MASTER PLAN AND FEASIBILITY STUDY FOR SEWERAGE AND DRAINAGE SYSTEM PROJECT IN ALOR SETAR AND ITS URBAN ENVIRONS MALAYSIA

VOLUME VI

INSTITUTIONAL STUDY

MARCH 1981

JAPAN INTERNATIONAL COOPERATION AGENCY

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ON
MASTER PLAN AND FEASIBILITY STUDY
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IN
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MALAYSIA

Guide to the Reports

The Reports consist of the following,

VOLUME I	:	SUMMARY
VOLUME II	:	SEWERAGE MASTER PLAN REPORT
VOLUME III	:	DRAINAGE MASTER PLAN REPORT
VOLUME IV	:	SEWERAGE FEASIBILITY STUDY REPORT
VOLUME V	:	DRAINAGE FEASIBILITY STUDY REPORT
VOLUME VI	:	INSTITUTIONAL STUDY REPORT
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LIST OF ABBREVIATIONS

ACP	- Asbestos cement pipe
ASTM	- American Society for Testing Materials
BOD	- Biochemical oxygen demand (3-day, 30 degrees C)
CRCP	- Centrifugally cast reinforced concrete pipe
DE	- Department of Environment, Ministry of Science, Technology and Environment
DID	- Drainage and Irrigation Department, Ministry of Agriculture and Fisheries
DO	- Dissolved oxygen
DWF	- Dry weather flow
EHEU	- Environmental Health and Engineering Unit, Ministry of Health
EPU	- Economic Planning Unit, Prime Minister's Office
ft	- feet
FTCP	- Federal Town and Country Planning
g/cap	- grammes per capita
g/day	- grammes per day
gal	- Imperial gallons
gal/cap	- gallons per capita
gal/day	- gallons per day
GDP	- Gross Domestic Product
GSD	- Federal Geological Survey Department
ha	- hectares
hr	- hours
IBRD	- International Bank for Reconstruction and Development
IMF	- International Monetary Fund
kg	- kilogrammes
km	- kilometres
l/day	- litres per day
l/day/cap	- litres per day per capita
l/sec	- litres per second
m	- metres
m^2	- square metres
m^3	- cubic metres

LIST OF ABBREVIATIONS (Continued)

MADA	- Muda Agricultural Development Authority
mg/l	- milligrames per litre
mil	- miles
MLG	- Ministry of Local Government
mm	- millimetres
MPKS	- Majlis Perbandaran Kota Setar (Municipal Council Kota Setar)
MPN	- Most probable number
MS	- Meterological Station
MSWL	- Mean Sea Water Level
NEB (LLN)	- National Electricity Board (Lembaga Letrik Negara)
p/ha	- persons per hectare
pH	- Hydrogen iron potential
ppm	- parts per million
PVCP	- poly Vinyl chloride pipe
PWD (JKR)	- Public Works Department, Ministry of Works and Utilities (Jabatan Kerja Raya)
RCP	- Reinforced concrete pipe
SDID	- State Drainage and Irrigation Department
SEDC	- State Economic Development Corporation
SEPU	- State Economic Planning Unit
SLO	- State Land Office
SMHD	- State Medical and Health Services Department
SS	- Suspended solids
STCP	- State Town and Country Planning
VCP	- Vitrified clay pipe
WHO	- World Health Organization
yr	- years

CONVERSION FACTORS

Multiply imperial unit by figures in multiplier column to obtain metric (Sl) equivalent; multiply metric (Sl) unit by reciprocal to obtain imperial equivalent.

Imperial Unit	Multiplier	Metric unit	Reciprocal
acre	0.4047	hectare (ha)	2.471
ft	0.3048	m	3.281
ft/s	0.3048	m/s	3.281
ft^2	0.0929	m^2	10.76
ft^3	0.02832	m^3	35.31
ft^3/s (cusec)	0.02832	m^3/s (cumec)	35.31
gal	4.546	litre	0.220
gal	0.004546	m^3	220
hp	0.7457	kW	1.341
in	25.40	mm	0.03937
lb	0.4536	kg	2.205
lb/ft^2	4.881	kg/m^2	0.2049
lb/ft^3	16.03	kg/m^3	0.06243
mile	1.609	km	0.6214
$mile^2$	2.589	km^2	0.3862
ton	1.016	tonne	0.9842
yd	0.9144	m	1.094
yd^2	0.8361	m^2	1.196
yd^3	0.7646	m^3	1.308

INSTITUTIONAL STUDY

CHAPTER 1
SUMMARY

1.1 Introduction

The studies on institutional and management arrangement for the proposed sewerage and drainage system at Alor Setar and its urban environs, Kedah State, are presented in this Chapter. The studies, undertaken in accordance with the Scope of Work and the Terms of Reference agreed upon both by the Governments of Malaysia and Japan, aimed at the creation of a sound and viable local institution in the Project Area to deal with management and operation of sewerage and drainage works in the immediate and long term period up to the year 2000. Considering the importance of institutional arrangement based on the local capabilities, existing situation at the Project Area has been taken into account through field observation and discussions with officials from various agencies concerned.

The Studies contain recommended institutional arrangements together with the organizational structure for a new proposed institution in broad terms with the required staffing schedule, together with reviews on existing legal provisions which will provide supporting basis for implementation of sewerage and drainage administration.

1.2 Summary

Sewerage

i. The studies on institutional and management requirement for the proposed sewerage system have been undertaken with the aim to create a sound and viable local institution in the Project Area which shall deal with construction, management and operation of the sewerage system for the immediate and long term needs up to the year 2000.

ii. Taking into consideration the current situation in Project Area, following four alternatives were suggested and the advantage and disadvantages of such alternative arrangements are analyzed:

1) Creation of a new autonomous statutory body for sewerage by the State Government.
2) The State JKR Water Supply Division takes on the sewerage management as an additional function.
3) Expansion of the existing function of MPKS, by adding sewerage management.
4) Creation of Joint Committee with representative from State JKR, SDID, State Health Department and MPKS.

From the analysis, Alternative 3 was recommended as a most appropriate among other alternatives, and within MPKS, Engineering Division was suggested to be expanded for inclusion of sewerage works.

iii. In order to implement sewerage programme, it is recommended that following new functional units were to be established within Sewerage Section. Such units are:

1) Operation and maintenance
2) Design
3) Construction
4) Laboratory

iv. The estimation of staff required for the proposed sewerage programme from 1981 up to the year 2000 was made as guideline in determining the number of staff to carry out the required function. Total numbers of personnel at the end of every five year are as follows:

1981	1985	1990	1995	2000
15	35	40	45	50

V. Following regulations pertinent to sewerage services were reviewed in terms of their executive and financial power:

1) Local Government Act, 1976.
2) The Street, Drainage and Building Act, 133, 1974.
3) Town and Country Planning Act, 1976.
4) The Environmental Quality Act, 1974.
5) Kota Setar Municipal Council Anti-Litter By-Laws, 1979.

Reviews disclosed that no additional legislation would be needed to expand the powers of sewerage service beyond those provided in the Street, Drainage and Building Act, 1974, and the Street, Drainage and Building Act and relevant by-laws should be adopted by the Kota Setar Municipality for immediate implementation.

For Urban Drainage Project

The institutional arrangement for the urban drainage system project has been studied in a similar approach, in principle, employed taking into account the existing institutions related to drainage activities and considering the work activities which require direct involvement of Municipality, MPKS is recommended to undertake the construction and also maintenance of proposed urban drainage system. The required personnel for the proposed drainage project has also been suggested for the different agencies in respect of construction and maintenance.

The availability of the regulations to support the proposed drainage activities was studied and all existing regulations valid for the proposed sewerage system, that is, The Drainage Works Ordinance, 1954, The Irrigation Areas Ordinance, 1953, Water Enactment No. 129 Kedah, 1960, are found applicable to the drainage works, when gazetted.

CHAPTER 2
INSTITUTIONAL ARRANGEMENT

2.1 For Sewerage System Project

2.1.1 Background and Present Situation

Alor Setar is the capital of the State of Kedah, serving as the institutional, commercial and transportation center in the State. The Study Area covers approximately 3,300 ha. In 1979, there were 136,600 people inhabited in the city. Recently development of both commercial and residential sectors in the city has been influencing the area with rapid urbanization, accompanied by corresponding increase of population.

There is no organized modern sewerage system in the Project Area presently except for rudimentary disposal system as septic tanks, night soil bucket collection and surface drain, which are operated and maintained by the Municipal Council Kota Setar. As to the drainage system, the city has been provided, although there is room for improvement, with trunk (mostly natural streams) and secondary drains constructed and operated by State DID (MPKS also looks after some part of drainage facilities). Recently a drainage master plan was prepared by State DID with its own funds and forces. The government institutions which are directly involved in the existing sewerage and drainage activities in Project Area are, i) the Municipal Council Kota Setar with its Engineering and Health Divisions, ii) State Drainage and Irrigation Department, and iii) State JKR. When overall sewerage and drainage system in the Project Area is established, an administrative organization sufficient to manage operation and maintenance of the system becomes necessary.

2.1.2 Review of Existing Institutions

THE FEDERAL GOVERNMENT

At the Federal level, several Ministries are involved in the provisions of public services, utilities and environmental control that have a direct bearing in sewerage and drainage in the country. The Ministries have, under them, Departments that specialise in their respective field of services. Most of these Departments have regulatory powers which relate directory to their field of operations. They have branches operating in the respective States. Administratively these branches are under their respective Ministry in the Federal Government, but are responsible to the State Governments in cooperating and participating in various programmes of utilities in the States.

Major administrative bodies in Federal level which are closely related to this Project are:

1) The Economic Planning Unit, under Prime Minister's Office,
2) The Environmental Health and Engineering Unit, under the Ministry of Health,
3) The Drainage and Irrigation Department, under the Ministry of Agriculture and Fisheries,
4) The Ministry of Local Government,
5) The Department of Environment, Ministry of Science, Technology and Environment, and
6) The Public Works Department, under the Ministry of Works and Utilities.

The Economic Planning Unit (EPU) is a central planning agency for planning socio-economic development programmes in the country, including the Third Malaysia Plan (1976 - 1980) now under implementation. The EPU in its Urban/Regional Development and Infrastructure Division is in charge of development of sewerage and drainage scheme for States together with other infrastructural facilities, inclusive of the provisions of

necessary budget allocation. The EPU not only plays a major role in the coordination of studies of large project but also undertakes negotiations for foreign technical and capital assistance for these projects in conjunction with the Treasury. At State level, the EPU advises the State Government on development plans in the state. The State EPU formulates plans for economic development, especially that of industrial development and urban housing development.

The Environmental Health and Engineering Unit (EHEU) is one of the divisions in the Ministry of Health, and is responsible, together with the additional duties involved, for sewerage and rural sanitation aspects. EHEU was established in 1969 and is mainly concerned with the public health engineering aspect of environmental control, namely in rural environmental sanitation, urban sewerage, solid waste disposal, environmental quality control and radiation protection service. EHEU is also responsible for planning, technical and logistic support and supervision of the rural environmental sanitation programme for Peninsular Malaysia and for the development of rural water supplies.

The Drainage and Irrigation Department, a division in the Ministry of Agriculture, is in charge of irrigation and drainage programmes in the country. The Department also provides the necessary assistance, guidance and coordination in the development and improvement of major waterways and trunk drains for the major towns of the country.

The Ministry of Local Government is in charge of local government affairs in the various States being responsible for administrative guidance for and coordination of local government authorities including coordination between the local authorities and the Economic Planning Unit of the Prime Minister's Office. It processes applications for loans and schemes of proposed projects and forwards them to the EPU together with its recommendations.

The Division of Environment, Ministry of Science, Technology and Environment was established in 1975 as a sole agency responsible for

conservation of the environment quality in accordance with the provision of the Environmental Act prepared in 1974. The Department is, in coordination with the Environmental Health and Engineering Unit, Ministry of Health, concerned with pollution control programme in the national parks and public water bodies such as seas, rivers, ponds and streams and is responsible for preparing legal provisions necessary for implementing the programme.

The Public Works Department, Ministry of Works and Utilities (Federal JKR) serves as a coordinating, advisory and information centre to the State JKR. The Federal JKR renders general assistance to the State JKRs in the form of coordination, information, advice, design of works and the provision of standard drawings. The Water Supply branch of the Federal JKR is the consulting, designing and coordinating agency for the Federal Government and provides advisory services to the State JKRs on all matters relating to water supplies.

THE STATE GOVERNMENT OF KEDAH

The State Economic Planning Unit (SEPU) is in charge of planning socio-economic development in the State, by keeping close relationship with Federal EPU. The State EPU is keeping close contact with other related agencies on economic matters such as the State Department Office, which is in charge of implementation of all projects in the States, and the State Economic Development Corporation, which is a corporation formed by the State Government and is in charge of socio-economic development with the main objective of expediting Bumiputra Participation. SEPU is finalizing economic development in the State through such coordination, and submits State programme for inclusion into Malaysia Plan of the Federal EPU.

The State Medical and Health Services Department is the agency in charge of public health programme including environmental sanitation matters in the State of Kedah, together with its medical facilities. It

offers advice and assistance for the municipal councils improvement of the health of the people and also undertakes sanitary activities in the rural areas on behalf of the local district councils.

The State Town and Country Planning is in charge of city planning. As the urban areas in the State of Kedah including Alor Setar are in the way of rapid urbanization influenced by commercial and residential sector developments, the State TCP is heavily involved in activities relating to urban planning, particularly by clearing plans presently submitted by private developers. The State TCP is responsible to develop and plan for future town scheme by coordinating and consulting with other Government agencies concerned, which will serve as a criteria for immediate and both future development of the city by public and local sources.

State JKR is in charge of planning construction and supervision of general civil works such as construction of roads, roadside drains, bridges and water supply facilities in the State under the coordination with the Federal JKR which is, in general terms, the advisory and information centre to the State JKR.

The State Drainage and Irrigation Department is in charge of construction and maintenance of both irrigation and drainage facilities for agricultural purposes and advisory services to drainage works in urban areas. For urban drainage system, at present(1979) the state DID is responsible for construction and operation of the major trunk drains covering the catchment areas of more than 100 acres, as agreed among the agencies concerned, while the small drains will be the responsibility of the local government.

The State Economic Development Corporation (SEDC) is the implementation body of the EPU, and is in charge of implementing industrial development in urban areas within the Kedah State. The development of Mergong Industrial Estate now going on in Alor Setar is under the SEDC control and direction. SEDC is also implementing industrial developments for other 5 cities such as Sungai Petani, Kuala Kedah, Tikam Batu, Baling, and Kulim.

The Survey Department Kulim, Kedah, is the branch office of the Federal Government, and is responsible for drawing maps for both State of Kedah and Perlis.

The Muda Agricultural Development Authority (MADA), a member of steering committee is an integrated organization established by ordinance in 1970 and confirmed by Act of Parliament in March 1972. Implementation of Muda Irrigation project started in 1966 by the co-ordinating office which was later replaced by the MADA with the source of fund, of which 40 percent was furnished by IBRD loan and 60 percent from the Federal Government, and completed in 1970. MADA has been implementing the country's largest irrigation project providing irrigation facilities for a net area of 960 km2 (237,000 acres), and by double cropping it supplies about half of Peninsular Malaysia's demand for rice.

THE LOCAL GOVERNMENT

Majlis Perbandaran Kota Setar (MPKS) was, by the Local Government Act (Act of Parliament 171), upgraded in February 1978 to administer the whole state of Alor Setar, 256.56 sq mile from former status of the District Council of Kota Setar. Before 1958, the area was administered by the Sanitary Board under the State Government. The Board controlled sanitation and health matters. In 1958, Town Board was formed as a financially autonomous body, by the Town Board Enactment.

In 1963, Town Council was formed in accordance with enforcement of local councilors' election. Town Council was restructured by the Act of Local Government, amalgamating 10 other councils, and in 1976 the District Council of Kota Setar was formed under the Act of Local Government.

The annual budget of MPKS is M$ 4 million, the major source of revenue being derived from the house assessment tax, rental and licensing fee. MPKS has been provided with the grants from the Federal and State governments, but the amount is negligible. As to the organization, there

are five divisions, namely, Health, Engineering, Legal, Finance, Administration and Personnel. There are presently 630 staff in total. The Health Division of MPKS is in charge of sanitary control in the area, collecting and disposing of night soil and septic tank deposits. Engineering Division undertakes infrastructural projects through its two sections: 1) Planning and Development Section, and 2) Building Section. Planning and Development Section deals with 1) project planning, 2) project implementation, 3) maintenance services to all the municipal buildings and engineering structures, 4) traffic system operation and maintenance and 5) town beautification. Building Section deals with 1) development of housing scheme and 2) improvements of existing housing.

2.1.3 Recommended Institutional Arrangement

i) General

Alor Setar has undergone rapid developments for the past few years and more developments are expected in the immediate future. Various activities, both commercial and industrial, have increased sharply, which will achieve the aim of making Alor Setar as a regional centre. The need for sewerage system for the city is evident and when it is constructed, reasonably efficient set-up has to be there for operation.

ii) Evaluation of Alternative Organization Arrangements

Considering the current situation in Project Area, basic organizational requirements and other factors, the following four alternatives are suggested and the advantage and disadvantages of the various possible alternative organizational arrangements are outlined below.

1. Creation of a new sewerage autonomous statutory body by the State Government.

2. The State JKR Water Supply Division takes on the sewerage management as an additional function. This means the expansion of the Water Supply Division of JKR to include the sewerage function.
3. Expansion of the existing function of MPKS, by adding sewerage management.
4. Creation of Joint Committee with Representatives from State JKR, State DID, State Health Department, and MPKS.

Table 1 shows the comparison of the proposed alternatives in terms of 5 criteria for evaluation. Under Alternative 1, the Sewerage Authority is an autonomous statutory body created by the State Government and should be capable of achieving the desired objective as stated earlier. The independence of the Authority from the other agencies as a body solely responsible for the sewerage system should produce strong capability and centralized enforcement for overall performance and direct control. The serious disadvantages of this approach are that a tremendous initial effort is required and also that the legislative and administrative procedures required are time-consuming, and establishment of such organization may not be justified when no other municipalities in the State of Kedah except Alor Setar will have sewerage facilities in the foreseeable future.

Alternative 2 proposes amalgamation of the new organization into JKR's Water Supply Division. Presently, the Water Supply Division of JKR handles the water supply business including billings and collections in the Study Area. It seems much easier and time-saving if the sewerage administration be done together with that of the water supply. Less initial effort and funds are required to expand the Water Supply Division in the JKR to include the sewerage functions. Only additional staff are required. However, legislative factors seem to be the main obstacle which will prevent the JKR from incorporating a new sewerage function.

Table 1. Comparison of Proposed Alternative Organization

	A1	A2	A3	A4
1. Possibility of minimizing:				
a) initial effort needed to create new organization	No	Yes	Yes	Yes
b) initial funds needed to create new organization	No	Yes	Yes	Yes
c) initial recruitment of personnel	No	Yes	Yes	Yes
2. Possibility of retaining ability for revenue collection	Yes	Yes	Yes	No
3. Possibility of economizing operation and administration expenditures by coordination of other administrative department	No	Yes	Yes	Yes
4. Possibility of existing regulations providing sufficient legal basis	No	No	*Yes	Yes
5. Conformity to Government Intentions as expressed in the Local Government Act, 1976	No	No	Yes	No

Note: A1 : Alternative 1 - Creation of a new sewerage automonous statutory body created by the state government.

A2 : Alternative 2 - Addition to State JKR Water Supply Division with sewerage management.

A3 : Alternative 3 - Expansion of existing function of MPKS.

A4 : Alternative 4 - Creation of Joint Committee with representatives from State JKR, SDID, State Health Department, MPKS.

* : Street, Drainage and Building Act.

Alternative 3 is, based on the legislation of Local Government Act. 1976* to let MPKS undertake the sewerage system operation by expanding its existing functions. It can be significant to save initial effort required to put a new organization. This alternative, however, requires a special accounting arrangement so that the revenue and expenditure for this project can be treated separately.

Alternative 4 proposes a Joint Committee comprising of representatives from the State JKR, State DID, State Health Department and MPKS. This approach has the advantage that less initial effort is needed to create such organization and also invaluable experience of the various representatives from the different departmental agencies are available. However, the Committee, by its own nature, will never have administrative capability similar to either one of the above referred alternatives, which makes this proposal to be not realistic and practical for implementation.

Detail analysis and discussions with the agencies concerned disclosed that Alternative 3 is the most feasible one. The major reasons are summarized as follows:

1. At present, all the sanitary facilities are provided and maintained by the Health Division of the MPKS which is also responsible for review of plans in connection with the approval of sanitation facilities for housing development schemes in Alor Setar. Taking over such function from the Health Division to proposed sewerage division will not entail any major drastic organizational changes as are required in the other alternatives.

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* (1) Construction and operation of sewerage system is under the responsibility of Local Government.

(2) Local Government is also responsible for maintaining sanitation which has much to do with sewerage system.

2. It is inappropriate at this stage to propose the creation of an entirely new regional organization in the Project Area because of the difficulties to proceed on adequate legal basis and to obtain adequate funds as well as qualified personnel. Such approach can be considered at a later date when sewerage system is developed to cover all of the city boundary and the size of the work for operation and maintenance, fee collection and other administrative matters warrants creation of such organization. For the immediate consideration, the expansion of the existing function of MPKS is the most realistic plan to pursue.

From the above analysis, Alternative 3 is considered most appropriate among other alternatives, and this is recommended for a new organization for the proposed sewerage system.

2.1.4 Organization Structure of New Proposed Organization

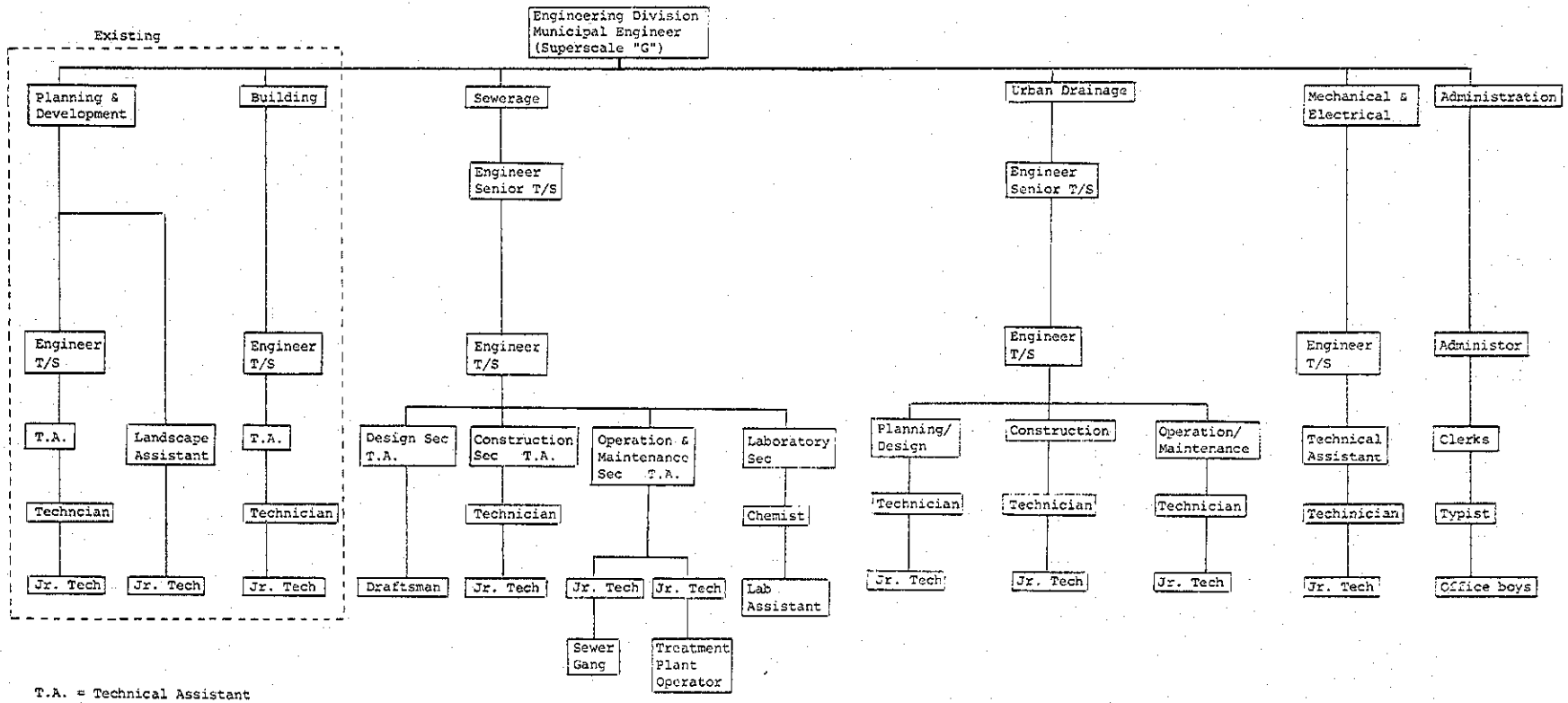
Although existing sanitation works such as disposal of septic tanks and night soil bucket collection are under the Health Division, the present practice is faded one, because sewerage system will replace the present system in the near future.

It is recommended that operation of sewerage works be added as a new function to the existing Engineering Division of MPKS. The purpose, objectives, functions and area of jurisdiction of this newly expanded division should be clearly stated in an organization chart or manual.

The new organizational structure proposed for the Engineering Division of MPKS is shown in Figure 1.

The Division will consist of six main departments, adding four departments, namely two major departments of sewerage and urban drainage, and two other coordinated departments of mechanical/electrical and administration, to the existing departments of planning/development and building.

Figure 1 Proposed Expansion of Engineering Division



T.A. = Technical Assistant

Jr. Tech = Junior Technician

The organizational expansion will bring major changes into the present structures of the Division. In particular, policy making and its transmission to all the staff in order to maintain effective control in implementation of sewerage activities shall be maintained in compliance with the new organization. Besides, a well established management is essential. Management from top to middle lines should be so designed as to function effectively as well as controlling operations and coordination of the Division.

Additional staff are to be recruited to fulfil the posts that will arise. For such posts, adequate description of the job functions and the area of responsibility are to be prepared. In driving such recruitment plan, it is important to have man specifications to ensure that only eligible and suitably qualified personnel be employed. Arrangement should be made for employee training and training programmes of either inside or outside of MPKS are to be initiated and carried out for the staff, especially those for newly joined.

The newly expanded Engineering Division should coordinate closely with the Finance Division, since a separate accounting system exclusively for sewerage system operation is suggested to be arranged in Finance Division to perform financial function properly for sewerage activities separated from others.

The coordination with the Health Division is also maintained. Preferably the new Division should take over the sanitary functions from the Health Division by stages over a period of say, 2 years. This gradual takeover will not pose a sudden burden on the Engineering Division and will make the task easier.

2.1.5 Functions, Staff Requirements and Training

(a) New Functional Units

Sewerage Department in Engineering Division should be divided into functional units. The functional units recommended are:

1. Operation and Maintenance Section

This section should be responsible for operation of the treatment plants, pumping stations and the sewers and consists of 2 units i.e. (i) Treatment Facility and Pumping Station Unit and (ii) Sewers and Drains Unit.

The former will be responsible for proper operation and maintenance of treatment plants and pump stations to achieve desired quality of sewage effluent and proper disposal of plant effluent as well as uninterrupted conveyance of sewage. This unit will also be responsible for the maintenance and repair of the treatment plant works and equipments to keep them in good working condition including pumps, structures and plant premises.

Sewer Unit will be responsible for proper maintenance of the public sewers by conducting routine inspection for physical damage and obstruction in the sewers including control of the illegal discharge from industries and septic tanks into main sewers.

2. Design Section

This section will be responsible for preparation of engineering design and specification of all sewerage projects, and also responsible for check and approval of sewerage design plans submitted by developers. This section will also undertake to accept tenders for the construction of sewerage and smaller system including service connection with cost estimation, drawings and reproduction of engineering plans and the issuance of permits for new service connections requested by the owners of building.

3. Construction Section

This section will be responsible for management and supervision services of all new construction works with field inspection to assure compliance with required specification and standards.

This section will also be responsible for supervision of construction of house connection including plumbing done by house-owners.

4. Laboratory Section

This section will be required to conduct monitoring and surveillance on water quality of industrial wastes, sewage and stabilization pond effluents.

Further, the section will monitor the followings:

1) Operation of stabilization pond systems, the data from which will be applied for the improvement of their operation and/or system themselves.
2) Water quality of drains and streams and the receiving waters of pond effluents, the data from which will be used to assess the effects and influences of the established sewerage system on the environmental water quality.
3) Monitoring and controlling waste effluents discharged from Mergong industrial estate.

Urban Drainage Department

The Engineering Division is also recommended to handle urban drainage activities in the administrative area of Alor Setar. The detail description of the department is given in Section 2.2 for Drainage System Project.

Mechanical and Electrical Department

The Department will be responsible for operation and maintenance mechanical and electrical equipment of pumping stations in the sewerage and drainage systems.

Administration Department

General administrative matters related to sewerage and drainage activities will be handled in the department.

The incorporation of a new sewerage management will not only involve the Engineering Division but also other divisions in MPKS which are required to extend their functions and responsibilities to assist the new Engineering Division.

Administration and Personnel Division

This Division should be responsible for the selection and recruitment of the new staff especially in preparing job specification, vacancy notice selection and appointment procedure.

Finance Division

This Division is presently undertaking financial control under a single system for all activities in the MPKS. However, a separate accounting and financial system for the sewerage including budgeting, billing and collections by the cooperation of JKR Water Supply Division in case sewerage fee will be collected on water rate surcharge and the maintenance of accounting records should be maintained. An important function to be included is the handling of a loan administration since the sewerage work may receive Federal and external loans for initial construction. The Division should be responsible for the systematic and efficient control of the cash flow for the sewerage programme.

Health Division

Until the proposed sewerage system replaces the night soil collection and spetic tank systems with completion of the Project, there will be need for continuation of some activities of this Division coordinating with the new sewerage organization.

Legal Division

This Division may be required to expand its functions necessary for proper administration of legal aspects of the new systems.

In addition to the above Divisions of MPKS, the following existing department of Kedah State Government is proposed to collaborate with MPKS.

Water Supply Division, JKR

It is recommended that sewerage charge be calculated on the basis of water rate surcharge which will be made in accordance with the volume of water used. Therefore, the cooperation of State JKR which is now handling the water supply services, is required for billing and collecting of sewerage charge on behalf of the MPKS. In this connection, agreement be made between the two agencies on system procedures of transferring the amount of collected charges and its administration fees etc.

(b) Staff Requirement

The estimation of staff required for the proposed sewerage programme from 1981 up to the year 2000 is presented in Table 2 as guidelines in determining the number of staff and labours to carry out the required functions.

The staffing estimates show a total of 15 in the initial year of 1981, 40 in 1990 and 50 in 2000. The staffing plan is showing minimum level of requirement, and this should be considered as the basis for recruitment of personnel by MPKS and alternative plans can be considered to meet such requirement, particularly, in case of insufficient capability of the staff in Design Section and Construction Section, engineering consultants may be retained to undertake detailed design and preparation of tender documents and subsequent supervision of construction.

Table 2 Schedule of Estimated Staff Requirement

Job Title	Number of Staff Required at the End of Year											
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1995	2000
Sewerage Works Dept.												
Dept. Head Engineer	1	1	1	1	1	1	1	1	1	1	1	1
Secretary-Typise	1	1	1	1	1	1	1	1	1	1	1	1
Design Section												
Section Head Engineer	1	1	1	1	1	1	1	1	1	1	1	1
Design Engineer T.A. Designer	-	-	2	2	2	2	2	2	3	3	3	3
Operation & Maintenance Section												
Section Head T.A.	1	1	1	1	1	1	1	1	1	1	1	1
Assistant Engineer T.A. Technician (Mechanical)	-	-	-	1	1	1	1	1	1	1	2	3
Assistant Engineer T.A. Technician (Electrical)	-	-	-	-	1	1	1	1	1	1	2	3
Sewer Gang.	2	2	13	13	13	13	13	13	13	13	14	14
Construction Section												
Section Head Engineer	-	-	1	1	1	1	1	1	1	1	1	1
Inspector (Cleark of Works) T.A.	2	2	2	2	2	2	2	2	2	2	2	2
Laboratory												
Chemist	-	-	1	1	1	1	1	1	1	1	1	1
Laboratory Assistant	-	-	1	1	2	2	2	2	2	2	2	5
Sub-total	8	8	24	24	25	25	25	25	25	25	31	36
Administrative Supporting Staff needed in existing organization units of sewerage programme												
ADMINISTRATIVE DIVISION												
Personnel Officer	1	1	1	1	1	1	1	1	1	1	1	1
Clerk	1	1	2	2	2	2	2	2	2	2	2	2
Sub-total	2	2	3	3	3	3	3	3	3	3	3	3
FINANCE DIVISION												
Budget Officer	1	1	2	2	2	2	2	2	4	5	7	7
Accounting Officer	2	2	2	2	2	2	2	4	4	4	4	4
Cash Clerk	2	2	3	3	3	3	3	3	3	3	3	3
Sub-total	6	6	7	7	7	7	7	7	11	12	14	14
Total Number Required	15	15	34	34	35	35	35	35	39	40	45	50

The followings are suggested qualification and job description of each personnel listed in Table 2. Schedule of Estimated Staff Requirement.

Position	Qualification	Job Description
Engineering Division		
Municipal Engineer (Superscale "G")	Bachelor's degree in Sanitary or Civil Engineering. An advance degree in either of the two fields is preferable. Work experience of at least 12 years in the field of engineering including an administrative and supervisory capacity in public utility operations.	To be responsible for the overall operations of the Divisions and to report to the President the results of operation.
Sewerage Works Dept.		
Dept. Head (Senior T/S)	Bachelor's degree in Sanitary Engineering with 10 years job experience.	To perform sound project planning and undertake project construction in the most effective and economical manner. To manage sewerage operation. To supervise all activities related to sewerage works and liaise with other departments representing his department.
Secretary Typist	Diploma on high school certificate	To assist Dept. Head in day to day administrative works including documentation and filing.
Design Section		
Section Head (Engineer T/S)	Bachelor's degree in Civil or Sanitary Engineering with 4 years job experience	To be responsible for all activities related to designing and engineering specification, supervising design engineer and draftmen.
Design Engineer (Engineer T/S)	Bachelor's degree in Civil or Sanitary Engineering with 2 years job experience	To prepare plan and design for the construction, improvement, repair of sewerage facilities including house connections.

Position	Qualification	Job Description
Draftman	Diploma on high school certificate	To assist design engineer in preparing drawing and other miscellaneous works.
Operation and Maintenance Section		
Section Head (Engineer T/S)	University degree in Sanitary Engineering with 7 years job experience	To supervise the operations and mainteannce of the sewers and pumping stations to ensure interrupted sewer service to users. To be responsible for all other activities related to maintenance/operation of sewerage system.
Construction Section		
Section Head	Bachelor's degree in Civil Engineering with 8 years experience	To supervise all construction work of sewerage facilities.
Inspector	Diploma on technical high school certificate	To inspect the equipments and materials for the construction to be in conformance with technical specification including house connection and public sewers laying.
Laboratory Section		
Chemist	Bachelor's degree in Chemistry or Sanitary Engineering with 5 years job experience	To manage and maintain laboratory services sufficient to make regular monitoring tests to monitor the quantities and qualities of wastewaters discharging to and in the sewerage system and the effluents from sewage treatment plants.
Laboratory Assistant	Bachelor's degree in Chemistry with 2 years job experience	Under the direction of chemist, to be engaged in collection of water and water quality examination for drains and stabilization ponds.

Position	Qualification	JOB Description
Mechanical and Electrical Dept.		
Engineer (Mechanical)	Bachelor's degree in Mechanical Engineering with 5 years job experience	To be engaged in maintenance and operation of treatment and pumping stations including control and repair of cleaning machines and trucks, and to be responsible for the safekeeping of all maintenance equipment.
Engineer (Electrical)	Bachelor's degree in Electrical Engineering with 5 years job experience	To be engaged in the control, monitoring and repair of all electrical equipments pertinent to treatment plant and pumping stations, and to be responsible for the safekeeping of all maintenance equipment.
Sewer Gang	No specific qualification is required	Cleaning of facilities Elimination of scum in sedimentation cell, and screen of pump station and scum and floating grass in ponds. Cleaning of the premises of treatment plant and pump station.
Administration Division		
Personnel Officer	University degree in administration or liberal arts	To be responsible for recruitment of new staff and administration for personnel assignment and wage control.
Clerk	Diploma on high school certificate	To be engaged in day to day works to assist the personnel officer including filing and documentation.
Finance Division		
Budget Officer	Bachelor's degree in accounting or administration with 5 years experience	To be responsible for loan administration and reimbursement programming for sewerage project.

Position	Qualification	Job Description
Accounting Officer	Bachelor's degree in accounting with 3 years experience	To be engaged in day to day cash flow administration including billing and collection of sewerage charge in close liaison with budget officer.
Cash Clerk	Diploma on high school certificate	To be engaged in day to day accounting work under the direction of budget officer and accounting officer preparing and filing the accounting record.

(c) Training Programme

INTAN (The National Institute for Public Administration) is, under Prime Minister's Office, a sole agency responsible for providing training programmes for public servants in whole States of Malaysia, with objectives of improving managerial standards of civil service in Federal, State and Local Government levels. While it provides different kinds of seminars on administrative and managerial field for middle and top managements in organization, the Agency also presents training courses covering wide range of field in public service for personnel newly employed. The Agency sends applications to all government institutions in Malaysia, inviting candidates to participate in the programmes. According to the information obtained at INTAN headquarters in Kuala Lumpur, the Agency has been providing programmes on development projects on infrastructural secotr and other training programmes related to sewerage project. It has been also confirmed that INTAN is now considering to provide operator training and executive development programmes on sewerage and sanitation control in the near future.

It is recommended that INTAN be advised to plan for adequate training programme for professional and sub-professional personnel engaged in sewerage work and prepare for maximum attendance from MPKS for such programme. In addition to above training programme already established other practices for training purposes are recommended such as transfer of advanced technology from foreign consultants to be achieved by job training involving in consulting services related to sewerage project.

It is also recommended that sewerage treatment operators be sent for training in treatment plants for the agreed period of time in Kuala Lumpur, or Penang, where technical know-how and accumulated experience on sewerage operation and management have been gained.

2.1.6 Coordinating Committee

MPKS is recommended to establish a Coordinating Committee consisted of representatives directly involved in sewerage programme in Project Area in, (1) MPKS, (2) SDID, (3) JKR, (4) SEPU, (5) STCP and (6) EHEU in order to maintain inter-agency coordination and collaboration on the matter of sewerage work implementation, and to meet with their representatives periodically.

2.1.7 Future Modification

The foregoing recommendation for institutional arrangement is considered best suited for implementation in the foreseeable future, under the present situation with which the present study has been conducted. However this recommendation should be considered flexible to any modification, as in case of any other long range projection, which may be considered necessary according to the changes of the situation up to the year 2000. MPKS and State Government should be prepared to give due consideration on the need of new organizational set-up according to the changing requirement.

2.2 For Drainage System Project

2.2.1 General

This chapter deals with the institutional and administrative arrangement to be required for the proposed urban drainage system development to be implemented from 1981 to 1985 for the urban area of Alor Setar. The main objectives of this study are to recommend

1. The government agency/or agencies to undertake the construction and maintenance/operation of proposed drainage system.

2. Organizational arrangement including assessment of personnel and functional requirement.

In addition to above recommendation considerations on the legal and managerial arrangement are made.

2.2.2 Review of Existing Agencies Relevant to the Proposed Drainage System Project

Drainage and Irrigation Department (DID), Federal Government

This department is under the Ministry of Agriculture and Fisheries and functions as a headquarter of all State Drainage and Irrigation Departments. They are supervising and giving necessary support for the activities of the State DISs such as development, maintenance and improvement of land drainage, agri-drainage, mining drainage, irrigation and river conservancy. As for the major drainage scheme in local States, Federal DID is involved in the design works whenever required by States. Training of Federal as well as State engineers and specialists relevant to DID's activities is also provided by Federal DID. The major mechanical works are undertaken by Ipoh Workshop including design, construction, operation and maintenance of the mechanical equipments. This Ipoh Workshop maintains a Federal Store which hold sufficient stocks of major mechanical equipments and spares.

Drainage and Irrigation Department (DID), State Government of Kedah

State DID is normally responsible for planning/design, construction as well as maintenance of irrigation channels, canals and drains for the agricultural development in rural areas in addition to the maintenance of natural rivers and trunk drains with catchment area over 40 ha (100 acres). State DID is, however, being required to be involved in the urban drainage activities to correspond to the increasing need of urban drainage development under the flood mitigation programme. The major design works which require engineers with substantial field experience and desirable qualification are undertaken by design office of Federal DID as mentioned in previous paragraph. The existing organization is presented by Figure 2.

One of the main functions provided by State DID are survey works, general investigation and preparation of project plans proposed. Such survey works include collection, analysis and interpretation of hydrological data related to river conservancy, flood mitigation, and coastal protection. As indicated in Figure 2 the engineers are assigned largely in three District Division, i.e. North District, Central District and South District Divisions. In each District Division the Staff are distributed for further zonal and areal assignments,

Municipal Council of Kota Setar, State of Kedah (MPKS)

The Municipal Council administer the whole district of Alor Setar covering 256.56 sq mile including the urban area proposed for drainage system development project. There is presently no clear functional set up for activities relevant to drainage control in the administrative boundary of MPKS. They are, however, providing rudimentary maintenance services for existing secondary and infrastructure drains. The construction of such drains are normally undertaken by private developers under contractual base.

Public Works Department, State of Kedah (JKR)

This department is in charge of water supply works and general civil works including construction of roads, roadside drains, bridge and facilities related to water supply works in the whole State including urban area of Alor Setar.

As for the present activities related to the drainage system, they are mainly responsible for the construction and maintenance of roadside drains pertinent to Federal and State roads. They can participate, however, in the construction of infrastructural drains as a part of development project of industrial estate if requested by Federal or State government. They have no section specifically responsible for the drains and the personnel in road section is taking care of the roadside drains incidental to their road works. The private contractors are normally retained by State JKR for the construction as well as improvement of the drains to support the department which maintains no sufficient engineers and equipments necessary for drainage works.

Muda Agricultural Development Authority (MADA)

This agency was established in 1970 for the successful completion of Muda Irrigation Project licated in the State of Kedah and Perlis in the northwest of Peninsular Malaysia with the primary objective to achieve double cropping of paddy in the area. This agency has, hence, been operating the irrigation system and supplying agricultural service to the farmers. As for the proposed urban drainage project MADA has no direct adminstrative implications in the urban drainage works while there will be some physical or technical impacts on the planning of the drainage in the project area contributed by a tidal barrage and irrigation dam outside the project area controlled by MADA which will affect the water flow of the proposed drains.

2.2.3 Proposed Agency to Execute the Drainage System Project

After reviewing the existing organization and present practices dealt with drainage activities in and around the area of Alor Setar and its urban environs the following three alternative approaches are considered to assume the potential responsibility for the proposed project with assumption that the present role of JKR will remain intact continuing to be responsible for construction and maintenance of Federal and State roadside drains, which are not included in the proposed project.

Alternative I

In this Alternative Drainage and Irrigation Department (DID), State of Kedah is assumed to undertake the full responsibility of the construction and subsequent maintenance and operation of drainage system.

Alternative II

Municipal Council of Alor Setar is assumed in this Alternative to undertake full responsibility of the construction and subsequent maintenance and operation of drainage system.

Alternative III

State DID is assumed to undertake the responsibility for the construction of all the drainage system, excluding Federal and State roadside drains, together with maintenance and operation of trunk drains only, and MPKS is assumed to be responsible for the maintenance of the secondary and infrastructural drains constructed by State DID.

Comparision of Alternatives

Each alternative as mentioned above has advantage and disadvantage with regard to possible problem and requirement in the implemention of the project such as funding, personnel recruitment and political or

legal implications. The executive organization to be proposed is to meet the requirement mentioned above, which, at the same time should be brought into in the area without any difficulty at an earliest possible occasion. Further descriptions of each alternative are presented as follows for the comparison purpose.

Alternative I

This Alternative is based on the existing capability of State DID to undertake the proposed project in terms of past similar experience in construction of drains with necessary contract documentation and further close liaison with Federal DID headquarter which will facilitates the funding arrangement.

The engineers necessary for the proposed project can be partly arranged or seconded by the Federal headquarters. The only disadvantage may be that this alternative has legal or political constrains. The function of Drainage and Irrigation Department is in principle limited to the activities dealt with irrigation, agri-drainage, river conservancy and those water channels more or less related to development or maintenance of agri-products and paddy. The secondary drainage or infrastructural drains in the town area are supposed to be dealt with by the local government body who administer such town area.

The DID can be involved, however, in the drainage in urban area when the local agency requests them to undertake the drainage works and/or when there arises a flood problem in the area. In the latter case the DID can be justified to undertake drainage works under flood mitigation probramme which empower DID, in accordance with Federal Government policy to undertake drainage works even in the urban area.

Alternative II

This Alterantive is based solely on the legislative implication of the urban drainage. The proposed drainage project is to construct or

improve the drainage system in the urban area of Alor Setar where the Municipal Council of Alor Setar is administratively responsible for any public utility services in compliance with the Local Government Act. The major disadvantage is a limited experience and potentiality for immediate mobilization of fund and required personnel for the drainage works. It may be a great burden for MPKS to assume a responsibility to undertake a project in the immediate future unless a substantial preparatory period is provided.

Alternative III

This Alternative is assumed basically in compliance with existing practice of drainage activities for the purpose of implementing the proposed First Phase construction program, in that DID will continue to be responsible for construction and maintenance of trunk drain and MPKS will be responsible for the secondary and infrastructural drains. However, due to the lack of expertise and personnel at the present in MPKS, construction of the secondary and infrastructural drains proposed for First Phase program are recommended to be undertaken by DID together with trunk drain construction program. Their maintenance will reasonably be handled by MPKS with its experience for rudimentary services thus far.

2.2.4 Recommendation on Organizational Arrangement

As is described in the previous section of each alternative, it seems that Alternative III is considered to have reasonable ground, at the present time, among others in terms of overall evaluation. However, considering the fact that so far the local authority is empowered to maintain and carry out infrastructural facilities including urban drainage in accordance with the Local Gobernment Act, and the recent strong guidance of the Federal Government to comply with the above, Alternative II is, in that sence, deemed eligible under the current development of the local government authority. Although there is a financial burden, MPKS is to be rested with responsibility for the execution of the proposed project. For the purpose of assisting MPKS, the inter-agency coordination should be closely be maintained by possibly establishing a coordination committee with representative from State DID, State JKR and MPKS for detailed arrangement of program implementation for the proposed First Phase drainage construction of its financing arrangement.

MPKS is recommended to modify the existing organization and strengthen the personnel to adequately cope with the immediate responsibilities. The functions and personnel to be newly required for the project is presented as follows.

Functions

1. Planning/Design

This function perfomrs development of plan and preparation of engineering design and specification necessary to receive tenders for construction of drainage systems with pertinent cost estimation, drawings and reproduction of engineering plans.

2. Construction

To manage and supervise all new construction works with attendant surveys and inspections to assure compliance with required specifications and standards.

3. Operation and Maintenance

To perform proper operation of gates and maintenance of trunk, secondary and infrastructural drains by conducting routine inspection for physical damage and obstruction in the drains including illegal discharge from ambient establishments.

Staffing

The staffing schedule as well as required qualification and job description for the personnel to be engaged in the First Phase construction and subsequent maintenance are presented in the following pages.

If it is anticipated the shortage of the required staff to be assigned, the external engineering consultants are suggested to undertake detailed design and preparation of tender documents and subsequent supervision of construction at the initial stage of the program. In such case a few

selected counterpart staff are recommended to participate in the consultants work in order to acquire the advanced technology which will be utilized advantageously for the future drainage project.

The organization newly proposed for drainage activities is shown in Fig. 1 Proposed Expansion of Engineering Division.

The staffing schedule for the following 5-years construction and an additional few years for the subsequent maintenance is presented as follows:

Table 3 Schedule of Estimated Staff to be newly Required for Drainage System Project

Job Title & Position	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Assistant Engineer (Construction)	1	1	1	1	1						
Assistant Engineer (Operation & Maintenance)	1	1	1	1	1	1	1	1	1	1	1
Labour	1	1	1	1	1	1	1	1	1	1	1

Note: The personnel for administrative and other miscellaneous works normally required for drainage maintenance are not included in above schedule. Such works can be done by Administration and Personnel Department of MPKS.

The followings are required qualification and job description for personnel as scheduled in previous page.

Position	Qualification	JOB Description
Assistant Engineer	Diploma on technical high school certificate with 5 years job experience	To be engaged in establishing a construction schedule and manage and supervise all construction works.
Assistant Engineer	Diploma on technical high school certificate with 5 years job experience	To be engaged in inspection, data collection, preparation of maintenance schedule as well as cordination of the drainage maintenance works.
Labourer	No specific qualification is required.	To be engaged in the routine works such as desilting and cleaning of smaller drains.

CHAPTER 3
LAWS AND REGULATIONS

3.1 For Sewerage System Project

3.1.1 Introduction

It is important that an explicit set of published regulations should be available for efficient control and operation of the sanitary sewerage and drainage system, and the Municipal Council Kota Setar be given authority to issue and enforce regulations for effective control, operation and maintenance on the basis of national and state legislations. This may be done by Legal Division in the existing organization for the proposed sewerage and drainage systems.

Therefore, the existing regulations and by-laws pertinent to proposed sewerage services are reviewed herewith, and on the basis of such review, considerations including brief suggestions are presented in the following.

3.1.2 Review of Existing Laws and Regulations

The existing laws and regulations pertinent to the proposed project are reviewed in this section. These regulations shall be the basis of governing the sewerage and drainage services. The municipal council Kota Setar is to be the responsible authority to issue and enforce regulations for effective operation and maintenance of the sanitary sewerage system that is to be newly constructed and also of the drainage system that exists at present. The Municipal Council Kota Setar is now administering the area extending its legislative power mainly derived from (1) Local Government Act, 1976 and (2) The Street, Drainage and Building Act 133, 1974. Therefore these two Acts were reviewed in terms of its executive and financial power particularly focussing on the undertaking of sewerage and drainage activities. However, as Town and Country Planning Act, 1976 is significantly affecting to the urban development, although it is not adopted and gazetted yet by the State Government, the review of the Act

was made. The Environmental Quality Act, 1974 was reviewed, since the Act is an integral part in way of controlling and eliminating polluted waste from industries. In addition, Kota Setar Municipal Council Anti-Litter By-Laws 1979 enacted in February 1979, was also reviewed, because this By-Laws will have considerable effect on the preservation of environment during interim period until the completion of sewerage system in Alor Setar.

(a) The Local Government Act, 1976

The Local Government Bill, 1975, has become the Local Government Act, 1976 (AG 171), by Royal Assent and gazetted in March, 1976 and is recently enacted and enforced to supplement and renew the former provisions of old Municipal Ordinance, (1) Town Boards Enactment of F.M.S., Johore, Trengganu, (2) Municipal Enactment of Kelantan (3) Municipal Ordinance of Strait Settlements, (4) Local Councils Ordinance 1952, and (5) Local Government Act, 1973. This Act is applicable only to West Malaysia.

As stipulated in Section 9, the State Authority has a power to issue directions of a general character on the policy to be followed in the exercise of the powers conferred and the duties imposed on the local authority. Likewise, the various of the Act point to the State Authority as the creator and permanent monitor of all local authorities within State boundaries.

The State Authority, by notification in the Gazette, declares an area in the State to be a Local Authority, and gives it a name, defines boundaries and a status which can be either that of a Municipal Council or that of a District Council.

The local authority consists of the Mayor or President and not less than eight and not more than 24 other Councillors in the case of Municipal Council and not less than eight and not more than twelve other councillors in the case of a District Council, to be appointed by the State Authority.

The approval of the State Authority is needed for staffing matters, establishment of funds and contribution of moneys. All moneys received and property owned constitute the Local Authority Fund.

Such related provisions are presented below.

(1) Financial Power

Section 127, 128, 129, 130, 131 and 132: The local authority is empowered to impose the annual rate or rates for the purpose to perform the duty of the local authority not exceeding 35 percent of the annual rental value of all rated properties. In addition to the above rate or rates, a sewerage improvement rate within 5 percent of the annual value can be imposed on beneficiaries served by sewerage system to meet the whole or part of the cost of the sewerage system and maintenance, and drainage rate within 5 percent of the annual value can be imposed to meet the cost of the construction of any drainage system. Such rate or rates can be imposed on the whole area or areas divided into two or more parts and further differential rating can be imposed within such part or parts.

Section 39: The revenue of the local authority shall consist of rates, taxes, rents, licence fees, charge payable to authority, charges or profits arising from any service or undertaking carried on by the local authority, interest and income arising from the investment or property, other revenue as grants, contributions and endowments from the Federal or State Government.

Section 41: The local authority is empowered to borrow maney subject to the approval of State Authroity for the Acquisition of land, the erection of any building and the execution of any permanent work, the provision of renewal of any plant. The amount of loan shall not exceed five times the annual value of the local authority.

Section 46: In addition to powers of borrowing as stipulated in section 41, the local authority may borrow money from any persons for the purpose of carrying out any developments for residential, commercial and industrial undertakings with the approval of State Authority.

Section 47: Federal or State Government may grant loans to any local authority at such rates of interest and on such terms and conditions as it shall think fit, out of its revenue or other moneys as may be set aside or appropriated for the purpose.

(2) Executive Power

Section 72: The local authority is empowered to establish, maintain and carry out sanitary services for the removal and destruction, or otherwise dealing with among others, night soil and all kinds of refuse and effluent.

(3) Required Use of Public Sewers

There is no specific provision to enforce the use of public sewer except for such provisions of Sections 69 and 70 which prohibit the disposal of indivisual waste water or sewage into any stream implying eventual use of public sewers for the disposals mentioned above.

The provisions related to private sewage disposal systems, plumbing regulation on discharge into public sewers are not stipulated in the Act.

(b) The Street, Drainage and Building Act, 1974

The street, Drainage and Building Act, 1974 (ACT 133) was enacted in June 1974. The Act applicable only to West Malaysia, includes the provisions required for sewerage and drainage works with adequate improvement and consolidation of provisions set forth in Municipal Ordinance and Local Government Act.

This Act does not compel the local authority to construct sewerage facilities. As is stipulated in Section 49, it states that the local authority may cause to be made constructed and maintained sewerage works. Section 50 also states that the local authority may cause to be made, constructed and maintained surface and storm water drains, culverts, gutters and watercourses.

The legal powers and their applications particularly relevant to sewerage management in the proposed project are presented as follows:

(1) Executive Power

Section 49 and 50: The power is given to local authority for which definition is made to include Municipal Council, to undertake the construction and maintenance of sewerage and drainage works.

Section 52: The Act contains prohibition against building unless provision made for drains, etc. and compliance with any notice or order.

Section 53: The Act provides that the local authority shall maintain and keep in repair and, as it sees fit, enlarge, alter, arch over or otherwise improve all or any of the sewers, and surface and stormwater drains. Close up or destory as it deems useless or unnecessary.

Section 54: The Act also provides that the local authority shall be responsible for the cleansing and emptying of sewers and drains so as not to be a nuisance or injurious to health and penalties for making unauthorized drains into public sewers.

(2) Financial Power

It is of vital importance that legal supports for financial operations are given to sewerage authorities especially if financially autonomous authority is required. The provisions for this purpose are significantly improved as against Municipal Ordinance.

Section 51: Local Authority is given power to recover the capital cost of the sewage and drainage works including cost of land acquisition by means of frontage charge.

It is also authorized to recover the cost from developers in such a manner that they may be claimed by way of deposit before developers proceed to develop any area.

Section 64: Local Authority is given the powers to levy fees or charges as may be prescribed to be paid by the sewer users.

This section implies that the local authority may recover the cost for sewerage operation and maintenance by settling fees in an appropriate manner.

There is no particular reference to rate or tax as indicated by Section 59 or Municipal Ordinance. If the rate or tax is regarded as necessary to be included in rate structure of proposed sewage works, section 59 of Municipal Ordinance should be applied.

Section 132: The power is given to local authority to establish "Improvement Service Fund". This fund can be administered by local authority at its absolute discretion. This suggests that the completely separate account can be maintained for the capital investments and financing for sewerage operation. This section, therefore, deemed to be appropriately applied to the financially autonomous management of proposed organization.

(3) Required Use of Public Sewers

Section 58 (2) and (7): The power is given to require the owner(s) of any house or building installment of water closets, urinals, sinks, and bathrooms to be connected to public sewer if it is available within 100 ft of the boundary of the premises.

The above section stipulates the mandatory use of public sewers. However, it may be necessary to provide the stipulation requiring such connections to be made at the expense of the owner(s).

(4) Private Sewage Disposal Systems

Section 58 (3) and (14): Private disposal system as septic tank, and cesspool as well as drains are allowed to be provided under the direction of local authority where there is no sewer and such system are required to be kept in proper order.

Section 62: Local authority may in its discretion decide to take over the control, supervision, maintenance and repair of private septic tanks or other sewage purification plants to such extent that fees or charges may be levied.

There is no specific provision for such septic tank and cesspool to be abandoned at such time a public sewer becomes available.

The mandatory use of public sewer as stipulated in Section 58 (2) should also be effectuated by provisions enforcing direct connection to public sewer when it becomes available.

(5) Plumbing

The regulations on sanitary and sanitary plumbing installations are embodied in the "Drainage, Sanitation and Sanitary Plumbing By-Laws" enacted under this Act.

(6) Regulations on Discharge into Public Sewers

Section 53: The prior written permission is required to make any drain into any of the public sewers. No night soil, excrementitious

matter and trade effluent can be discharged into sewers without prior written permission of local authority.

(7) Other Provisions

The local authority is impowered to enter into any private property or premises to execute the works as altering, enlarging, repairing or cleaning the sewer and drains as stipulated in Section 52 and 53.

Section 97 reads in part "Any local authority may, for purposes of this Act, enter into and upon any building or land as well for the purposes making any survey or inspection as for the purpose of executing any work authorized by this Act ....." Sections 133, 123, 124, 125, 126 provide legal procedures as court trial, prosecution, conviction, arrest for any person guilty of an offence under this Act or any by-laws made thereunder.

(c) Town and Country Planning Act, 1976

This Act is enacted through Perliament Assembly pursuant to the Federal Constitution for the uniformed control of town and country planning in each local authority in whole Malaysia. This Act applicable to the State of Kedah has not been adopted and gazetted yet by the state government.

Under the assumption that this Act will be adopted in due course, the provisions relevant to the Project are summarized as follows.

In this Act no person shall use any land or building without permission of local planning authority to be established in Municipal Council and such permission shall be given in conformity with local development plan. Any authority established by law, is, however, authorized to undertake any development including provision and improvement of sewer

pipes and drains without such permission. A development charge is leived on the local developer who undertakes any development works which are expected to enhance the value of land. Such legal provisions construed that developers are required to contribute a part of their profit accrued from the land development by paying the charge or alternatively providing the utility systems as required by local planning authority. The local planning authority has a power to refuse any development plan proposed by an applicant on the ground that the land proposed to be developed is intended for public use even before such land is officially declared as development area. Any land owners who are aggrieved by the fact that their land is refused to be developed and such land is not capable of beneficial use are qualified to require the local planning authority to purchase such land at a reasonable price.

The local authority is empowered to declare a certain area or areas to be development area or areas at any time after a local plan has been adopted. The local authority is, however, required to purchase the area in such development area at fair market value. In this Act, the local authority is empowered to borrow sums of money as are necessary for financing the development of a development area declared.

(d) The Environmental Quality Act, 1974

Under this Act, the Minister of Environment is appointed to be charged with environmental protection of whole Malaysia.

Under the Minister, Director General of Environmental Quality is appointed to execute all activities required to environmental pollution control. The Environmental Quality Council is also established as an advisory council consisted of the members representing various authorities and institutions concerned.

The provisions which have direct or indirect bearings on sewage works are Sections 21, 24 and 25 regulating discharge of waste into soil, land and inland waters, Sections 26, 27 and 29 on oil discharge into

Malaysian waters, and Section 31 enforcing the provision of adequate equipment to control and eliminate polluted waste from industries.

(e) Kota Setar Municipal Council Anti-litter By-laws 1979

In February 1979, the Municipal Council enforced the Anti litter By-laws 1979 in exercise of the powers conferred by Section 73 and Section 102 of the Local Government Act 1976.

The By-laws intends to keep the cleanliness and beauty in the locality of Kota Setar Municipal Council and for the harmony of all the residents.

The By-laws prohibits any citizens to throw, place or leave behind any litter at any building, ground or public place which includes roads and lanes, market or other places. The By-laws also regulates that the owner or occupier of any building, shop, house or other erection, it responsible if there is any rubbish and other litter in front, at the rear, around or at any section of the said premises.

Litter includes any dust, dirt, sand, earth, laterite, gravel, clay, stone, ashes, carcase, refuse, leaves, and branches, grass straw, boxes, barrels, bales, shavings, hairs, feathers, sawdust, garden refuge, stable refuse, trade refuse, manure, garbage, bottles, glass, can, food container, food wrapper, particles of food or other things or articles.

The By-laws stipulates that any person found guilty for committing an offence under the said By-laws shall be liable to a fine not exceeding $2,000 or imprisonment not exceeding one year or to both such fine and imprisonment and in the case of a continuiing offence, a sum not exceeding $200 for each day during which such offence is continued.

3.1.3 Considerations on Existing Laws and Regulations

It was found that, through review of existing legislations in preceding section, the provisions of existing lawas and regulations related to

sewerage and drainage now available in Malaysia can cover necessary judicial actions required to control sewerage and drainage undertakings. Among other laws mentioned above, the Street, Drainage and Building Act, 1974, contains considerable provisions relating to the powers of sewerage services. It appears, therefore, that no additional legislation will be needed to expand the powers of sewerage services beyond those provided in the Street, Drainage and Building Act, until such time when sewerage works are provided in considerable number of cities in the country.

In view of the provision of sewerage system in Alor Setar, it is recommended that MPKS be responsible for sewerage business activities including raising revenue by billing and collection from sewer users according to the quantity of water delivered. In addition to the existing legislations, it is recommended to provide or amend necessary regulations as follows:

(1) Some legislative amendments be made in the State Waters Enactment, and agreement be made between Water Supply Division of the State Public Works Department and MPKS. The State JKR would send bills for sewerage services based on the written instructions of MPKS.

(2) A Co-ordinating Committee should be created as a an advisory organ for agreeing common approaches and reaching for agreements where necessary, as recommended in Section 2.6.

(3) By-laws concerning sewerage and sanitary installation should be prepared, so that MPKS will be rested legislative powers for sewerage and sanitary facilities installation.

3.2 For Drainage System Project

3.2.1 Review of Existing Regulation

The existing laws and regulations pertinent to proposed drainage system are reviewed to make sure that the proposed drainage works are legally supported.

The followings are, among other, those reviewed regulations.

* The Local Government Act, 1976
* The Street, Drainage and Building Act., 1974
* Drainage, Sanitation and Sanitary Plumbing By-laws, 1974
* Town and Country Planning Act., 1954
* The Drainage Works Ordinance, 1954
* The Irrigation Areas Ordinance, 1953
* Wastes Enactment No. 129 KEDAH, 1960

Among above the Local Government Act, 1976, The Street, Drainage and Building Act, 1974 and its Plumbing By-laws and Town and Country Planning Act, 1976 are those closely related to the drainage activities and they are mentioned in previous parts of this report for the Sewerage Institutional Study. The Local Government Act, 1976 authorize the Municipal Council to execute the drainage construction as well as the maintenance and operation. The most articles of this Act applied to sewerage works are also applicable for the drainage works providing that article 131 is excluded and articles 69, 70 and 71 are added instead. Such articles to be added prescribe the necessary penal regulation for the offence of polluting or nuisance to the stream, channel, public drain or other watercourse.

The Street, Drainage and Building Act, 1974: This Act also provides necessary articles for the Municipal Council to execute the drainage works. The all articles to be applied for the sewerage works except for articles 49, 58 (2) (3) (7), 64 and 62 are applicable to the drainage works. The previous descriptions about Town and Country Planning Act, 1976 will also

be instrumental to facilitate the public attention for the cleanliness and beautification of public places and facilities including stream and drains. The Drainage, Sanitation and Sanitary Plumbing By-laws, 1974 is a complete set of regulation with specific provisions for the administrative control and engineering procedures for the drains construction. The above mentioned Acts and By-laws are all concerned to the drainage works of local authority.

3.2.2 Conclusion

The existing laws and regulations are reviewed to ascertain the proposed agencies which are legally supported in undertaking of the drainage construction and maintenance/operation. It is clear that the local authority is fully authorized to undertake the public services within its administrative boundary including sewerage and drainage services. MPKS authorized to undertake the drainage works while State DID is also in charge of the works by the Drainage Works Ordinance, 1954. MPKS is, therefore, recommended to undertake the construction and maintenance of the drainage in coordination with State DID by way of coordination committee.