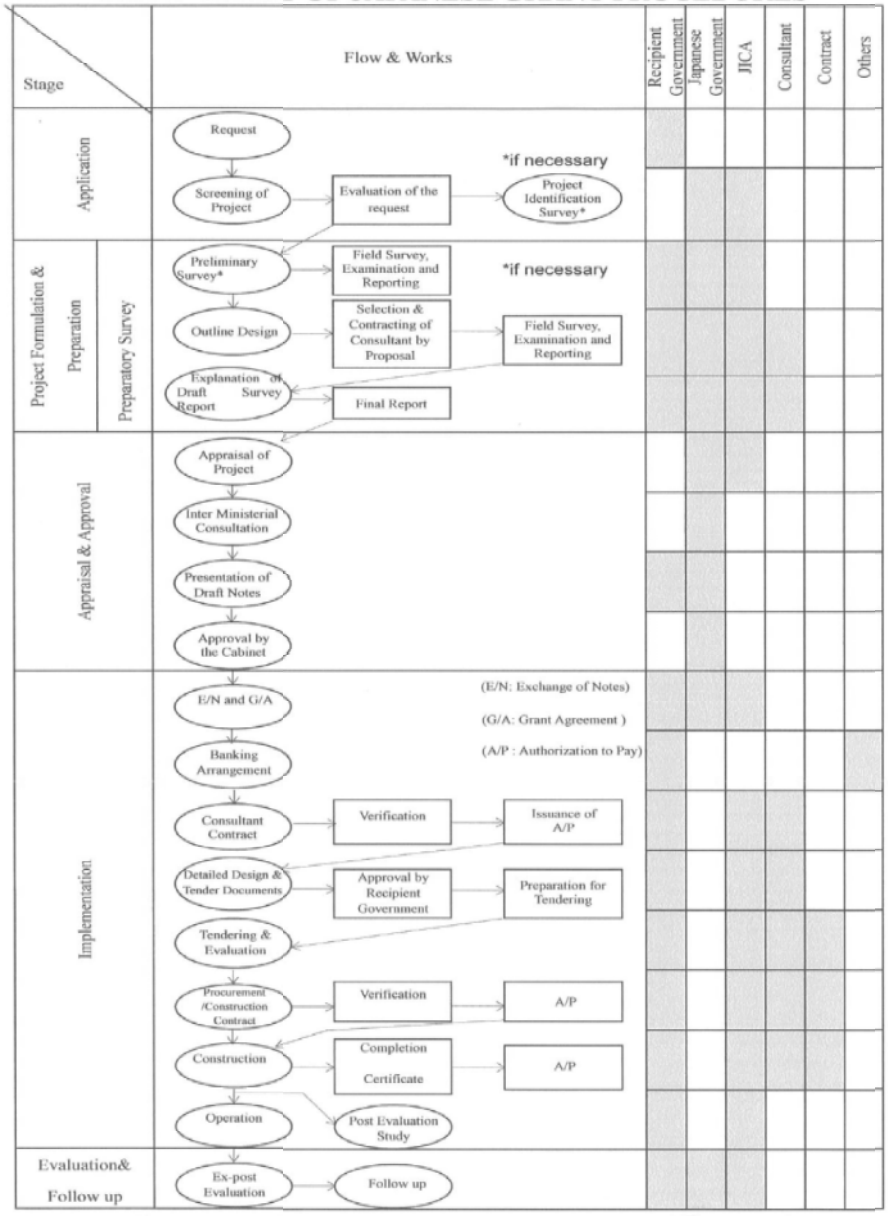
(13) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Client, the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design, before start of construction.
b) Discussing the issues affecting Works such as construction progress, modification of the design, test, inspection, safety control and the Client's obligation progress, during of construction.

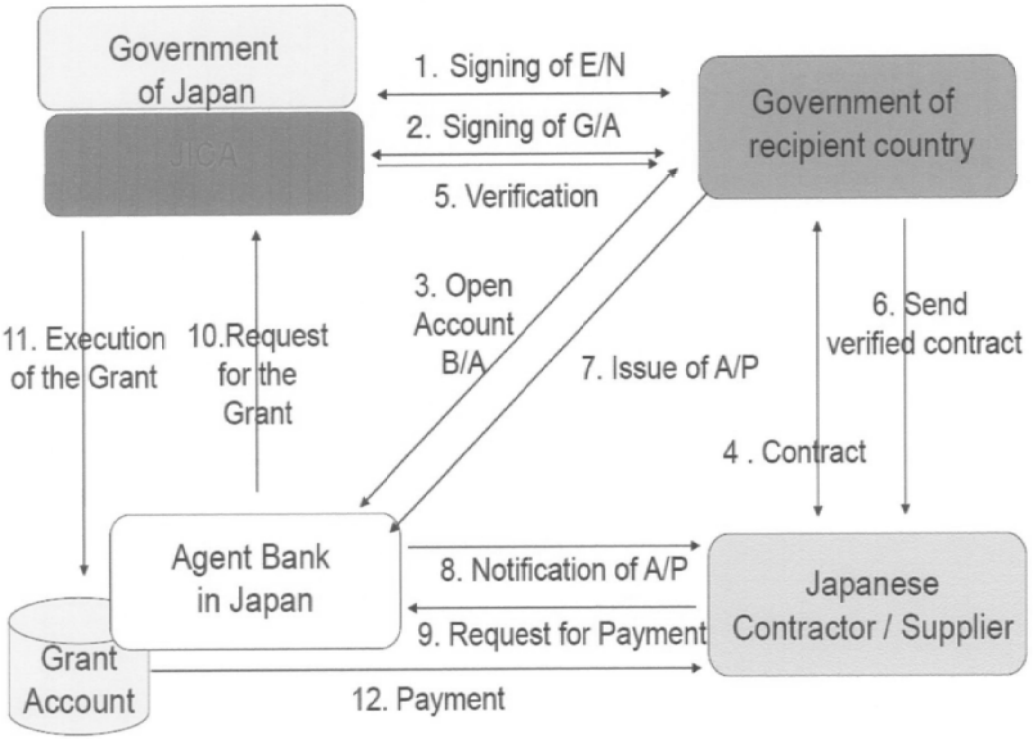
Annex 5

FLOW CHART OF JAPANESE GRANT PROCEDURES



Annex 6

FINANCIAL FLOW OF JAPANESE GRANT



4.2 Second Survey

Minutes of Discussions
on the Preparatory Survey (Second Field Survey)
for the Project for the Improvement of Fire-Rescue Equipment
in the Republic of Armenia

In response to the request from the Government of the Republic of Armenia (hereinafter referred to as "Armenia"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (second field survey) (hereinafter referred to as "the Team") of the Project for the Improvement of Fire-Rescue Equipment (hereinafter referred to as "the Project") to Armenia, headed by Mr. Hiroyuki HAYASHI, Senior Advisor to the Director General, Industry Development and Public Policy Department, JICA, from December 6 to December 20, 2016. The Team held a series of discussions with the officials of the Government of Armenia. In the course of the discussions, both sides have confirmed the main items shown in the attached sheets.

The language of this Minutes of Discussion is English, of which 2 authentic copies will be signed officially by both sides.

Yerevan, December 19, 2016

Mr. Hiroyuki HAYASHI
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Mr. Mushegh GHAZARYAN
Director
Rescue Service
Ministry of Emergency Situations
Republic of Armenia

ATTACHMENT

1. The Preparatory Survey for Outline Design

1-1. In the Minutes of Discussions on the Preparatory Survey for Outline Design (first field survey) in October, 2016, both sides confirmed the basic contents of the Project; objective of the Project, title of the Project, the Project sites in Armenia, responsible authority for the Project, the items requested by the Government of Armenia, procedures and basic principles of Japanese Grant, and the schedule of the Survey.

1-2. During the Preparatory Survey for the Outline Design (second field survey) in December, 2016, the Armenian side presented the allocation and operation plan for the equipment to the Team, and the Team confirmed the necessity of the following items:

1) 36 fire trucks
2) 3 ladder trucks
3) mobile workshop vehicle(s), and
4) spare parts.

And the detailed information on the items is presented in Annex 1.

2. Necessary Measures for the Procedures of Japanese Grant

2-1. As for the monitoring of the implementation of the Project, JICA requires the Armenian side to submit the Project Monitoring Report, the form of which is attached as Annex 2.

2-2. The Armenian side agreed to take the necessary measures, as described in Annex 3, for smooth implementation of the Project. The contents of Annex 3 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 3 will be updated as the Preparatory Survey progresses will be used as an attachment to the Grant Agreement.

3. Schedule of the Survey

3-1. JICA prepares a Draft Preparatory Survey Report in English and sends a mission to Armenia in order to explain its contents around April 2017.

3-2. If the contents of the Draft Preparatory Survey Report are accepted and the undertakings for the Project are fully agreed by the Armenian side, JICA will finalize the Preparatory Survey Report and send it to Armenia around July 2017.

3-3. The above schedule is tentative and subject to change.

Annex 1 List of items requested by the Government of Armenia
Annex 2 Project Monitoring Report (template)
Annex 3 Major Undertakings to be taken by the Government of Armenia

Annex 1

LIST OF ITEMS REQUESTED BY THE GOVERNMENT OF ARMENIA

1. Main Components

No.	FFRB		Marz	Quantity of Original Request	
				Fire Truck	Ladder Truck
1	No. 37	Vanadzor	Lori	2	1
2	No. 38	Vanadzor	Lori	2	---
3	No. 39	Gugark	Lori	2	---
4	No. 40	Tumanyan	Lori	2	---
5	No. 41	Stepanavan	Lori	2	---
6	No. 42	Spitak	Lori	2	---
7	No. 43	Tashir	Lori	2	---
8	No. 48	Gyumri	Shirak	2	1
9	No. 49	Artik	Shirak	2	---
10	No. 50	Amasya	Shirak	2	---
11	No. 51	Ani	Shirak	2	---
12	No. 52	Ashotsk	Shirak	2	---
13	No. 53	Akhuryan	Shirak	2	---
14	No. 54	Kapan	Syunik	2	1
15	No. 55	Goris	Syunik	2	---
16	No. 56	Meghri	Syunik	2	---
17	No. 57	Sisian	Syunik	2	---
18	No. 58	Qajaran	Syunik	2	---
		Total		36	3

Note: **FFRB** means Fire Fighting & Rescue Brigade

2. Mobile Workshop Vehicle(s)

Mobile workshop vehicle(s) with portable compressor(s) and portable welding machine(s): To be deployed to Yerevan

3. Spare Parts

Adequate quantity of spare parts

Annex 2
G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

Project Monitoring Report
on
the Project for the Improvement of Fire-Rescue Equipment
Grant Agreement No. XXXXXXX
Month, 20XX

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	**Rescue Service of the Ministry of Emergency Situations of the Republic of Armenia** Person in Charge (Designation) Mr. Mushegh GHAZARYAN Contacts Address: RA, Yerevan, 0054, A. Mikoyan Street 109/8 Phone/FAX: +374-10-31-78-01 Email: mushegh.ghazaryan@mes.am
Line Ministry	**Ministry of Emergency Situations of the Republic of Armenia** Person in Charge (Designation) Mr. Gagik HAYRAPETYAN Contacts Address: RA, Yerevan, 0054, A. Mikoyan Street 109/8 Phone/FAX: +374-10-31-77-66 / +374-10-36-02-87 Email: gagik.hayrapetyan@mes.am

General Information:

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

*JPY: Japanese Yen, AMD: Armenian Dram

1

1. Project Description

1-1 Project Objective

1-2 Project Rationale

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

1-3 Indicators for measurement of "Effectiveness"

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

2. Details of the Project

2-1 Location

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

2-2 Scope of the work

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

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

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

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

2-4 Obligations by the Recipient
Progress of Specific Obligations
See Attachment 2.

2-5 Project Cost

2-5-1 Cost Borne by the Grant (Confidential until the Completion of Bidding)

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

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

2-5-2 Cost Borne by the Recipient

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

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

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

(PMR)

2-6 Executing Agency

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

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

3. Operation and Maintenance (O&M)

3-1 Physical Arrangement

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

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

3-2 Budgetary Arrangement

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

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

4. Potential Risks and Mitigation Measures

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

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

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

5-1 Overall Evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

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

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

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

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
4. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR No. 4 only)
5. Pictures (by JPEG style by CD-R) (PMR No.4 only)
6. Equipment List (PMR No.4 only)

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

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

Annex 3

Major Undertakings to be taken by the Government of Armenia

1. Specific Obligations of the Government of Armenia which will not be Funded with the Grant

(1) Before the Bidding

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open bank account (B/A)	within 1 month after G/A	Central Bank of the Republic of Armenia		
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	RS		
3	To submit Project Monitoring Report No. 1 (with the result of Detailed Design)	before preparation of bidding documents	RS		

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

(2) During the Project Implementation

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)		RS		
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A 1) Advising commission of A/P 2) Payment commission for A/P		RS		
3	To ensure prompt customs clearance and to assist the Supplier(s) with inland transportation in recipient country		RS		
4	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work		RS		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted		RS		
6	To submit Project Monitoring Report No. 2 after the signing of contract		RS		
7	To secure and clear the parking spaces for each fire station		RS		
8	To submit Project Monitoring Report No. 3 after handover the equipment		RS		
9	To ensure that the maintenance and safe operation training costs(daily allowance, transportation, lodging, fuel, etc.) for fire service staffs will be covered under the Project		RS		
10	To submit Project Monitoring Report No. 4(final)	within 2 weeks after the completion of technical trainings	RS		

1

(3) After the Project

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To register the equipment provided under the Project		RS		
2	To maintain and use properly and effectively the equipment provided under the Grant 1) Allocation of operation and maintenance cost 2) Organization of operation and maintenance 3) Routine check/Periodic inspection	After completion of the Project	RS		
3	To ensure that the maintenance and safe operation training costs for fire service staff are covered		RS		

2. Other Obligations of the Government of Armenia Funded with the Grant

No.	Items	Deadline	Amount (Million Japanese Yen)*
1	To procure the equipment including the following transportation 1) Marine transportation of the products from Japan 2) Inland transportation from the port of disembarkation to Yerevan (CIP Yerevan)		
2	To implement detailed design, bidding support and procurement supervision (Consulting Service)		

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

4.3 Third Survey

Minutes of Discussions
on the Preparatory Survey for the Project for
the Improvement of Fire-Rescue Equipment
in the Republic of Armenia
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between the Rescue Service of the Ministry of Emergency Situations in the Republic of Armenia and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on October 7, 2016 and December 19, 2016, and in response to the request from the Government of the Republic of Armenia (hereinafter referred to as "Armenia") dated August 11, 2014, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for the Improvement of Fire-Rescue Equipment in the Republic of Armenia (hereinafter referred to as "the Project"), headed by Mr. Katsutoshi FUSHIMI, Chief Representative of JICA Uzbekistan Office from April 17 to April 22, 2017.

As a result of the discussions, both sides agreed on the main items described in the attached sheets. The language of this Minutes of Discussion is English, of which 2 authentic copies will be signed officially by both sides.

Yerevan, April 21, 2017

Mr. Katsutoshi FUSHIMI
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Mr. Mushegh GHAZARYAN
Director
Rescue Service
Ministry of Emergency Situations
Republic of Armenia

ATTACHMENT

1. Objective of the Project
   The objective of the Project is to improve the rescue performances for the scenes of emergency by procurement of the fire-rescue equipment, thereby contributing to improvement of the people's security in the Project sites.

2. Title of the Preparatory Survey
   Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for the Improvement of Fire-Rescue Equipment in the Republic of Armenia".

3. Project Sites
   Both sides confirmed that the sites of the Project are in Lori, Shirak, and Syunik Marzes, which are shown in Annex 1.

4. Responsible Authority for the Project
   Both sides confirmed the authorities responsible for the Project are as follows:

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

4-2. The line ministry of the Executing Agency is the Ministry of Emergency Situations. The Ministry of Emergency Situations shall be responsible for supervising the Executing Agency on behalf of the Government of Armenia.

5. Contents of the Draft Report
   After the explanation of the contents of the Draft Report by the Team, the Armenian side agreed to its contents.

6. Cost Estimate
   Both sides confirmed that the cost estimate described in the Draft Report is provisional and will be examined further by the Government of Japan for its approval.

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

8. Timeline for the Project Implementation
The Team explained to the Armenian side that the expected timeline for the project implementation is as attached in Annex 3.

9. Expected Outcomes and Indicators
Both sides agreed that key indicators for expected outcomes are as follows. The Armenian side will be responsible for the achievement of agreed key indicators targeted in year 2022 and shall monitor the progress based on these indicators.

[Quantitative indicators]

Indicators	Baseline 【actual performance in 2016】	Target (2022) 【3 years after project completion】
Average preparation time from issuance of dispatch order to dispatch of fire vehicle (in minutes)	More than 10 minutes	Below one minute
Availability of fire vehicles that can be dispatched within one minute from issuance of dispatch order (%)	0%	100%
Average time required from arrival on the site to beginning of the fire extingushing (in minutes)	More than 5 minutes	Below 5 minutes

[Qualitative indicators]

- Enabling safe, effective and efficient firefighting operations
- Improving safety of residents in the target areas as a result of enhanced firefighting capacities

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

Considering the sustainable operation and maintenance of the equipment granted through the Project, following technical assistance is planned under the Project as the Soft Componetnt of the Project. The contents of the Soft Compornent are described in the Draft Report. The Armenian side confirmed to deploy necessary number of personnels (e.g. trainers, trainees from those concerned units/ departments/ agencies) who are appropriate and competent in terms of its purpose of the Soft Component as described in the Draft Report.

11. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 4. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in Annex 4, both sides confirmed that such customs duties, internal taxes and other fiscal levies include VAT, commercial tax, income tax and corporate tax, which shall be clarified in the bid documents by the Executing Agency during the implementation stage of the Project.

The Armenian side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 4 will be used as an attachment of Grant Agreement (G/A).

12. Monitoring during the Implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 5. The timing of submission of the PMR is described in Annex 4.

13. Project Completion

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

14. Ex-Post Evaluation

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

15. Items and measures to be considered for the smooth implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as follows:

15-1. The Armenian side will provide safe operation for the implementation of Soft Component.

15-2. The Armenian side will be responsible for the transportation of the equipement from Yerevan to three (3) Project Sites safely and promptly.

16. Schedule of the Survey

JICA will finalize the Preparatory Survey Report in English based on the confirmed items. The report will be sent to the Armenian side around June, 2017.

17. Environmental and Social Considerations

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

18. Other Relevant Issues

18-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which the Project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

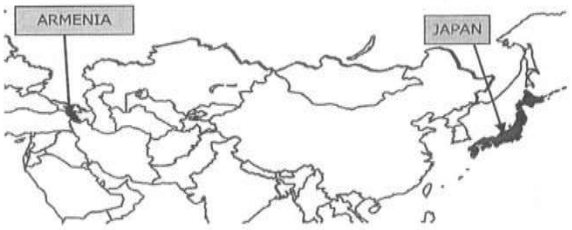
18-2. Public Awareness

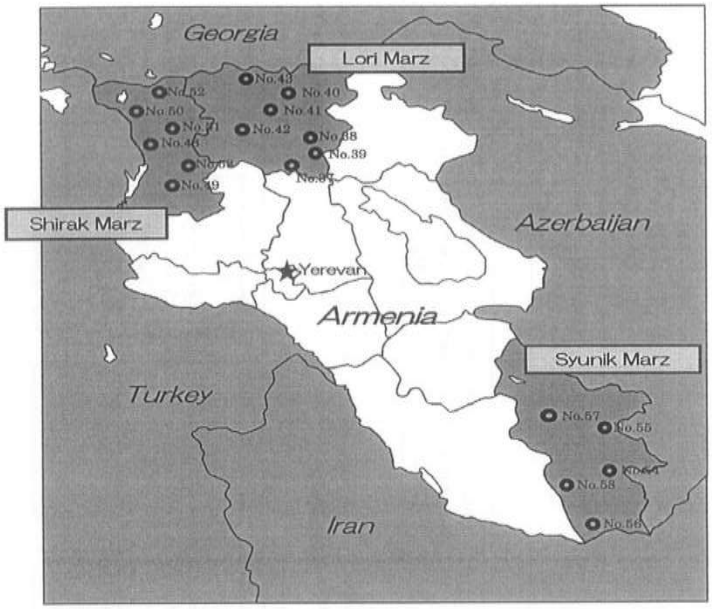
The Armenian side comfirmed to provide public awareness during the implementation and after the completion of the Project.

Annex 1 Project Sites
Annex 2 Organization Chart
Annex 3 Project Implementation Schedule
Annex 4 Major Undertakings to be taken by the Government of Armenia
Annex 5 Project Monitoring Report (template)

Annex 1

PROJECT SITES IN ARMENIA





Note

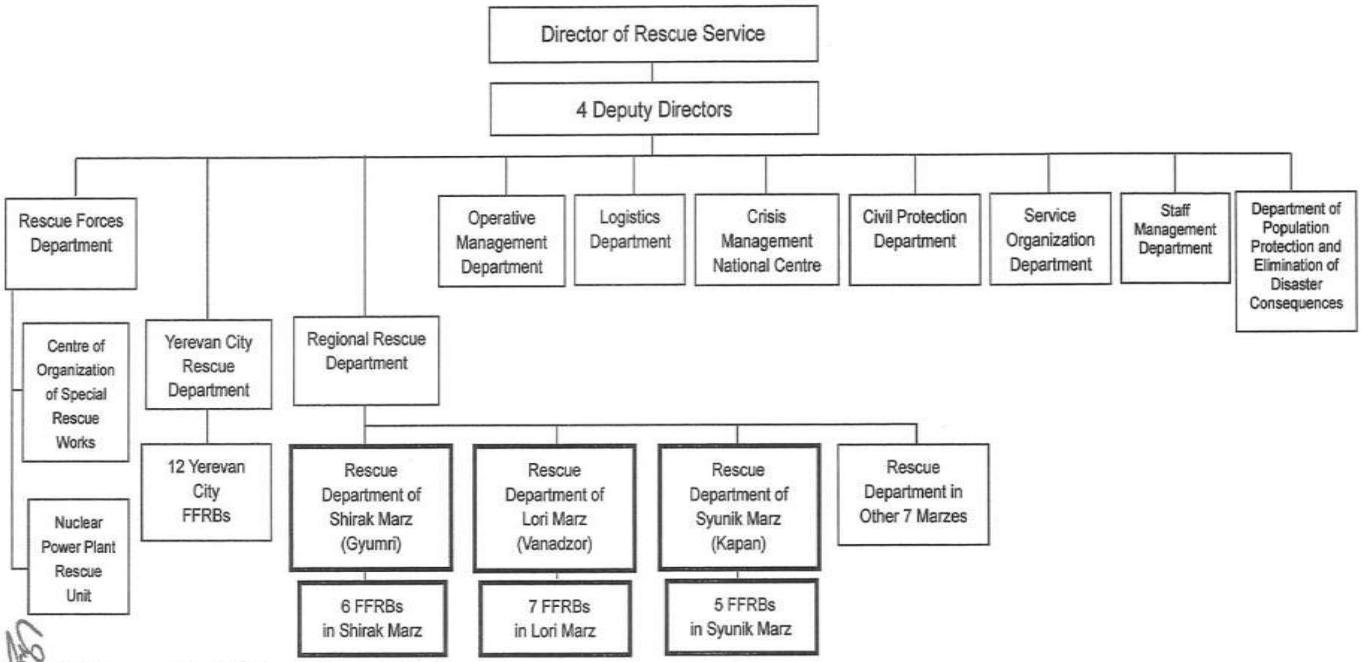
Lori Marz (7 Brigades)	Shirak Marz (6 Brigades)	Syunik Marz (5 Brigades)
No.37 Vanadzor FFRB	No.48 Gyumri FFRB	No.54 Kapan FFRB
No.38 Vanadzor FFRB	No.49 Artik FFRB	No.55 Goris FFRB
No.39 Gugarq FFRB	No.50 Amasia FFRB	No.56 Meghri FFRB
No.40 Tumanyan FFRB	No.51 Ani FFRB	No.57 Sisian FFRB
No.41 Stephanavan FFRB	No.52 Ashotsq FFRB	No.58 Qajaran FFRB
No.42 Spitak FFRB	No.53 Akhuryan FFRB	
No.43 Tashir FFRB		

Locations of Surveyed Fire Fighting & Rescue Brigade (FFRB)

Annex 2

ORGANIZATION CHART

Rescue Service of the Ministry of Emergency Situations of the Republic of Armenia



Note: **FFRB** means Fire Fighting & Rescue Brigade

Marz(es) is Region(s) in Armenia

Annex 3

Project Implementation Schedule

Annex 4

Major Undertakings to be taken by the Government of Armenia

1. Specific Obligations of the Government of Armenia which will not be Funded with the Grant

(1) Before the Bidding

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open bank account (B/A)	Within 1 month after G/A	Central Bank of the Republic of Armenia	25,000 JPY	
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	Within 1 month after the signing of the contract with the consultant	RS	25,000 JPY	
3	To submit Project Monitoring Report No. 1 (with the result of Detailed Design)	Before preparation of bidding documents	RS	-	

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

(2) During the Project Implementation

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the supplier(s)	Within 1 month after the signing of the contract with the supplier(s)	RS	25,000 JPY	
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A 1) Advising commission of A/P 2) Payment commission for A/P	1) Within 1 month after the signing of the contract with the supplier(s) 2) Every payment	RS	25,000 JPY	
3	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the Equipment and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	Immediately after the signing of the contract with the supplier(s)	RS	-	
4	To submit Project Monitoring Report No. 2 after the signing of contract	Immediately after the signing of the contract with the supplier(s)	RS	-	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Equipment and/or the services be exempted	Before import of the Equipment	RS	-	
6	To ensure prompt customs clearance and to assist the supplier(s) with inland transportation in the recipient country	Immediately after the shipment of the Equipment	RS	-	

7	To secure and clear the parking spaces for each fire-fighting & rescue brigade	Before receiving the Equipment	RS	11,000 USD	
8	To ensure that the initial and ordinary operation training costs (daily allowance, transportation, lodging, fuel, water etc.) for fire service staffs will be covered	Before receiving the Equipment	RS	11,200 USD	
9	To ensure necessary number of personnel to collaborate with Japanese experts for provision of the Soft Component (including revision of manuals and operation training)	Before the receiving the Equipment	RS	-	
10	To ensure the cost for the Soft Component (daily allowance, transportation, lodging, fuel, water etc.)	Before the receiving the Equipment	RS	17,000 USD	
11	To submit Project Monitoring Report No. 3 (after receiving the Equipment)	Within 2 weeks after receiving the Equipment	RS	-	
12	To submit Project Monitoring Report No. 4(final: with the result of the Soft Component)	Within 2 weeks after the completion of Soft Component	RS	-	

(3) After the Project

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To register the Equipment provided under the Project	Immediately after receiving the Equipment	RS	2,050 USD	
2	To maintain and use properly and effectively the Equipment provided under the Japanese Grant 1) Allocation of operation and maintenance cost 2) Organization of operation and maintenance 3) Routine check/Periodic inspection	After the completion of the Project : Every year (Annual running cost)	RS	12,000 USD	
		After the completion of the Project : Every 3 years (Light overhaul)	RS	77,000 USD	
		After the completion of the Project : 9th year (Medium overhaul)	RS	404,000 USD	
3	To execute trainings on maintenance and safe operation	Every year	RS	13,250 USD	

2. Other Obligations of the Government of Armenia Funded with the Grant

No.	Items	Deadline	Amount (Million Japanese Yen) *
1	To procure the Equipment and to arrange the following transportation 1) Marine transportation of the products from Japan 2) Inland transportation from the port of disembarkation to Yerevan (CIP Yerevan)		
2	To implement detailed design, bidding support and procurement supervision (Consulting Service)		

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

Annex 5
G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

Project Monitoring Report
on
the Project for the Improvement of Fire-Rescue Equipment
Grant Agreement No. XXXXXXX
Month, 20XX

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	**Rescue Service of the Ministry of Emergency Situations of the Republic of Armenia** Person in Charge (Designation) Mr. Mushegh GHAZARYAN Contacts Address: RA, Yerevan, 0054, A. Mikoyan Street 109/8 Phone/FAX: +374-10-31-78-01 Email: mushegh.ghazaryan@mes.am
Line Ministry	**Ministry of Emergency Situations of the Republic of Armenia** Person in Charge (Designation) Mr. Gagik HAYRAPETYAN Contacts Address: RA, Yerevan, 0054, A. Mikoyan Street 109/8 Phone/FAX: +374-10-31-77-66 / +374-10-36-02-87 Email: gagik.hayrapetyan@mes.am

General Information:

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

*JPY: Japanese Yen, AMD: Armenian Dram

1

1. Project Description

1-1 Project Objective

1-2 Project Rationale

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

1-3 Indicators for measurement of "Effectiveness"

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

2. Details of the Project

2-1 Location

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

2-2 Scope of the work

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

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

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

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

2-4 Obligations by the Recipient
Progress of Specific Obligations
See Attachment 2.

2-5 Project Cost

2-5-1 Cost Borne by the Grant (Confidential until the Completion of Bidding)

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

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

2-5-2 Cost Borne by the Recipient

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

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

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

(PMR)

2-6 Executing Agency

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

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

3. Operation and Maintenance (O&M)

3-1 Physical Arrangement

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

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

3-2 Budgetary Arrangement

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

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

4. Potential Risks and Mitigation Measures

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

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

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

5-1 Overall Evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

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

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

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

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
4. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR No. 4 only)
5. Pictures (by JPEG style by CD-R) (PMR No.4 only)
6. Equipment List (PMR No.4 only)

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

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

5. Soft Component (Technical Assistance) Plan

The soft component to be implemented in the Project is described below.

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR
THE IMPROVEMENT OF
FIRE-RESCUE EQUIPMENT
IN
THE REPUBLIC OF ARMENIA

Soft Component Plan

April 2017

INGEROSEC CORPORATION
KATAHIRA & ENGINEERS INTERNATIONAL

Contents

1. Fire Truck (Fire Tank Engine)

2. Ladder truck (folding-boom type or sliding-ladder type)

Folding-boom-type ladder truck

Sliding-ladder-type truck

Reference photographs of equipment to be used in the Soft Component

1. Background of the Soft Component Plan

1-1 Basic Concept of the Project and Current Status of the Rescue Service

The Republic of Armenia (hereinafter referred to as “Armenia”) is a landlocked country situated in the Caucasus, covering 29,800 square kilometers (approximately one-thirteenth the area of Japan), with a population of approximately three million (2015 data of the Ministry of Foreign Affairs).

Armenia is a mountainous country situated on a seismic belt, prone to natural disasters such as earthquakes (in 1988, a magnitude 6.8 earthquake struck Lori causing twenty-five thousand deaths), landslides, floods, and meteorological disasters (hailstorms, windstorms, etc.). Therefore, reducing the risk of disasters is one of the priority issues of the state government. In 2012, the Armenian government formulated the National Strategy for Disaster Risk Reduction, which states that the construction of a disaster preparedness system is considered indispensable for the sustainable development of the nation. The Mid-Term Expenditure Framework 2014-2016 also cites improving the capacity of firefighting and rescue operations to save lives in emergencies as one of the prioritized issues.

The Rescue Service (hereinafter referred to as “RS”) was formed under the Ministry of Emergency Situations for firefighting and rescue operations and was reinforced in 2012 as part of the efforts to improve and expand the disaster preparedness system.

However, with a tight fiscal situation, the Government of Armenia has not been able to properly renew the old fire vehicles at the firefighting and rescue brigades (FFRBs), which are under the jurisdiction of RS. In particular, the fire vehicles in the regional areas are very decrepit, often breaking down and not able to fully function. Because of the lack of appropriate fire vehicles, it is not possible to provide sufficient firefighting and rescue services.

Among the regions, Shirak (with a population of about 360,000), Lori (330,000), and Syunik (160,000), in which are the target areas of this project, have the second- to fourth-largest cities after the state capital of Yerevan (Gyumri with a population of 160,000, Vanadzor 150,000, and Kapan 45,000, respectively). In recent years, these regional cities have seen an increase in population and rapid urbanization, due to an influx of people from rural areas. Accelerated construction of single-family and mid- to high-rise housing has led to a growing number of fires, and together with the frequent outbreak of bush fires, fire vehicles are dispatched more frequently in these regions than others.

These regions also have narrow and steep terrain and considerable differences in temperature, so the fire vehicles currently operating under these conditions suffer significant damage and wear. The replacement of these fire vehicles and establishing a better firefighting system as early as possible are pressing issues. As of April 2017, about 90% of the fire vehicles in these three marzes were first deployed when Armenia was part of the former Soviet Union and were manufactured over 25 years ago. The frequent breakdowns of the vehicles and their equipment, and the use of obsolete equipment not fully functioning, are hindering the firefighting and rescue operations.

In the Project for Improvement of Fire Fighting Equipment in Yerevan City (E/N concluded in 2009), 28 fire vehicles were provided. Through the soft component, manuals for efficient and effective firefighting and rescue operations using fire trucks and ladder trucks were prepared and technical

guidance was provided using these manuals. Consequently, the firefighting and rescue system in the capital city and its surrounding area improved significantly. However, as mentioned above, the regions remain problematic.

Under these circumstances, the Government of Armenia has positioned the improvement of firefighting capabilities in the Shirak, Lori and Syunik marzes as a priority issue and requested Japanese Grant Aid to procure new fire vehicles (the Project for the Improvement of Fire-Rescue Equipment, hereinafter referred to as "the Project").

The Project aims to provide new fire vehicles for the implementing agency, RS, enhancing the capacity of firefighting and rescue operations, protecting local residents and their property against fires and securing safety in the Shirak, Lori and Syunik marzes.

1-2 Soft Component in the Project for Improvement of Fire Fighting Equipment in Yerevan City

In the past, RS used firefighting manuals based on fire vehicles made in the former Soviet Union to conduct firefighting and rescue operations.

In 2009, an E/N was signed for the Project for Improvement of Fire Fighting Equipment in Yerevan City, and Japanese fire vehicles were procured through assistance from Japan. It was necessary to learn how to operate the new equipment, and the responses and operational skills to meet the different types of disasters had to be renewed. Recognizing the need to update the manuals from the days of the former Soviet Union as well as the need to relearn the handling of the equipment and firefighting skills, technical guidance was provided through the soft component.

The soft component was aimed at acquiring the knowledge and learning techniques necessary to carry out efficient and effective firefighting and rescue operations through the appropriate use of fire trucks and ladder trucks, to ensure the effective use of the equipment provided. In 2010, (1) manuals in Armenian for firefighting and rescue operations using fire vehicles and ladder trucks were created and (2) guidance was provided for the operation of the fire trucks/ladder trucks procured as well as for firefighting techniques and rescue operations using these trucks. The trainees in the soft component were mainly 422 firefighters from Yerevan City and 4 teaching staff from Crisis Management State Academy (CMSA). The benefits of this training can still be seen today at the operational level in the firefighting administration in Yerevan City, where firefighting equipment is efficiently and effectively used. The manuals created continue to be useful for education and training.

1-3 Needs for a Soft Component

The soft component in the Project for Improvement of Fire Fighting Equipment in Yerevan City primarily targeted the fire fighters based in the FFRBs in Yerevan, and it has been confirmed that no technical transfers were made to those firefighters (except for some executive officers) based in the FFRBs in the Shirak, Lori and Syunik marzes. The firefighters based in the FFRBs in the target areas of the Project lack experience in firefighting and rescue operations using Japanese fire vehicles. In addition, the fire vehicles to be provided are significantly different from those made in the former

Soviet Union in terms of structure and performance, therefore, the soft component is necessary to ensure the safe and efficient utilization of the fire vehicles when introduced. To further enhance and sustain the benefits of this assistance, it is important that the soft component provides operational guidance, by experts with considerable experience and track records with regard to firefighting and rescue operations, including the operation of fire trucks and ladder trucks, in addition to initial operation training by the manufacturer, so that efficient and effective use of the firefighting equipment is established.

1-4 Contents of the Necessary Technical Guidance

As outlined in 1-1 Basic Concept of the Project and Current Status of the Rescue Service, most fire vehicles currently used in the target areas of the Project are significantly lacking in functionality and performance and are also markedly different from the fire vehicles to be provided by the Project in terms of vehicle structure, firefighting equipment and driving performance, etc. In particular, the operational procedures of the safety devices, extinguishing fire by discharging water from the basket at the top of the ladder or by entering the buildings, and methods to promptly rescue people trapped in mid- to high-level floors are very different between the current and new ladder trucks, which makes it essential to learn the proper operational skills.

Therefore, supervision of the manual revision and technical guidance will be provided for the items mentioned in 5-4 Soft Component Action Items to enable safe and effective use of the newly procured equipment. These items can be summarized as follows:

- Revision of manuals for firefighting and rescue operations using fire vehicles and ladder trucks
- Technical guidance for efficient and effective firefighting and rescue operations using fire trucks and ladder trucks to be procured in the Project

2. Objectives of the Soft Component

As discussed earlier, the outcomes of the soft component implemented in the Project for Improvement of Fire Fighting Equipment in Yerevan City are diffused among the CMSA teaching staff and the firefighters based in Yerevan. As it was confirmed that there were sustainable improvements, the transfer of knowledge and techniques to the firefighters in the target three regions (Shirak, Lori and Syunik) aims to equip them with skills equivalent to those in the Yerevan project. The target group of the technical transfer is approximately 120 firefighters based in the three target marzes.

There are three specific objectives as listed below:

- The manuals are revised (supplementary version) for continued use
- Prompt and efficient firefighting operations can be performed using the fire trucks
- Firefighting and rescue operations can be performed efficiently from high places using the ladder truck

3. Outcomes of the Soft Component

3-1 Manual Revision for Continuous Firefighting and Rescue Operations

The following listed manuals in Armenian were produced in the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City and are still used as official teaching materials at the CMSA.

- Fire equipment operation manual (fire tank engine)
- Fire equipment technical manual (fire tank engine)
- Fire equipment operation manual (ladder truck)
- Fire equipment technical manual (ladder truck)

As the fire vehicles to be procured in the Project have new functions that are not found in the fire equipment procured in the previous project, the four manuals must be partially revised and supplemented by 2019, when the Project is scheduled to be completed.

Accordingly, in the soft component of the Project it is important to revise and expand the existing manuals on safety management and firefighting techniques with a focus on the new functions, and to enable firefighters in the three target regions to establish and carry on operational skills through technical guidance.

3-2 Improvement of the Fire Truck Operations and Firefighting Techniques

Trainees will learn maintenance and inspection methods necessary to use fire trucks continuously, and will be able to safely, promptly, and efficiently perform operations including evacuation guidance for ordinary citizens at the fire scene, vehicle placement, collaboration between two fire trucks or between fire trucks and ladder trucks, securing water sources for extinguishing the fire, firefighting and water discharging methods, and rescue activities.

3-3 Improvement of Ladder Truck Operation Techniques

Trainees will learn maintenance and inspection methods necessary to use ladder trucks continuously, as well as skills for relaying firefighting water from the fire truck, raising/extending/turning the ladder, firefighting by discharging water from the basket at the top of the ladder or by entering into the buildings, and for rescue operations to promptly rescue people trapped on mid- to high-level floors, so that firefighting and rescue activities can be carried out safely, promptly and efficiently, according to the type, scale, and risk level of the fire.

Incorrect operations with the ladder trucks can cause serious accidents involving firefighters and citizens, for example, falls from heights or the vehicle toppling over, so the improvement in operation techniques can secure safety during ladder operations (in particular, the series of operations to ensure the stability of the vehicle when extending the ladder and to set up the ladder for access to the building). Trainees will also learn to operate the ladder with an understanding of the operational limits in case the safety devices are malfunctioning.

4. Evaluation of the Outcome Achievement Level

In order to continue to use the fire vehicles efficiently and safely over a long period, the manuals created in the previous project must be reviewed and revised to meet practical needs. To this end, the fire vehicles to be procured in the Project will be compared with the Japanese fire vehicles deployed in Yerevan to identify similarities and differences in structure, performance, and functionality, in order to create revised manuals with updates on operation and safety management methods.

When creating the revised manuals, documents from the Japanese manufacturers and the Fire and Disaster Management Agency of Japan must be translated accurately into Armenian. Several translation agencies in Armenia will be employed for cross-checking the translation. In addition, Japanese experts specialized in fire services will supervise the revision, incorporating input from the RS executive officers, CMSA teaching staff, and firefighters of the three target regions to further the accuracy of the translation. These manuals are planned to be used in the classroom lectures during the soft component of the Project. As shown below, there will be tests before and after the lectures. Furthermore, the trainees will be asked to answer questionnaires, and if the manuals are found to contain unclear material, corrections will be made so that future training can be more effective.

The level of technical transfer achieved will be evaluated using the methods and criteria shown in Table 1. Achievement is determined through written tests, and trainees are required to score 90 or above in order to pass the test. Action will be taken for trainees with scores below this mark, such as additional classroom lectures/training provided by RS.

The target skill levels and the test schedules to evaluate the outcome achievement level are shown in Table 1.

As for the responsibilities of the parties involved, the firefighting techniques instructor (fire truck) and the firefighting techniques instructor (ladder truck) will give classroom lectures, then the technical guidance assistant (firefighting) will administer the tests and analyze the level of achievement. The test questions will be developed through discussions with the firefighting techniques instructors (fire truck) and (ladder truck), and aligned with the instructor team in RS. The contents of the test and the test results will always be reported to the responsible person in the Project representing RS by the technical guidance assistant (firefighting).

Table 1 Outcome Achievement Criteria and Evaluation Methods (draft)

	Fire Vehicle		Outcome Evaluation Method	
	Technical Guidance (Fire Truck)	Technical Guidance (Ladder Truck)	Evaluation Method	Evaluation Criteria
Classroom Lecture	Firefighting tactics and operations for mid- to high-rise buildings (common)		Tests before and after lecture	Must score 90 or above to pass
	Fundamental principles of firefighting operations and safety management (common)			
	Dispatch, securing water source, relaying water, preparing for water discharge, operations management (common)			
Virtual Training in Classroom	Operations at mid- to high-rise buildings (common)		Tests before and after lecture for each fire vehicle	Must score 90 or above to pass
	Cooperation between multiple firefighting teams (common)			
Practical Training	Operation and management of fire pump systems	Operation from the console on the ladder or basket	Tests before and after lecture for each fire vehicle	Must score 90 or above to pass
	Water supply from natural water sources or fire hydrants	Learning safe, basic operations		
	Loading hoses onto the hose truck and extending the hoses, checking the pump pressure when discharging water	Operation near the limit and confirming the activation of safety device		
	Supplying water to ladder trucks	Coordinated operation between the truck operator and the firefighter in the basket		
	Relaying water supply between pump trucks, appropriate pressure, how to use the gun nozzle	Receiving water supply from the fire truck and discharging water		
	How to use a three-section ladder, generator, combine cutter and monitor nozzle	Water discharge using monitor nozzle from the basket		
	How to use an engine cutter and breathing apparatus, test operation of radio equipment	Refamiliarization training for safe operations		
	—	Safe maintenance of ladder trucks (for mechanics)		

5. Soft Component Activities (Input Plan)

5-1 Summary of Soft Component Activities

The soft component in the Project will basically reference the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City, taking into consideration the specific geographic conditions of the target areas in the training, such as the narrow and steep terrain and the cold climate.

The soft component activities will be conducted with focus on the matters described later in this section. The soft component can be roughly divided into manual revision and technical guidance.

The soft component of the Project will be conducted under the scheme shown in Figure 1.

As mentioned earlier, the outcomes of the soft component implemented in the Project for Improvement of Fire Fighting Equipment in Yerevan City were diffused among the firefighters based in Yerevan and the CMSA teaching staff. A team comprised of members selected from the recipients of this technical transfer will play a central role in the revision of the current manuals and in providing technical guidance (soft component) to the firefighters at the FFRBs in Shirak, Lori and Syunik as well as the junior RS personnel and CMSA teaching staff.

The Japanese experts specialized in fire service (the consultant) will oversee the manual revision,

supervise the technical guidance to ensure that appropriate guidance is given, and provide advice as necessary.

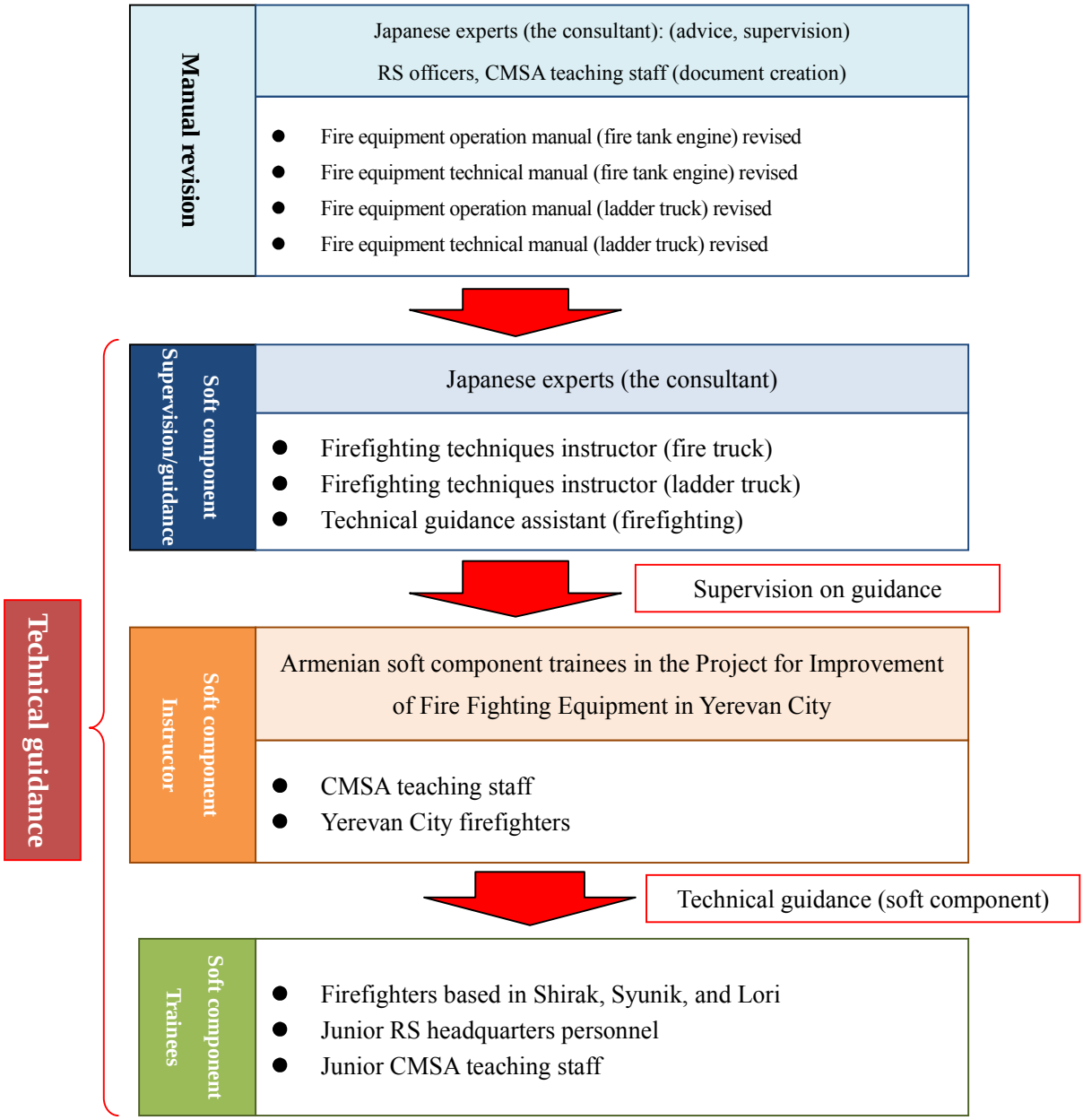


Figure 1　Soft Component Implementation Scheme

(1) Manual revision for continued firefighting and rescue operations

The four manuals created in the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City (Fire equipment operation manual (fire tank engine), Fire equipment technical manual (fire tank engine), Fire equipment operation manual (ladder truck), Fire equipment technical manual (ladder truck)) will be used as the base to prepare revised editions of these manuals properly covering new functions and operation methods with regard to the fire vehicles to be procured in the Project. RS will play a central role in the actual revision, with Japanese experts specialized in

fire service (the consultant) supervising the revision. This will encourage RS to have maximum self-reliance and ensure that the revision takes into consideration the natural conditions and disaster situations in the target regions.

(2) Fire truck operations and firefighting techniques

Most of the fire trucks currently deployed in the target regions are not used in an efficient manner, because they are often breaking down and unable to provide sufficient firefighting and rescue services. In addition, malfunctioning pumps and other equipment of the fire vehicles reduce the water discharge performance of these vehicles. The firefighters are using what equipment they have on hand to provide firefighting and rescue services. For example, because the fire pumps are lacking in pressure, the firefighters must take risks to get as close to the building on fire as possible in firefighter suits that do not have sufficient heat resistance.

The fire trucks to be procured in the Project have high-pressure water discharge and can also relay water supply to other fire trucks. The equipment provided on the fire trucks is also significantly better both in terms of performance and functionality when compared with the current ones.

(3) Ladder truck operation techniques

The old ladder trucks owned by RS can not sufficiently fulfill their roles as ladder trucks; in addition, their safety devices and outriggers are not functioning properly. Also, the ladders are not equipped with baskets on their tips, which makes it impossible to conduct firefighting and rescue operations safely. In addition to baskets, there are no monitor nozzles, and firefighters have to make do with the hose equipment on hand, exposing themselves to the risk of falling caused by the push-back of the hose conveying water.

The ladder trucks to be procured in the Project are equipped with baskets, each with a monitor nozzle, and will improve the safety of firefighters significantly. Nevertheless, the skills for effectively using the equipment while also securing safety must be learned and established through technical guidance.

5-2 Skills Required for the Soft Component

Experts must satisfy the requirements in Table 2 in order to carry out the soft component.

Table 2 Skills Required to Carry Out the Soft Component

Personnel	Required skills
Firefighting techniques instructor (fire truck)	Has experience in firefighting/rescue operations using fire trucks equipped with tanks in Japan or in a third country, and has knowledge regarding firefighting tactics.
Firefighting techniques instructor (ladder truck)	Has experience in firefighting/rescue operations using ladder trucks with a ladder of 25 meters or more in Japan or in a third country, and is thoroughly knowledgeable in firefighting tactics.

5-3 Participants of the Soft Component (trainees)

(1) Local firefighters in the three marzes

Approximately 120 trainees will be chosen from 18 FFRBs in the Shirak, Lori and Syunik marzes. The trainees from each FFRB will form a team of six to seven in accordance with actual firefighting operations, comprising the leader, fire truck operator, ladder truck operator and firefighters.

Japanese experts specialized in fire service will provide technical guidance for RS instructors (several trainees of the past soft component) for manual revision and provide assistance in technical training to secure RS's self-reliance.

(2) RS headquarter personnel and CMSA teaching staff

Among the members involved in the fire service education in Armenia, RS headquarters personnel and CMSA teaching staff who did not receive guidance under the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City (approximately five people) will be selected preferentially.

Instructing the CMSA teaching staff enables the use of revised manuals for training younger professionals who will be responsible for firefighting and rescue operations in Armenia in the future.

5-4 Soft Component Action Items

In order to prevent accidents due to human error such as failing to confirm safety or skipping procedures, the Project will not only review the soft component implemented in 2010 and the current manuals, but also present proposals on any additional operational guidance on fire vehicles deemed necessary and will also create the manuals with attention to safety.

Classroom lectures and practical training will be planned, making effective use of both current and new manuals.

To be specific, the topics in Table 3 will be incorporated into the revised manuals and practical training.

Table 3 Soft Component Action Items (Summary)

Manual revision

1. Evaluate current manual (sort into usable material and otherwise)

2. Revise manuals

- Fire equipment operation manual (fire tank engine) revised
- Fire equipment technical manual (fire tank engine) revised
- Fire equipment operation manual (ladder truck) revised
- Fire equipment technical manual (ladder truck) revised

Technical guidance

	Fire Vehicle		Remarks
	Technical Guidance (Fire Truck)	Technical Guidance (Ladder Truck)	
Classroom Lecture	Firefighting tactics and operations for mid- to high-rise buildings (common)		Utilize previous soft component
	Fundamental principles of firefighting operations and safety management (common)		Utilize previous soft component
	Dispatch, securing water source, relaying water, preparing for water discharge, operations management (common)		Utilize previous soft component
Virtual Training in Classroom	Operations at mid- to high-rise buildings (common)		Utilize previous soft component and provide additional guidance
	Cooperation between multiple firefighting teams (common)		Utilize previous soft component and provide additional guidance
Practical Training	Operation and management of fire pump systems	Operation from the console on the ladder or basket	Utilize previous soft component and provide additional guidance
	Water supply from natural water sources or fire hydrants	Learning safe, basic operations	Utilize previous soft component
	Loading hoses onto the hose truck and extending the hoses, checking the pump pressure when discharging water	Operation near the limit and confirming the activation of safety device	Utilize previous soft component and provide additional guidance
	Supplying water to ladder trucks	Coordinated operation between the truck operator and the firefighter in the basket	Utilize previous soft component and provide additional guidance
	Relaying water supply between pump trucks, appropriate pressure, how to use the gun nozzle	Receiving water supply from the fire truck and discharging water	Utilize previous soft component
	How to use a three-section ladder, generator, combine cutter and monitor nozzle	Water discharge using monitor nozzle from the basket	Utilize previous soft component and provide additional guidance
	How to use an engine cutter and breathing apparatus, test operation of radio equipment	Refamiliarization training for safe operations	Utilize previous soft component and provide additional guidance
	—	Safe maintenance of ladder trucks (for mechanics)	Utilize previous soft component and provide additional guidance

5-5 Soft Component Implementation Resources

Implementation personnel for the soft component includes Japanese experts specialized in fire service and RS personnel. The reason why RS personnel are included is as described under 6. Procurement of Soft Component Implementation Resources.

In the soft component of the Project, RS personnel will act as instructors to directly provide technical guidance to the firefighters of the target areas (as well as junior RS headquarters personnel and junior CMSA teaching staff). The Japanese experts will provide assistant support as well as supervisory guidance to the technical transfer activities led by RS instructors.

Note that local interpreters/translators shown under (3) below will be employed for the creation and verification of the revised manual in the Armenian language.

(1) Japanese experts specialized in fire service

Japanese personnel dispatched from the Japanese consulting firm and the dispatch period is as shown in Tables 4 and 5.

As a general rule, the Japanese experts will have experience in firefighting services and will be ranked as Grade Three.

Table 4 Japanese Personnel Dispatched (Work in Armenia)

Personnel	Description	Dispatch period
Technical guidance assistant (firefighting) (Grade 3)	(1) Assistant tasks: The soft component will provide technical guidance to firefighters of 18 FFRBs in 3 regions. There will be about 10 groups of trainees in one session, so it will be difficult to provide supervision by only two persons, the firefighting techniques instructors (fire truck) and (ladder truck). For this reason, the technical guidance assistant (firefighting) will assist supervision of technical guidance receiving instructions from the two instructors. (2) Coordination: Tasks such as making arrangements with RS during the soft component period and preparation of documents. (3) Safety management during the technical guidance period: Handles safety management during the technical guidance period. In particular, holds discussions with the firefighting techniques instructor (ladder truck) on safety management for measures to make sure there are no accidents during guidance on operations at height using ladder trucks. (4) Reporting to the RS executive officers and CMSA staff: Gives the final report to the RS executive officers and CMSA staff	35 days (1.17 M/M)

	in the latter half of the technical guidance, to wrap up the soft component.	
Firefighting techniques instructor (fire truck) (Grade 3)	Supervises guidance on fire truck operations and firefighting techniques.	44 days (1.47 M/M)
Firefighting techniques instructor (ladder truck) (Grade 3)	Supervises guidance on ladder truck techniques and operations.	46 days (1.53 M/M)

Table 5 Japanese Personnel (Work in Japan)

Personnel	Description	Work period
Technical guidance assistant (firefighting) (Grade 3)	Organizes electronic data of the manuals currently used by RS and discusses necessary revisions with the firefighting techniques instructors (fire truck) and (ladder truck). Also performs task coordination.	2 days (0.10 M/M)
Firefighting techniques instructor (fire truck) (Grade 3)	Analyzes manuals (fire truck) currently used by RS and participates in discussions.	3 days (0.15 M/M)
Firefighting techniques instructor (ladder truck) (Grade 3)	Analyzes manuals (ladder truck) currently used by RS and participates in discussions.	3 days (0.15 M/M)

(2)Armenian personnel

The Armenian personnel listed below will take the initiative in creating the revised manuals and will also work with the Japanese experts and local interpreters/translators to cross-check the manuals including checking for errors in translation. As for practical training, selected instructors will directly provide technical guidance to the firefighters in the target area under the supervision of Japanese experts. Selection of these personnel will be made as shown in Table 6, through discussions with the

RS personnel of the Project.

Table 6 Armenian Personnel

Personnel	Description	Period
RS headquarters personnel	Executive officers who received training in the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City	As necessary
CMSA teaching staff	Teaching staff who received training in the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City	As necessary
Others (Yerevan City firefighters, etc.)	Firefighters who received training in the soft component of the Project for Improvement of Fire Fighting Equipment in Yerevan City and are currently using Japanese fire vehicles	As necessary

(3) Support staff

Local engineers will be employed as support staff for the soft component, also acting as personnel in charge of Armenian interpreting/translation. Their responsibilities and employment periods are shown in Table 7.

Table 7 Locally Hired Engineers (Interpreters/Translators)

Personnel	Description	Period
Technical support staff 1 (interpreter)	Assists and interprets for the Japanese firefighting techniques instructor (fire truck) and works on the translation of the manuals	34 days
Technical support staff 2 (interpreter)	Assists and interprets for the Japanese firefighting techniques instructor (ladder truck) and works on the translation of the manuals	36 days
Driver	For the transportation of the technical guidance assistant (1 person), firefighting techniques instructors (2 persons) and interpreters (2 persons) between the training site and RS headquarters.	40 days

5-6 Soft Component Implementation Method

In the first half of the soft component of the Project, the Japanese experts and local technical support staff, four in total, will work on revising the current manuals.

The revision is expected to be completed by the time the procured equipment arrives in Armenia and initial operation training is given by the manufacturer. In the technical guidance, the same lectures and training will be given twice. This is because the trainees are firefighters selected from the FFRBs in

the three target regions, and gathering and training all at the same time in Yerevan City causes the risk of hindering firefighting and rescue operations in case major disasters or any other emergencies occur in the regions. This can be avoided by providing two sessions each for every lecture and practical training to spread the risks related to firefighting and disaster prevention.

The draft schedule for the soft component is shown in Table 8.

Table 8 Soft Component Implementation Plan (draft)

Total number of days			Technical guidance assistant (firefighting)				Firefighting techniques instructor (fire truck)				Firefighting techniques instructor (ladder truck)				Local hire		
			3	32	35		3	41	44		3	43	46		34	36	40
			Travel (return trip)		Soft component	Total (days)	Travel (return trip)		Soft component	Total (days)	Travel (return trip)		Soft component	Total (days)	Total (days)	Total (days)	Total (days)
49	Sat		35	Arrive in Japan													
48	Fri		34	Return to Japan; departure from Yerevan													
47	Thu		33	Wrap-up with RS executive officers and CMSA staff			44	Arrive in Japan									
46	Wed		32	Evaluation of outcome achievement level (test)			43	Return to Japan; departure from Yerevan			46	Arrive in Japan					
45	Tue		31	Evaluation of outcome achievement level (test)			42	Practical training 2nd session	How to use an engine cutter and breathing apparatus, test operation of radio equipment		45	Practical training 2nd session	Return to Japan; departure from Yerevan		34 days (not including Sundays)		
44	Mon		30				41		How to use a three-section ladder, generator, combine cutter and monitor nozzle		44		Refamiliarization training for safe operations			36 days (not including Sundays)	
43	Sun		29				40				43						
42	Sat		28	Final confirmation on the manual contents with RS			39		Relaying water between pump trucks; appropriate pressure; how to use the gun nozzle		42		Water discharge using monitor nozzle from the basket				
41	Fri		27	Discussion on the manual contents with RS			38		Supplying water to ladder trucks; discharging water		41		Receiving water supply from the fire tank engine and discharging water				
40	Thu		26	Supervision and support during practical training			37		Loading the hose onto the hose truck; extending the hose; checking the pump pressure when discharging water		40		Coordinated operation between the truck operator and the firefighter in the basket				
39	Wed		25	Supervision and support during practical training			36		Specification/performance of the equipment on the truck; operation methods and function checks		39		Operation near the limit and confirming the activation of safety device				
38	Tue		24	Supervision and support during practical training			35		Water supply from natural water sources or fire hydrants		38		Learning basic operations				
37	Mon		23	Supervision and support during practical training			34		Operation and management of fire pumps		37		Operation from the console on the ladder or basket				
36	Sun		22				33				36						
35	Sat		21	Supervision and support during virtual training in the classroom			32	Virtual Training in Classroom 2nd session	Cooperation between multiple firefighting teams (pump truck, ladder truck)		35	Virtual Training in Classroom 2nd session	Cooperation between multiple firefighting teams (pump truck, ladder truck)				
34	Fri		20	Supervision and support during virtual training in the classroom			31		Operations at mid- to high-rise buildings		34		Operations at mid- to high-rise buildings				
33	Thu		19	Analysis on the lecture contents with RS			30	Classroom lectures 2nd session	Dispatch, securing water source, relaying water, preparing for water discharge, operations management		33	Classroom lectures 2nd session	Dispatch, securing water source, relaying water, preparing for water discharge, operations management				
32	Wed		18	Analysis of outcome achievement level evaluation (test) results			29		Fundamental principles of firefighting operations and safety management		32		Fundamental principles of firefighting operations and safety management				
31	Tue		17	Evaluation of outcome achievement level (test)			28		Firefighting tactics and operations for mid- to high-rise buildings		31		Firefighting tactics and operations for mid- to high-rise buildings				
30	Mon		16	Evaluation of outcome achievement level (test)			27	Practical training 1st session	How to use an engine cutter and breathing apparatus, test operation of radio equipment		30		Safe maintenance of ladder trucks (for mechanics)				
29	Sun		15				26				29						
28	Sat		14	Supervision and support during practical training			25		How to use a three-section ladder, generator, combine cutter and monitor nozzle		28	Practical training 1st session	Refamiliarization training for safe operations				
27	Fri		13	Supervision and support during practical training			24		Relaying water between pump trucks; appropriate pressure; how to use the gun nozzle		27		Water discharge using monitor nozzle from the basket				
26	Thu		12	Supervision and support during practical training			23		Supplying water to ladder trucks; discharging water		26		Receiving water supply from the fire tank engine and discharging water				
25	Wed		11	Supervision and support during practical training			22		Loading the hose onto the hose truck; extending the hose; checking the pump pressure when discharging water		25		Coordinated operation between the truck operator and the firefighter in the basket				
24	Tue		10	Supervision and support during practical training			21		Specification/performance of the equipment on the truck; operation methods and function checks		24		Operation near the limit and confirming the activation of safety device				
23	Mon		9	Supervision and support during practical training			20		Water supply from natural water sources or fire hydrants		23		Learning basic operations				
22	Sun		8				19				22						
21	Sat		7	Supervision and support during practical training			18		Operation and management of fire pumps		21		Operation from the console on the ladder or basket				
20	Fri		6	Final confirmation on the manual contents with RS			17	Virtual Training in Classroom 1st session	Cooperation between multiple firefighting teams (pump truck, ladder truck)		20	Virtual Training in Classroom 1st session	Cooperation between multiple firefighting teams (pump truck, ladder truck)				
19	Thu		5	Supervision and support during virtual training in the classroom			16		Operations at mid- to high-rise buildings		19		Operations at mid- to high-rise buildings				
18	Wed		4	Manual revision, integration			15	Classroom lectures 1st session	Dispatch, securing water source, relaying water, preparing for water discharge, operations management		18	Classroom lectures 1st session	Dispatch, securing water source, relaying water, preparing for water discharge, operations management				
17	Tue		3	Manual revision, integration			14		Fundamental principles of firefighting operations and safety management		17		Fundamental principles of firefighting operations and safety management				
16	Mon		2	Supervision and support during classroom lecture			13		Firefighting tactics and operations for mid- to high-rise buildings		16		Firefighting tactics and operations for mid- to high-rise buildings				
15	Sun		1	Japan to Moscow			12	Manual revision			15	Manual revision					
14	Sat						11		Create lecture materials with RS: 8th day (operation/management of fire tank engines (2))		14		Create lecture materials with RS: 11th day (basic mechanics)				
13	Fri						10		Create lecture materials with RS: 7th day (operation/management of fire tank engines (1))		13		Create lecture materials with RS: 10th day (case examples of breakdown and damage of ladder trucks)				
12	Thu						9		Create lecture materials with RS: 6th day (fire pump troubleshooting)		12		Create lecture materials with RS: 9th day (basic rules of ladder truck operation)				
11	Wed						8		Create lecture materials with RS: 5th day (firefighting operations using fire tank engines (3))		11		Create lecture materials with RS: 8th day (operation/management of ladder trucks (2))				
10	Tue						7		Create lecture materials with RS: 4th day (firefighting operations using fire tank engines (2))		10		Create lecture materials with RS: 7th day (operation/management of ladder trucks (1))				
9	Mon						6		Create lecture materials with RS: 3rd day (firefighting operations using fire tank engines (1))		9		Create lecture materials with RS: 6th day (ladder truck troubleshooting)				
8	Sun						5				8						
7	Sat						4		Create lecture materials with RS: 2nd day (sort revisions necessary in the current manuals)		7		Create lecture materials with RS: 5th day (firefighting operations using ladder trucks (3))				
6	Fri						3		Create lecture materials with RS: 1st day (sort revisions necessary in the current manuals)		6		Create lecture materials with RS: 4th day (firefighting operations using ladder trucks (2))				
5	Thu						2	Arrive in Yerevan; visit the Japanese embassy; meeting with RS to confirm working direction			5		Create lecture materials with RS: 3rd day (firefighting operations using ladder trucks (1))				
4	Wed						1	Japan to Moscow			4		Create lecture materials with RS: 2nd day (sort revisions necessary in the current manuals)				
3	Tue										3		Create lecture materials with RS: 1st day (sort revisions necessary in the current manuals)				
2	Mon										2	Arrive in Yerevan; visit the Japanese embassy; meeting with RS to confirm working direction					
1	Sun										1	Japan to Moscow					
															Engineer (fire truck)	Engineer (ladder truck)	Driver (minibus)

40 days (not including Sundays)

15

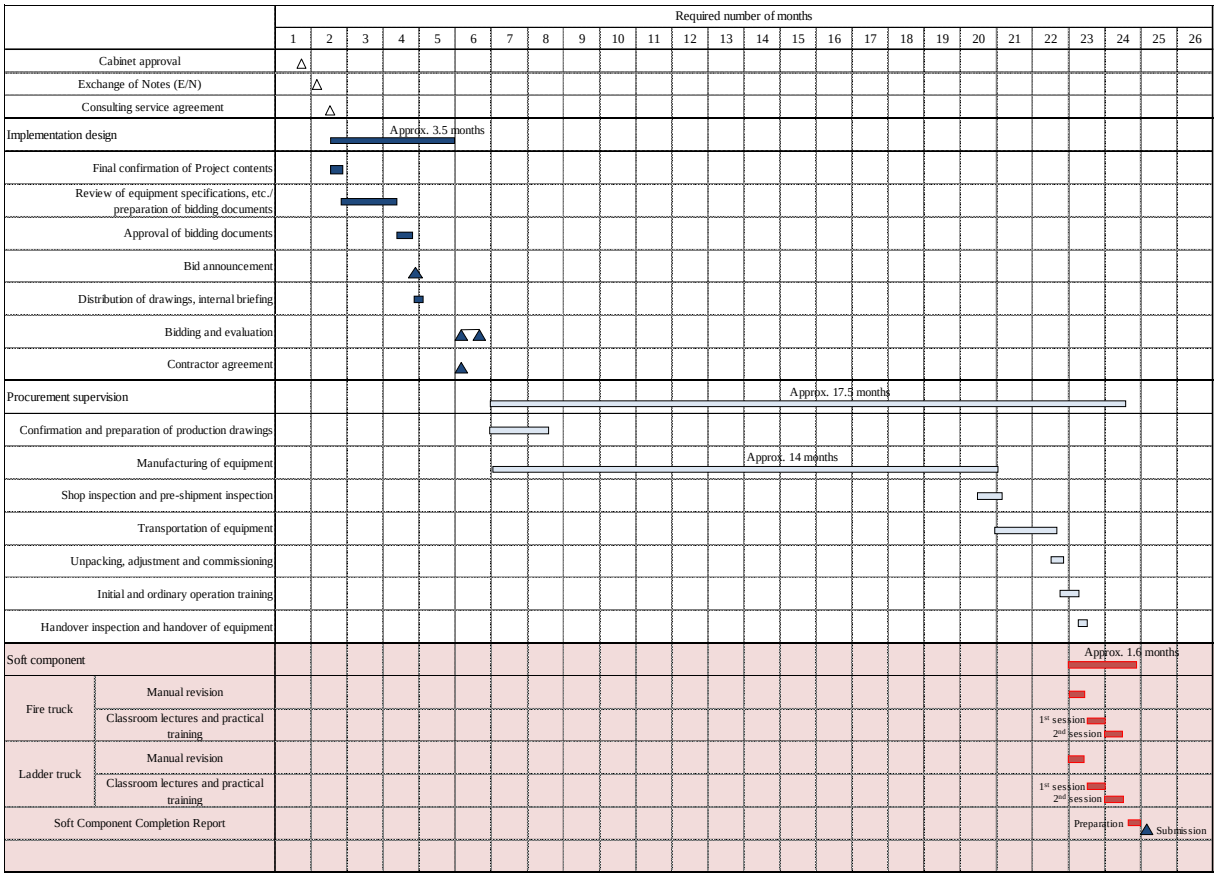
6. Procurement of Soft Component Implementation Resources

The techniques transferred by the soft component are those of firefighting and rescue experts with considerable knowledge of fire vehicles. Therefore, the soft component will basically take the form of "direct support" by the Japanese consultant. However, the consultant will be supervising and providing advice for the technical transfer, to fully utilize the firefighting and rescue skills in RS, accumulated and passed on through the previous soft component provided by Japan.

7. Soft Component Implementation Schedule

The implementation schedule of the Project and its soft component are shown in Table 9.

Table 9 Project and Soft Component Implementation Schedule (draft)



8. Deliverables of the Soft Component

The soft component of the Project will produce the following deliverables:

- Progress Report
- Firefighting training manuals (revised) (total of four manuals)
- Lecture materials
- Collected materials
- Soft Component Completion Report

8-1 Soft Component Completion Report

The Soft Component Completion Report will be created based on the "Soft Component Guidelines (Third Edition)". A Soft Component Implementation Status Report may be submitted to the Government of Armenia and JICA as necessary. The languages used are Armenian and Japanese.

8-2 Progress Report

The Progress Report is submitted to the Government of Armenia after confirming the progress status. The language used is Armenian.

8-3 Training Manuals for the Firefighters

As discussed in 5-1 (1) Manual revision for continued firefighting and rescue operations, the current manuals will be revised and be part of the deliverables. The manuals listed below will be revised. The language used is Armenian.

Main revisions expected are supplementary material to cover the new equipment and anti-freezing measures. In particular, ladder trucks with a different structure from the current trucks may be procured as a result of the bidding, in which case, new material needs to be added to cover the new equipment.

- Fire equipment operation manual (fire tank engine) revised
- Fire equipment technical manual (fire tank engine) revised
- Fire equipment operation manual (ladder truck) revised
- Fire equipment technical manual (ladder truck) revised

8-4 Lecture Materials

The above manuals will be used as lecture materials. Supplementary materials introducing actual cases from the experience of the Fire and Disaster Management Agency in Japan may also be used. The language used is Armenian.

8-5 Collected Materials

Photos taken and materials collected during the soft component will be compiled to be a part of the deliverables. The language used is Armenian.

9. Soft Component Cost Estimation

Estimated cost required for the soft component is shown in Table 10.

Table 10 Soft Component Cost Estimation

(Unit: yen)

Soft Component Costs (1)+(2)+(3)	16,400,360
(1) Direct labor cost	3,975,900
(2) Direct expenses	4,154,588
(3) Indirect expenses	8,269,872

10. Responsibilities of the Recipient Country

10-1 Obligations of the Recipient Country during Soft Component Implementation

The obligations of the recipient country in the soft component are as follows:

- Securing classrooms and training space for the soft component. The training site should include facilities for ladder truck training (including safety management)
- Selection of trainees
- Travel and other expenses for the trainees
- Water, extinguishing agents, fuel required for the training
- Selection of instructors from RS

10-2 Obligations of the Recipient Country after Soft Component Implementation

The manuals created during the soft component in the Project for Improvement of Fire Fighting Equipment in Yerevan City are still used in RS today for the education and training of firefighters. In particular, CMSA continues to use these manuals as official textbooks. The various materials and implementations in this soft component will be treated in the same manner as the previous soft component.

The technical guidance and revised manuals provided through the soft component of the Project can be expected to be officially transferred to RS and CMSA and continued to be used to contribute to improving the skills of the firefighters.

6. References

6.1 Photographs of the current conditions of garages in all FFRBs (18 FFRBs) of target areas

Photographs of exterior of garages in all FFRBs (18 FFRBs) of the target areas are shown below.

6.1.1 Shirak (6 FFRBs)

	
No.48 Gyumri FFRB	No.49 Artik FFRB
	
No.50 Amasia FFRB	No.51 Maralik FFRB
	
No.52 Ashotsk FFRB	No.53 Akhuryan FFRB

6.1.2 Lori (7 FFRBs)

No.37 Vanadzor（East）FFRB

No.38 Vanadzor（West）FFRB

No.39 Gugark FFRB

No.40 Alaverdi FFRB

No.41 Stephanavan FFRB

No.42 Spitak FFRB

No.43 Tashir FFRB

6.1.3 Syunik (5 FFRBs)

No.54 Kapan FFRB

No.55 Goris FFRB

No.56 Meghri FFRB

No.57 Sisian FFRB

No.58 Kajaran FFRB