第 4 章　本格調査の実施方針

第４章　本格調査の実施方針

４－１　本格調査の実施方針（案）

(1) マスタープランとフィージビリティスタディの２段階の作業を行うものである。

(2) 調査対象は次のとおり。

① 幹線，処理場位置等の根幹施設のマスタープラン …… ４地区

② 既設の管渠，ポンプ場の改良
③ 管渠の新設
④ 関連する調査（水質の状況，腐食の状況）
} マーラ，タワヒ地区

(3) 上記②，③，④については，①の最終決定の前に作業を進めることが可能であり，調査期間が短いため，マスタープラン作業と併行して実施する必要がある。

(4) 施設計画については，現地の経済情勢もあり，できるだけ少ない費用で効果があがるように配慮すること。また段階的な考えも導入すること。

(5) 現地の維持管理条件を考えていくこと。

(6) 処理水は，かんがいへの再利用を前提とした方がよい。

(7) 降雨頻度の少ない地域であるため，雨水排水は基幹的なものの配慮だけでよい。

４－２　調査実施上の留意点

(1) 調査期間が短いため，手戻りにならない範囲で，迅速な作業を行う必要がある。

(2) F/Sの中心となるマーラ，タワイ地区の幹線ルート及び面整備拡大（能力増を含む）は，処理場の位置選定作業にかかわらず実施可能であり，早期に着手することにより，第２段階の調査期間（予定では夏期）を短縮できる。

(3) 軍事施設等立ち入り禁止の区域が多いので，特にマスタープランにおいて，現地カウンターパートと十分な共同作業を行い，相手側の意向を十分読み取ること。

(4) 施設計画については，硫化水素（下水濃度の高さ，高下水温）対策及び塩分を含んだ粉塵対策を十分考慮すること。また，腐食状況を調査すること。

(5) 維持管理については，部品供給源から非常に遠いことを配慮する必要がある。

(6) 社会体制の異なる国であるため，特に早期に現地の状況に慣れる必要がある。

(7) 既設施設の状況調査の際，硫化水素に特に注意する必要がある。

(8) 港内水質調査は，栄養塩濃度，透明度等を主体にした方がよいと考えられる。

4－3　調査スケジュール

本格調査は，S/W(案) スケジュールに沿って，前半のマスタープラン作成に約6カ月，後半のフィージビリティ調査に約9カ月をかけ，全体として15カ月で完了する。

4－4　要員構成

本格調査には，おおむね以下のような専門分野による要員構成が必要である。

総括，都市計画，下水道計画，施設計画，設計・積算，水質，環境・衛生，組織・制度，経済・財務，測量監督。

4－5　調査用機材

(1)　水質試験用機材

アデン市内にある水質試験室は，Al-Sharb下水処理場付属の試験室，水道公社の試験室及び水産養殖研究センターの試験室の3カ所である。このうちAl-Sharb処理場の水質試験室はアデン市の管轄下にあり，今後の日本調査団の使用が許可されているものである。

今後現地で行う水質調査で使用する器具のうち，Al-Sharb処理場の水質試験室に備わっているものを表4－1に示す。なお，対象分析項目は，温度，透視度，pH，TS，VTS，SS，DO，BOD，COD，NH3-N，T-N，T-P，塩素イオンである。

表4－1　Al-Sharb処理場の水質試験室に備わっている試験器具

分析装置		ガラス器具類		試薬類	
蒸溜水製造装置	◎	ビーカー類	○	pH，BOD，COD関係	○
化学天秤	◎	フラスコ類	○	窒素，燐関係	×
水　浴	◎	ピペット類	○		
恒温槽（ふ卵器）	◎	メスシリンダー類	○	その他	
真空ポンプ（注1）	◎	比色管（注3）	×	温度計	◎
ドラフト	◎	DOびん	○	転倒水温計	×
pHメーター(注2)	◎	ビュレット	×	採水器具	○
DOメーター(注2)	◎	透視度計（注4）	×	雑貨類	○
乾燥機	◎	磁性皿	○	アンモニア電極	△
マッフル	◎	グーチるつぼ	○	分注器	△
吸光光度計（注3）	×	窒素蒸溜装置	×	自動ビュレット	△
		ケールダールフラスコ	×		
		時計皿	×		

種別　◎　現地のものが利用できるもの
　　○　現地にもあるが，できれば日本から持ち込んだ方がよいもの
　　×　日本から持ち込まなければならないもの
　　△　特に必要ないが，あれば便利である
注１　交換用オイル切れのため，オイルは持ち込む必要がある
　２　電極は予備も含めて持ち込んだ方がよい
　３　NO3-N，NO2-N，Pの分析をしない場合には不要である
　４　海水を測定する場合には透明度板が必要である

なお，水産養殖研究センターの試験室（Little Aden）には表４－１に示したほとんどの器具類が備わっており，調査団の使用も可能である。

(2)　現地事情を考慮し，調査用車両，ゼロックス機械を持ち込む必要がある。

４－６　相手方便宜供与

S/W参照のこと。

付　　録

付－1　相手国要請書

REQUEST FOR TECHNICAL ASSISTANCE FOR A MASTER PLAN FOR ADEN INCLUDING A FEASIBILITY STUDY FOR MA'ALLA AND TAWAHI AS PART OF THE MASTER PLAN

Terms of Reference
FOR TECHNICAL ASSISTANCE FOR THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM IN ADEN

1. INTRODUCTION

Aden, the capital municipality of the People's Democratic Republic of Yemen, lies in the southern extremity of the Arabian Peninsula, and is located 170 km east of the gateway of the Red Sea and bordered by the Indian Ocean on the south.

Aden was endowed with an ideal natural port shaped by a volcanic eruption having taken place at primitive ages. Thanks to the geographically blessed location in the Indian Ocean, Aden has an important position in the trade between the Orient and the Occident, and has been prosperous as an intermediate port from ancient times of the spice trade.

The urbanization of Aden began with its conquest by the Britain in 1839, which introduced a modern water supply and sewerage system into the capital, and laid the foundation of the present features in Aden; the Capital Municipality Aden extends along the inner harbour, and consists of the districts of Tawahi, Ma'alla and Crater in the south, Khormaksar in the east, Al-Mansoura, Sheikh Othman and Dar Sa'ad in the north, and Little Aden in the west covering 20,800 ha with the total population of about 300,000, as shown in the Drawing No.1.

Due to the regional separation and time lag in development of each district, most of sewerage systems in these districts are independent each other, though the sewerage system in Al-Mansoura, Sheikh Othman, Dar Sa'ad, Mimdara and Al-Durain as well in the

north were recently integrated by the sewerage treatment located in Madinat Al Sha'ab, to which other sewerage systems in the south and east of Aden are also supposed to be integrated under a long term plan.

Following improvement of the sewerage system in the north districts a great emphasis is now laid on improving the aged sewerage systems in Ma'alla and Tawahi districts in Aden.

2. BACKGROUND INFORMATION

2.1 Urban Structure

Ma'alla and Tawahi districts extend along the wall of the port of Aden, and spread over a gentle slope of Mt. Shamsan close to the inner harbour. Both districts have been almost fully developed, and the space for further development is limited.

Tawahi is one of the oldest towns in this country, and has been developed as the gate of Yemen from the sea, (where various shops dealing with foreign goods, hotels, National Shipping Company, National Drug Company, bank, Ministry of Communication and other governmental offices are located, as shown in the Drawing No. 10

Ma'alla was first developed as the British colony during their conquest of Yemen, and became Yemeni living quarter after independence from the Britain in 1967, where a great number of multi-storied flats have been built on each side of the main street, and their ground floors are occupied by various shops, restaurants, airline offices and some government offices, etc. forming a shopping centre At the back of the main street, Ma'alla wharf is the centre with the Port Authority, the customs, lots of warehouses, government offices and a supermarket, etc. around it. At the opposite side of the main street, there are a lot of two or three storied houses,

institutes, Ministry of Commerce, Housing Authority of Ministry of Construction and Housing, Telephone Department of Ministry of Communication and other government offices located on the gentle slope of the mountain.

Between Ma'alla and Tawahi, there is Hedjuff district where Ministry of Fish Wealth, Public Corporation for Electric Power, dock yard and cold storages are located along the wall of harbour, and a living quarter extends over the slope of the mountain, as shown in the Drawing No. 11.

2.2 Population

The 1973 census showed the population of Ma'alla and Tawahi inclusive of Hedjuff to be 47,044 and 16,444 respectively .

According to the 1987 census, the population of Ma'alla and Tawahi increased to 62,700 and 21,800 respectively.

As a matter of fact, both districts have been almost fully developed and there is little space left for further development. Thus, the future population in Ma'alla and Tawahi is assumed not to exceed 115,000, whole the average annual growth rate is estimated at 2.6 per cent in Aden.

2.3 Sewerage Systems in Ma'alla and Tawahi

The waterborne sanitation systems were introduced into Tawahi' about 40 years ago, and into Ma'alla in 1960 respectively, and thereafter no improvement has been made in spite of the increase of the population. The waterborne sanitation systems with closed piped passage thus cover 70 per cent of the area in Ma'alla and 65 per cent of the area in Tawahi, and the remaining parts of the areas still have open channel drains or traditional

systems where night soil is collected every morning and imposes a high risk on the public health. Moreover, there are about 70 new houses provided with septic tanks.

In Ma'alla and Tawahi, therefore, most of the drains and sewers have become of considerable age and too small in diameter, and locally there is a considerable backlog of repair and maintenance.

In Ma'alla, there are three intermediate pumping stations, by which the sewage is pumped to the nearest manhole and then flows by gravity into the main pumping station in Hedjuff. There is a longer outfall with small tidal holding-up tank, which is not working well. Therefore, crude sewage is discharged by the main pumping station directly into the inner harbour, causing severe smell nuisance and visible pollution in the inner harbour.

In Tawahi, the sewage of each area flows by gravity into each outfall except the shopping centre where there is a pumping station through which the sewage is pumped into outfall to the inner harbour. However, these outfalls are tide locked, and backing-up occurs into the sewers, causing settlement of solids and aggravating severe smell nuisance and visible pollution in the inner harbour.

Such nuisance and pollution caused by the deficiencies in the existing systems in Ma'alla and Tawahi have produced complaints from the Port Authority, Ministry of Fish Wealth, and other authorities. On the other hand, inconvenience and shortcomings in the existing sewerage network have also produced severe complaints from the inhabitants in Ma'alla and Tawahi. From the viewpoint of public health and living environment, therefore, there is a considerable need to improve the existing sewerage systems in Ma'alla and Tawahi districts.

3. OBJECTIVES

This study aims at preparing a master plan of the sewerage system for whole Aden, and a feasibility study for Ma'alla and Tawahi districts which are in need of urgent rehabilitation/ improvement of the existing sewerage systems. The 1977 report by John Taylor and Sons is to be reviewed and updated in the course of this study.

4. STUDY AREA

This study covers Ma'alla, Tawahi, Crater, Khormaksar, a permanent site of sewerage treatment and the industrial area in Al-Mansoura for the long term master plan, and Ma'alla, Tawahi and a site of their temporary outfall for the feasibility study.

5. SCOPE OF WORK

The scope of work to be carried out under this study shall consist of the followings.

5.1 Collection of Date and Information

Up-to-date data and information shall be collected from authorities concerned as required to draw up the long term master plan and the feasibility study.

5.2 Review and Evaluation of Data and Information Collected

Data and information so collected shall be reviewed and evaluated to grasp the present situation and study the plan.

5.3 Visit and Investigation of Project Area and Existing Facilities

The project area and the existing facilities shall be investigated to grasp the environmental and sanitary conditions in the project area, and to evaluate the existing sewerage and sanitation systems, and sites of facilities to be proposed under this study.

5.4 Topographic and Soil Surveys

If necessary, topographic and soil surveys shall be executed at selected places for preliminary design of foul sewer networks, pumping mains, pumping stations, and sewerage treatment site in the long term master plan.

5.5 Tidal Current Survey

The tidal current survey shall be carried out at selected places to evaluate type and location of temporary outfall to be proposed under the feasibility study for Ma'alla and Tawahi.

5.6 Analysis of Sewage and Industrial Waste Quality

Sewage and industrial waste shall be sampled from various sections of the project area, particularly from sea water now affected by discharge of sewage. The sampled sewage and industrial waste shall be analysed for pH, temperature, BOD, Cl, suspended solids (SS), coliforms, and other relevant characteristics as required to examine the most desirable approach to the regional pollution control programmes as a whole and a particular sewerage treatment process.

5.7 Review and Selection of Foul Sewer Network, Pumping Mains Routes and Locations of Pumping Stations

The proposed foul sewer network and pumping mains in the 1977 report shall be thoroughly reviewed and checked in view of the latest conditions of the study area , and revised as required to fit the present situation. For selecting the most viable routes and locations for foul sewers, manholes, pumping mains, pumping stations and outfalls, possible alternative plans shall be proposed, and evaluated as to their suitability as part of the whole system, taking into account such elements as topographical conditions, future urban development, environmental aspects, and economy of the whole sewerage system, etc.

5.8 Selection of Sewerage Treatment Process and Outfall System

In order to select the most desirable sewerage treatment process and outfall system, studies shall be made on the possible alternatives. General layout plans for each alternatives shall be drawn up and compared to identify advantages and disadvantages with regard to :

- Land requirement
- capital costs
- operation and maintenance costs
- operational characteristics
- Efficiencies of process and system
- Environmental impacts

Evaluation of each alternative process and system shall be made in light of inherent operational characteristics such as complexity of operation and maintenance, sludge production, organic removal efficiencies, and environmental impacts, etc.

5.9 Basic Design of Sewerage and Sanitation System

Design concept for the sewerage system shall be established. The basic design shall consist of necessary calculation, layout plan of manholes, chambers, foul sewers, and pumping mains based on a result of the topographic surveys, hydraulic calculations of pipelines, plan of sewerage treatment and outfall with longitudinal profiles as required, and drawings and diagrams to be incorporated into the preliminary proposals for the functional design of manhole, chamber, foul sewers, pumping mains, pumping stations, sewerage treatment works and outfall.

5.10 Design Criteria

Design criteria for the master plan and feasibility study shall be set up, considering the conditions in the project area, and shall be discussed on their application to this study.

5.11 Consideration to Integration of Existing Systems and to Future Extension

Due consideration shall be taken into integration of the existing systems, and into their extension to be planned in future.

5.12 Provision of Implementation Schedule

A detailed implementation schedule for all project components shall be drawn up, taking into account the various important factors which will affect sanitary and environmental conditions in the project area.

5.13 Preliminary Design

Upon completion of the implementation schedule and phasing of construction of the sewerage facilities, the preliminary design of the selected sewerage system shall be made, considering the ultimate integration of the initial stage works into the whole sewerage system, and then compiled in an appropriate form including the following items :

- Calculations of the capacity of each facility
- Treatment processes
- Outfall system
- Layout plan of foul sewers, manholes, pumping mains, pumping stations, treatment facilities, and outfall.
- Hydraulic profiles of foul sewers, manholes, pumping mains, pumping stations, treatment facilities and outfall.
- Flow diagrams of treatment works
- Single line diagrams of electric system
- Plans and sections of major structures
- List of mechanical and electrical equipment.

5.14 Cost Estimates and Capital Investment Programme

Cost estimates shall be made based on the materials, equipment and labour available at the site, site conditions and a construction method to be adopted to cope with the different soil conditions, depth and width of trench, size of pipes, working space, and traffic conditions of streets, etc.

Investment programme for the recommended system also shall be prepared based on results of the study above mentioned.

An initial stage construction programme shall be determined based on the evaluation of the area and facilities constructed. A realistic schedule of implementation of the initial stage project shall be proposed, showing the construction timing of the project components, and required annual construction, operation and maintenance costs throughout the construction stage and designed life spans of the facilities.

5.15 Organization in Managerial and Legal Aspects

It shall be required to assess the existing operational and managerial organizations, and to propose new organizations desirable to operate and manage the existing and proposed sewerage facilities, referring to the following points :

- Legal grounds and possible legal constraints
- Organization charts, existing and proposed
- Extent and location of facilities to be operated and maintained
- Relationship among sections (planning), design, Construction, operation/maintenance, and finance, etc.) and among regional offices.
- Relationships with other government agencies and organizations involved in connection with operation and management of the sewerage facilities (engineering, public health, environment, and procurement, etc.)
- Process of establishing policies and making major decisions.

5.16 Staffing and Training

It shall be required to assess the present situation of operation and maintenance of the existing facilities in terms of management and personnel, and to propose outline plans of the staff requirement, staff motivation, training and retraining for operation and maintenance of the proposed facilities.

5.17 Financial Plans

Financial plans of the works in the initial stage and in the long term plan shall be drawn up respectively based on the estimated cost of operation and maintenance, and expected conditions of fund.

5.18 Assessment of Environmental Impacts

Assessment shall be made on environmental impacts which may be brought by implementation of the project in the fields of public health, living environment, and sea water, etc.

5.19 Conclusion and Recommendation

In conclusion, comments shall be made on the feasibility of this project, referring to the economic assessment and an influence upon the environment, which may be exerted by the implementation of it.

6. Technology Transfer and Training Programme

Technology transfer to counterpart staffs shall be planned both in field and in Japan during this study.

7. REPORTS AND DOCUMENTS

During the period of this study, reports, drawings and other supporting documents shall be prepared from time to time as the study progresses, and submitted in the following manner.

7.1 Inception Report

An inception report showing a schedule of work and manning, in accordance with which actual works are to be carried out both in P.D.R. of Yemen and Japan, shall be prepared, and submitted in 20 copies.

7.2 Progress Reports

Progress reports with graph and chart shall be prepared on quarterly basis, and submitted in 20 copies.

7.3 Interim Report

An interim report with its summary and drawings shall be prepared based on the results of field survey and technical, socio economical and organizational studies, and 20 copies each of the interim report and its summary and 10 copies of drawings shall be submitted respectively.

7.4 Final Report

Based on the interim report, if necessary, having been amended according to comments on it, a final report and drawings shall be prepared, and submitted in 40 copies respectively.

8. SERVICE PERIOD AND WORK SCHEDULE

The consulting services of this study shall be completed within seven (7) months after receipt of the notice to proceed of work.

9. EXPERTISE REQUIRED

The following expertise will be required for this study.

Classification of Experts		Man-month
1)	Team Leader (Civil/Sanitary Engineer)	7
2)	Senior Civil/Sanitary Engineer (Overall Sewerage Planning)	7
3)	Senior Sewerage Engineer	7
4)	Sewerage Engineer	7
5)	Sewerage Treatment Plant Engineer	7
6)	Water Quality Analyst	5
7)	Water Quality Analyst	4
8)	Economist/Institutional Expert	5
9)	Mechanical Engineer	5
10)	Electrical Engineer	4
11)	Architect	2
	Total	60

10. UNDERTAKINGS OF THE GOVERNMENT

10.1 Facilities and Equipment

The Government of the People's Democratic Republic of Yemen (hereinafter referred to as "Government") will make available the services and facilities as mentioned below :

a) Office and accommodation for expatriates during their stay in Aden.

b) All documents, reports, drawings, data and information necessary for this study.

10.2 Access to Land

The Government will warrant to give the consultant a permission for free access to land as necessary for this study.

10.3 Taxation and Duties

The Government will exempt the consultant from any taxes, duties, fees, levies and other impositions which may be imposed on the consultant, their survey and drawing instruments, and personal effects under the laws and ordinances in force in P.D.R. of Yemen.

10.4 Other Privileges and Assistance

The Government will warrant to provide the consultant with the followings at the expenses of the Government .

a) Counterpart staffs with necessary facilities to cooperate and assist the consultant during the field works in Aden.

b) Work permits as may be necessary for their expatriates to perform their study in Aden.

c) Entry and exit visas, and registration for the expatriates, whenever required .

付－２　調査団持参S/W案

I.INTRODUCTION

In response to the request of the Government of People's Democratic Republic of Yemen (hereinafter referred to as "the Government of South Yemen"),the Government of Japan decided to implement a feasibility study for the improvement of Ma'alla and Tawahi Sewerage System in Aden (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly,the Japan International Cooperation Agency (hereinafter referred to as "JICA"),the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan,will undertake the Study,in close cooperation with the authorities of the Government of South Yemen.

The present document sets forth the scope of work with regard to the Study.

II.OBJECTIVE OF THE STUDY

The objective of the Study is to carry out the feasibility study for the improvement of Ma'alla and Tawahi sewerage system in Aden.

III.SCOPE OF THE STUDY

1.Study Area

The Study area will cover Ma'alla,Tawahi and related districts.

2.Contents of the Study

The Study will be composed of field surveys and data collection in South Yemen and of analysis works in both South Yemen and in Japan.

Part A: Data collection and analysis

(1) population
(2) land use
(3) city development plan
(4) natural condition(topographical,meteorological and hydrological data)
(5) soil and geological condition
(6) water use and water quantity and quality
(7) sewerage and related facilities
(8) present sanitary condition
(9) institution and financial condition
(10) previous studies

Part B: Formation of basic concept

(1) target year
(2) definition of planning area
(3) basic design concept
(4) improvement of existing facilities
(5) economic,financial and social analysis
(6) organization and institution

Part C: Survey

(1) water and waste quality survey
(2) topographic survey

Part D: Feasibility study

(1) estimation of sewage amount

(2) facility planning
  a.design criteria
  b.examination of alternatives
  c.new sewerage facility
  d.improvement of existing facilities
  e.preliminary design
  f.cost estimation
  g.procurement planning of construction materials and estimation of manpower requirement

(3) institutiuonal and organizational planning
  a.appropriate institution form
  b.organization of the institution
  c.user charge system

(4) project evaluation
  a.financial evaluation
  b.economic evaluation
  c.environmental and social evaluation

(5) implementation program
  a.implementation schedule
  b.disbursement schedule

IV.STUDY SCHEDULE

The study will be conducted in accordance with the attached tentative schedule.

V.REPORT

JICA will prepare and submit the following reports in English to the Government of South Yemen.

1.inception report
20 copies,at the beginning of the first field survey

2.

3.

4.draft final report
20 coplies,

The Government of South Yemen will provide JICA with their comments within one (1) month after receipt of the draft final report.

5.final report

VI.UNDERTAKINGS OF THE GOVERNMENT OF SOUTH YEMEN

1.To facilitate smooth conduct of the Study,the Government of South Yemen shall take necessary measures:

(1) to secure the safety of the Study team

(2) to permit the members of the Study team to enter, leave and sojourn in South Yemen for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees

(3) to exempt the members of the Study team from taxes, duties and any other charge on equipment, machinery and other materials brought into South Yemen for the conduct of the Study

(4) to exempt the members of the Study team from income tax and charges of any kind imposed on or in connection with any emolument or allowance paid to the members of the Study team for their services in connection with the implementation of the Study

(5) to provide necessary facilities to the Study team for remittance as well as utilization of the funds introduce into South Yemen from Japan in connection with the implementation of the Study

(6) to secure permission for entry into private properties or restricted areas for the conduct of the Study

(7) to secure permission to take all data and documents (including photographs) related to the Study out of South Yemen to Japan by the Study team

(8) to provide medical services as needed. Its expenses will be chargeable on members of the Study team

2. The Government of South Yemen shall bear claims, if any arises, against the members of the Study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study team.

3. Directorate General for Local Government shall act as counterpart agency to the Study team and also cordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. Directorate General for Local Government shall, at its own expenses, provide the Study team with the followings, in cooperation with other relevant organizations:

(1) available data and information related to the Studsy
(2) counterpart personnel
(3) suitable office space with necessary equipment in Aden
(4) credentials or identification cards
(5) vehicles with driver

VII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

(1) to dispatch, at its own expenses, Study team to South Yeman

(2) to pursue technology transfer to the South Yemen counterpart personnel in the course of the Study

VIII. JICA and Directorate General for Local Government shall consult each other in respect of any matter that may arise from or in connection with the Study

SCOPE OF WORK

FOR

A STUDY FOR THE IMPROVEMENT OF MA'ALLA AND TAWAHI SEWERAGE SYSTEM IN ADEN

AGREED UPON BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

AND

DIRECTORATE GENERAL FOR LOCAL GOVERNMENT

Aden, July 17, 1988

Mr. Mohsin Ali Al Naqeeb
Deputy General Director
G. D. L. G

亀田泰武

Mr Yasutake KAMEDA
Leader of Preliminary
Study Team
Japan International
Cooperation Agency .

1. INTRODUCTION

In response to the request of the Government of People's Democratic Republic of Yemen (hereinafter referred to as "the Government of PDRY), the Government of Japan decided to implement a study for the improvement of Ma'alla and Tawahi Sewerage System in Aden (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official Agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study, in close cooperation with the authorities of the Government of PDRY.

The present document sets forth the scope of work with regard to the Study.

II. OBJECTIVES OF THE STUDY.

The objectives of the Study are to formulate a master plan of sewerage system in Khormaksar, Crater, Ma'alla and Tawahi area and to carry out a feasibility study for the improvement of Ma'alla and Tawahi sewerage system.

III. SCOPE OF THE STUDY

1. STUDY AREA

The Study area will cover Khormaksar, Crater, Ma'alla and Tawahi.

2. Contents of the Study

The Study will be composed of field surveys and data collection in PDRY and of analysis works in both PDRY and in Japan.

Part A : Data collection and analysis

(1) population

(2) land use

(3) city development plan

(4) natural condition (topographical, meteorological and hydrological data)

(5) soil and geological condition

(6) water use and water quantity and quality

(7) sewerage and related facilities

(8) present sanitary condition

(9) institution and financial condition

(10) previous studies

Part B : Formation of basic concept

(1) target year

(2) proposal of alternatives

(3) consideration from economic, financial and social point of view

(4) selection of appropriate master plan

Part C : Survey

(1) water and waste quality survey

(2) topographic survey

Part D : Feasibility study

(1) estimation of sewage amount

(2) facility planning

a. design criteria

b. examination of alternatives

c. new sewerage facility

d. improvement of existing facilities

e. preliminary design

f. cost estimation

g. procurement planning of construction materials and estimation of manpower requirement

(3) institutional and organizational planning

a. appropriate institution form

b. organization of the institution

c. user charge system

(4) project evaluation

a. financial evaluation

b. economic evaluation

c. environmental and social evaluation

(5) implementation program

a. implementation schedule

b. disbursement schedule

IV. STUDY SCHEDULE

The study will be conducted in accordance with the attached tentative schedule .

V. REPORT

JICA will prepare and submit the following reports in English to the Government of PDRY.

1. Inception Report
   20 copies, at the beginning of the first field survey

2. Progress Report (I)
   20 copies, at the end of the first field survey .

3. Interim Report
   20 copies, within 3 months after the completion of the first field survey

The Government of PDRY will provide JICA with their comments within 1 month after the receipt of the Interim Report.

4. Progress Report (II)
   20 copies, at the end of the second field survey

5. Draft Final Report
   20 copies, within 3 months after the completion of the second field survey.

The Government of PDRY will provide JICA with their comments within 1 month after the receipt of the Draft Final Report.

6. Final Report
   30 copies, within one month after the receipt of comments on the Draft Final Report.

VI. UNDERTAKINGS OF THE GOVERNMENT OF PDRY

1. To facilitate smooth conduct of the Study, the Government of PDRY shall take necessary measures :

(1) to secure the safety of the Study team

(2) to permit the members of the Study team to enter, leave and sojourn in PDRY for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees

(3) to exempt the members of the Study team from taxes, duties and any other charge on equipment, machinery and other materials brought into PDRY for the conduct of the Study。

(4) to exempt the members of the Study team from income tax and charges of any kind imposed on or in connection with any emolument or allowance paid to the members of the Study team for their services in connection with the implementation of the Study

(5) to provide necessary facilities to the Study team for remittance as well as utilization of the funds introduced into PDRY from Japan in connection with the implementation of the Study。

(6) To secure permission for entry into private properties or restricted areas for the conduct of the Study

(7) to secure permission to take all data and documents (including photographs) related to the Study out of PDRY to Japan by the Study team

(8) to provide medical services as needed. Its expenses will be chargeable on members of the Study team.

2. The Government of PDRY shall bear claims, if any arises, against the members of the Study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study team.

3. Directorate General for Local Government shall act as counterpart agency to the Study team and also cordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. Directorate General for Local Government shall, at its own expenses, provide the Study team with the followings, in cooperation with other relevant organizations :

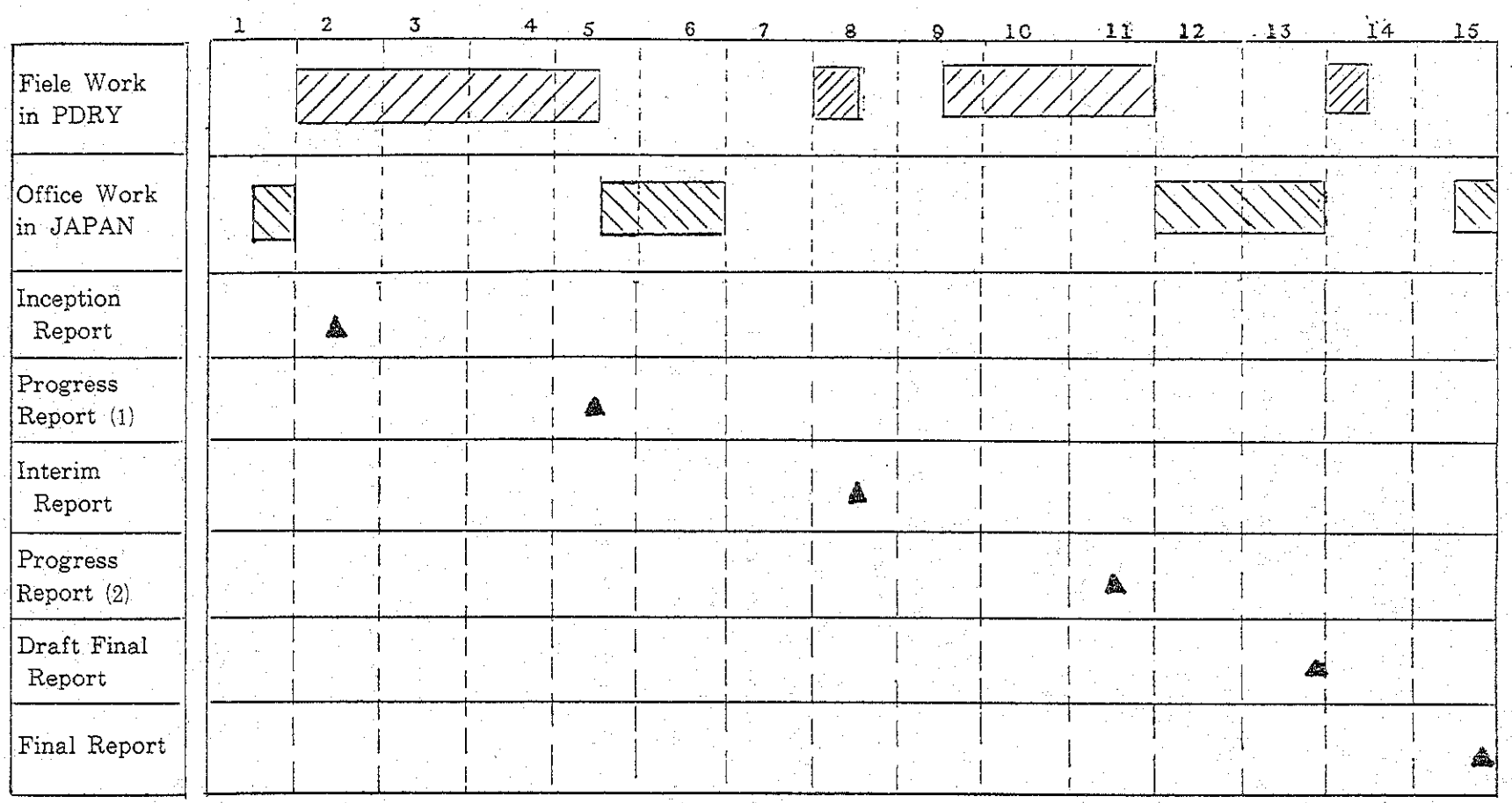
(1) available data and information related to the Study
(2) counterpart personnel
(3) suitable office space with necessary equipment in Aden.
(4) credentials or identification cards
(5) boat for water quality survey.

VII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures :

(1) to dispatch, at its own expenses, Study team to PDRY
(2) to pursue technology transfer to the PDRY counterpart personnel in the course of the Study

VIII. JICA and Directorate General for Local Government shall consult each other in respect of any matter that may arise from or in connection with the Study.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Fiele Work in PDRY
Office Work in JAPAN
Inception Report
Progress Report (1)
Interim Report
Progress Report (2)
Draft Final Report
Final Report

Minutes of Meeting

The Japanese Preliminary Study Team organised by the Japan International Cooperation Agency (hereinafter referred to as "JICA") visited Peoples Democratic Republic of Yemen (hereinafter referred to as "PDRY") and had a series of discussion with the authorities concerned of PDRY, in particular with the Directorate General for Local Government (hereinafter referred to as "DGLG").
As a result of meetings, both sides agreed upon the Scope of Work for a study of the improvement of Ma'alla and Tawahi Sewerage System in Aden, (hereinafter referred to as "the Study"). This minutes of meeting will supplement the Scope of Work.

1. Both sides confirmed that urgent improvement of Ma'alla and Tawahi Sewerage System was important and agreed that minimum possible number of alternatives should be proposed for full consideration in the course of master plan formation to avoid the unncessary delay of the project.

2. Japanese Team requested DGLG to supply 2 vehicles with drivers for the Study and DGLG expressed that it was very difficult since the number of vehicles was limited. However, DGLG would make necessary arrangements for rental of vehicles with English-speaking drivers. (Cost for that would be borne by the Study team).

3. Both sides will communicate each other when necessary by telex. Number of telexes is as follows :

DGLG : 2264 YD MAHLYAT

JICA : Call J22271
(Answer Back Code JICA HDQ J22271
(Attention Second Development Survey Division).

4. Both sides confirmed that the Study team could use the existing laboratories of PDRY for water quality analysis.and all facilities available at Almansura camp.

Aden, July, 17, 1988.

Mr. Mohsin Ali Al Naqeeb.
Deputy General Director
G.D.L.G.

Mr Yasutake KAMEDA
Leader of Preliminary
Study team,
Japan International
Cooperation Agency .

付－4　収集資料リスト

1. Peoples' Democratic Republic of Yemen General Directorate for Local Government Sewerage Sechemes 1981 — 1990

2. Peoples' Democratic Pepublic of Yemen Directorate General for Local Government First Governorate
   Extract from 1977 report on Ma'alla and Tawahi Sewerage Project

3. Greater Aden Development Principal Scheme for the year 2010

4. Tourism in Democratic Yemen

付－5　面会者一覧

Abdullah S. Abaddan	Deputy Minister of Planning
Nagi O. Ahmed	Mayor of Aden Governorate
Farouq B. Shamlan	Director General Directorate General for Local Government (DGLG)
Mohsin A. Nageeb	Deputy General Director Directorate General for Local Governmnt (DGLG)
Rashid A. Ahmed	Ascistant Deputy Director Director for Environmental Health, Aden Governorate
Mohamad Musa	Municipality Director
Hamed Ahmed Mohamed	Director Planning and Statistic, DGLG
Ahmed Saif Abdulmageed	Director Public Corporation for Electric Power