

CIVIL DEFENCE  
THE HASHEMITE KINGDOM OF JORDAN

No. 1

BASIC DESIGN STUDY REPORT  
ON  
PROJECT FOR IMPROVEMENT OF EQUIPMENT  
FOR FIRE FIGHTING SERVICES  
IN  
THE HASHEMITE KINGDOM OF JORDAN

JCA LIBRARY



J 1145072 (3)

JAPAN INTERNATIONAL CO-OPERATION AGENCY

THE PROTECTION OF CULTURAL AND ART CENTER OF JAPAN

GPI

55-246

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR FIRE FIGHTING SERVICES IN THE HASHEMITE KINGDOM OF JORDAN

07  
28  
PT







**CIVIL DEFENCE  
THE HASHEMITE KINGDOM OF JORDAN**

**BASIC DESIGN STUDY REPORT  
ON  
THE PROJECT FOR IMPROVEMENT OF EQUIPMENT  
FOR FIRE FIGHTING SERVICES  
IN  
THE HASHEMITE KINGDOM OF JORDAN**

**FEBRUARY 1998**

**JAPAN INTERNATIONAL COOPERATION AGENCY  
FIRE PROTECTION EQUIPMENT AND SAFETY CENTER OF JAPAN**

## PREFACE

In response to a request from the Government of the Hashemite Kingdom of Jordan, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Equipment for Fire Fighting Services in the Hashemite Kingdom of Jordan and entrusted the study to the Japan International Cooperation Agency(JICA).

JICA sent to Jordan a study team from 23rd October to 26th November, 1997.

The team held discussions with the officials concerned of the Government of Jordan, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Jordan in order to discuss a draft basic design, and as this result, 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.

I wish to express my sincere appreciation to the officials concerned of the Government of the Hashemite Kingdom of Jordan for their close cooperation extended to the teams.

February, 1998



Kimio Fujita

President

Japan International Cooperation Agency

February, 1998

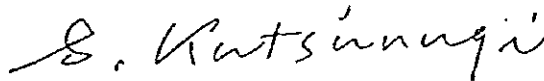
## LETTER OF TRANSMITTAL

We are pleased to submit to you the basic design study report on the Project for Improvement of Equipment for Fire Fighting Services in the Hashemite Kingdom of Jordan.

This study was conducted by Fire Protection Equipment and Safety Center of Japan, under a contract to JICA, during the period from 13th October, 1997 to 27th February, 1998. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Jordan and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

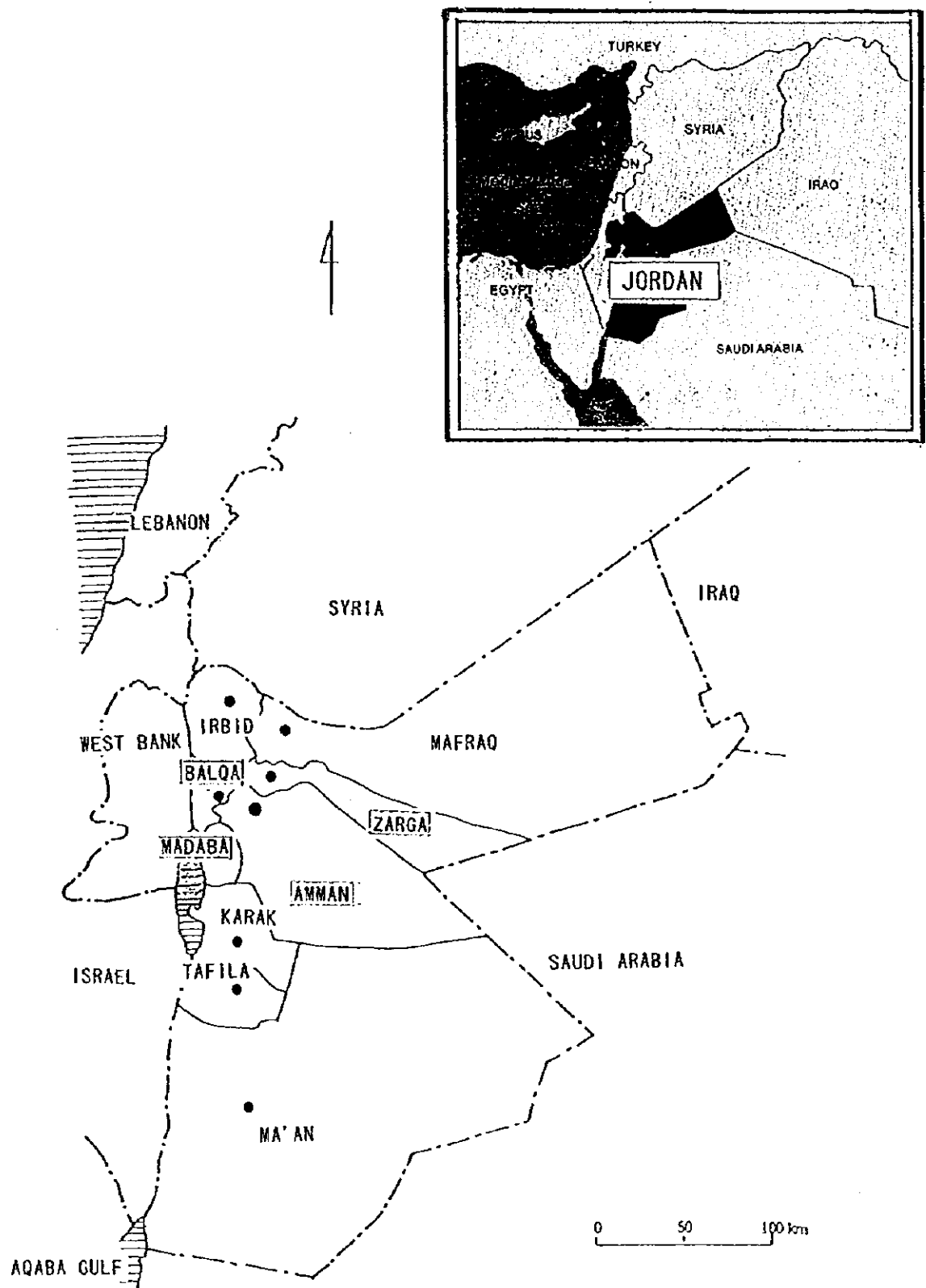


Satoru Kutsunugi

Project Manager

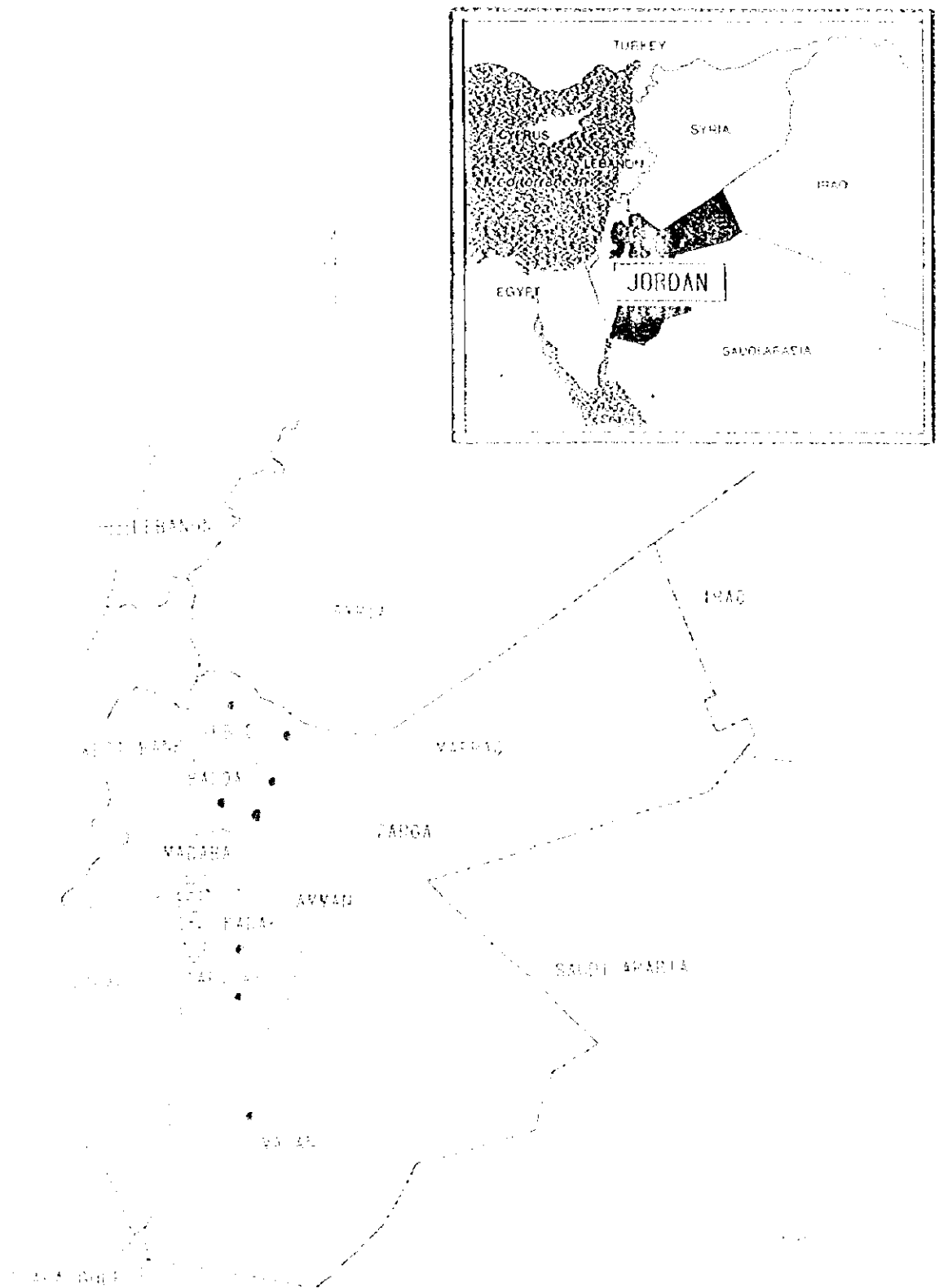
Basic design study team on the Project for  
Improvement of Equipment for Fire Fighting Services  
in the Hashemite Kingdom of Jordan  
Fire Protection Equipment and Safety Center of Japan

## Location Map of the Hashemite Kingdom of Jordan

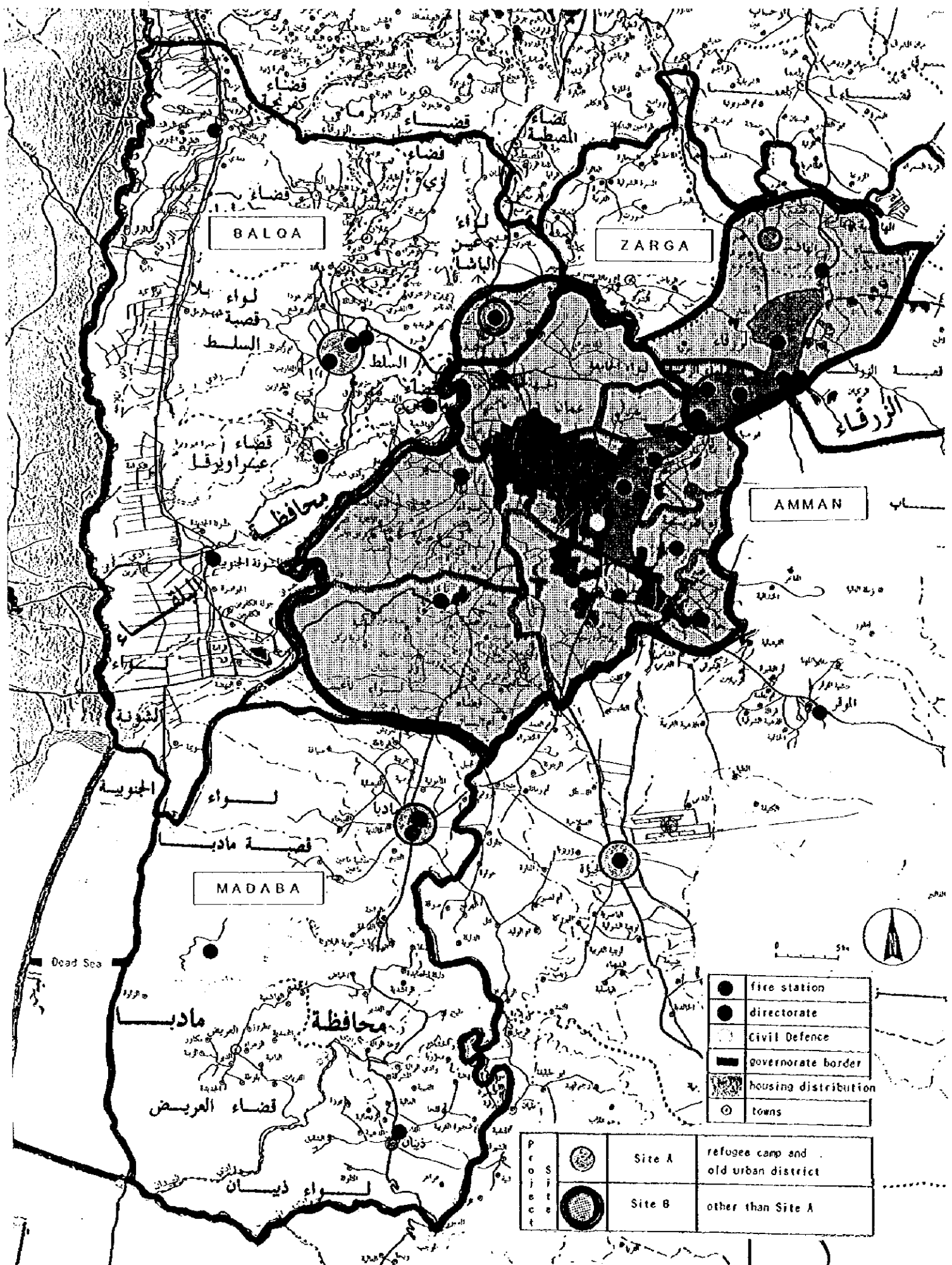




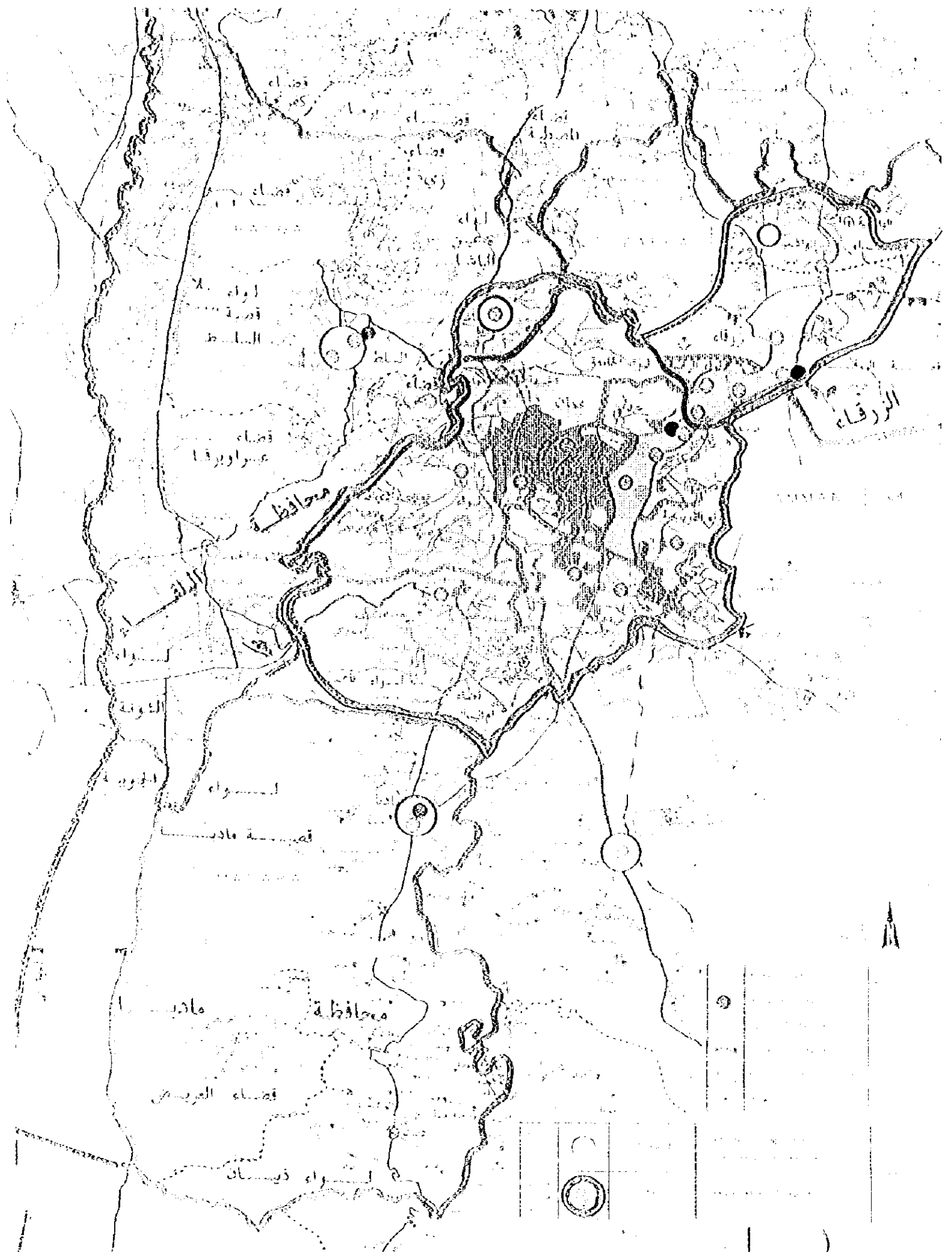
# Location Map of the Hashemite Kingdom of Jordan



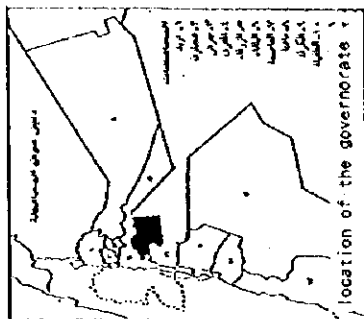
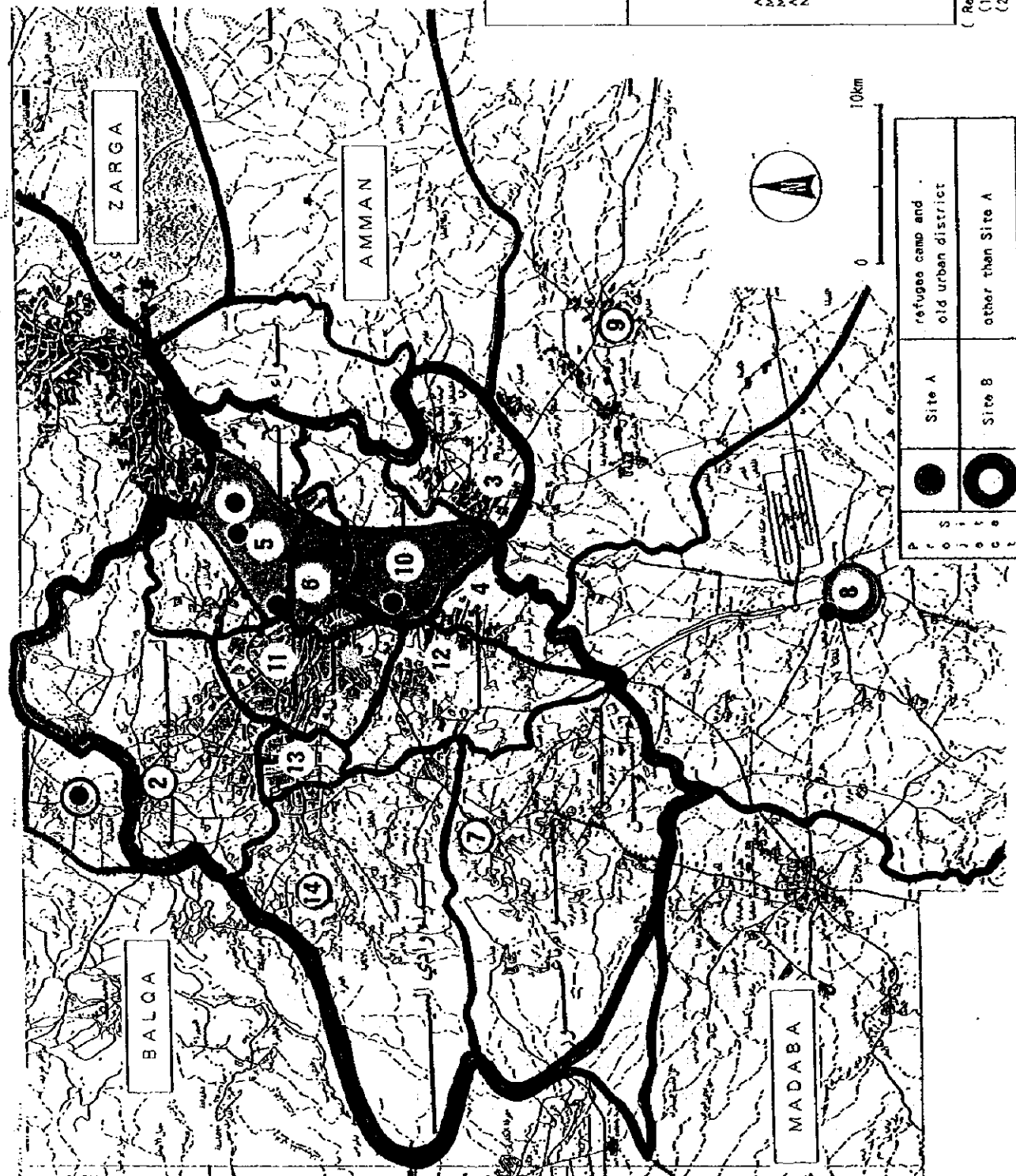
# Project Area (Amman Municipality and its Suburbs)



Project Area (Amman Municipality and its Suburbs)



# Location and its Jurisdiction of Fire Stations in AMMAN

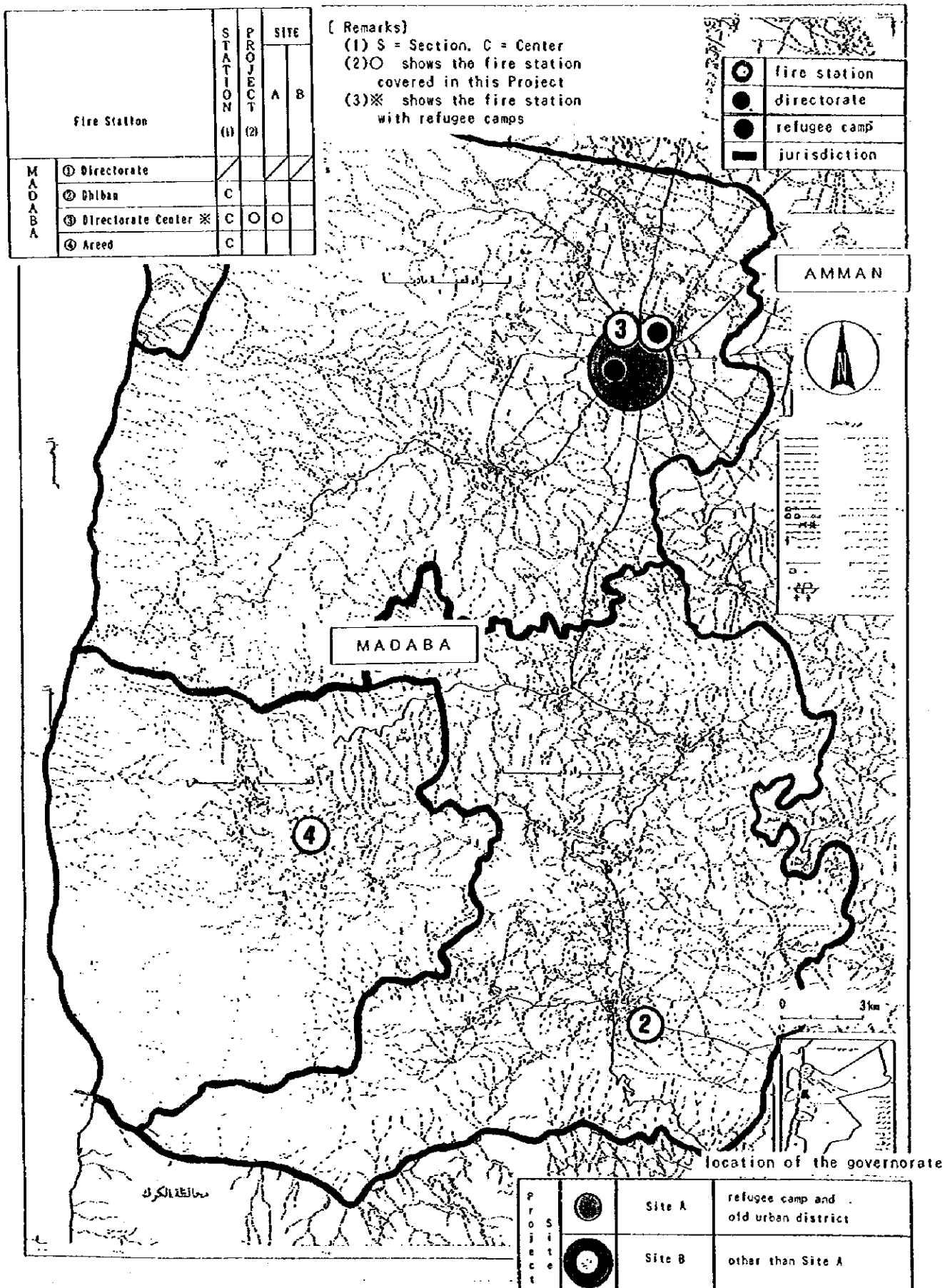


○	fire station
●	directorate
○	Civil Defence
—	jurisdiction
●	refugee camp

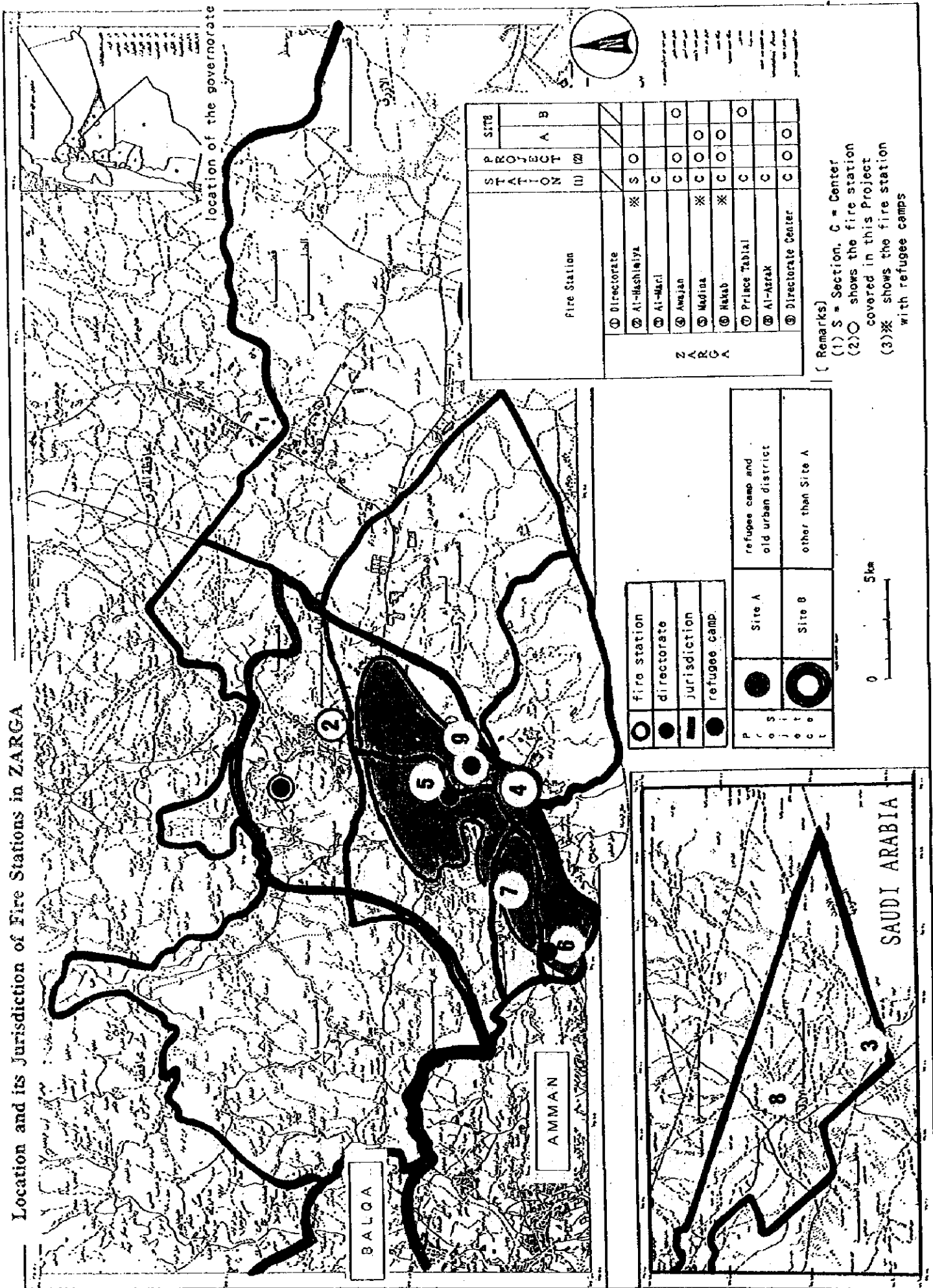
Fire Station	SITE	
	SECTION	A B
① Directorate	S	○
② Sweiten	S	○
③ Sahab	S	○
④ Qweisayeh	C	○
⑤ Madatla	C	○
⑥ Madina (City Center)	C	○
⑦ Na'ar	C	○
⑧ Al-Jazeera	C	○
⑨ Al-Humayra	C	○
⑩ Maara	C	○
⑪ Sports City	C	○
⑫ Jweidah	C	○
⑬ Star Ammanah Garden	C	○
⑭ East Sir	S	○

(Remarks)  
 (1) S = Section, C = Center  
 (2) ○ shows the fire station covered in this Project  
 (3) \* shows the fire station with refugee camps

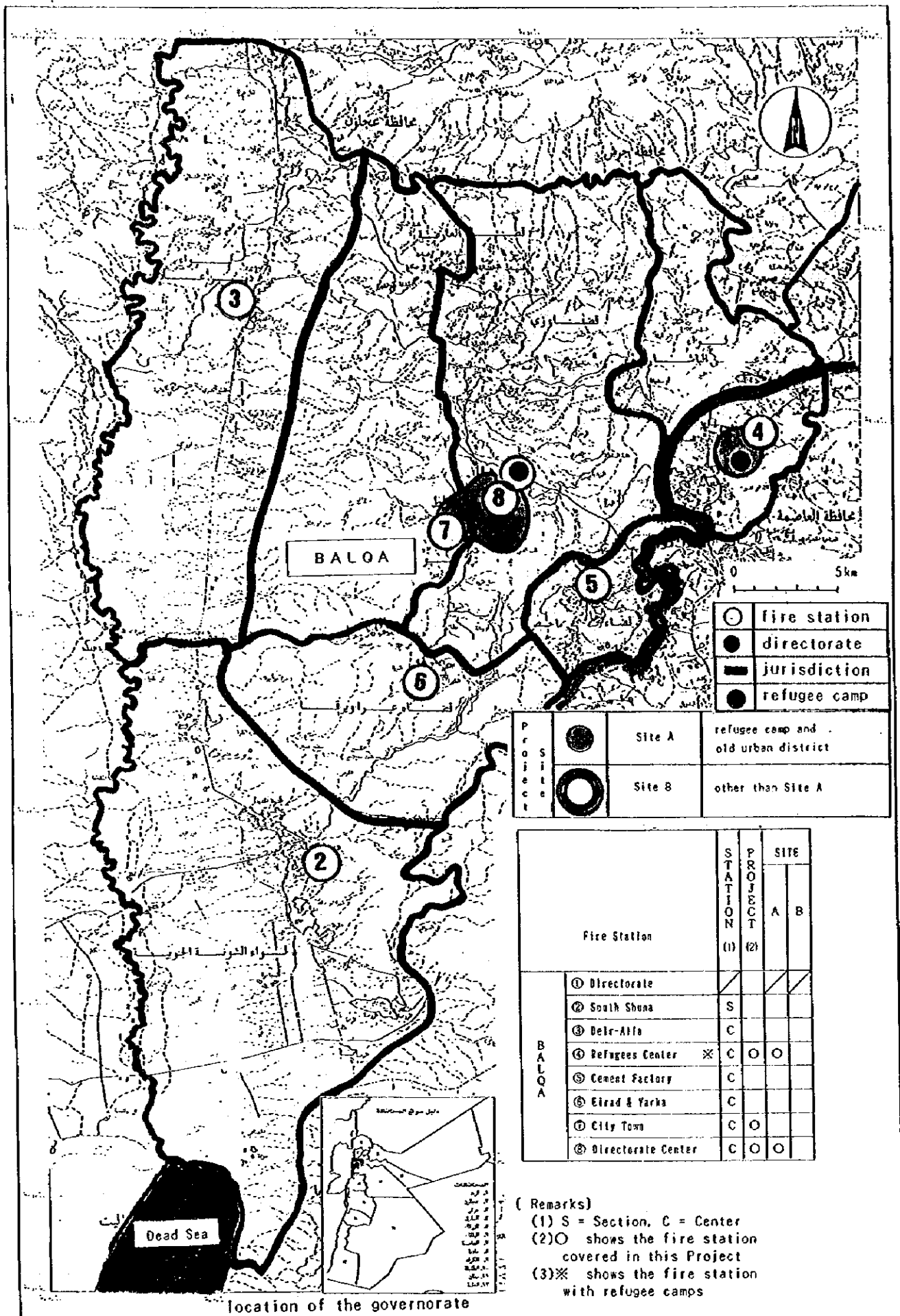
# Location and its Jurisdiction of Fire Stations in MADABA



# Location and its Jurisdiction of Fire Stations in ZARGA



# Location and its Jurisdiction of Fire Stations in BALQA







## **ABBREVIATIONS**

<b>A/P</b>	<b>: Authorization to Pay</b>
<b>B/A</b>	<b>: Banking Arrangement</b>
<b>BHN</b>	<b>: Basic Human Needs</b>
<b>CD</b>	<b>: Civil Defence</b>
<b>D.C.U.</b>	<b>: Decontamination Chemical Unit</b>
<b>F/T</b>	<b>: Foam Tank (of fire fighting truck)</b>
<b>G.V.W.</b>	<b>: Gross Vehicle Weight</b>
<b>JD</b>	<b>: Jordan Dinar (local currency)</b>
<b>LPG</b>	<b>: Liquefied Petroleum Gas</b>
<b>MOP</b>	<b>: Ministry of Planning</b>
<b>R.I.V.</b>	<b>: Rapid Intervention Vehicle</b>
<b>UNRWA</b>	<b>: United Nations Relief and Works Agency for Palestine Refugees in the Near East</b>
<b>W/T</b>	<b>: Water Tank (of fire vehicles)</b>

# CONTENTS

## PREFACE

## LETTER OF TRANSMITTAL

## LOCATION MAP

## ABBREVIATIONS

## CHAPTER 1 BACKGROUND OF THE PROJECT ..... 1

## CHAPTER 2 CONTENTS OF THE PROJECT ..... 3

- 2.1 Objectives of the Project ..... 3
- 2.2 Basic Concept of the Project ..... 3
- 2.3 Basic Design ..... 4
  - 2.3.1 Design Concept ..... 4
  - 2.3.2 Basic Design ..... 21

## CHAPTER 3 IMPLEMENTATION PLAN ..... 37

- 3.1 Implementation Plan ..... 37
  - 3.1.1 Implementation Concept ..... 37
  - 3.1.2 Implementation Conditions ..... 38
  - 3.1.3 Scope of Works ..... 38
  - 3.1.4 Consultant Supervision ..... 39
  - 3.1.5 Procurement Plan ..... 40
  - 3.1.6 Implementation Schedule ..... 42
  - 3.1.7 Obligations of Government of Jordan ..... 43
- 3.2 Operation and Maintenance Plan ..... 44

## CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION ..... 46

- 4.1 Project Effect ..... 46
- 4.2 Recommendation ..... 47

## APPENDICES

- 1 Member List of the Study Team ..... A-1
- 2 Survey Schedule ..... A-3
- 3 List Of Party Concerned in the Recipient Country ..... A-5
- 4 Minutes of Discussions ..... A-8
- 5 Cost Estimation Borne by Jordan ..... A-14
- 6 Garage of Fire Station ..... A-35
- 7 References ..... A-54

# **CHAPTER 1 BACKGROUND OF THE PROJECT**

## CHAPTER 10: THE HISTORY OF THE UNITED STATES

The history of the United States is a complex and multifaceted story that spans centuries. It is a story of exploration, discovery, and the struggle for freedom and equality.

The story begins with the first people to inhabit the land, the Native Americans. They lived in harmony with nature and had a deep understanding of the land and its resources.

The story continues with the arrival of European explorers and settlers. They brought with them new ideas, technologies, and a desire for wealth and power.

The story is filled with challenges and triumphs. It is a story of the American dream, of the pursuit of happiness, and of the fight for justice.

The story is still being written. It is a story that belongs to all of us, and it is a story that we must continue to tell and to learn from.

## CHAPTER 1 BACKGROUND OF THE PROJECT

The Hashemite Kingdom of Jordan (hereinafter referred to as Jordan) has seen a steady population increase at a rate of 3.5% a year due to natural increase, immigration and the return of overseas workers in the aftermath of the Gulf War and also the progress of urbanization, resulting in a huge concentration of some 2.8 million people, i.e. three-fifths of Jordan's total population, in Amman and its suburbs (subject area of the Project). Consequently, the risk of fires and accidents has been steadily increasing, as evidenced by the increased number of fires from 3,794 in 1992 to 4,971 in 1996 and the increased number of accidents from 26,327 to 32,408 in the same period.

Under these circumstances, the Ministry of Interior and the Civil Defence, the two organizations responsible for fire-fighting and ambulance services in Jordan, introduced the Civil Defence New Law in 1997 to protect the lives and assets of citizens from various types of disasters, the occurrence of which has shown an increasing trend following the population increase and growing socioeconomic activities. This improvement of the legal system regarding fire-fighting and disaster prevention followed the formulation of the Civil Defence Development Plan (1996 - 2001) in 1996 to establish a reliable fire-fighting service in terms of fire stations and other facilities, fire-fighting equipment and manpower, etc. by the year 2001. Although the Government of Jordan has increased its fire service budget to achieve the targets of this plan, the incremental portion of the budget has mainly been used to finance the personnel cost, i.e. the recruitment of new fire-fighters and the training of new and existing fire-fighters, making it difficult to secure sufficient funds to replace or strengthen the fire-fighting and ambulance vehicles and equipment. The insufficient funding for vehicles has led to a situation in which 34 of the 54 fire-fighting trucks, 29 of the 58 ambulances and 17 of the 20 water tankers possessed by fire stations in the Amman municipality and its suburbs are experiencing various problems, including a reduced operation rate, due to aging. While the deployment of water tankers is essential in view of the inadequate network to supply water to fight fires, the present deployment level is unsatisfactory to serve the vast area of some 15,000 km<sup>2</sup> with a population of 2.8 million.

Against this background, the Government of Jordan has requested the Government of Japan's provision of grant aid to cover 25% of the cost of procuring the vehicles planned under the Civil Defence Development Plan in order to improve Jordan's fire-fighting and ambulance services. Table 1-1 shows the contents of the original request.

**Table 1-1 List of Requested Vehicles**

Type of Vehicle		Requested Number of Vehicles				
		Amman	Madaba	Zarga	Baka	Total
1	Fire-Fighting Truck	9	2	3	2	16
2	Rapid Intervention Vehicle (RIV)	10	3	4	2	19
3	Ambulance	11	3	4	2	20
4	Water Tanker	11	2	5	2	20
5	Fire Equipment Carrier	9	2	3	1	15
6	Personnel Transportation Vehicle	5	2	4	1	12
7	Decontamination Chemical Unit (DCU)	1	0	1	0	2
8	Recovery Winch Truck	1	1	1	0	3
Total		57	15	25	10	107

## **CHAPTER 2 CONTENTS OF THE PROJECT**

REPORT ON STUDIES OF THE



## **CHAPTER 2 CONTENTS OF THE PROJECT**

### **2.1 Objectives of the Project**

The overall object of the Project is to reduce personal and material damage to citizens due to such disasters as fires and accidents by providing new vehicles, etc. to replace those deteriorated vehicles, etc. possessed by the Civil Defence for four governorates, i.e. Amman, Zarga, Madaba and Balqa, in the Amman municipality and its suburbs where there is a particularly high disaster hazard in order to establish a fire-fighting and ambulance service system in line with the Civil Defence Development Plan designed to protect the lives and assets of citizens.

### **2.2 Basic Concept of the Project**

The basic concept of the Project is described below. The principles regarding the formulation of such project contents as the subject area, project scale and vehicle specifications, etc. are described in 2.3.1 - Design Concept while the finalised plan contents are described in 2.3.2 - Basic Design.

#### **(1) Conformity with Superior Plan Targets**

The contents of the Project are fully in line with the targets of such superior laws and plans as the Civil Defence New Law and the Civil Defence Development Plan. Special emphasis of the Project is placed on "the protection of the lives and assets of citizens" which is the target of both the said Law and Plan. The Project is designed to contribute to the achievement of this target through the provision of vehicles, etc. which is one of the necessary measures suggested by the Law and Plan to achieve the target together with the construction/consolidation of such facilities as fire stations and the improvement of training.

#### **(2) Subject Disasters and Beneficiaries**

The intended beneficiaries of the Project are ordinary citizens, including refugees, and emphasis is placed on securing their safety. Accordingly, the priority of the Project is to deal with ordinary fires and accidents, both of which are closely linked to the lives of ordinary citizens and which frequently take place.

### **(3) Scope of the Project**

The aging of fire-fighting vehicles and ambulances, etc. in Jordan has made it impossible to maintain the previous level of service activities. Meanwhile, it is necessary to maintain the present fire-fighting and ambulance service system in Jordan as much as possible. Under these circumstances, the Project principally intends to restore the previous level of the fire-fighting and ambulance service activities of the Civil Defence by means of replacing aged vehicles.

### **(4) Relationship with Other Types of Cooperation Schemes**

Following the implementation of the Project, there is a possibility that various forms of technical cooperation, including the acceptance of trainees, will be requested by the Jordanian side in addition to the grant aid for the Project proper. Given this possibility, the Project is planned to allow technical cooperation to make the Project more effective as well as more efficient even though the implementation of the Project alone should have significant achievements.

## **2.3 Basic Design**

### **2.3.1 Design Concept**

#### **(1) Project Area**

The subject area of the Project (Project Area) is the Amman municipality and its suburbs with a population of 2.8 million, accounting for some 60% of Jordan's total population.

#### **(2) Project Sites**

The Amman municipality and its suburbs cover a wide area with diverse topographical features. While the degree of fire hazard to human life or the hazard of a fire spreading varies, therefore, from one location to another, the strength of each fire station in terms of the garage and manpower, etc., which are essential for vehicle operation and maintenance, varies from one station to another. Accordingly, the necessity and suitability for cooperation at each fire station or site also varies, making it necessary for the project planning to select those sites with a strong necessity and suitability for cooperation based on the following site selection criteria.

## 1) Site Selection Criteria

The site selection criteria employed for the Project are described here. While there is a total of 35 directorates, sections and centres in the Project Area, directorates are excluded from the scope of the Project because of criterion ① described below. Those sites which meet criteria ② or ③, which are believed to constitute particularly important criteria from the viewpoint of extending cooperation for the Project, are automatically selected as the project sites. Sites which do not meet criteria ② or ③ but which do meet criterion ④ are included in the Project as sites with a strong necessity and suitability for cooperation after sites meeting criteria ② and ③.

### ① Sections and centres assigned to make primary response

Sections and centres in the Project Area are assigned to make a primary response to disasters. In the case of a large or special type of disaster, a directorate is ordered to turn out to provide a secondary response. As the sections and centres assigned to make a primary response urgently require new vehicles, these are included in the scope of the Project while directorates are excluded.

### ② Sites responsible for refugee camps

Due to the lack of urban planning, refugee camps have a high housing density and narrow streets, resulting in a very high risk of fires spreading and human casualties. Those sites responsible for refugee camps are included in the scope of the Project.

### ③ Sites responsible for areas including shopping streets in Old Quarter

No street replanning has taken place in Old Quarter, including areas with shopping streets. The existence of mainly narrow roads not only prevents the smooth passage of fire vehicles but also increases the prospect of fires spreading. Those sites responsible for areas with a high risk of fires spreading are included in the scope of the Project.

### ④ Sites other than those in ② or ③ above but responsible for areas with high frequency of fires or high fire hazard

These are sites responsible for areas with a high fire hazard with a population of 25,000 or more or areas requiring an improved fire service due to the occurrence of 100 or more incidents of fire a year even though

the subject area(s) does not have a refugee camp(s) or shopping street(s) in Old Quarter.

The existence of a garage is another issue to be considered in the planning of the Project. In principle, however, the Project intends the replacement of existing aged vehicles as discussed later in (4) - Determination of Project Scale, meaning that a garage for the new vehicles is basically in place. Accordingly, no criteria for garages or other operational aspects of the fire vehicles are included in the site selection criteria.

## 2) Site Selection Results

The sites selected on the basis of the criteria described in 1) above are shown in Table 2-1.

Table 2-1 Site Selection Results

Relevant Criterion	Amman	Madaba	Zarga	Balqa
②	⑤ Mahatta ⑧ Alijeeza ⑩ Manara	③ Directorate Centre	② Al-Hashimiya ⑤ Madina ⑥ Nakab	④ Refugees Centre
③	⑤ Madina		⑨ Directorate Centre	⑦ City Town ⑧ Directorate Centre
④	② Sweileh ③ Sahab ④ Qweismeh ⑦ Na'aur ⑪ Sports City ⑫ Jweidah ⑬ King Abdallah Garden ⑭ Wadi Sir		④ Awajan ⑦ Prince Tablat	

Of the sites selected in Table 2-1 above, those meeting criteria ② or ③ are particularly in urgent need of new fire vehicles and, therefore, are classified as Category A sites. Meanwhile, those selected on the basis of criterion ④ are classified as Category B sites in view of the urgent need for new fire vehicles after Category A sites.

As described earlier, there is a total of 35 directorates, sections and centres in the Project Area and 22 sites are selected as the project sites based on the selection criteria. Table 2-2 shows the level of fire-fighting, ambulance and

rescue activities of all fire stations, including these 22 sites. The scale of providing water tankers will be different for Category A sites and Category B sites. The reason for this is described in detail in (4) - Determination of Project Scale.

### (3) Selection of Subject Vehicles

#### 1) Selection Criteria for Subject Vehicles

The main fire vehicles currently used by the Civil Defence are fire-fighting trucks, rapid intervention vehicles (RIV) without a water tank, ambulances, water tankers, rescue trucks, aerial ladder trucks, elevating platform trucks, recovery winch trucks, fire equipment carriers, personnel transportation vehicles and pick-up trucks.

The fire occurrence situation in Jordan in 1996 by type of fire shows that forest and grass fires are ranked first, followed by housing fires and vehicle fires which are ranked second and third respectively. Given the actual picture of fire occurrence in the Project Area, general fire-fighting vehicles appear to have a higher priority than such special vehicles as aerial ladder trucks and recovery winch trucks. The number of ambulance responses and the number of persons transported by ambulance have increased by 38% and 29% respectively in the last three years, illustrating the growing need for the ambulance service by ordinary citizens.

The fire vehicles deployed by the sections and centres basically consist of fire-fighting trucks, RIVs without a water tank, ambulances and water tankers. In view of the actual situation of operation, these vehicles are judged to be regularly used. Such special vehicles as aerial ladder trucks and recovery winch trucks are deployed and operated by the directorates, mainly to deal with fires in tall buildings and large-scale disasters.

The original request listed eight types of fire vehicles, i.e. fire-fighting trucks, RIVs without a water tank, ambulances, water tankers, DCUs, fire equipment carriers, personnel transportation vehicles and recovery winch trucks. In deciding the subject vehicles for the Project, priority was given to those vehicles which are required to directly protect the lives of citizens in order to ensure the safety of ordinary citizens. Table 2-3 shows the selection criteria for the subject vehicles.

Table 2-2 Number of Fires, Ambulances and Rescues (average of 1994~1996)

Fire station	Station (1)	Project (2)	Number per year			Popula- tion	Area (km <sup>2</sup> )	Population density in refugee camp (/km <sup>2</sup> )
			Fire	Ambu- lance	Rescue			
Amman	① Directorate	—	—	—	—	—	—	—
	② Sweileh	S	⊙	179.0	462.0	32.7	181,600	150
	③ Sahab	S	⊙	74.7	740.7	13.0	49,000	467
	④ Qweismeh	C	⊙	193.3	571.3	14.3	125,000	140
	⑤ Mahatta ※	C	⊙	210.7	992.7	33.0	300,000	150
	⑥ Madina (City Center)	C	⊙	122.7	656.3	8.7	500,000	67
	⑦ Na'aur	C	⊙	87.0	150.0	0	30,700	80
	⑧ Alijeeza ※	C	⊙	38.3	418.3	6.0	34,000	5,580
	⑨ Al-Muwaggar	C		14.7	437.3	2.7	19,100	715
	⑩ Manara ※	C	⊙	35.7	289.0	2.7	49,000	196
	⑪ Sports City	C	⊙	95.3	476.3	5.0	212,100	124
	⑫ Jweidah	C	⊙	84.7	355.3	27.0	25,000	300
	⑬ King Abdallah Garden	C	⊙	50.5	139.5	8.0	30,000	110
	⑭ Wadi Sir	S	⊙	206.7	721.0	36.3	140,500	152
Madaba	① Directorate	—	—	—	—	—	—	—
	② Dhiban	C		14.7	273.7	3.7	31,700	800
	③ Directorate Center ※	C	⊙	94.0	235.7	15.7	70,500	808
	④ Areed	C		8.7	274.3	1.3	8,500	400
Zarga	① Directorate	—	—	—	—	—	—	—
	② Al-Hashimiya ※	S	⊙	49.0	156.0	21.7	34,248	12
	③ Al-Mari	C		1.3	79.3	1.0	20,000	30
	④ Awajan	C	⊙	64.0	307.0	22.7	60,700	55
	⑤ Madina ※	C	⊙	138.7	682.0	37.7	354,346	3,683
	⑥ Nakab ※	C	⊙	51.3	373.7	18.3	15,000	60
	⑦ Prince Tablal	C	⊙	46.0	370.3	10.3	40,000	50
	⑧ Al-Azrak	C		22.3	324.7	3.0	9,193	70
	⑨ Directorate Center	C	⊙	28.0	200.3	30.0	153,513	120
Balqa	① Directorate	—	—	—	—	—	—	—
	② South Shuna	S		64.3	172.3	21.7	39,300	275
	③ Deir-Alla	C		40.3	204.0	12.0	44,000	116
	④ Refugees Center ※	C	⊙	83.3	515.3	13.7	17,000	57
	⑤ Cement Factory	C		12.0	32.0	0	18,000	40
	⑥ Eirad & Yarka	C		5.0	21.0	0.7	7,000	211
	⑦ City Town	C	⊙	86.3	192.3	21.7	150,000	141
	⑧ Directorate Center	C	⊙	57.3	157.3	40.7	26,000	236

[Remarks] (1) S = Section, C = Center

(2) ⊙ shows fire stations covered in this Project.

(3) ※ shows the fire station with refugee camps within its territorial jurisdiction.

Table 2-3 Selection Criteria for Subject Vehicles

- |   |   |
|---|---|
| ① | Vehicle capable of responding to fires at ordinary houses or shops which frequently occur   |
| ② | Vehicle capable of responding to traffic accidents or labour accidents which frequently occur   |
| ③ | Vehicle required to resupply water to fire vehicles in view of the absence of such artificial water sources as fire plugs, etc. or such natural water sources as rivers, etc. |
| ④ | Vehicle required to ensure the efficient operation of fire vehicles   |
| ⑤ | Vehicle of which the function can be substituted by another type of vehicle is excluded   |
| ⑥ | Type of vehicle which is already in use so that the present operation and maintenance system can cope with the new vehicles following completion of the Project               |
| ⑦ | Type of vehicle of which the operating skills are difficult to learn is excluded from the viewpoint of efficient fire-fighting activities                                     |

## 2) Selection Results of Subject Vehicles

Based on the subject vehicle selection criteria, it has been decided that the subject vehicles to be provided under the Project will be fire-fighting trucks, RIVs with a water tank, ambulances and water tankers. The reasons for selecting these four types of vehicles are detailed below.

### ① Fire-Fighting Trucks

For ordinary house fires, etc., fire-fighting trucks use the water they carry. In the case of factory fires or fires at oil storage bases, etc., the use of water simply spreads the fire. Therefore, fire-fighting trucks use a foaming agent to suppress the fire. Fire-fighting trucks account for 98% of the fire vehicles presently operating in Jordan and, therefore, are the principal fire vehicles. Fire-fighting trucks are the basic fire vehicle used to combat frequent house fires and other common types of fire and are the most suited among the requested vehicles to the objective of the Project. While there is the alternative choice of water tankers with a pump as the basic fire vehicles, the diversity of fires involving vehicles, factories and petrol stations, etc. in the Project Area as shown in Table 2-4 suggests a strong demand for fire-fighting trucks as water alone is not sufficient to deal with some 18% of all fires. Consequently, fire-fighting trucks rather than water tankers with a pump are included in the scope of the Project.

Table 2-4 Fires Requiring Fire-Fighting Trucks (1996)

Total Number of Fires	Fires Requiring Fire-Fighting Trucks	
	Total	Number of Fires by Type
4,905	887 (18%)	- Vehicle (including car park) : 410
		- Factory and warehouse storing dangerous substances : 207
		- Tyre depot : 181
		- Boiler : 52
		- Electrical installation : 29
		- Petrol station : 8

② RIVs with Water Tank

RIVs are vehicles for fire-fighting and rescue activities and are frequently required in areas with narrow streets. Their advantages are particularly strong in refugee camps, meeting the objectives of the Project. As the RIVs without a water tank which are currently used find it difficult to provide an effective initial response to a fire, the specifications must be reviewed.

③ Ambulances

Ambulances are vehicles equipped with a main cot stretcher to transport injured or ill persons to hospital, first aid kit, etc. while providing emergency medical care. In the Amman municipality and its suburbs, the number of trips made by ambulances and the number of persons transported have increased by 38% and 29% respectively in the last three years, indicating an increased demand for the ambulance service. Meanwhile, the Ministry of Health also provides an ambulance service as part of its activities but this ambulance service is mainly aimed at transferring patients which have been accepted by a hospital but found difficult to treat to another hospital where the required medical care can be provided. In contrast, the Civil Defence provides a 24 hour ambulance service in response to requests made by citizens or accidents, etc. and its ambulances transport injured or ill persons to hospital while providing emergency medical care en route. The ambulance service of the Civil Defence, therefore, greatly benefits the public and meets the objective of the Project.



④ Water Tankers

A water tank and water supply pump are placed on top of the truck chassis to make a water tanker. Water tankers are essential to supply water to fire-fighting vehicles to assist the fighting of ordinary house fires and other types of fires because of the lack of other water supply sources and, therefore, must be provided under the Project.

⑤ DCUs

When a disaster such as leakage, contamination or fire involving a dangerous substance(s) occurs, the damage may further spread without an appropriate response to the specific properties of the dangerous substance(s) in question. A DCU is mounted with equipment to analyse and measure the dangerous substances involved in leakage, contamination and/or fire and also with a comprehensive range of tools and other items (uniforms, chemical treatment agents, equipment/tools to recover leaked substances and equipment/tools to prevent further leakage, etc.) in order that appropriate fire-fighting and other activities can be conducted. The Civil Defence is currently developing a data bank and is able to provide information on the substances stored and used by individual plants provided that the storage of dangerous substances has been notified. It is also possible to confirm the necessary information with people related to each plant. As the tools and other items carried by DCUs can be substituted by means of equipping fire-fighting trucks with the minimum tools, etc., DCUs are excluded in the scope of the Project.

⑥ Recovery Winch Trucks

The steep slopes and sharp curves of roads in both the mountainous and hilly areas of the Amman municipality and its suburbs are liable to cause vehicles to turn sideways or slip due to the frozen or snow covered road surface. In addition, many accidents also take place on the well-developed highways linking one area with another. Recovery winch trucks are required for rescue activities involving large vehicles which have fallen to the valley bottom or to remove heavy items in efforts to rescue survivors trapped in cave-ins and other types of accidents. In the case of traffic accidents involving passenger vehicles, minibuses and/or ordinary trucks, etc., rescue activities can be conducted using such rescue equipment as a hydraulic jack, etc. in most cases if the purpose is

simply to rescue the people involved. By equipping fire-fighting trucks with such equipment, the purpose of recovery winch trucks can be partly met. As the provision of recovery winch trucks under the Project does not appear particularly urgent, recovery winch trucks are excluded from the scope of the Project.

#### ⑦ Fire Equipment Carriers

Fire equipment carriers are required to transport the equipment, etc. stored at each directorate or fire station to a fire or any other disaster site when fire vehicles alone cannot cope with the situation. The confirmed fire equipment, etc. which is required to be transported to deal with different types of disasters in the Amman municipality and its suburbs is listed below.

- Large fires: cylinder for air breathing apparatus, reinforcement hose, smoke ejector and stretcher, etc.
- Fires at cliff sites: portable pump (for water relay) and reinforcement hose, etc.
- Fires at chemical plants or tank lorries: foam liquid and high expansion foam apparatus, etc.
- Forest and grass fires: grass fire extinguishing equipment (fire beaters, etc.), spades, sand carriers and reinforcement hose, etc.
- Water disasters such as floods: water pump and drainage hose, etc.
- Accidents requiring large-scale rescue efforts (involving many casualties): stretchers and first aid kits, etc.

At present, many of the above items are kept at the directorates. In view of their low use level for frequent ordinary fires, fire equipment carriers are excluded from the scope of the Project.

#### ⑧ Personnel Transportation Vehicles

Personnel transportation vehicles are necessary to transport groups of lightly injured persons in a major disaster/accident with many casualties as only one or two persons can be transported at a time by an ambulance. Given the fact that there are many isolated desert and mountain areas which are far from fire stations in the suburbs, these vehicles could prove useful for transporting reinforcement firemen as well as the victims of floods or forest fires in such areas. However, as they are

seldom used for frequent ordinary fires, personnel transportation vehicles are excluded from the scope of the Project.

#### ⑨ Radio Communication System

For the effective and efficient use of the vehicles to be provided under the Project, a communication system consisting of mobile radio units working with the command centre of a directorate and portable radio units to ensure well-organized command activities at disaster sites is required. Accordingly, such a system is included in the scope of the Project. The radio communication system using these units is shown in Fig. 2-1.

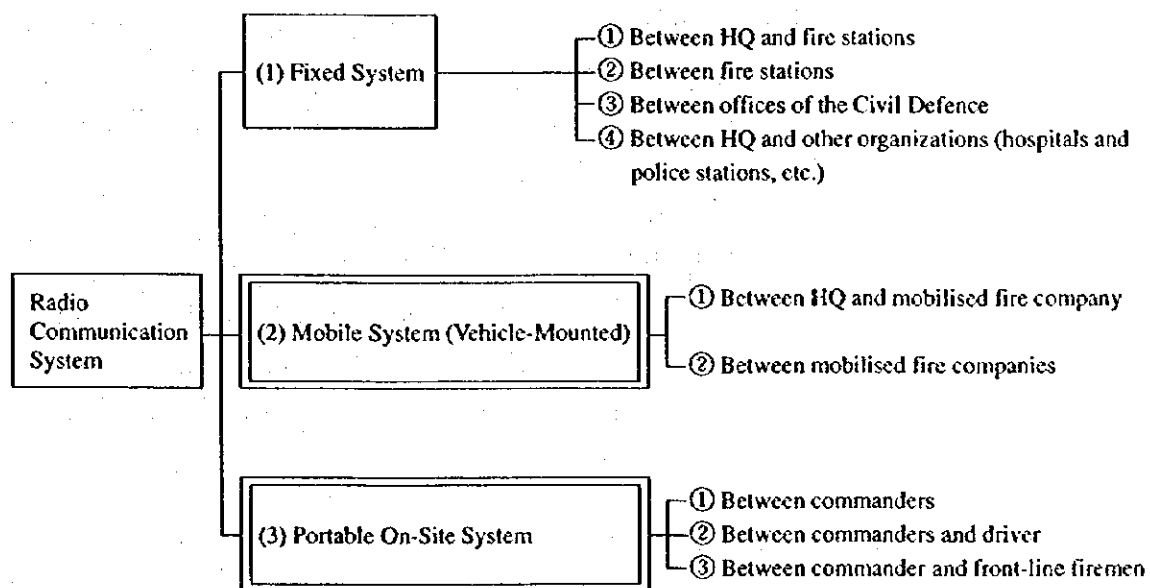


Fig. 2-1 Radio Communication System

The following types of emergency radio communication are expected to take place at the scene of a disaster.

- Site Reporting

The actual situation at the disaster site is reported to the HQ, etc. so that the proper organization can be set in place to suit the size of the disaster.

- Request for Reinforcement

If there is any risk that the fire may spread or of the outflow of a dangerous substance, a request is swiftly made for the dispatch of water tankers and other fire vehicles as well as the necessary equipment.

- On-Site Commands

At the fire site, it is necessary for the site commander to issue commands to the company commanders regarding the division of work (primary assignment to rescue, extinguishing, evacuation and other work) so that all of the companies can perform their assigned work in a coordinated manner.

- Conveyance of Information

As the on-site activities may be of a three-dimensional nature, it may be impossible to gather all of the firemen in one place for the issue of commands. Commands are, therefore, conveyed by means of radio communication.

#### (4) Determination of Project Scale

In accordance with the subject sites and subject vehicles of the Project discussed above, the scale of the Project, i.e. number of vehicles to be provided under the Project, was determined based on the project scale determination criteria discussed in 1) below. The results are outlined in 2) - Project Scale Determination Results and further details are given in Table 2-13.

##### 1) Project Scale Determination Criteria

- ① In principle, the Project should be formulated so as not to require any extension of the present operation and maintenance capabilities. Therefore, the scale of the Project should be the simple replacement of aged vehicles at each fire station.

- ② The upper limit of vehicle replacement should be determined by the vehicle deployment standards in Jordan shown in Table 2-5. In Jordan, the distinction between a section and centre is based on the size of the fleet deployed but the actual deployment standards are not very clear. In order to determine the scale of the Project, the deployment size of six sections is changed to that of a centre as shown on Table 2-6 based on the results of the site survey conducted during the basic design study.

Table 2-5 Fire Vehicle Deployment Standards in Jordan

Type of Fire Station	Fire-Fighting Trucks	RIVs Without Water Tank	Ambulances	Water Tanker
Section	2	1	2	1
Centre	1	1	1	1

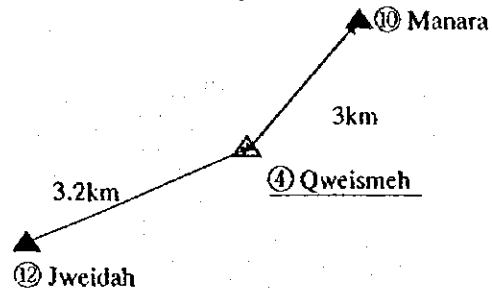
Table 2-6 Reclassification of Section to Centre

Type After Reclassification	Name of Section	Reason for Reclassification
Centre	④ Qweismeh (Amman)	Reinforcement by nearby station(s) is possible (Note)
	⑤ Madina (Zarga)	
	④ Refugee Centre (Balqa)	
	⑥ Al-Azrak (Zarga)	Demand for fire service due to fires, etc. is small because of suburban location
	③ Deir-Alla (Balqa)	
	⑥ Alijeeza (Amman)	Assigned to airport fires but seldom required

Note: The scope of feasible reinforcement is defined as a 9 km radius of a directorate or nearby station(s). The standard rate of water discharge by a fire-fighting truck is 400 - 450 litres/minute and the present tank capacity of 4,500 litres carried by a fire-fighting truck makes 10 - 11 minutes continual water discharge possible. Meanwhile, assuming an average travelling speed when on duty of 50 km/hr, a reinforcement truck can travel 9 km during the said water discharge period of the fire-fighting truck already at the site. As it is difficult to measure the actual travelling time, the linear distance is used for calculation purposes. The reinforcement system for those sections which are now reclassified as centres because of the possibility of reinforcement by a nearby station(s) is illustrated below.

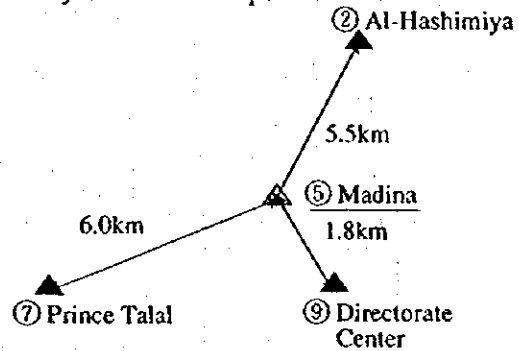
i) ④ Qweismeh (Amman Governorate)

○ Reinforcement by nearby two stations is possible



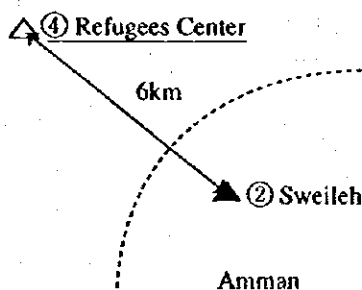
ii) ⑤ Madina (Zarga Governorate)

○ Reinforcement by nearby three stations is possible



iii) ④ Refugees Centre (Balqa Governorate)

○ Reinforcement by nearby one station is possible



- ③ The current deployment rate by type of vehicle, including aged vehicles, at the sections and centres in the Project Area, calculated on the basis of Jordan's vehicle deployment standards, is 100% for fire-fighting trucks, 67% for RIVs without a water tank, 100% for ambulances and 55% for water tankers. Based on the actual deployment situation, the priority deployment of water tankers appears to be the lowest among the subject vehicles of the Project. Taking this situation into consideration, those sites in need of the urgent deployment of water tankers under the Project are Category A sites where the necessity and urgency of vehicle deployment are very high as discussed in (2) above. The scale of water tanker deployment under the Project should be minimised while ensuring effective reinforcement to fight fires in Category A sites. The relative site locations of the subject fire stations from the viewpoint of mutual reinforcement are given in Figs. 2-3 through 2-6 in 2.3.2 - Basic Design.
- ④ RIVs with new specifications to ensure versatility in initial fire-fighting and rescue activities should be deployed at eight fire stations in the Project Area in order to cover all refugee camps in the Amman municipality and its suburbs where it is difficult for fire-fighting trucks to conduct fire-fighting activities.
- ⑤ A mobile radio unit should be mounted to all the vehicles to be provided under the Project so that a well-organized radio communication network can ensure the effective use of the new vehicles. Portable radio units should be provided depending on the degree of necessity at disaster sites. In short, two for fire-fighting trucks, one for RIV with a water tank and one for water tanker should be provided. No mobile radio units should be provided for ambulances under the Project on the grounds that mobile radio units should be sufficient.

## 2) Project Scale Determination Results

The number of vehicles to be provided under the Project, determined on the basis of the relevant standards, is given in Table 2-7.

Table 2-7 Number of Vehicles and Radio Units to be Provided Under the Project

(Unit: vehicle)

Type of Vehicle	Fire-Fighting Truck	RIV with Water Tank	Ambulance	Water Tanker	Radio Unit	
					Mobile	Portable
Number	12	8	11	6	37	38

## (5) Vehicle and Radio Unit Specifications

In order to allow the existing operation and maintenance systems to cope with the new vehicles, the specifications of the new vehicles should basically be compatible with the existing vehicles. Although the water tank capacity and water discharge rate of the fire-fighting trucks and water tankers should preferably be large, similar specifications to those of the existing vehicles should be adopted in view of smooth travelling and safety on the road during emergency activities.

### 1) Conditions to Determine Specifications

The conditions to determine the main specifications for the vehicles and radio units selected in (3) above are shown in Tables 2-8 through 2-12.

Table 2-8 Conditions to Determine Specifications for Fire-Fighting Trucks

Main Specification Item	Standard	Reasons
Water Tank Capacity	4,500 litres or more	In Jordan, reinforcement between fire stations assumes a travelling time of approximately 10 minutes. Common fire-fighting work uses a nozzle diameter of 16 mm and a nozzle pressure of 4 - 6 kg/cm <sup>2</sup> with a water discharge rate of 400 - 450 litres/min. To enable continuous water discharge for 10 minutes, the water tank capacity should be 4,500 litres or more which is the same capacity as that of existing standard vehicles.
Foam Liquid Tank Capacity	450 litres or more	Because of the limited space for mounting, the foam tank capacity is generally set at 10% of the water tank capacity. The mixing ratio of the foam agent in the fire water is 3 - 6% but a higher foam agent ratio to water is employed in view of the possible deterioration of the agent. This capacity is the same as that of the existing vehicles.
Seating Capacity	Four persons or more	The existing fire-fighting trucks consist of a single cabin with a seating capacity of three persons. However, depending on the disaster scale, fire-fighters are reinforced by persons assigned to other work. During the day, a commander also goes out with the fire-fighters, resulting in a required seating capacity of at least four persons.
Vehicle Dimensions	<ul style="list-style-type: none"> <li>- Overall length: approx. 9.0 m</li> <li>- Overall width: approx. 2.4 m</li> <li>- Overall height: approx. 3.2 m</li> <li>- Wheel base: approx. 4.7 m</li> </ul>	Because of the mountainous topography, there are many steep slopes and sharp curves in the Amman municipality and its suburbs. As there is repeated sudden starting and stopping during an emergency run, large trucks are unsuitable. Medium-size trucks are, therefore, selected as in the case of the existing fire-fighting trucks. The dimensions are comparable to those of the existing fire-fighting trucks.



Table 2-9 Conditions to Determine Specifications for RIVs with Water Tank

Main Specification Item	Standard	Reasons
Vehicle Dimensions	Overall width: approx. 2.0 m	The main roads/streets in the refugee camps have a width of 4 m. Small trucks with an appropriate width which can pass parked vehicles (passenger vehicles) should, therefore, be selected.
Vehicle Weight	Gross weight: approx. 5.0 tons	
Water Tank Capacity	800 litres or more	The maximum loading capacity of a common small truck (2 - 3 ton chassis) is approximately 4.0 - 5.0 tons. Within this overall weight limit, three fire-fighters (240 kg), a fire pump, fire equipment, chassis weight and others must be accommodated, thereby leaving room for a water tank with a capacity of 800 litres or more.

Table 2-10 Conditions to Determine Specifications for Ambulances

Main Specification Item	Standard	Reasons
Vehicle Dimensions	<ul style="list-style-type: none"> <li>- Overall length: &gt;approx. 4.4 m</li> <li>- Overall width: &gt;approx. 1.6 m</li> <li>- Overall height: &gt;approx. 2.4 m</li> </ul>	The minimum dimensions given on the left should be adopted as the standard dimensions to ensure space to accommodate injured/ill persons. The accommodation space should have minimum dimensions of 2.3 m in length and 1.4 m in width. These dimensions are comparable to those of the existing ambulances.
Driving Mode	4 x 4 (four wheel drive)	Because of the mountainous local topography, there are many steep slopes and sharp curves, posing a hazard of slipping, etc. at the time of rain or snow. Four wheel drive vehicles should be adopted to ensure the safe transportation of injured/ill persons. This driving mode is the same as that of the existing ambulances.
Attachments	Water tank and basin	A water tank and basin are required to clean injured/ill persons as well as for paramedics to provide hygienic emergency medical care and the existing ambulances are also equipped with a water tank and basin.
	Medical cabinet	A medical cabinet is required to store emergency medical care equipment in order and the existing ambulances are also equipped with a medical cabinet.
Equipment	Main cot stretcher	This is basic equipment for an ambulance to transport injured/ill persons and the existing ambulances are also equipped with a main cot stretcher
	<ul style="list-style-type: none"> <li>- Oxygen resuscitator</li> <li>- Manual resuscitator set</li> <li>- Vacuum splints</li> <li>- Portable electric suction pump</li> <li>- First aid kit</li> <li>- Others</li> </ul>	These are standard emergency medical care equipment and the existing ambulances are also equipped with this equipment.

Table 2-11 Conditions to Determine Specifications for Water Tankers

Main Specification Item	Standard	Reasons
Vehicle Dimensions	<ul style="list-style-type: none"> <li>- Overall length: approx. 9.2 m</li> <li>- Overall width: approx. 2.5 m</li> <li>- Overall height: approx. 3.1 m</li> </ul>	Taking the road passability and driving safety in the Amman municipality and its suburbs into consideration, specifications which are comparable to those of the existing water tankers should be adopted.
Water Tank Capacity	12,000 litres	

Table 2-12 Conditions to Determine Specifications for Radio Units

Main Specification Item	Standard	Reasons
Mobile Radio Unit	<ul style="list-style-type: none"> <li>- Output: 25 - 40 W</li> <li>- Frequency: as designated by each governorate</li> </ul>	The specifications should be determined based on a permit issued by the Ministry of Telecommunications in Jordan and should be comparable to those of the radio units currently used.
Portable Radio Unit	<ul style="list-style-type: none"> <li>- Output: 5 W</li> <li>- Frequency: as designated by each governorate</li> </ul>	

## 2) Other Conditions to Determine Vehicle/Equipment Specifications

### ① Natural Conditions

- i) Given the local temperature conditions, the specifications must be appropriate for a hot climate. The very dry weather in summer is likely to affect the vehicles because of sand dust, etc., making it essential for the vehicle design to include a high performance air filter together with the strengthened sealing of all components. In winter, the roads may be frozen or covered by snow. Four wheel drive vehicles should, therefore, be selected in the case of ambulances and RIV with a water tank to ensure their safety at the time of emergency activities and tyre chains should also be provided.
- ii) Because of the presence of many steep slopes and sharp curves due to the mountainous topography, the vehicle models to be selected should be those known to have excellent stability and maneuverability.

## ② Social Conditions

The specifications must reflect the local laws and regulations.

- i) Traffic law: Jordan Traffic Regulations
- ii) Industrial standards: British Standards for pumps as currently is the case in Jordan
- iii) Units: metric units as standard
- iv) Telecommunications law: permitted frequency and output under the Jordan Telecommunications Regulations
  - Permitted frequency: 148 - 173 MHz
  - Output: mobile radio unit - upto 40 W, portable radio unit - upto 5 W

## ③ Other Design Conditions

Although the presence of Japanese vehicles with well-established local agents is increasing in the Jordanian market, those made in Europe still form the mainstay with some 60% of all fire vehicles, etc. currently owned by the Civil Defence being made in Europe in view of Jordan's geographical location. Taking the efficient operation and maintenance of the new vehicles into consideration, the procurement of the planned vehicles from a third country appears feasible. Accordingly, the vehicle specifications must take the specifications employed by European manufacturers into consideration. In addition, proper guidance in regard to the operation and maintenance of the new vehicles must be provided.

### 2.3.2 Basic Design

#### (1) Site Conditions

The existing facilities at the fire stations where the new vehicles will be deployed under the Project consist of a garage, office, communications room and rest rooms, etc. with electricity and water supply. Simple vehicle inspection and maintenance can be conducted on site. A water tank is located on the premises which receives water from the municipal water supply system and which can replenish the water tanks of the vehicles at any time. Sufficient infrastructure is, therefore, in place to ensure the efficient use of the vehicles to be provided under the Project.

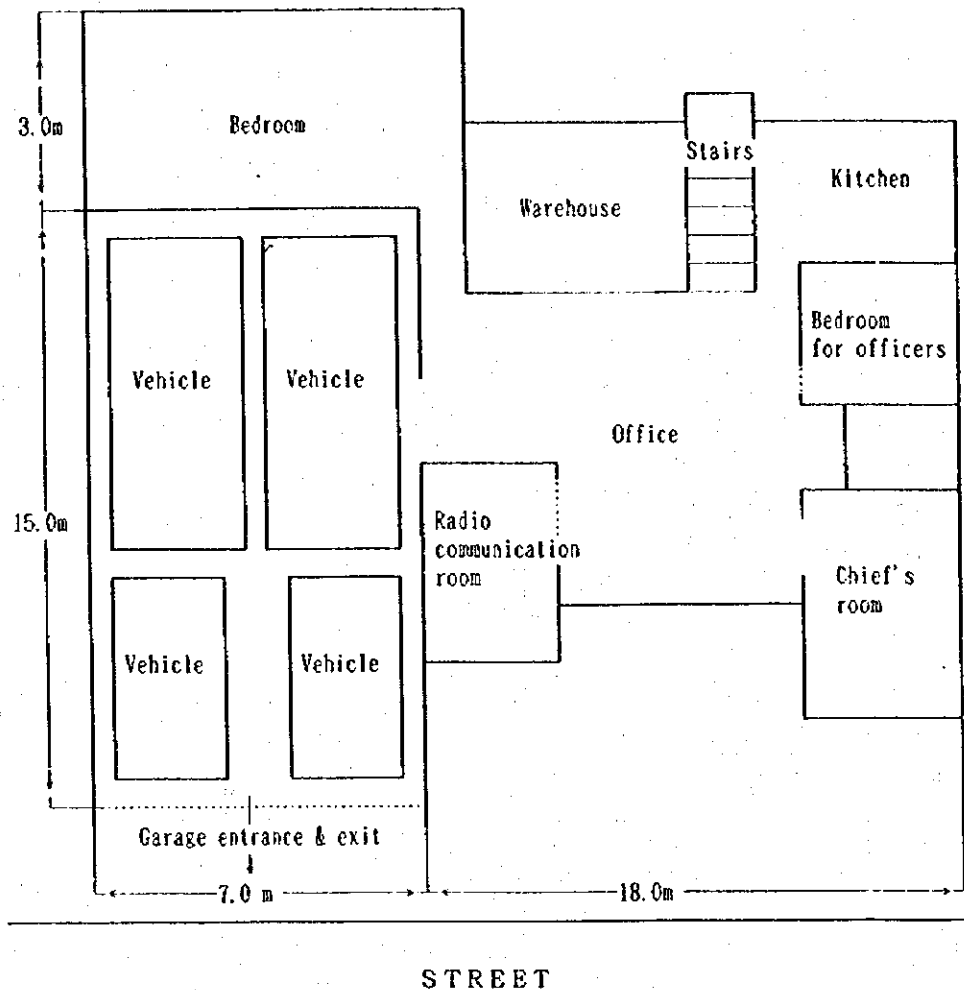


Fig. 2-2 Existing Facilities at Standard Fire Station

## (2) Types and Number of Vehicles

The types and number of vehicles, decided on the basis of the criteria referred to in the basic concept of the Project, are shown in Table 2-13. The number of vehicles at the sections and centres before and after the implementation of the Project is given in Table 2-14.

The scope of feasible reinforcement following the deployment of the new water tankers (together with the existing water tankers) is shown in Figs. 2-3 through 2-6 and the areas classified as Category A sites will be more or less entirely covered by the mutual reinforcement system.

The detailed specifications of the vehicles to be provided under the Project are given in Tables 2-15 through 2-18 while their rough drawings are given in Figs. 2-7 through 2-10.

Table 2-13 Deployment of Equipment to be Provided under the Project

Fire station		Station (1)	Project (2)	Number of Equipment					
				Fire fighting truck	RIV with water tank	Ambu- lance	Water tanker	Mobile radio unit	Portable radio unit
Amman	① Directorate	—	—						
	② Sweileh	S	⊙	1			1	2	3
	③ Sahab	S	⊙	1		1		2	2
	④ Qweismeh	C	⊙	1		1	1	3	3
	⑤ Mahatta ※	C	⊙		1			1	1
	⑥ Madina (City Center)	C	⊙						
	⑦ Na'aur	C	⊙	1			1	2	3
	⑧ Alijeeza ※	C	⊙	1	1	1		3	3
	⑨ Al-Muwaggar	C							
	⑩ Manara ※	C	⊙		1	1		2	1
	⑪ Sports City	C	⊙						
	⑫ Jweidah	C	⊙	1				1	2
	⑬ King Abdallah Garden	C	⊙						
	⑭ Wadi Sir	S	⊙	1		1		2	2
Madaba	① Directorate	—	—						
	② Dhiban	C							
	③ Directorate Center ※	C	⊙		1		1	2	2
	④ Areed	C							
Zarga	① Directorate	—	—						
	② Al-Hashimiya ※	S	⊙	1	1	1		3	3
	③ Al-Mari	C							
	④ Awajan	C	⊙	1		1	1	3	3
	⑤ Madina ※	C	⊙		1	1		2	1
	⑥ Nakab ※	C	⊙		1	1		2	1
	⑦ Prince Tablal	C	⊙						
	⑧ Al-Azrak	C							
	⑨ Directorate Center	C	⊙	1				1	2
Balqa	① Directorate	—	—						
	② South Shuna	S							
	③ Deir-Alla	C							
	④ Refugees Center ※	C	⊙	1	1	1		3	3
	⑤ Cement Factory	C							
	⑥ Eirad & Yarka	C							
	⑦ City Town	C	⊙	1		1		2	2
	⑧ Directorate Center	C	⊙				1	1	1
Total				12	8	11	6	27	38

[Remarks] (1) S = Section, C = Center

(2) ⊙ shows fire stations covered in this Project.

(3) ※ shows the fire station with refugee camps within its territorial jurisdiction.

(4) Quantity of portable radio units per vehicle: Fire fighting truck (2), RIV (1), Ambulance (0), Water tanker (1)

Table 2-14 Number of Vehicles before and after the Project at Fire Stations covered in the Project

Fire station	STATION	Deployment Standard	Number of Vehicles before the Project (G and B)										Number after the Project (G and Project)																							
			① Fire fighting truck					② RTV					③ Ambulance					④ Water tanker																		
			existing					existing					existing					existing																		
			G	B	T	RE	ADD	T	G	B	T	RE	ADD	T	G	B	T	RE	ADD	T	G	B	T	RE	ADD	T										
Amman	② Sweileh	S	2	1	2	1	1	1	2	1	0	1	0	0	0	2	0	2	0	0	0	0	1	1	1	0	1	1	2	1	2	1	2	0	1	1
	③ Sahab	S	2	1	2	1	1	1	2	1	0	1	1	0	1	0	1	1	1	1	2	0	1	1	1	0	1	1	2	1	2	0	0	0		
	④ Qweimch	C	1	1	1	1	0	1	1	1	0	1	0	0	0	0	2	2	1	0	1	0	1	1	0	1	1	0	1	1	0	1	1			
	⑤ Mahatta	C	1	1	1	1	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0			
	⑥ Madina (City Center)	C	1	1	1	1	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0			
	⑦ Na'aur	C	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0			
	⑧ Aljezza	C	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0			
	⑨ Manara	C	1	1	1	1	1	0	1	1	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1	1	0	0	0			
	⑩ Sports City	C	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0		
	⑪ Jweidah	C	1	1	1	1	0	1	1	1	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0		
Madaba	⑫ King Abdullah Garden	C	1	1	1	1	1	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0		
	⑬ Wadi Sir	S	2	1	2	1	1	1	2	1	0	1	1	0	1	0	1	2	1	0	1	0	1	1	0	1	1	2	1	2	1	2	0	0	0	
	⑭ Directorate Center	C	1	1	1	1	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	0	1	0	1		
	⑮ Al-Hashimiya	C	1	1	1	1	1	0	1	1	0	0	0	0	0	1	1	2	1	0	1	1	2	0	0	0	1	1	2	1	2	1	0	1		
	⑯ Awojan	C	1	1	1	1	0	1	1	1	0	1	0	0	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1	1	0	1	0	1		
Zarga	⑰ Madina	C	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	1	1	2	0	1	1	0	0	0		
	⑱ Nakab	C	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	1	1	2	0	1	1	0	0	0			
	⑲ Prince Tabla	C	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	1	1	2	0	1	1	0	0	0			
	⑳ Directorate Center	C	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	2	0	1	1	0	0	0			
	㉑ Refugees Center	C	1	1	1	1	0	1	1	1	0	1	1	0	0	0	0	1	1	0	0	0	0	0	1	1	2	0	1	1	0	0	0			
Baqqa	㉒ City Town	C	1	1	1	1	0	2	2	1	0	1	0	1	1	0	1	1	1	0	1	0	0	0	1	1	0	0	0	1	1	0	0	0		
	㉓ Directorate Center	C	1	1	1	1	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	1	1	0	1	1	0	1	0	1		
	Total		14	17	31	12	0	12	14	4	18	1	4	8	15	13	28	11	1	12	2	15	17	12	8	20	14	32	26	15	33	26	2	6	8	

(Remarks) (1) [Station] S = Section, C = Center, [RTV] WT = Water tank, [Name of vehicles] ① F.F. = Fire fighting truck, ② ANBU = Ambulance, ③ WATER = Water tanker [shortage against standard] RE = replacement of vehicle, ADD = increase of vehicle, T = Total [present conditions of vehicles] G = Good, B = Bad

(2) [ ] : vehicles to be provided under this project

(3) \* shows the fire station with refugee camps within its territorial jurisdiction.

(4) RTV to be provided under this Project has a water tank.

F.F. truck	RTV	Ambulance	Water tanker
12	8	12	20
12	8	11	6
100%	100%	92%	30%