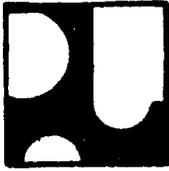


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REPUBLIC OF INDONESIA  
MINISTRY OF PUBLIC WORKS  
DIRECTORATE GENERAL OF HOUSING BUILDING  
PLANNING AND URBAN DEVELOPMENT (CIPTA KARYA)

MEDAN URBAN DEVELOPMENT, HOUSING, WATER SUPPLY AND SANITATION PROJECT

23p

## TECHNICAL MEMORANDUM NO.38

### ORGANIZATION FOR WATER SUPPLY AND SANITATION

This is a draft of part of Section 15 of the Master Plan Report  
for Water Supply and Sanitation

NOVEMBER 1979

ENGINEERING - SCIENCE, INC. • SINOTECH ENGINEERING CONSULTANTS, INC  
A JOINT VENTURE  
in association with  
PADCO and P.T. DACREA

**MEDAN URBAN DEVELOPMENT, HOUSING,  
WATER SUPPLY AND SANITATION PROJECT**

Jln. Singamangaraja 1-3, P. O. Box 26, Phone 20716, Medan-Sumatra, Indonesia

Our ref.: 79/1209/MUDS/313

12 November 1979

Director General Cipta Karya  
Ministry of Public Works  
Jalan Pattimura 20  
Kebayoran Baru  
Jakarta Selatan

Subject: Technical Memorandum No. 38,  
Organization for Water Supply  
and Sanitation

Dear Sir:

Attached are 20 copies of the subject Technical Memorandum for your information and review. The material contained in this memorandum constitutes partial submission of Section 15 of the draft Master Plan for Water Supply and Sanitation Report.



Yours faithfully,

*John M. McGill*  
John M. McGill  
Project Representative

C.C.: Ir. Ruslan Diwiryono, Director of City & Regional Planning  
Ir. Susanto Mertodiningrat, Director of Sanitary Engineering  
Ir. Sunaryo, Head Sub-Directorate Town Planning  
Ir. K. Pohan, Project Manager, MUDS  
AID - Jakarta, attn.: P. Thorn, Project Officer  
ES - Arcadia  
SINOTECH - Taipei  
DACREA - Jakarta

JM/1

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1.	Preliminary Site Selection Criteria for Perumnas Medan III, SSCH/LCH Project	March, 1979
2.	Work Plan for Water Supply and Sanitation Master Plans and Feasibility Studies	April, 1979
3.	Policy Issues for Project Guidance	March, 1979
4.	Drainage - Principal Rivers and Rainfall Analysis	May, 1979
5.	Preliminary Evaluation of Sunggal Water Treatment Plant	May, 1979
6.	Public Health Considerations	July, 1979
7.	The Present Drainage System	August, 1979
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9.	Medan Household Income/Expenditures	August, 1979
10.	Existing Land Use in Medan	August, 1979
11.	The Regional Functions of Medan	August, 1979
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13.	Evaluation of Medan Master Plan	August, 1979
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17.	Developments in Education	October, 1979
18.	Existing Water Supply and Sanitation Systems	October, 1979
19.	Public Health and Environmental Aspects	October, 1979
20.	Alternative Solid Wastes Management Systems	October, 1979

# BEST AVAILABLE DOCUMENT

LIST OF TECHNICAL MEMORANDA PREVIOUSLY SUBMITTED (CONTINUED)

Report No.	Title	Date Submitted
21	The Distributed Investment Strategy Plan (DISP)	October, 1979
22	Recommended Solid Wastes Management System	October, 1979
23	Recommended Drainage Management System	October, 1979
24	Alternative Water Supply Management Systems	November, 1979
25	Water, Wastewater, Stormwater and Solid Wastes Systems	November, 1979
26	Alternative Wastewater Management Systems	November, 1979
27	Design Criteria and Bases for Cost Estimates	November, 1979
28	Recommended Water Supply Management System	November, 1979
29	Recommended Wastewater Management System	November, 1979
30	Environmental Assessment	November, 1979
31	Finance	November, 1979
32	Groundwater Resources	November, 1979
33	The Existing Urban Situation	November, 1979
34	Sibolangit Springs	November, 1979
35	Distribution System Analysis	November, 1979
36	Surface Water Hydrology	November, 1979
37	Detailed Projections of Water and Waste Quantities	November, 1979

## ORGANIZATION AND FINANCE

### 15.1 EXISTING ORGANIZATIONS

#### 15.1.1 Water Supply

In the past several years the direction of P.A.M. Tirtanadi as a local enterprise has been changed several times. Tirtanadi's organisational structure has ranged from direction being provided by a single Board of Directors for all Regional Companies of North Sumatra to P.A.M. Tirtanadi's present temporary Board of Directors.

In November 1977 the staff of P.A.M. Tirtanadi prepared a development plan which included suggested regulations to govern its operations, a planned organization structure with job descriptions, and short term plans for the development of water supply facilities.

In the development plan it is proposed that the existing organization structure be modified to conform generally with organizational guidelines prepared by the federal Directorate of Sanitary Engineering. The current and proposed organization charts are shown in Figure 15.1 and 15.2 respectively.

The present temporary Boards of Directors was appointed by the Provincial Government. Under the organizational plan put forward by Tirtanadi overall direction would be provided by a Board of Supervisors formed and chaired by the Governor of North Sumatra. The Secretary of the Board would be from Regional Government and membership would consist of representatives of Regional Government, the Department of Public Works, the Bank of Indonesia, the Department of Health and others as required.

Day to day operations of P.A.M. Tirtanadi would be provided by a Board of Directors consisting of a General Director assisted by two other Directors. It has been proposed that the Directors also be appointed by the Governor. The duties of the Directors and other staff positions are described by the proposed organization and job descriptions. The relationship between the Board of Supervisors, the Board of Directors and Government is further defined by the proposed new regulation under which P.A.M. Tirtanadi would operate. However, the relation-

# PAM TIRTANADI EXISTING ORGANIZATION CHART

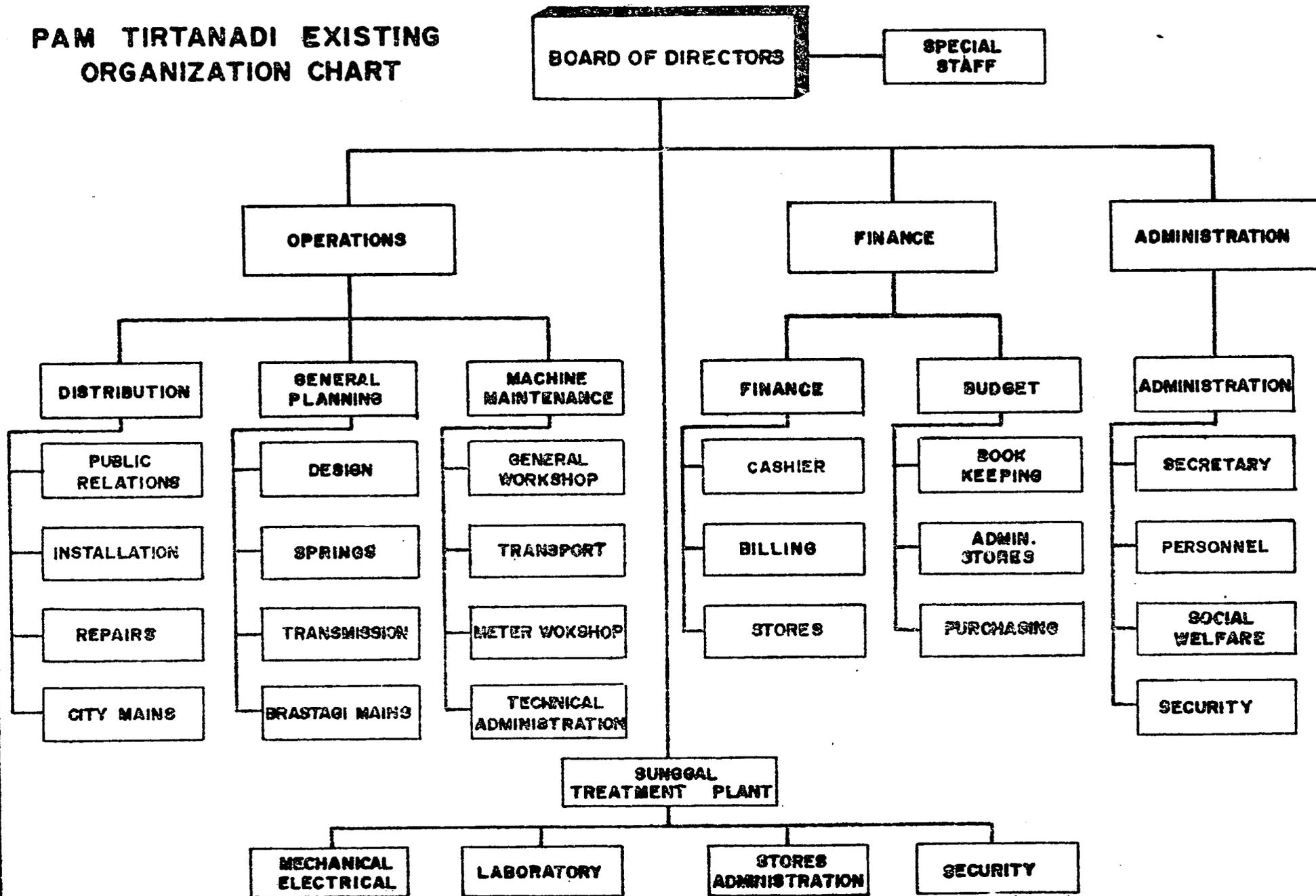


FIGURE 18.1

ORGANIZATION CHART  
PROPOSED BY  
P.A.M TIRTANADI  
1977

GENERAL DIRECTOR

BOARD OF SUPERVISORS

DIRECTOR  
ADMINISTRATION  
AND FINANCE

TECHNICAL DIRECTOR

ADMINISTRATION

FINANCE

BUDGETING

PLANNING

PRODUCTION

DISTRIBUTION

SECRETARY

COLLECTION

BOOKKEEPING

DESIGN

SPRINGS

CITY MAINS

SECURITY

BILLING

ADMIN.STORES

SUPERVISION  
INSPECTION

TREATMENT  
PLANT

INSTALLATION

PERSONNEL

STORES

SUBCONTRACTS

WORK SHOP

TRANSMISSION

METER  
WORK SHOP

BRASTAGI

PURCHASING

SUDGET  
PLANNING

LABORATORY

TRANSPORT

REPAIRS

BELAWAN

CASHIER

CUSTOMER  
SERVICE

FIGURE 15.2

ship among these groups requires additional definition to ensure that areas of responsibility and accountability are clear.

Until recently major water supply projects have been planned by the Directorate of Sanitary Engineering. The completed works have then been turned over to P.A.M. Tirtanadi for operation and maintenance.

Recently the planning and development of new water supplies has been decentralized to the Provincial level. All additions to the distribution system and the recently completed additions to the Sunggal Water Treatment Plant have been planned by P.A.M. Tirtanadi by a small design group within the operational structure of the organization and constructed by force account or contract.

Problems resulting from organizational deficiencies occur in the areas of formulation and implementation of broad policy matters such as planning of service extensions, planning and executing work programs necessary to provide the physical facilities needed to meet service objectives, ability to alter company structure to provide better operation, rate structure changes, and the ability to define the status of employees and to provide work incentives comparable to the private sector.

Organizational changes necessary to overcome these fundamental problems are described in Section 15.3.

#### 15.1.2 Wastewater

At present there is no agency in Medan with responsibility for wastewater collection treatment and disposal. Related functions such as the septic tank clean-out service, the cleaning of drains which carry some sanitary sewage and most of the greywater, the installation of improved latrine facilities and the regulation of sanitation practices in housing and in commercial and public building construction are delegated to various agencies.

The absence of a program for wastewater management in Medan has resulted in many existing problems. The correction of these problems in addition to providing for the additional sanitation needs of a growing metropolitan region present a challenge which will require the efforts of an exceptionally strong organization if the required rate of progress is to be made.

### 15.1.3 Drainage

Responsibility for drainage in Medan is shared by the provincial and city governments. The province assumes responsibility for major rivers such as the Deli, Babura, Belawan and Percut. Beyond the city boundaries, the lower reaches of some of the larger streams which originate in Medan are also dealt with by provincial agencies. Within Medan the city government administers the drainage program with many of the major capital works supported by the programs of senior levels of government such as INPRES.

On June 25 1979 a new organization structure for the department of public works was enacted altering the drainage program administration shown in Figure 15.3 to that shown in Figure 15.4. The new organization chart illustrates the close correlation that exists between drainage and street improvements in city operations. Drainage works are usually undertaken to accommodate road improvements initiated in response to traffic needs.

The scope of the proposed drainage program will require the initiation of projects based on drainage needs and close control of drainage works carried out in conjunction with other programs.

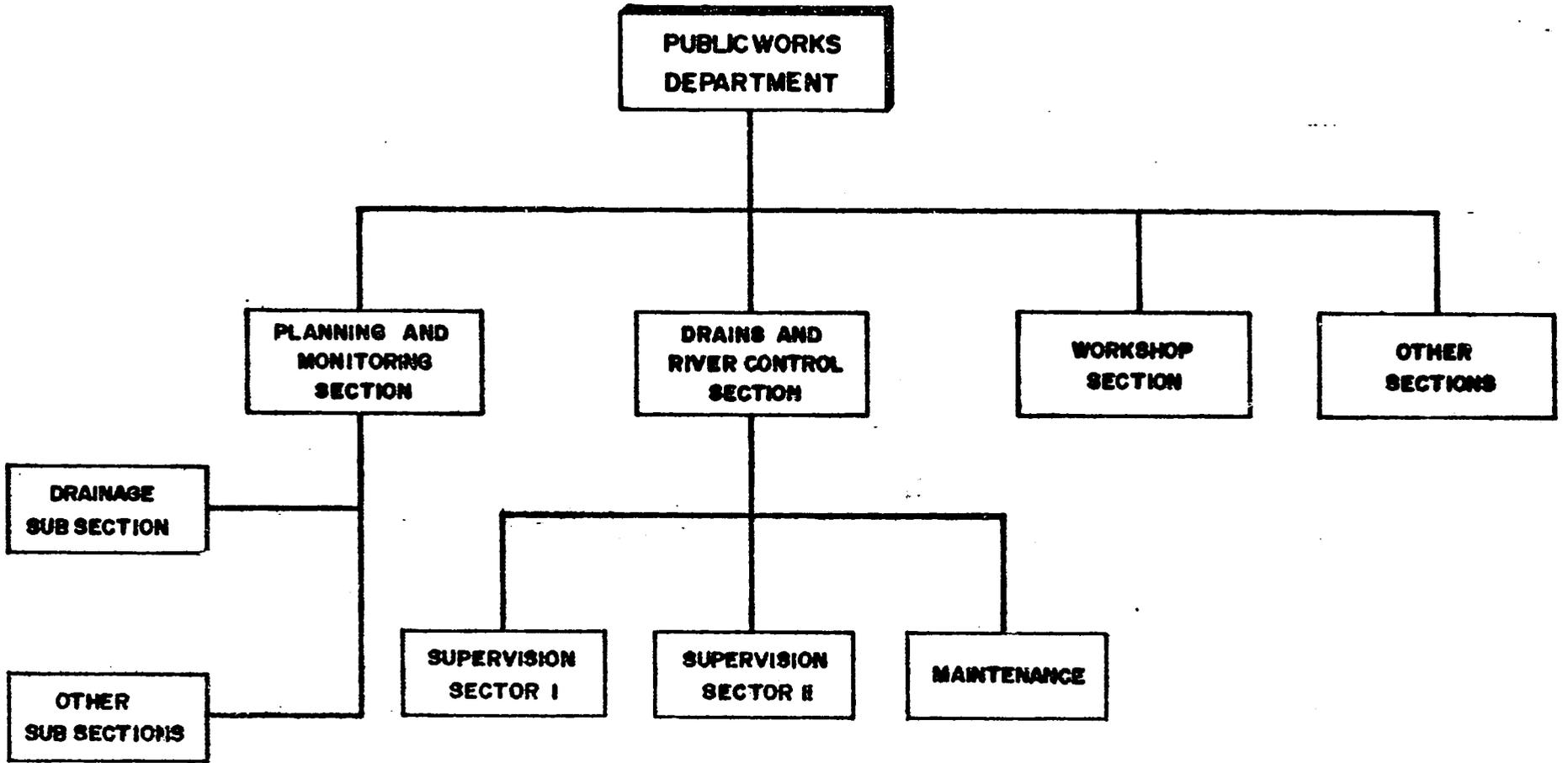
The organizational requirements of the proposed drainage program are discussed in subsection 15.3.3.

### 15.1.4 Solid Wastes

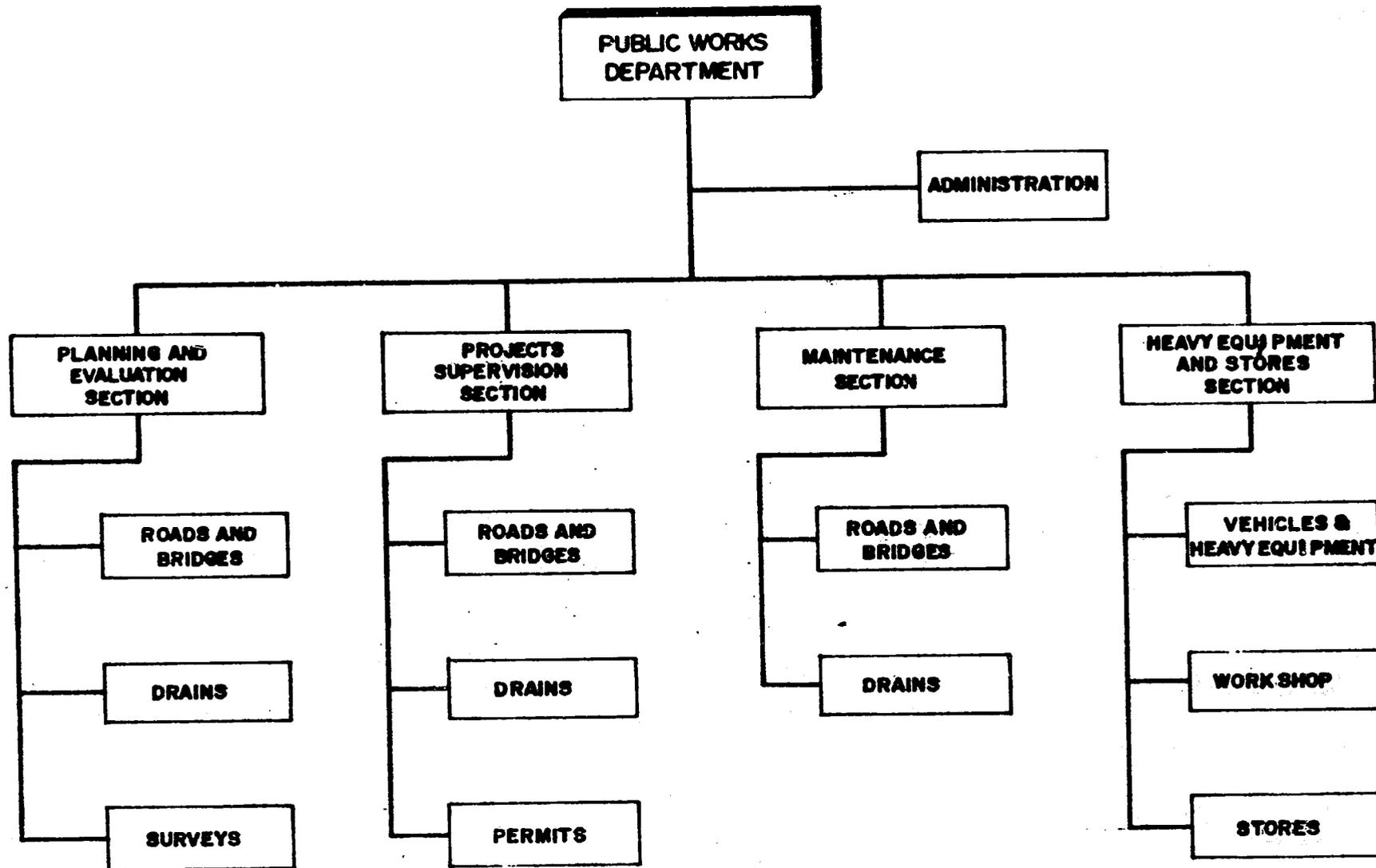
The organization structure of the Cleaning Department of the city was officially changed in July 2, 1979 from that of Figure 15.5 to that shown in Figure 15.6.

The transfer of all functions other than cleaning to other city departments will enable greater direction of effort in the cleaning tasks. However, lack of direct control of even routine vehicle servicing and repairs may interfere unduly with collection operations. Further, the initiation of the new service levels will require special organizational features which can be defined in an organization chart.

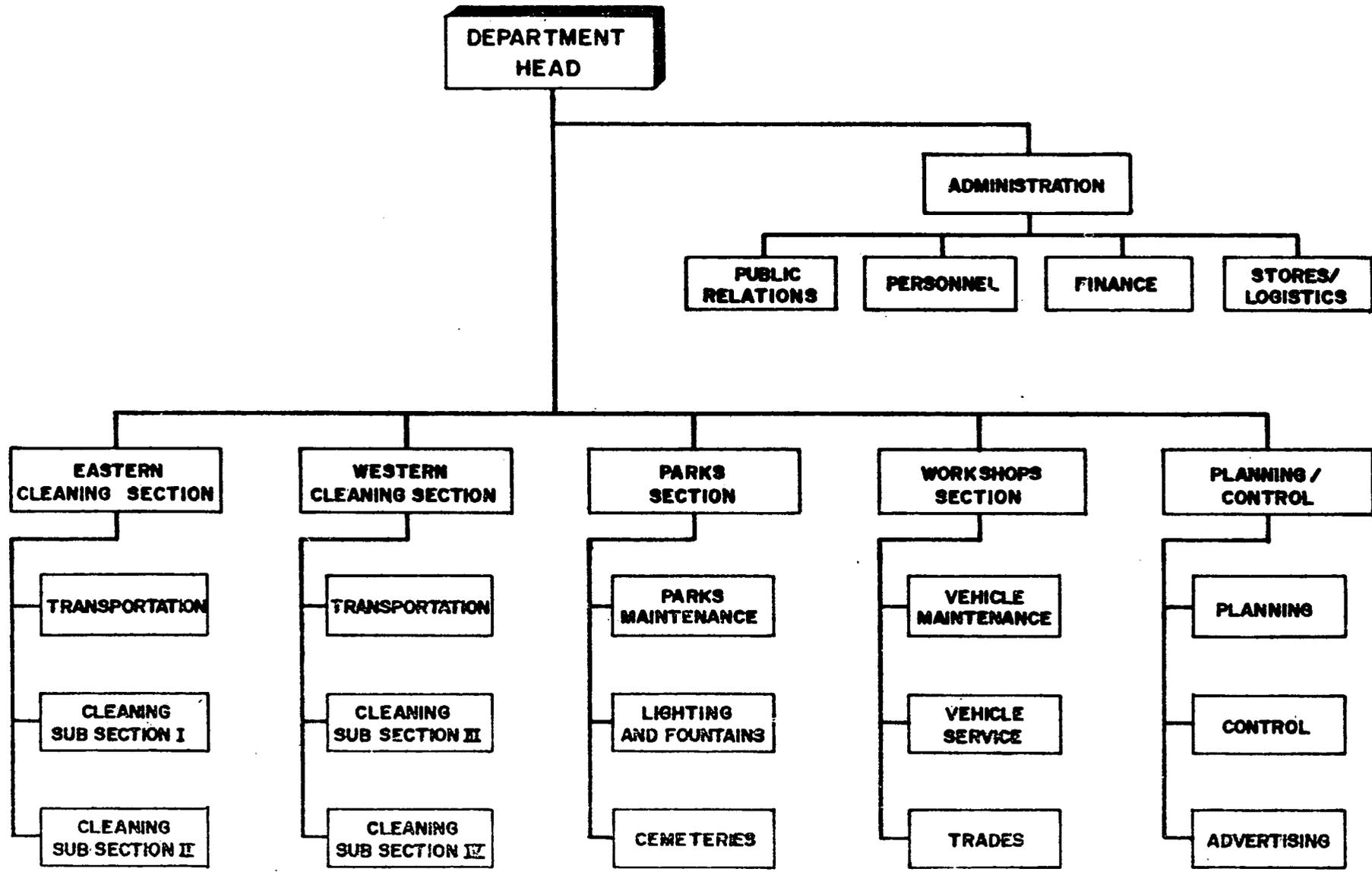
Organization changes suggested for the proposed new solid wastes program are discussed in subsection 15.3.4.



FORMER ORGANIZATION CHART  
DRAINAGE SECTION



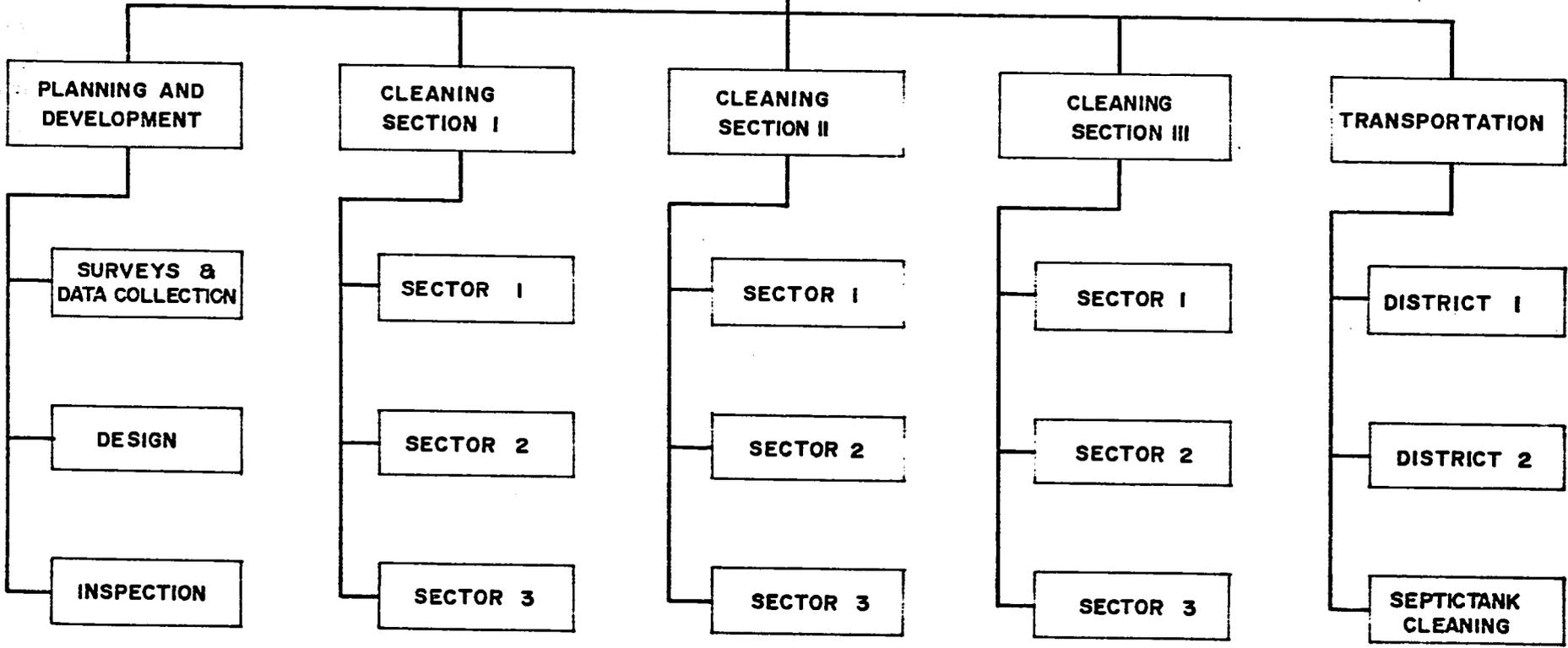
EXISTING ORGANIZATION CHART DRAINAGE



FORMER ORGANIZATION CHART DKKP

HEAD  
CLEANSING DEPARTMENT

ADMINISTRATION



EXISTING ORGANIZATION CHART  
CLEANSING DEPARTMENT

## 15.2 COORDINATION WITH KIP AND SSCH/LCH PROGRAMS

The objectives of the programs in water supply, wastewater drainage and solid wastes management are primarily for the benefit of Medan's low income groups. Many program elements are not directly identifiable with the KIP and SSCH/LCH programs while others form an integral part of them. The development of new water supply sources and the installation of standpipes are respective examples.

It is anticipated that initiatives for extension of service will originate from these programs which will then become incorporated in the programs for water supply, drainage, wastewater, and solid wastes management. Once service is established these agencies will also monitor service to ensure that the objectives of their programs continue to be met.

The coordination of urban service programs can be accomplished by identifying coordinating functions in the organization structure of each management system and by appointing senior representatives to the KIP and SSCH/LCH projects Steering Committee.

## 15.3 RECOMMENDED ORGANIZATIONAL MODIFICATIONS

### 15.3.1 Water Supply

If PAM Tirtanadi is to operate effectively as an independent self supporting local enterprise it is essential that the objectives, strategies and goals of the organization be clearly defined and that the body responsible (Board of Directors) for the attainment of corporate objectives be provided with the authority to act independently within broad guidelines established by government.

The activities of the enterprise must be closely monitored and controlled by the Board and executive responsibilities must be defined explicitly. The chief executive of the organization should preferably be appointed by the Board of Directors from among its members. He would be assisted in his duties by a staff of specialists in the areas of public relations, law, planning and programming, coordination with development programs, management and staff development and auditing. He would delegate key operational responsibilities in each of the areas of

administration and finance, engineering design and construction, operations and maintenance, and system monitoring.

Implementation of the capital works programs for the development of new water sources and strengthening the distribution system will be the essence of PAM Tirtanadi's activities over the next several years and direct executive control of this function must be assured.

Figure 15.7 illustrates the organizational modifications proposed for PAM Tirtanadi. Below the manager level more flexibility exists for a gradual transition from the existing situation. The final form of the organization structure must be based on a detailed inventory of existing functions and personnel needs. Now that the future program is more clearly defined it is recommended that an intensive management study of PAM Tirtanadi's operations be initiated to prepare it for the tasks that lie ahead.

#### 15.3.2 Wastewater

Several alternatives have been considered for the organization which will administer the wastewater program.

Local Enterprise: This alternative envisages the formation of a regional sewerage company similar to PAM Tirtanadi. A regional company could adopt management practices used in the private sector to attract and motivate qualified and able personnel and to help it operate on a self supporting basis.

Although the local enterprise would come under the control of regional government little difficulty is anticipated in assuring public support for the organization which would be readily identifiable by the public as a local organization serving only the needs of Medan.

Department of City Government: Under this alternative a separate sewerage department of the city administration would be established.

The main advantage of integration within an existing organization is the possibility of utilizing existing organizational capacities for the new service. However, many of the required organizational characteristics are not available at the city level.

**PROPOSED ORGANIZATION  
CHART  
PAM TIRTANADI**

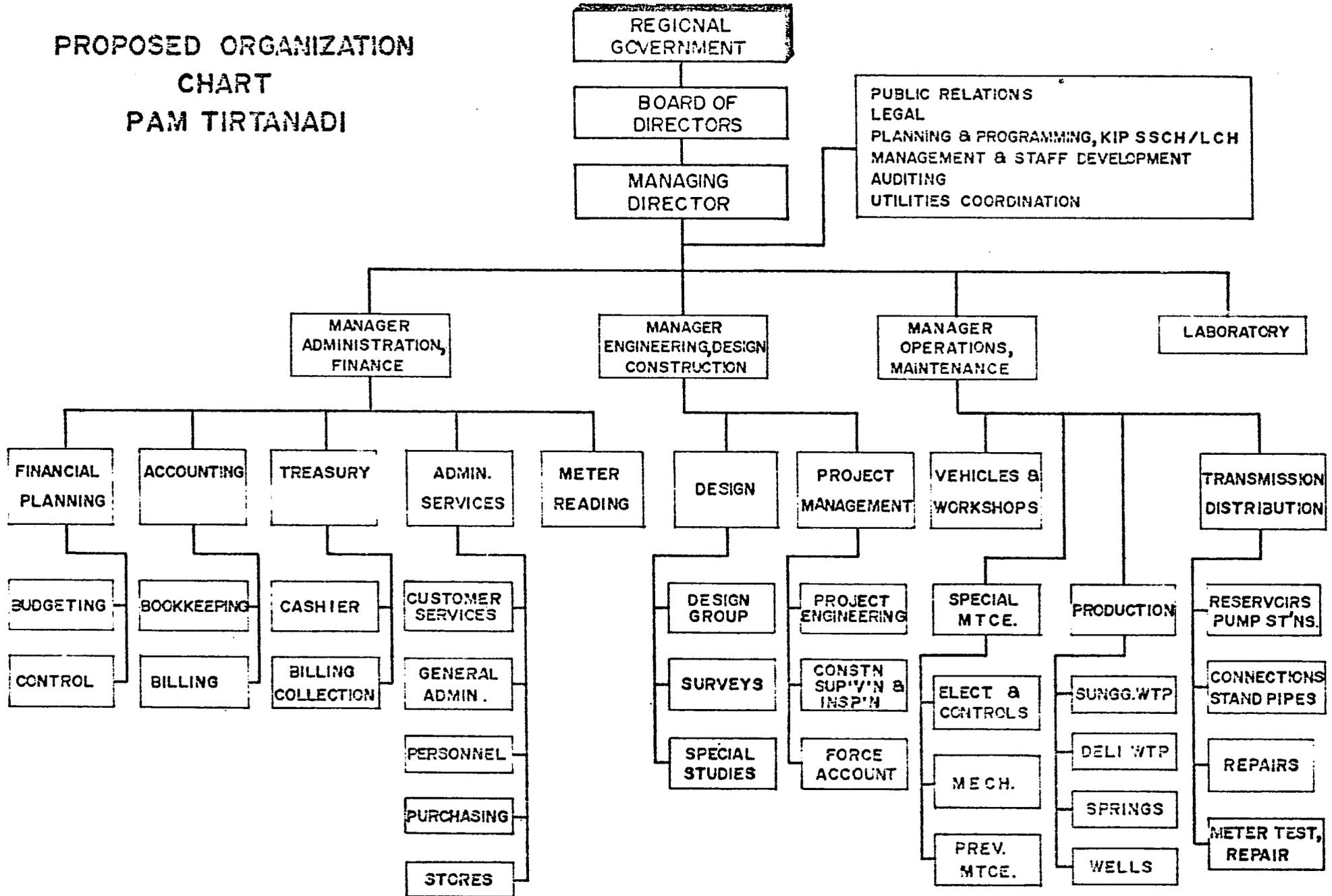


FIGURE 15.7

The ability to raise money to implement the program is of first importance. The city is dependant upon provincial and central government funding for much of its program of works. The general scarcity of funds results in budgeting shortfalls in most aspects of city administration. Existing municipal revenue collection practices are at present totally inadequate for the needs of a commercially oriented utility.

Municipal level public service employment conditions such as salaries, fringe benefits, scope for advancement and promotional practices based primarily on seniority are all factors which would make it difficult to attract personnel who could meet the requirements of the new organization.

Integration With Water Supply: The integrated operation of water supply and wastewater management systems is widely practiced. Together these systems provide for the management of water from source through treatment, delivery, use, collection treatment and return to natural waters.

The simultaneous development of both services is essential to avoid sanitation problems in urban areas where water use is high and, as in Medan and most other urban centers, where conventional private wastewater treatment disposal facilities can be applied with limited success.

Both systems have common management, planning, design, construction and operational elements which make it practical to integrate finance and administration activities, billing and collection, design and construction, and some operations and maintenance functions, as well as laboratory facilities.

Problems which may be encountered when integrating a new function into an existing organization such as providing additional office accomodation, disturbances to existing operations while staff members are being trained, and balancing new workloads and responsibilities can be anticipated and minimized in developing Tirtanadi's new organization structure.

Integration of Wastewater and Drainage: The integration of wastewater and drainage management systems are sometimes considered because of their many common technical elements and the use of combined sewerage systems in some urban areas. However, drainage management systems are

not amenable to development as self supporting utilities with a rate structure and for this critical reason joint management with drainage is not recommended for Medan.

Summary: The recommended wastewater system for Medan is ideally suited for development as a local enterprise and the presence in Medan of a parallel water authority offers a unique opportunity for the coordinated joint development of each system. It is therefore recommended that PAM Tirtanadi assume responsibility for implementing the wastewater program. The proposed organization structure is shown in Figure 15.8.

### 15.3.3 Drainage

Drainage is no doubt an important element of new road construction. Close coordination between road works and other utility programs is an important element of urban utilities planning. However, the implementation of a comprehensive drainage program requires direct administrative continuity through each stage of the implementation process. For this reason the organization structure shown in Figure 15.9 is recommended.

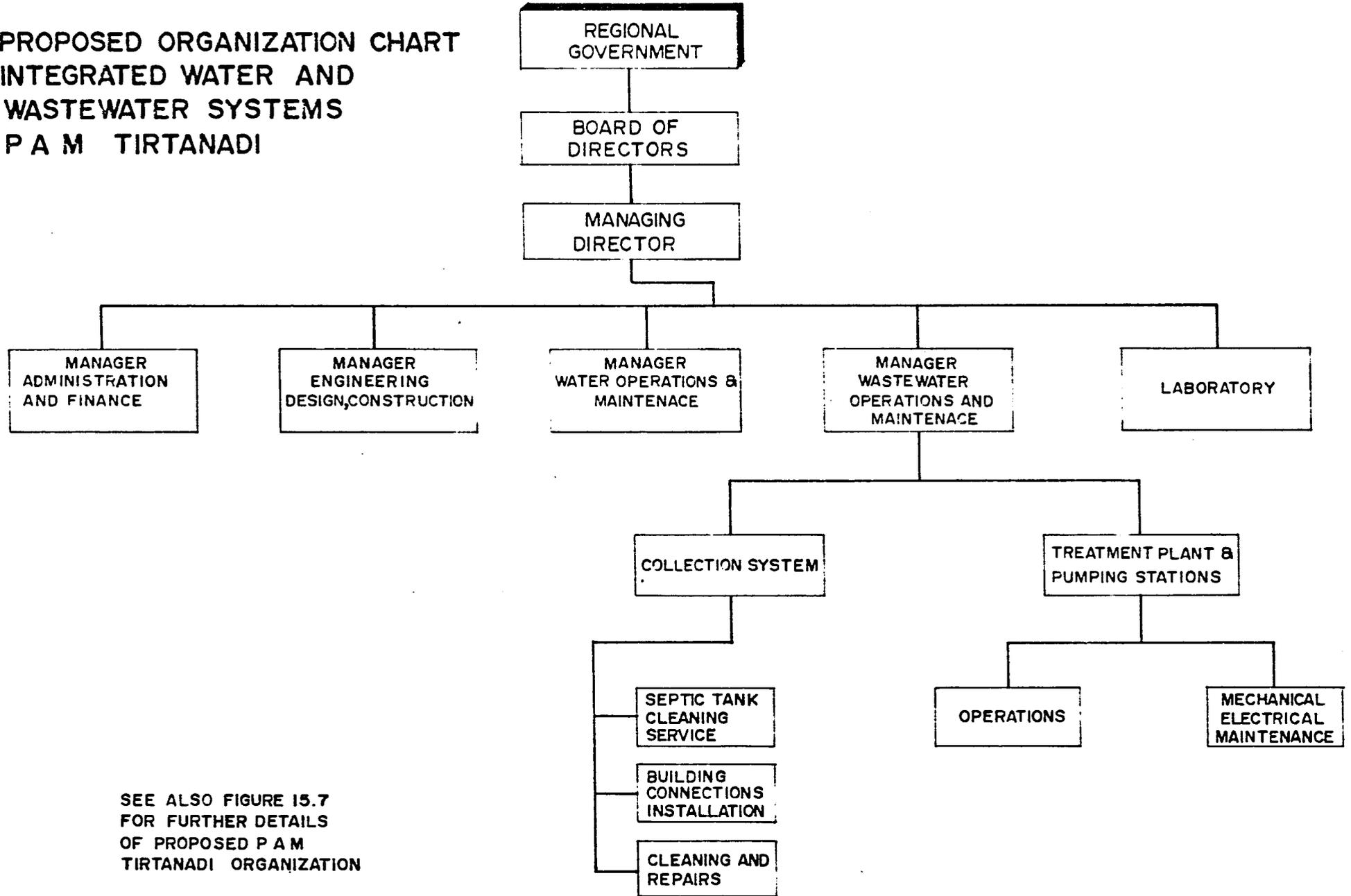
Maintenance operations have been divided into three geographical areas with one unit given responsibility for maintenance operations in a priority central area. Two other units will function; one in the easterly and one in the westerly sections of the city.

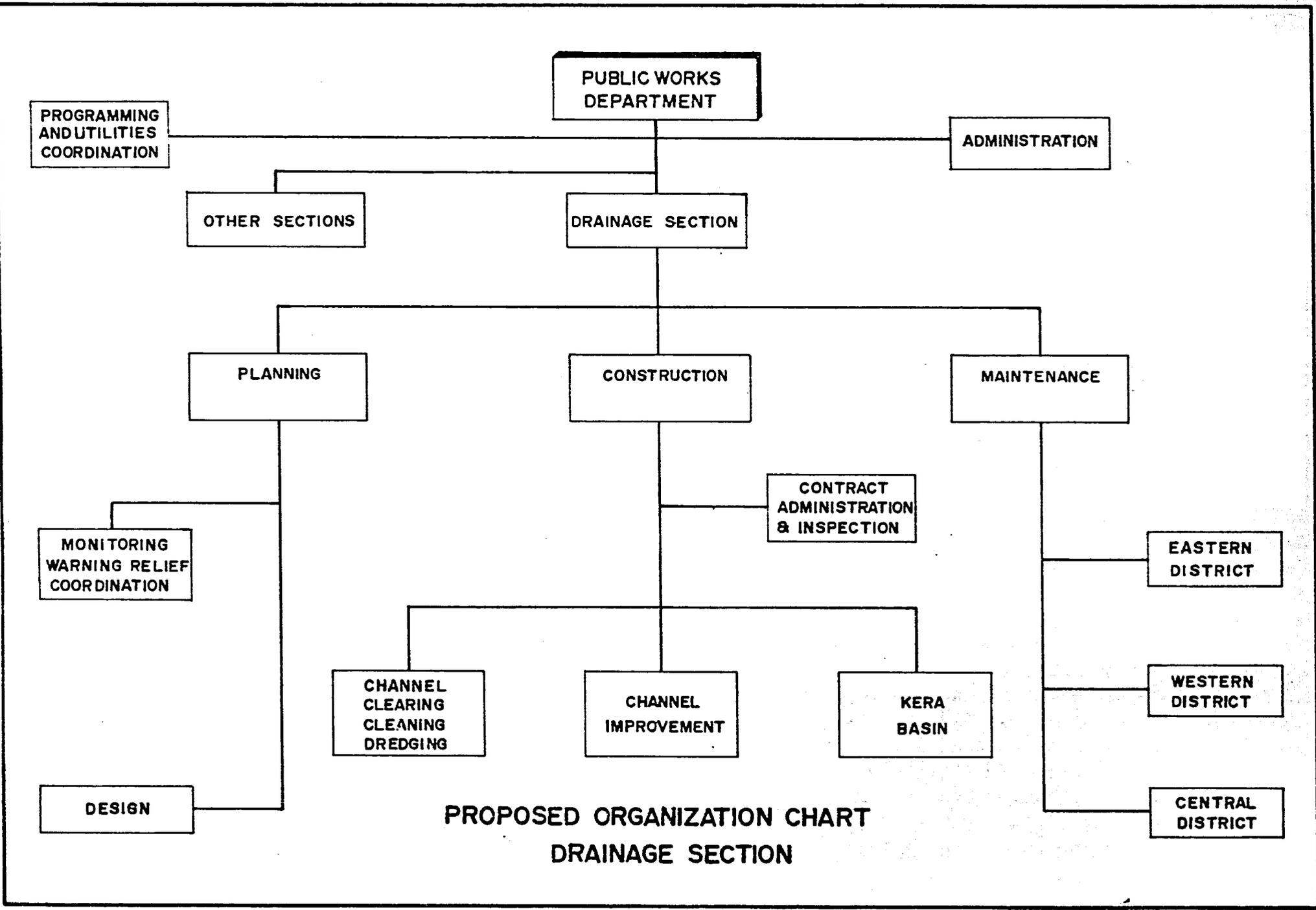
Construction will become an important part of the Drainage Section's operations. Construction may be carried out either by Municipal forces or by contract.

The urban area channel clearing, cleaning and dredging program will represent a large steady long-term workload which could be effectively carried out by Drainage Section forces and equipment as may some components of the channel improvement and Kera basin programs. The construction by contract of the remainder of the major work items should be considered and a construction division of the Drainage Section is proposed that will provide for:

- Contract management
- Construction supervision
- Supervision of capital works carried out by Municipal forces.

# PROPOSED ORGANIZATION CHART INTEGRATED WATER AND WASTEWATER SYSTEMS P A M TIRTANADI





PROPOSED ORGANIZATION CHART  
DRAINAGE SECTION

A monitoring, control and planning section is also proposed which could consist of the following components:

1. Monitoring
  - Flood flow for areas subject to inundation
  - Flood warning and emergency services coordination
2. Programming
  - Develop capital works and maintenance programs which will be implemented by the construction and maintenance divisions
3. Design
  - Preparation of designs and construction drawing specifications and other contract documents for all capital works items.

#### 15.3.4 Solid Wastes

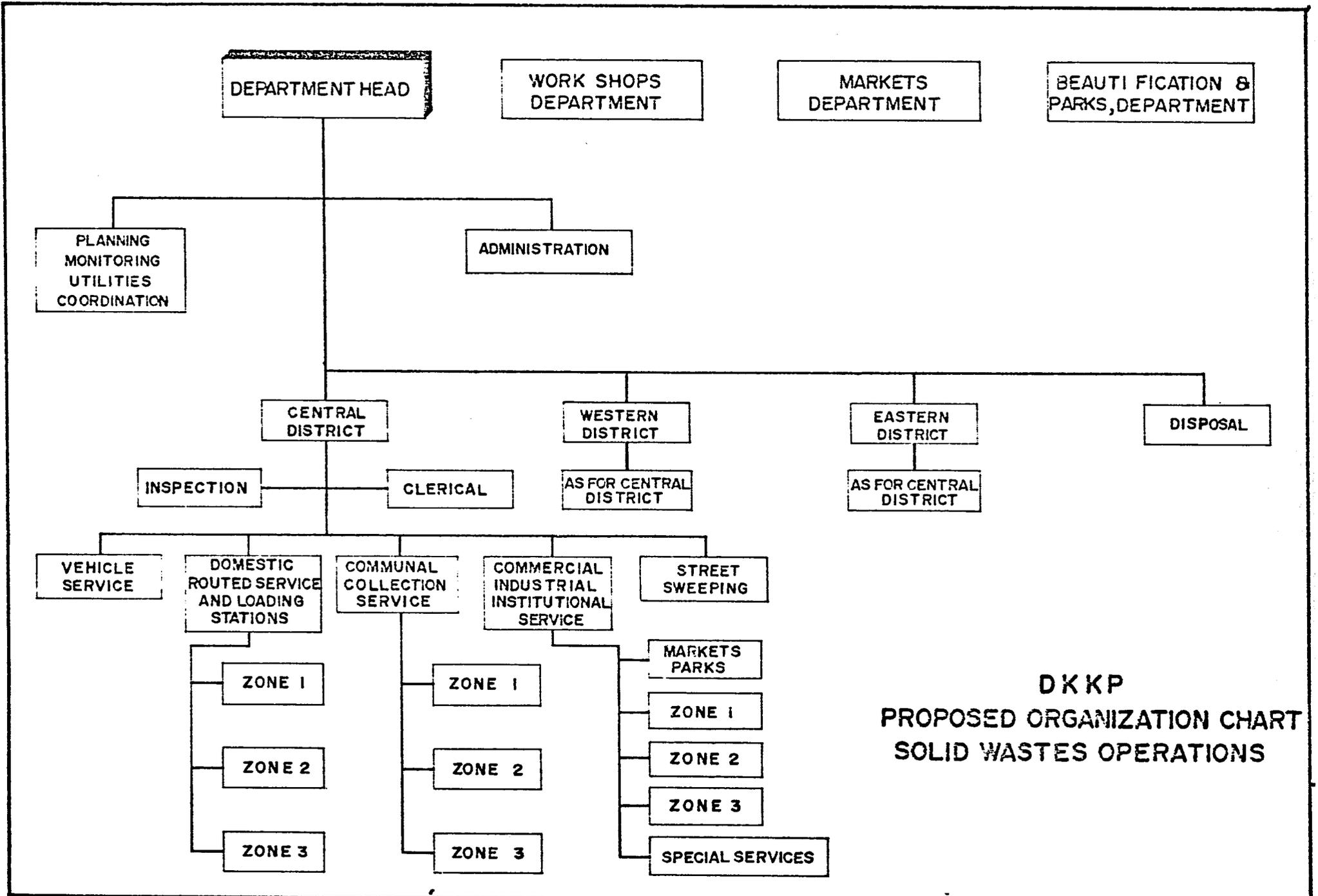
The increase in size of the service area of DKKP and the large increase in the number of vehicles and staff requires that the organizational structure of DKKP be expanded to ensure that adequate levels of supervision and control are provided.

This can be accomplished by defining a greater number of operational units on the basis of service type and geographical area.

Because of the limited capacity of the existing DKKP works yard to accommodate additional staff and equipment and because of the greater operational efficiency that can result from decentralization, it is recommended that two additional operational centers be formed and that the organizational structure be strengthened as shown in Figure 15.10.

Consideration can be given to assigning certain of the organizational elements to other agencies. For example communal collection could be assigned to Kampung and Kecamatan administrations and other elements could be carried out by contract.

Operational planning including such matters as vehicle and service schedules should be under the direct control of the area superintendents. The area superintendents will also have an inspection staff who will observe the operation of the collection system and report variations from established operational programmes so that corrective action can be taken.



**DKKP**  
**PROPOSED ORGANIZATION CHART**  
**SOLID WASTES OPERATIONS**