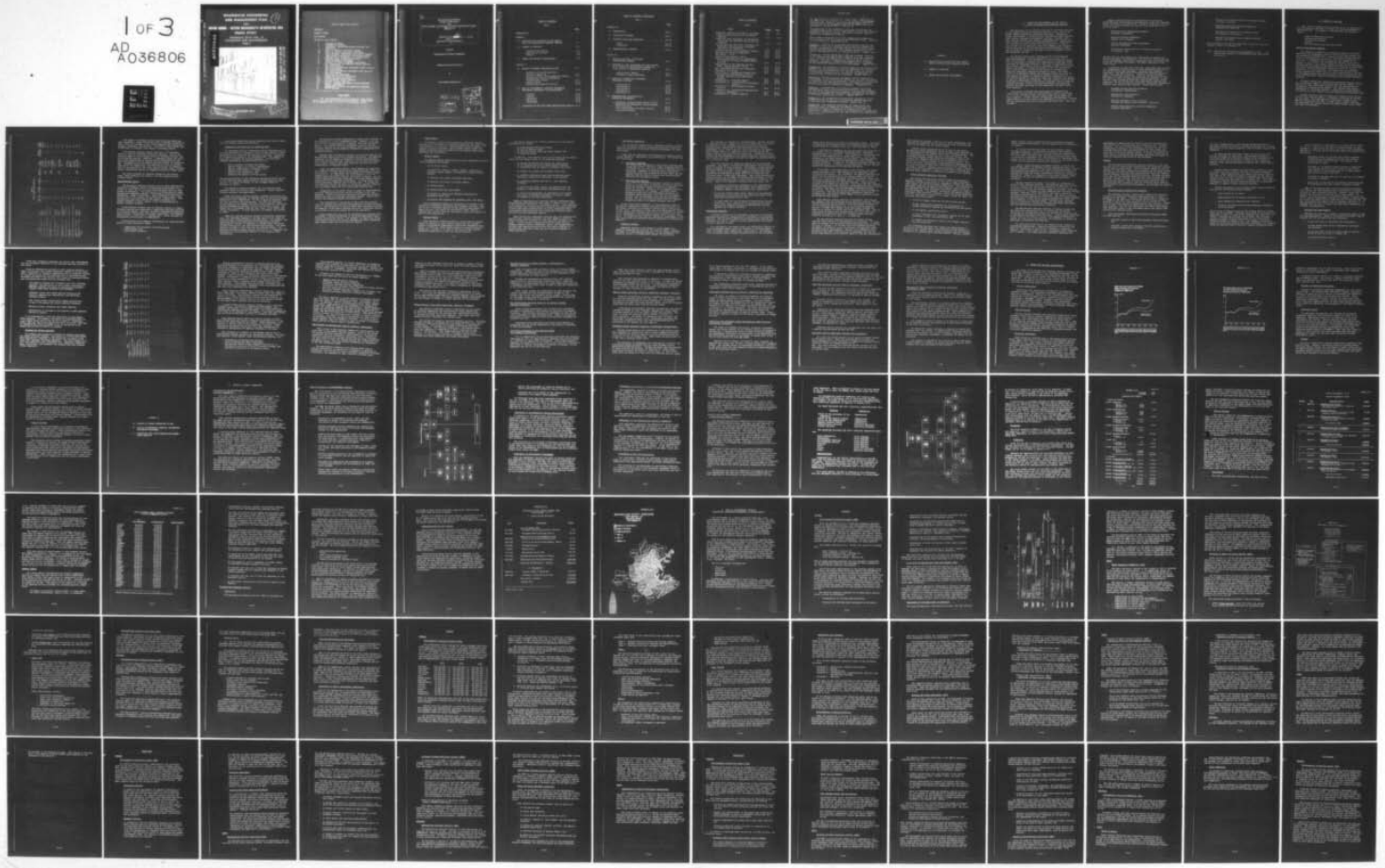
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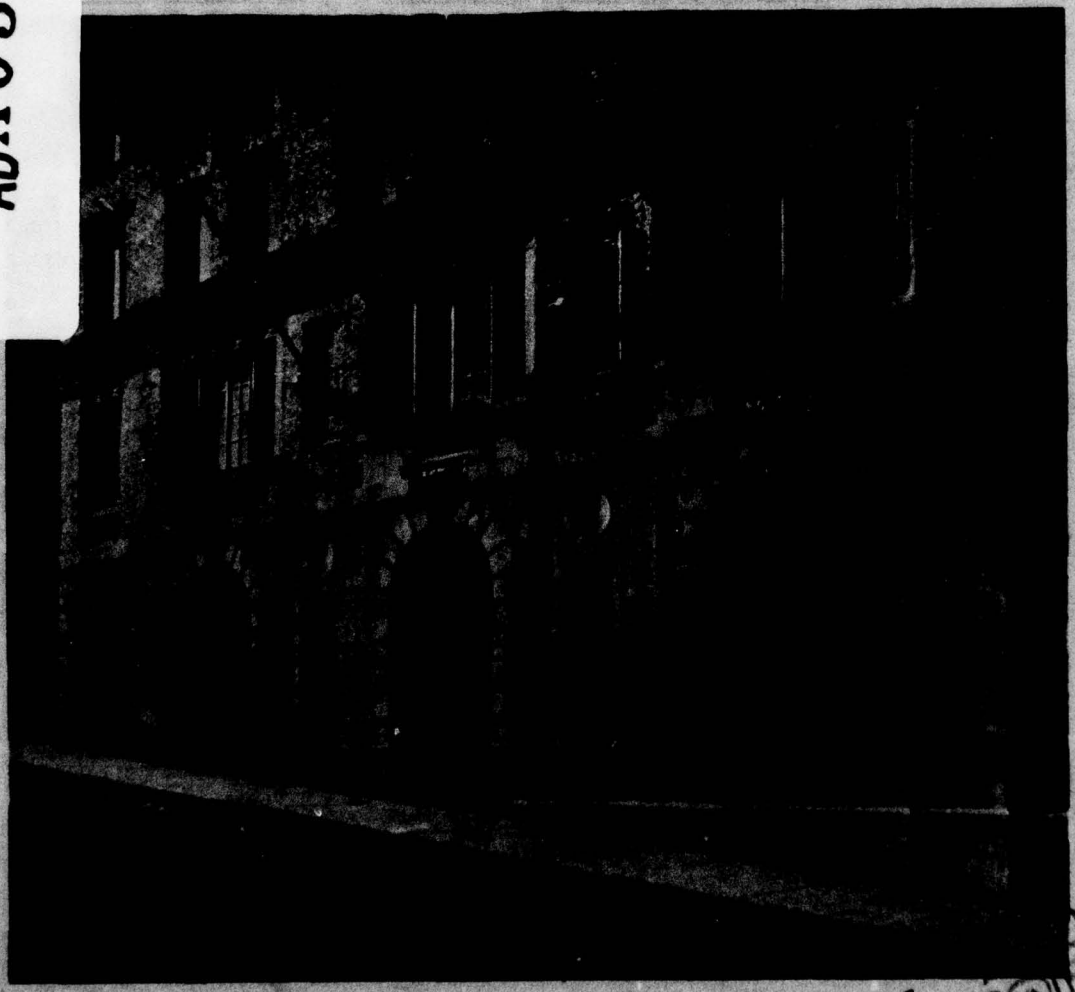
FOR

BOSTON HARBOR - EASTERN MASSACHUSETTS METROPOLITAN AREA

EMMA STUDY

TECHNICAL DATA VOL. 12
FINANCING AND MANAGEMENT
PART 1

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COVER PHOTO

The cover photograph in this Technical Data Volume depicts the Metropolitan District Commission headquarters at 20 Somerset Street, Boston, Massachusetts 02108.

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WASTEWATER ENGINEERING AND MANAGEMENT PLAN FOR BOSTON HARBOR – EASTERN MASSACHUSETTS METROPOLITAN AREA EMMA STUDY.

Volume 12.

TECHNICAL DATA
PART 1.
FINANCING AND MANAGEMENT.

FOR THE

METROPOLITAN DISTRICT COMMISSION

COMMONWEALTH OF MASSACHUSETTS

BY

PEAT, MARWICK, MITCHELL & CO.

ACCESSION for
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(11) OCT 1975
(12) 208p.

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INTRODUCTION

As indicated by the index on the inside cover, the results of the EMMA study are presented in several volumes. This volume, Technical Data Volume 12, Financing and Management, contains the findings of the management phase of the EMMA study and is presented in two parts (Part 1 and Part 2).

The objectives of the management phase were to evaluate and recommend modification to the organizational entity and financial mechanisms required to manage, administer, control, fund and operate the recommended system.

This volume is organized into seven chapters which represent major milestones of the Financing and Management Study. Contents of each chapter are summarized below.

Chapter I - Profiles of 12 metropolitan sewerage agencies were prepared to serve as a benchmark against which to compare the delivery of wastewater treatment services in the Eastern Massachusetts Metropolitan area. This chapter summarizes the important characteristics of the agencies profiled. (Report Part 1)

Chapter II - Current operations of MDC are reviewed, focusing on the services provided by MDC's Sewerage Division. Organizational features are compared with those of other Metropolitan agencies. The role of governmental agencies which influence wastewater management in EMMA is described within a framework of five functions related to service performance. (Report Part 1)

Chapter III - The influence of institutional and non-institutional pressures on the Metropolitan District Commission are examined. Possible goals and objectives that provide a basis for future organizational designs as well as criteria for evaluating the organizational alternatives are discussed. (Report Part 1)

Chapter IV - Barriers to goal attainment, and the implications of no change in the institutional network on the level and quality of wastewater services are described. Organizational alternatives and variations are described which focus on those issues most critical to effective wastewater management. (Report Part 1)

Chapter V - A methodology for analyzing treatment facilities and associated costs is described and alternative apportionment and allocation techniques are presented. Alternatives considered feasible to implement are highlighted and evaluated on the basis of previously established criteria. (Report Part 2)

Chapter VI - The recommended organizational alternative is described in detail as well as the legislative program required to implement the recommended structure. (Report Part 2)

Chapter VII - The approved methodology for apportioning and allocating costs is summarized and applied to historical and projected cost data to determine the relative cost impact on communities. Bonding alternatives are presented and a recommended structure is incorporated into the cost allocation to communities. (Report Part 2)

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CHAPTER 1

A. OBJECTIVES AND APPROACH OF THE PROFILE STUDY OF METROPOLITAN SEWERAGE AGENCIES

B. SUMMARY OF PROFILES

C. TRENDS AND NATIONAL DEVELOPMENTS

A. OBJECTIVES AND APPROACH OF THE PROFILE STUDY OF METROPOLITAN SEWERAGE AGENCIES

The objective of the profile study was to determine how some of the larger metropolitan sewerage agencies across the United States perform wastewater management functions. Structures, scopes, and methods of operation vary considerably among agencies which perform wastewater management functions. Further, while some agencies perform only sewage related functions, others perform a number of related and unrelated activities. Observations of distinctive characteristics and identification of significant trends were to serve as a basis for comparing the organizational structure of the Metropolitan District Commission (MDC) and its scope of operations and lead to the development of goals and objectives for MDC.

To identify significant characteristics of metropolitan wastewater agencies in the United States, an overall framework was developed. The achievement of several tasks was necessary to establish a framework for identifying significant characteristics of wastewater agencies. Data such as geographic size and location, population, level of treatment, number of treatment plants, and amount of sewage processed (in million gallons per day), were developed to provide the basis for assessing and comparing wastewater agencies according to size. The legal entity of a wastewater agency was analysed through the study of such aspects as degree of community control, description of territorial boundaries, degree of power and authority, and method of debt and operational financing. Finally, several other factors descriptive of an agency's operational features, such as scope of services provided, related functions performed, and marketing methods utilized, were used in distinguishing individual wastewater agencies.

The overall framework was constructed by reviewing and researching existing pertinent publications, reports, documents, and articles, including data previously compiled by PMM&Co. and other agencies. Current federal legislation, particularly the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) and the subsequent pertinent guidelines and regulations, were also reviewed.

Federal and other officials connected with wastewater technology were interviewed to discuss their views and recommendations of agencies to be profiled. Based on field work and interviews, four large metropolitan agencies were selected to visit on field trips:

- Municipality of Metropolitan Seattle
  (Seattle, Washington)
- Pollution Control Department
  (Kansas City, Missouri)
- Detroit Metropolitan Water Department
  (Detroit, Michigan)
- Metropolitan Sewer District of Greater Cincinnati
  (Cincinnati, Ohio)

Top officials of each agency were interviewed to discuss the agency's strengths and weaknesses, the chain of events which led to its development, operational techniques, debt and operational financing, the impact of federal and state legislation, and future plans.

In addition to these four profiles, eight additional profiles (not supported by field visits) of major wastewater agencies in the United States were developed. To obtain the required information, the Association of Metropolitan Sewerage Agencies (AMSA) was contacted initially. From its listing of member agencies, 20 of the largest were contacted by telephone or mail and copies of enabling legislations, bond prospectuses, annual reports, sewer ordinances, and other descriptive material were requested. Of the 20 agencies contacted, information adequate to complete eight profiles was received. These agencies are:

- Allegheny County Sanitary Authority
  (Pittsburgh, Pennsylvania)
- Metropolitan Sewer District
  (Louisville, Kentucky)
- East Bay Municipal Utility District
  (Alameda and Contra Costa Counties, California)
- Hampton Roads Sanitation District Commission
  (Norfolk, Virginia)

- Metropolitan Sanitary District of Greater Chicago (Chicago, Illinois)

- Washington Suburban Sanitary Commission (Hyattsville, Maryland)

- Sanitation Districts of Los Angeles County (Los Angeles, California)

- Metropolitan Denver Sewage Disposal District (Denver, Colorado)

The individual profiles are summarized in Section B and discussed in detail in Appendix I-1.

Note: The profile information was developed in 1973. It is likely that changes in methodologies have taken place since 1973.

B. SUMMARY OF PROFILES

This section summarizes the profiles of the 12 metropolitan sewerage agencies selected for study, highlighting predominant characteristics. The summary is divided into the following topics:

- Scope of Wastewater Agencies
- Organizational Entity
- Operational Features
- Finance
- New Developments and National Trends

SCOPE OF WASTEWATER AGENCIES

The agencies included in the profile study are of various population and geographic sizes and service various numbers of participating municipalities. Since no single agency contained absolute characteristics in each of these three categories, it could not be determined which agency was the largest or the smallest. For example, the Metropolitan Sanitary District of Greater Chicago is the largest agency in terms of the population serviced and the number of municipalities connected to the system; the agency provides wastewater service for over 5.5 million persons in 117 municipalities. The Louisville and Jefferson County Metropolitan Sewer District, with a population of 380,000, or the Hampton Roads Sanitation District, which incorporates only eight municipalities, could be considered the smallest agencies surveyed.

A simple average was computed for population served, size of the area served, number of municipalities and MGD (Exhibit I-1). The mean of each statistical category was thus determined and considered an average sized agency. The average sized agency represented in the study services a population of approximately 1.8 million in a 671 square mile area comprising 44 municipalities.

Another statistic used to identify an agency's size was the average daily flow of sewage, as measured in millions of gallons per day (MGD). The mean amount of wastewater treated by the agencies studied was 300 MGD. Chicago, which treats 1,380 MGD, was considered the largest agency and Hampton Roads, which treats 68.5 MGD, the smallest.

EXHIBIT 1-1

WASTEWATER AGENCIES INCLUDED IN THE STUDY

Identity	Location	Population Serviced (000)	Participating Communities	Geographic Size (sq. mi.)	Number of Treatment Plants	Level of Treatment	Quantity of Wastewater Treated (in MGD)	Body of Water Discharged
Municipality of Metropolitan Seattle	Seattle, Washington	1,100	29	300	5	Four Primary One Secondary	160	River and Puget Sound
Pollution Control Department	Kansas City, Missouri	1,300	18	700	2 Large 16 Small	Two Primary Sixteen Secondary	70	River
Detroit Metropolitan Water Department	Detroit, Michigan	3,200	72	488	1	50% Primary 50% Secondary	800	River
Metropolitan Sewer District of Greater Cincinnati	Cincinnati, Ohio	900	35	414	5 Large 30 Small	Three Primary Two Secondary Thirty Secondary and Advanced	170	River
Allegheny County Sanitary Authority	Pittsburgh, Pennsylvania	1,200	75	225	1	Secondary	150	River
Metropolitan Sewer District	Louisville, Kentucky	380	33	375	1 Large 8 Small	Large: Primary Small: Secondary and Advanced	86	River
East Bay Municipal Utility District, Special District No. 1	Alameda and Contra Costs Counties, California	600	9	1,466	1	Primary	74	Ocean
Hampton Roads Sanitation District	Norfolk, Virginia	900	10	1,400	9	Six Primary Three Secondary	69	River
Metropolitan Sanitary District of Greater Chicago	Chicago, Illinois	5,500	118	860	10	Primary and Secondary One Advanced	1,380	River
Washington Suburban Sanitary Commission	Hyattsville, Maryland	1,000	41	1,000	3	Two Advanced One Secondary	148	River
Sanitation District of Los Angeles County	Los Angeles, California	4,000	71	729	1 Large 10 Small	Large: Primary Small: Secondary	350	Ocean
Metropolitan Denver Sewage Disposal, District No. 1	Commerce City, Colorado	1,000	22	100	1	Secondary	130	River
Average		1,757	44	671			299	

The number of treatment plants operated by an agency was also determined. These plants have been classified according to their level of treatment in the three commonly used categories: primary, secondary, and tertiary. Officials of each agency were relied upon to classify their agency's treatment plants.

The agencies profiles operate from one to 35 treatment plants of various treatment levels and capacity. Many of the agencies refer to their larger plants as "permanent plants" and to the smaller ones as "temporary." Permanent plants are generally those constructed to service several municipalities and have the capacity to treat several million gallons of sewage per day. Temporary plants are those designed to treat the sewage from one or two communities, and have relatively low capacity. Many of the agencies in the study operate several large treatment plants, maintaining smaller or temporary plants in fringe areas.

The study included two agencies bordering the Atlantic Ocean, three bordering the Pacific, and the remaining seven located inland.

ORGANIZATIONAL ENTITY

The wastewater agencies surveyed service large metropolitan areas which encompass several incorporated participants (e.g., cities or towns) as well as areas unincorporated into any local system of government. One prerequisite of establishing a large metropolitan wastewater agency - transcending existing political boundaries - seems to have been a major obstacle in some areas and has led to the creation of quasi-public corporations. Such corporations have been created for special purposes (e.g., sewage treatment or water supply) or for the performance of several regional services.

Study findings indicate that an infinite variety of organizational entities are structured to administer sewerage functions in the United States. However, two major categories predominate: city municipal departments ("municipal operations") and separate legal entities ("quasi-public corporations"), often referred to as districts, authorities, or commissions.

The following three elements characterize the organizational entity of every wastewater agency:

- composition and selection of governing body;
- legal powers; and
- territorial authority.

Variations within these three categories have direct impact upon the agency's method of operation.

Composition and Selection of Governing Body

The governing body of a wastewater agency formulates policy to guide the agency in accordance with the requirements of both the population it services and regulatory agencies. The powers of an agency are vested in its governing body, thus empowering that body to perform its function properly. The functions commonly performed by governing bodies are to:

- hire a director to manage the agency;
- approve budgets and capital expenditures;
- approve comprehensive wastewater plans;
- authorize the issuance of bonds;
- approve rate adjustments; and
- establish the agency's overall policy.

The governing boards of the wastewater agencies profiled varied in size from the three member board of the Metropolitan Sewer District of Greater Cincinnati to the 54 member board of Metropolitan Denver.

The method of selecting members for the governing body generally falls into one of three categories: direct election; indirect election; and appointment.

Under the direct election method, residents serviced by the agency elect board members to represent them on matters concerning wastewater policy formulation. Of the 12 agencies surveyed, only two used the direct election method: the East Bay Municipal Utility District of Alameda and Contra Costa Counties, California, and the Metropolitan Sanitary District of Greater Chicago. The former has a five member body and the latter a nine member body (called "trustees"). In both agencies, the members are elected at large.

Under the indirect election method of selecting a governing body, the individual members of the body serve on the board by virtue of their holding another elected office. For example, the governing body of the Municipality of Metropolitan Seattle (Metropolitan Council) is composed of elected mayors and other elected officials of each participating municipality. Two other agencies included in the study use the indirect method: the Metropolitan Denver Sewage Disposal District No. I (Commerce City, Colorado) and the Sanitation District of Los Angeles County (California).

The Pollution Control Department of Kansas City, Missouri is not governed by its own independent body. Instead, it is the City Council's responsibility to approve and direct wastewater policy. This method could be considered a form of indirect election inasmuch as the council members have multiple responsibilities and are often elected for reasons not associated with wastewater policy.

Another form of indirect election is the method used by the Metropolitan Sewer District of Greater Cincinnati. The Board of Directors of this agency is composed of County Commissioners. Under the Ohio Revised Code, powers of the district are vested in its board, which in this case comprises the three elected Commissioners of Hamilton County.

Under the appointment method, board members are appointed by encumbent governing officials or a governing body, such as a city council. In some areas, the Governor of the state assumes responsibility for appointing the board members, as in the Hampton Roads Sanitation District of Norfolk, Virginia. In the Detroit Metropolitan Water Department, the seven member Board of Commissioners is appointed by the Mayor. In other areas, the county government appoints the directing body. In Louisville and Jefferson County, the Mayor of Louisville appoints three of the five member board and the County Judge appoints two.

Composition of the board varies in terms of representation from the different political entities included in the area serviced. Three key political entities are generally included within the area of a regional wastewater agency: inner city; county; and combined suburban municipalities.

The composition of the boards of most agencies surveyed reflected concern for equitable representation of each political entity. Representation is usually based upon population serviced. For example, in the Denver Metropolitan area, a political entity is entitled to one board member per 25,000 population.

Board composition may also be determined by a formula which guarantees a certain percentage of the board membership representing a particular entity. For example, at least four of the seven member board of the Detroit Metropolitan Water Department must reside within the city limits of Detroit.

Legal Powers

The manner in which the metropolitan wastewater agencies perform their functions is determined largely by the powers they are authorized to exercise. General powers allow an agency to perform its basic functions, while special powers enable the agency to perform specific aspects of its function more comprehensively and effectively.

General Powers

The general powers characteristic of most wastewater agencies can be summarized as follows:

- to sue and be sued;
- to construct, improve, extend, enlarge, reconstruct, maintain, equip, repair, and operate a sewage disposal system;
- to contract with other government agencies;
- to exercise the powers of eminent domain;
- to accept grants;
- to borrow money and issue bonds;
- to prepare or cause to be prepared comprehensive wastewater plans; and
- to acquire real property by purchase, gift, and lease.

These fundamental powers are essential to an agency's performance of wastewater collection and treatment services. Only two of the 12 surveyed agencies do not possess these powers as legal entities; the powers are available to them, however, through their cities' enabling legislation since they operate as part of city departments.

Special Powers

Some wastewater agencies possess a broad range of special powers in addition to their general powers and are thereby capable of performing comprehensive wastewater management functions. In addition, these powers magnify an agency's scope of operations to enable it to control and enforce water quality standards established by state and federal agencies.

The special powers most commonly possessed by the agencies profiled are as follows:

- to issue General Obligation Bonds;
- to levy ad valorem taxes;
- to fix and collect rates and other charges; and
- to annex new areas.

In addition, some agencies hold the following special powers which are not common to most of the agencies profiled:

- to review and approve the design and construction of all sewerage facilities which connect directly or indirectly into the agency's sewerage facilities;

- to inspect all sewers and treatment facilities;

- to prohibit individual users from discharging toxic substances directly or indirectly to the system;

- to establish plumbing code and to issue plumbing licenses;

- to enter on any lands, waters, and premises for the purpose of conducting surveys and examinations; and

- to require municipalities to discharge to its system when such is determined necessary to health, safety, or welfare of the area population.

Some of these powers are acquired through ordinances which participating municipalities must adopt in order to be included in the territory serviced by a wastewater agency. Other agencies, which possess very limited powers in dealing with municipalities, acquire such powers through inter-municipal agreements which participating municipalities must accept when entering into a contract with the wastewater agency.

Some metropolitan wastewater agencies have the authority to provide other regional services, the most common of which is water distribution (provided by three agencies included in the study). Other regional responsibilities are flood control, garbage disposal, public recreation, power, and transportation. Although many agencies profiled have the legal authority to perform these functions, they were not currently engaged in these activities.

Territorial Authority

The territorial authority of a wastewater agency is determined by the extent to which significant political boundaries have been unified to facilitate effective management of wastewater needs.

There are two approaches to determining an agency's territorial authority, legislative and evolutionary. The former has two variations:

1. Geographic Approach
   The legislature designates a specifically defined area (sometimes called a district) either geographically or to include all the area lying within a drainage basin or watershed. Examples of agencies whose territorial authorities have been determined on this basis are the Hampton Roads Sanitation District and the Sanitation Districts of Los Angeles County.

2. Political Map Approach
   This method of selected territorial authority legislatively is on the basis of existing political boundaries, which may include a group of cities or a specific county or counties. Seven of the 12 agencies profiled were designated in this manner. (Although county boundaries could have been determined according to watershed characteristics, this fact was not readily evident from the information the agencies provided.) However, not all the areas included within an agency's boundaries receive its sewage treatment services.

In the evolutionary approach, as the wastewater needs of surrounding communities develop, the territorial authority of the agency performing the regional service expands accordingly. In most cases, comprehensive plans have been developed to include fringe communities, although they are not included in the territorial boundaries of the wastewater agency until official annexation. An example of this type of territorial development is the area serviced by the Pollution Control Department of Kansas City, Missouri.

Community Control

Community control is the degree to which members of a community influence the policies of a public agency. Based on the study of 12 metropolitan agencies, it was determined that community control is accomplished through two approaches.

One approach is through the governing body. In this approach to community control, communities have the opportunity to control the policies of the sewerage agencies by ensuring that the governing body composition is representative of the various subelements (city, town, district, etc.) serviced by the agency. Still another degree of community control is effected by the method used for selecting the governing body. Selection of body members can be determined by the elective process, thereby giving each resident of voting age the power to select his representatives on the governing body.

The other approach to community control is the referendum technique. The agency is authorized many powers, the exercise of which is subject to voter approval. For example, issuing General Obligation Bonds is a power subject to the majority approval of the voters in an election. Other community controls are exemplified by the Metropolitan Sewer District of Louisville and Jefferson County (Louisville, Kentucky). While this metropolitan sewerage agency has the power to perform many functions, it must receive citizen approval prior to the exercise of several of its powers. Some of the community controls over this agency are:

- to construct facilities, according to the comprehensive wastewater plans it has developed, after receiving the necessary approval from designated city authorities;

- to fix and collect sewer rates, subject to the approval, supervision, and control of the legislative body of the city being provided service; and

- to issue bonds for the purposes of construction directly affecting a city, subject to the approval by an ordinance of the legislative body of the affected city and approved at a public election.

OPERATIONAL FEATURES

The basic function of all wastewater agencies is to perform wastewater collection, transportation, treatment, and discharge services. The two major methods of providing these services are wholesale and retail. However, varying combinations were found in the 12 agencies studied.

As a wholesaler, the agency plans and constructs a system of large interceptor sewers which are extended to outlying communities to connect these communities' local sewers. The metropolitan wastewater agency assumes responsibility for the collected

sewage as it enters its system of interceptor sewers. The sewage is conducted to treatment plants for processing and is then discharged from the treatment plant to a receiving body of water.

A wholesaler's customers are the municipalities connected to its system, not the individual household units, commercial establishments, or industries. The charges for its services are billed to the community on an agreed upon basis. Two of the agencies in the study operate on this basis: the Municipality of Metropolitan Seattle and the Metropolitan Denver Sewage Disposal District. In Seattle, the system intercepts sewage from 29 municipalities. In Denver, 21 municipalities and one special industrial connection are serviced by the agency.

In contrast to the wholesaler is the retailer, who offers sewage services to all users located in the geographic area serviced by the agency. As a retailer, the agency constructs or supervises the construction of all public sewage facilities within its territorial authority, including lateral, trunk, and interceptor sewers and treatment plants. Each user in the system is billed individually for services received. Three agencies included in the study are retailers: the Louisville and Jefferson County Metropolitan Sewer District, the Metropolitan Sewer District of Greater Cincinnati, and the Washington Suburban Sanitary Commission. All three base their charges upon water consumed on the premises. Two levy an additional wastewater industrial surcharge for contributors whose sewage is not considered normal, as defined by each agency.

Some agencies combine features of wholesaler and retailer. For example, both the Allegheny County Sanitary Authority and the Hampton Roads Sanitation District intercept sewage collected by the participating municipalities' local collection networks. However, a sewage user charge, based upon water consumed and measured by meters, is levied upon each individual user. Both of these agencies depend upon outside water utilities for water consumption information, with the Allegheny County Sanitary Authority relying on 23 water service agencies.

The Metropolitan Sanitary District of Greater Chicago combines other features of wholesale/retail functions. It intercepts the sewage from all participating municipalities, including the City of Chicago. Ad valorem taxes are assessed uniformly throughout the District to pay maintenance and operating costs and debt service requirements. However, all industries which contribute more than 10,000 gallons of wastewater per day are billed individually by the District based on flow and constituency.

Each industrial premise is metered for water consumption; the readings are submitted to the District by water utilities and serve as the basis for the sewage charge.

Another unique operating policy is that of the Detroit Metropolitan Water Department, which provides water services to 94 municipalities and sewage services to 72 municipalities. For the municipalities outside the city limits of Detroit, the department provides normal wholesale interceptor service and charges each community according to its combined flows, as measured by a meter or meters at each connecting point. Full retail services, including the construction and maintenance of all local collection facilities, are provided for residents of the City of Detroit. Sewerage service charges to these customers are billed and collected as part of their water bills and are based on water consumed, as measured by meters of each premise.

Other Prevalent Operating Features

The single most prevalent practice among the wastewater agencies included in the study is the use of formal contracts (sometimes called inter-municipal agreements) between the wastewater agency and the participating communities. This document is especially important to agencies with limited legal powers, as the agreement may grant the agency additional powers it needs to function properly. For example, the Detroit Metropolitan Water Department inter-municipal agreement, which the agency negotiates with each municipality entering its system, grants the agency the following additional powers:

- to set or change rates upon 90 days written notice;
- to set construction standards for installation of sewage collection, pumping and transportation facilities;
- to pre-approve construction plans;
- to force compliance with wastewater aspects of all laws, ordinances, rules, and regulations; and
- to inspect any wastewater facility for proper installation and operation.

For wastewater agencies that finance the construction of facilities with Revenue Bonds, the contracts provide support in securing a low interest rate, primarily because they are usually written for an uncancellable long-term period. Further, minimum

annual charges may be established using projected wastewater flows, thereby guaranteeing a certain annual flow of revenues to the agency.

An unusual practice was noted in the Allegheny County Sanitary Authority. As mentioned previously, the authority provides interceptor service to its participating communities but bills each individual user according to metered water usage. A contractual arrangement with each municipality guarantees the payment of all defaulted service fees charged to individual users within the municipality's territorial boundaries.

Lastly, inter-municipal agreements provide a vehicle for the sewerage agency to delegate certain responsibilities (e.g., to monitor industrial wastes) to the other contracting party. The participating municipalities may also be required to maintain records detailing the wastes discharged by principal industrial discharges. Subject to inspection by the sewage agency, these records can be used to determine an industrial wastewater surcharge.

Several agencies included in the study are authorized to perform other regional services. The East Bay Municipal Utility District (Alameda and Contra Costa Counties, California) is authorized to perform the broadest range of functions, including transportation, telephone or other communication services, garbage disposal, sewerage, power generation, and public recreation facilities appurtenant to its reservoirs. The agency currently performs only the functions of water distribution, sewage disposal, and recreation. Three of the agencies perform both water and sewer services on a regional basis: the Washington Suburban Sanitary Commission, the Detroit Metropolitan Water Department, and the East Bay Municipal Utility District.

The Metropolitan Sanitary District of Greater Chicago has the additional responsibilities of maintaining navigation facilities on the waterways within its territorial authority and of preventing flooding by polluted water. Water quality standards established by the State of Illinois Environmental Protection Agency are enforced by the district, and discharge to sewers and waterways is policed by the district.

The Sanitation Districts of Los Angeles County feature an interesting organization. Enabling legislation authorizes the board of supervisors of any county to organize a sanitation district, and 27 such districts have consequently been organized. All 27 formed a Joint Administrative Agreement regarding the

performance of administrative functions for all the districts, and District No. 2 was assigned this responsibility. Another agreement, the Joint Outfall Agreement, provides for the joint construction, operation, and maintenance of trunk sewers and treatment works to the mutual benefit of two or more districts. Each unit of the joint outfall system is stated in capacity in cubic feet per second and the agreement specifies the amount of capacity ownership each district has purchased.

FINANCE

The metropolitan wastewater agencies included in the study pay the cost of constructing, maintaining, and operating sewerage facilities by several means. The one element common to all the agencies is that major construction projects are financed through the issuance of long-term debt securities and state and federal grants, whenever individual projects qualify. Revenues collected from users of the sewerage facilities are used to repay the debt incurred, interest charges, and the cost of maintaining and operating the system. The following sections describe some of the practices most frequently used for financing major construction projects, meeting cash requirements, and charging for sewerage services.

Financing Major Construction Projects

The agencies surveyed finance major construction projects through the issuance of long-term debt securities or bonds, generally of two types. A General Obligation Bond is supported by pledge of the full faith and credit of the issuer and constitutes a lien of all real property within the district. Repayment of these obligations is guaranteed by taxes levied on all real property. The low risk associated with these bonds awards them favorable status in the investment market and grants them generally low interest rates.

Other advantages associated with General Obligation Bonds are that they are:

- generally easier to sell with favorable terms available; and
- flexible in that other revenues from the system may be pledged toward their retirement.

One major disadvantage is that General Obligation Bonds are generally limited by statutory provisions expressed as a stated percentage of the taxable property, and the credit rating of the community.

To issue General Obligation Bonds, an agency must first possess the power to levy taxes. The issuance of General Obligation Bonds also generally requires prior approval of the qualified voters at an election. Eight of the 12 agencies surveyed were found to possess the power to tax; ironically, however, three use Revenue Bonds to finance their major capital projects.

Revenue Bonds represent the other type of security issued to finance the major capital projects of regional wastewater agencies. These bonds differ from General Obligation Bonds in that they do not become the general obligation of the district. Instead, money for their repayment is raised from the charges levied for services performed by the issuing unit. This type of financing is called revenue financing because it is generally employed to finance revenue producing projects.

Revenue financing is quite popular among revenue producing agencies for the following major reasons:

- Legal limits do not exist.
- Many agencies do not possess the power to tax.
- Voter approval is generally not required.
- Projects extending beyond normal municipal boundaries can be financed.

Seven of the 12 agencies profiled use Revenue Bonds to finance major capital projects. Although these bonds are generally more expensive to issue in terms of the interest rate they bear, if certain covenants are attached to the bonds, the financial community normally accepts them almost at par with General Obligation Bonds in terms of risk. For example, the Revenue Bonds of the Detroit Metropolitan Water Department are currently rated the same as those of Detroit's General Obligation Bonds.

Bond covenants are requirements the issuing agency agrees to fulfill. The sale of the bonds is made pursuant to these agreements. Some of the covenants that most of the wastewater agencies in the study which use Revenue Bonds have agreed to are as follows:

- Estimated annual net revenues must equal a certain percentage of the combined principal and interest, usually between 130% and 150%. (In Detroit, the percentage is 150%).

- Revenues of the Sewage Disposal System are deposited in a special receiving fund as they are collected. These funds are then apportioned in a manner agreed upon prior to sale of the bond.

- Proceeds of the bond sale must be used for the purposes originally intended.

- Facilities or services of the sewerage system must not be furnished to any user without reasonable charge.

Many of the agencies have utilized financial assistance from federal and state programs that issue grants to finance portions of major treatment projects. However, these have not always been available to agencies at the time needed. For example, the Municipality of Metropolitan Seattle financed 96% of its capital requirements through the issuance of Revenue Bonds, with state and federal grants contributing the remaining 4%. As the requirements for higher forms of treatment increase, it is expected that the use of federal and state grant assistance will increase correspondingly.

Meeting Cash Requirements

Revenues are required to enable a wastewater agency to meet its cash requirements. Based on the agencies surveyed, cash is required for the following four major purposes:

- to pay the costs of operations and maintenance;

- to meet annual debt service requirments (principal and interest);

- to pay the costs of annual routine capital improvements not paid by bonds or grants; and

- to provide working capital.

These four categories determine the annual cash requirements for the successful operation of the regional agencies included in the study.

Based on information provided by eight sewerage agencies, a table of financial and revenue parameters (Exhibit I-2) was developed. Comparison of financial characteristics is difficult because of varying practices and the unavailability of detailed records. Following are some of the factors that should be considered before any conclusions are drawn from the attached data.

- The exhibit includes both wholesale and retail sewerage agencies, the operations of which differ significantly. Wherever possible the costs of constructing and maintaining local sewer networks were excluded.

- Treatment levels vary among agencies affecting the costs of constructing, maintaining, and operating treatment plants.

- Debt ratios differ significantly among agencies due to age of the agency and recent expansion programs.

- Methods of grant financing vary among agencies.

- Depreciation is included in the figures of some agencies and not in others.

It is interesting to note the variations in costs among these agencies. For example, the amount of outstanding debt on a per capita basis varies from $22.15 to $150.97. Similarly, annual cost per capita has ranges from $3.93 to $13.66. The cost of treatment per million gallons is as low as $46.60 in one agency and as high as $228.74 in another.

Charging for Sewage Services

Two methods were generally utilized for charging recipients for sewage services rendered. One method is to bill each individual municipality connected to the system for its share of the total cash required (wholesale approach). The other method is to bill each individual user (household unit, commercial establishment, institution, and industry) for sewerage services rendered (retail approach).

EXHIBIT I-2

FINANCIAL CHARACTERISTICS OF WASTEWATER AGENCIES

Agency	Population	MGD	Long Term Debt Outstanding (000)	Revenues Collected From Users (000)	Cost of Operations (000)	Debt Service (000)	Ratio of Cost of Operations to Debt Service	Cost of Operations & Debt Service (000)	Debt Per Person	Annual Cost Per Person	Annual Cost of Treatment per Million Gallons
Municipality of Metropolitan Seattle	1,100,000	160	153,046	12,841	6,274	6,522	1.03	12,796	$ 139.13	$ 11.63	$ 219.11
Detroit Metropolitan Water Department	3,200,000	800	70,880	17,431	9,748	3,863	.40	13,611	22.15	4.25	46.60
Metropolitan Sewer District of Greater Cincinnati	900,000	170	28,951	15,269	7,508	3,334	.44	10,842	32.17	12.04	174.73
Metropolitan Sewer District, Louisville and Jefferson County	380,000	86	57,370	11,347	3,373	3,807	1.13	7,180	150.97	18.89	228.74
East Bay Municipal Utility District, Special District No. 1	600,000	85	15,830	3,067	2,017	486	.24	2,503	26.38	4.17	80.67
Hampton Roads Sanitation District	900,000	69	30,154	4,695	2,449	1,089	.44	3,538	33.50	3.93	140.48
Metropolitan Sanitary District of Greater Chicago	5,500,000	1,380	281,309	76,419	52,093	23,032	.44	75,125	51.15	13.66	149.14
Metropolitan Denver Sewage Disposal District No. 1	1,000,000	130	31,459	5,283	4,138	1,369	.33	5,506	31.46	5.51	116.04

Another consideration related to revenue generation and billing procedures is the selection of a criterion for charging each user (community or individual) for his proportionate share of the costs incurred in providing services. The most common criterion used by the agencies included in this study is water consumption, based on the assumption that most of the water entering a user's property is eventually discharged to the sewerage system. Accordingly, a sewerage service charge is calculated on the basis of water consumed by the user, as measured by a meter. Other agencies elect to measure actual sewage flows entering their systems. Since sewage metering of each individual user is not economically justifiable, aggregate flows from municipalities and from large industries are measured.

Other bases for establishing a service charge are: size of water meter used; flat rates; number of water taps; and number of toilet facilities. Less directly related to the generation of sewage, but a method historically used to generate revenue, is the assessment of ad valorem taxes on all real property located in the region where sewerage services are performed.

A trend toward billing sewerage charges to each individual household unit, institution, commercial establishment, and industry discharging to a sewerage system is evident among the metropolitan sewerage agencies surveyed. The rationale supporting this trend is the concept of "fair share" - that each user should pay his share of the costs incurred in rendering services.

Many agencies assign additional service charges to users whose sewage discharge contains elements uncharacteristic of the majority of sewage entering the system. These dischargers are required to pay the costs of the additional treatment. These "industrial wastewater surcharges" have been implemented and enforced in the majority of agencies included in the study.

The following is a summary of the methods used by the 12 metropolitan sewerage agencies for generating revenues. The first five agencies, which operate under the wholesale approach, are:

- Municipality of Metropolitan Seattle;
- Detroit Metropolitan Water Department;
- Metropolitan Denver Sewage Disposal District No. I;
- Metropolitan Sanitary District of Greater Chicago; and
- Sanitation Districts of Los Angeles County.

The wholesale approach to revenue generation is generally considered the simplest to administer due to the low volume of activity required to perform the billing functions. Further, the limited number of "customers" simplifies and reduces the collection activity required of the agency.

Following the summary of the five wholesalers is a summary of the seven agencies utilizing the retail approach:

- Hampton Roads Sanitation District;
- Allegheny County Sanitary Authority;
- Washington Suburban Sanitary Commission;
- Louisville and Jefferson County Metropolitan Sewer District;
- East Bay Municipal Utility District;
- Pollution Control Department, Kansas City, Missouri; and
- Metropolitan Sewer District of Greater Cincinnati.

The retail approach to revenue generation involves charging each individual user for sewerage services. Achievement of an efficient system is usually dependent upon inter-agency cooperation. In addition, due to the characteristically large number of accounts, computerized billing procedures are necessary to handle the volume of required work efficiently. Unless otherwise noted, the collected revenues are used for paying the costs of operating and maintaining the sewerage system, interest on borrowed funds, and amortizing portions of bond issues. Some agencies use current revenues for financing small portions of capital construction costs. The extent to which this practice is used could not be determined from the information provided. It could be estimated, however, that this method is used to finance a relatively small portion of overall capital expenditures.

Municipality of Metropolitan Seattle (Seattle, Washington)

Each of the 12 participating communities shares equally the total cost of the sewage treatment system. Costs of the system are totaled and then allocated to participants on the basis of residential units or residential equivalent units. Equivalent units are calculated by dividing actual monthly water consumption (in cubic feet) by 900, the average monthly rate established for residential units. Only the sewered residences are considered in the cost allocation model.

The amortization schedule of the Revenue Bonds used to finance construction or acquisition of property is arranged in conjunction with the service area's estimated population increases. Accordingly, the repayment of debt incurred to provide extra

capacity in new treatment facilities is delayed a number of years and eventually paid by the users for which the extra capacity was provided.

Service charges are billed to each participating municipality. This charge is based upon the average quantity of water consumed by household units, which is in turn based upon historical water consumption statistics for the City of Seattle. The average consumption statistics are applied to all household units located within the area of the agency's geographical authority which receives sewerage services. For users not defined as individual household units, the total of all water consumption is converted to household equivalent units.

The monthly rate for each household or equivalent unit is $2.75. All units are combined and multiplied by $2.75 to determine a participating municipality's monthly sewerage service charge. At the time of the study, the agency did not impose a surcharge for dischargers of sewage of unusual quantity of constituency.

Detroit Metropolitan Water Department (Detroit, Michigan)

The costs of interceptor sewers constructed for the benefit of outlying communities are apportioned to those communities, as are costs related to the purchase and installation of meters to measure the flows from each community. All other costs are spread uniformly throughout the service area.

Two methods are used for charging sewerage services. Individual charges are made to residents who live within Detroit city limits, according to the water consumed on each premise, as measured by a water meter. The charge is included on the water bill sent to each resident. For suburban communities, the combined waste from each community is measured by a meter installed at each point of interception. (The communities pay the cost of the meters.) At the time of the study, a method to assess dischargers of unusual sewage was being reviewed, and no significant revenues were being generated from sewage surcharges.

Metropolitan Denver Sewage Disposal - District No. 1
(Denver, Colorado)

Costs are apportioned uniformly to the 13 original member communities. Communities that joined subsequent to the District's establishment pay the additional cost of the interceptors and meters constructed for their benefit.

Charges are determined by measuring flow, BOD, and Suspended Solids at each municipal connecting point. Tests are conducted on an unannounced basis for seven consecutive days and a subsequent one-day return visit is made to test the reliability of the seven-day test.

Total annual charges are apportioned so that 45.51% of the charges are made for flow considerations; 30.88% for BOD content; and 23.61% for Suspended Solids content. At the time of the study, large individual dischargers were not identified for purposes of assessing a surcharge.

The Metropolitan Sanitary District of Greater Chicago
(Chicago, Illinois)

Total revenue requirements for the District's wastewater programs are assessed to the counties on the basis of property valuation. The counties include this assessment as part of the total assessment to their municipalities. There is no special allocation of extra capacity costs collected from recipients of sewerage services.

Industries which contribute more than 10,000 gallons of sewage per day are billed separately by the District according to flow and strength.

Sanitation Districts of Los Angeles County
(Los Angeles, California)

The 27 subdistricts of the Sanitation Districts are centrally administered, with all administrative expenses that can be traced to a subdistrict apportioned accordingly. Other administrative expenses are apportioned on the basis of the ratio of a district's bond sales or capital investments, whichever is greater, to the aggregate sum for all of the districts.

When two or more districts share the same treatment facilities, they also share all the costs in proportion to the initial capacity provided for each.

Most revenues are generated by imposing ad valorem taxes upon all the real property within a District. In addition, annual wastewater surcharges are levied on all commercial and industrial establishments within the Districts. The surcharges compensate for the capital costs and the maintenance and operating costs incurred to treat industrial wastewaters.

Hampton Roads Sanitation District Commission (Norfolk, Virginia)

Costs are distributed uniformly throughout the District with all serviced premises paying the same rate. The basis upon which the costs are distributed is water consumption. No special allocations are made for extra capacity costs, which are collected along with the other costs from the current users.

Interception and treatment services are provided, and service charges are based on water consumed, measured by a water meter. A minimum charge of $1.50 per month is made and currently, the scale of rates for sewerage charges offers a discount to large consumers. The charge for unmetered users is based upon the number of flush toilets in use. Wastewater surcharges for excess BOD, Suspended Solids, and other characteristics (as determined by the agency) are also applied.

Allegheny County Sanitary Authority (Pittsburgh, Pennsylvania)

Uniform rates apply to all communities in the service area. When expansion of the service area to fringe communities materially affects the rates of the core cities, the extra costs are allocated to the new communities. These costs are paid either in a lump sum or through higher rates.

The Authority is responsible for intercepting, treating, and discharging sewage collected from the local networks of the participating municipalities. Charges are based upon the quantity of water entering the premises, as measured by a water meter. Large users of water are granted a lower rate. To users whose water bills are based on a flat rate, the sewerage service charge

is a fixed percentage of the flat rate charge. To all other water users, the water consumption is estimated by the Authority and billed in accordance with the rate charged to metered users.

A wastewater industrial surcharge is charged to commercial and industrial contributors whose wastes contain unusually high concentration of BOD, Suspended Solids, or chlorine demand. A quarterly charge is also made for garbage grinders.

The information concerning water meter readings required to determine the sewerage service charge is provided by one of 23 independent water service agencies.

Washington Suburban Sanitary District (Hyattsville, Maryland)

The sewer use charge is uniform throughout the District except in three subdistrict areas where the cost of providing sewage treatment capabilities is greater. For these three districts, the WSSC has determined that the excess costs should be financed through connection fees for all properties. The commodity rate, however, is uniform throughout the District and is charged to all sewered property. The costs associated with constructing, operating, and maintaining storm drains are allocated to property owners through ad valorem taxes. Costs for future capacity are paid by the current recipients of sewage services.

Louisville and Jefferson County Metropolitan Sewer District (Louisville, Kentucky)

The costs of treatment facilities, including interceptor sewers, are shared equally be all sewerage service recipients in the District. Construction costs of local collection networks and appurtenant facilities are apportioned to the benefited area and distributed according to the number of square feet in any lot or tract within the area described.

Sewerage service charges are based on water consumed, as measured by a meter, and include a minimum charge and a commodity charge. The minimum charge is determined according to the size of the water meter and the commodity charge is scaled downward in favor of large water users.

The MSD has established an industrial waste surcharge for dischargers whose wastes contain excessive concentrations of Suspended Solids and grease.

The Louisville Water Department provides the District with water services. Through a cooperative arrangement with the MSD, the water department includes a sewerage service charge on its bills. Approximately 40 industrial accounts are billed directly by the MSD based on special meter readings by MSD personnel.

East Bay Municipal Utility District (Oakland, California)

The East Bay MUD apportions the costs incurred for providing extra capacity in its treatment facilities to the District's property owners. The remaining costs are apportioned among two classes, homeowners and business, in the form of service charges.

Sewerage service charges have recently been adopted. The charge to homeowners is a flat rate based on an analysis of historical water consumption statistics. This charge is $.075 per month.

Commercial and industrial accounts have been separated into two classifications - those that require permits and those that do not. Firms having discharges of unusually large volume or strength require permits. Special rates are established for these customers. Those accounts that do not require permits are classified into one of 15 industry categories which serve as the basis for determining their rate per 100 cubic feet of water consumed, as measured by a meter.

Sewerage service charges are incorporated into the water bill, a service also performed by East Bay MUD.

Pollution Control Department (Kansas City, Missouri)

All costs are shared equally by all sewered property owners in the service area. Costs are distributed on the basis of water consumption, and a surcharge is imposed on Suspended Solids industrial users for excess quantities of BOD. The costs incurred for providing excess capacity are not segregated, but are combined with all other costs and are paid by current users.

Billing services are performed by the Kansas City Water Department. Bills are sent to all sewered premises within the city limits of Kansas City and in suburban municipalities receiving water services from Kansas City. Communities not receiving water services from Kansas City are responsible for remitting to Kansas City sewerage charges for all premises benefiting from the system. Because the suburban Kansas City area is largely residential, monthly sewerage charges are computed by multiplying the number of residential units by a flat rate charge of $2.88.

Metropolitan Sewer District of Greater Cincinnati (Cincinnati, Ohio)

Costs are uniformly shared by all premises served by a connection to the sewerage system. There is no special allocation for extra capacity costs, which are paid by current users of the system.

Service charges consist of a minimum charge and a commodity charge. The minimum charge is based on either the size of the water meter used to serve the premises or the size of the premises served as determined by the number of family units therein, whichever results in the larger minimum charge. Where commercial or manufacturing facilities require water for other than sanitary purposes, the minimum charge is not less then the minimum charges for a meter one size smaller than the branch serving the premises.

The commodity charge is based on the quantity of water used by the premises served, as measured by a water meter acceptable to the City of Cincinnati.

An industrial sewage surcharge is imposed for sewage considered other than normal. A comprehensive monitoring program determines the nature and quality of sewage discharged from commercial and industrial customers to determine the amount of the surcharge.

All billing is handled by the Cincinnati Water Department. A small number of accounts are billed only after special meter readings have been performed by MSD personnel.

C. TRENDS AND NATIONAL DEVELOPMENTS

The study of 12 metropolitan sewerage agencies disclosed the following significant trends in the wastewater management field. While some of these trends have been developing over the past 15 to 20 years, others are so recent that their results can only be projected. The impetus of these recent trends seems to derive from new environmental concerns and the recent state and federal legislation reflecting these concerns.

Federal Legislation

Legislation and legislative intervention in themselves represent trends. The comprehensive Federal Water Pollution Control Act Amendments, enacted in 1972, extend federal and state regulation to all navigable waters, establish strict effluent limitations, implement a permit program to control effluent discharged to navigable waters, prohibit toxic discharges, strengthen federal enforcement procedures, authorize large fines, increase federal grant programs, and direct municipal sewerage programs toward self-sufficiency.

New Facilities

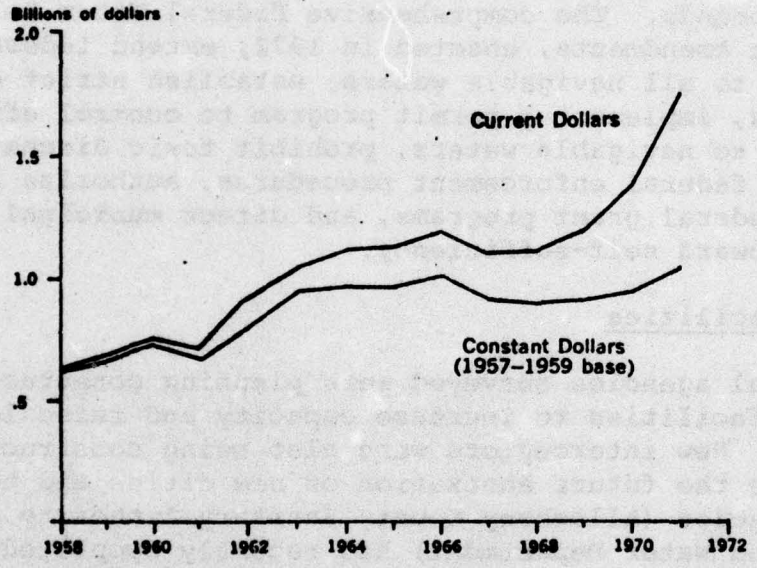
Several agencies surveyed were planning construction of new treatment facilities to increase capacity and raise levels of treatment. New interceptors were also being constructed to accommodate the future annexation of new cities and towns. Some of the agencies (Allegheny County Sanitary Authority and Detroit Metropolitan Water Department) had recently completed upgrading treatment capabilities to the secondary level, while in others (Cincinnati) construction was under way to upgrade treatment and to provide additional capacity.

Municipal Investment

These trends are substantiated in the Fourth Annual Environmental Report published by the Council on Environmental Quality in September 1973. This report indicates that annual municipal investment for wastewater collection and treatment facilities rose from approximately $600 million in 1958 to over $1.7 billion in 1971. In current dollars, the increase was over 150%; adjusted for constant dollars, it was less that 50% (Exhibit I-3). When judged on a per capita basis (Exhibit I-4), however, this phenomenal increase in capital outlay shows little change until 1970. Changing credit markets and new water pollution legislation were

EXHIBIT I-3

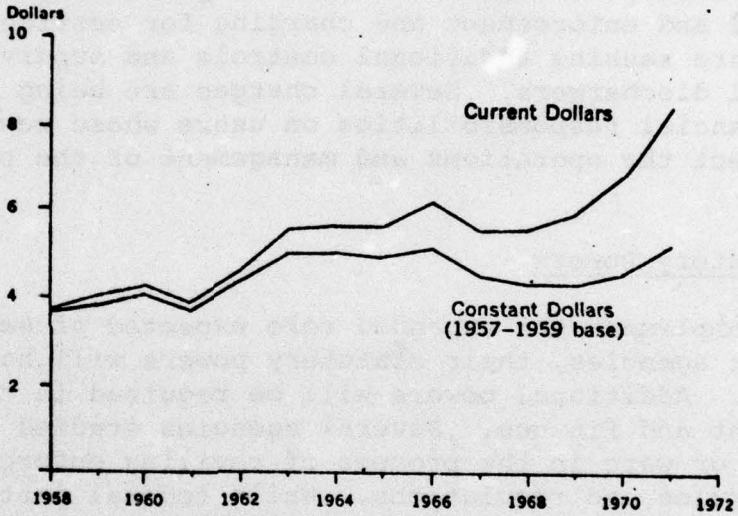
State and Local Investment for Waste Water Collection and Treatment Facilities for 1958–1971



Source: Department of Commerce, Bureau of the Census, Government Finances (Washington: Government Printing Office, 1958–1970/71); constant dollars calculated with Environmental Protection Agency, Office of Water Program Operations, "Sewer Treatment Plant and Sewer Construction Cost Index" (undated and unpublished index)

EXHIBIT I-4

Per Capita State and Local Investment for Waste Water Collection and Treatment Facilities for 1958–1971



Source: Department of Commerce, Bureau of the Census, *Government Finances* (Washington: Government Printing Office, 1958–1970/71); constant dollars calculated with Environmental Protection Agency, Office of Water Program Operations, "Sewer Treatment Plant and Sewer Construction Cost Index" (undated and unpublished index)

primarily responsible for the lack of growth. Much of the recent upturn is attributed to new federal enforcement and increased construction grant commitments.

Increased capital outlays will impact on increased operating and maintenance costs. The Council's report states that these costs are expected to increase over 230%, while capital costs will increase only 120%.

Methods of Wastewater Management

Methods of performing wastewater management are also undergoing change. The profile study indicates a gradual tendency of agencies to adopt the retail method in performing the functions of control and enforcement and charging for services. Many agencies are seeking additional controls and supervision over individual dischargers. Several charges are being structured to place financial responsibilities on users whose sewage contributions affect the operations and management of the overall sewerage system.

Statutory Powers

To complement the expanded role expected of wastewater management agencies, their statutory powers will have to be augmented. Additional powers will be required in two areas: enforcement and finance. Several agencies studied had just completed or were in the process of revising enforcement ordinances or rules and regulations. While federal participation in financing construction projects is increasing, the nature and scope of the projects are also increasing due to new laws requiring higher levels of treatment. Thus, the local share of costs, in total dollars, for these expanded water pollution programs will strain the existing debt limitations of many governmental units.

Finance

No new or significant financial powers were revealed by the profile study. However, significant direction toward revenue financing (Revenue Bonds) was identified or seemed likely due to the debt/valuation ratios by which some agencies were restricted. Increased federal pressure for treatment requirement will eventually force changes in financing methods.

A new national commitment to pollution abatement has resulted in increased federal spending in the wastewater area. Construction grants of up to 75% of cost are available for constructing sewage treatment plants, pumping stations, interceptors, and in some cases, local collection networks. Along with increased federal spending, however, are new regulations governing the use of federal funds and their recovery ("The Role of Governmental Agencies Influencing Wastewater Management" in Chapter II, Section B of this report).

These trends and developments should have an overall economic impact on family income. The Council's report indicates that by 1976, a median-income family will pay about 1.8% of its income ($250) for the incremental costs of abating air and water pollution and improving solid waste disposal. These amounts will be generated by increased taxes, service charges, and higher prices of consumer products.

State Utilities

A trend toward establishment of statewide environmental organizations, sometimes called state utilities, was observed in the large metropolitan areas. These organizations seem to have evolved as a result of political and social difficulties encountered in establishing regional systems, as well as encouragement from the federal government.

The statewide utility concept is gaining acceptance largely because it permits the pooling of needed economic and physical resources. Concerning long-term financing, the utility may receive more favorable recognition than some of the individual local governments that would have to approach the bond market. Economies are realized through centralized monitoring and enforcement practices, and staff research is made available to smaller communities. These activities are coordinated at a higher level for the benefit of all communities and the overall enhancement of the state.

CHAPTER II

A. REVIEW OF CURRENT OPERATIONS OF MDC

B. ROLE OF GOVERNMENTAL AGENCIES INFLUENCING WASTEWATER MANAGEMENT

C. COMPARISON WITH OTHER METROPOLITAN WASTEWATER AGENCIES

A. REVIEW OF CURRENT OPERATIONS

EVOLUTION OF THE METROPOLITAN DISTRICT COMMISSION

The first legally constituted metropolitan district in the United States was the Metropolitan Sewerage District (MSD), established in the Commonwealth of Massachusetts in 1889. This regional agency was charged with the responsibility to build, maintain, and operate a metropolitan sewerage system for the communities surrounding the City of Boston. The topographical character of the Boston Basin, which drains into the Mystic, Charles, and Neponset Rivers and empties into Boston Harbor, had created a drainage problem and the consequent need for a regulatory agency.

Other regional Massachusetts agencies established at about the same time were the Metropolitan Parks District in 1893 and the Metropolitan Water District in 1895. In 1901, an act of the Massachusetts Legislature abolished the Metropolitan Sewerage Commission and the Metropolitan Water Board and transferred their powers and duties to the newly created Metropolitan Water and Sewerage Board.

A constitutional amendment in 1918 required that all state boards and commissions be organized into not more than 20 departments. Accordingly, the Metropolitan District Commission (MDC) was created in 1919 to assume the powers, duties, and responsibilities of the Metropolitan Parks Commission and the Metropolitan Water and Sewerage Board. This institutional arrangement was maintained for half a century, until pressure to reorganize the entire executive branch of state government resulted in the legislative establishment of a cabinet level structure of 10 executive offices. All state departments, boards, commissions, and divisions were realigned, generally along functional and programmatic lines, and placed within one of these executive offices.

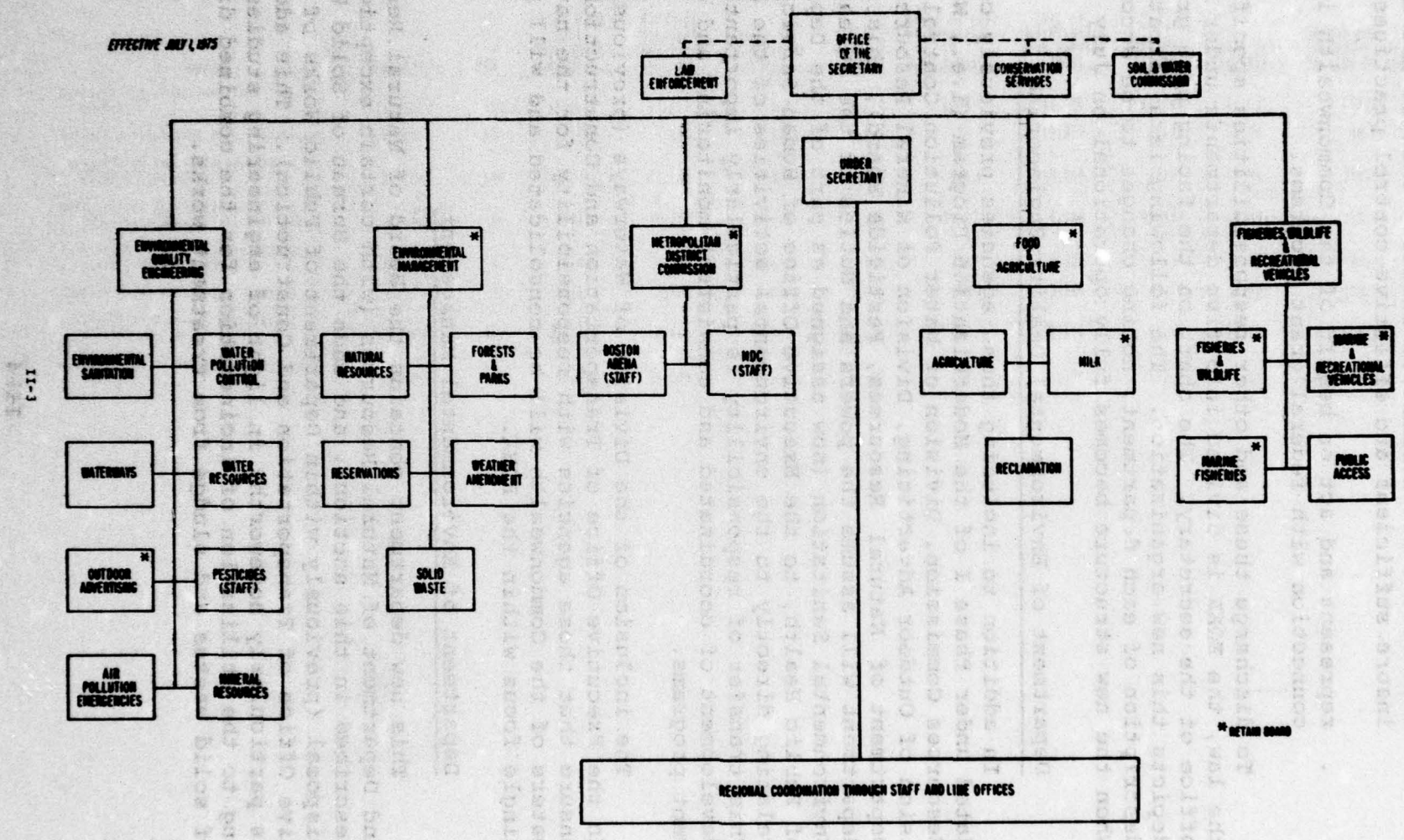
The Executive Office of Environmental Affairs (EOEA), under the direction of a Secretary appointed by the Governor, comprises the Metropolitan District Commision, Department of Natural Resources, Water Resources Commission, Division of Water Pollution Control, Bureau of Environmental Sanitation, Department of Agriculture, and numerous other previously autonomous commissions, boards, and divisions.

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

The 1974 session of the Massachusetts Legislature reorganized the structure for the coordinated administration of environmental programs and activities performed by state government (Exhibit II-1). The EOEA thus comprises agencies whose programs, in their totality, represent the potential for effective State-level management of the complex and interrelated environmental issues facing the Commonwealth.

The EOEA has broad powers and an impressive and challenging mandate. The following selected sample of the specific powers enumerated in the law, particularly those which bear directly on wastewater management, is indicative of the scope of this new structure:

- provide for the management of air, water and land resources to assure the protection and balanced utilization of such resources within the Commonwealth;
- develop statewide policies regarding the acquisition, protection, and use of areas of critical environmental concern to the Commonwealth;
- promote the best usage of land, water, and air to optimize and preserve environmental quality by encouraging and providing for, in cooperation with other appropriate state agencies, planned industrial, commercial, recreational, and community development;
- provide for the prevention and abatement of water, land; air, noise, and other pollution or environmental degradation;
- develop programs relating to the reclamation or disposal of solid waste material and the operation of sewer and water systems;
- encourage the restoration and reclamation or disposal of solid waste material and the operation of sewer and water systems;
- assist other state and regional agencies in developing appropriate programs and policies relating to land use planning and regulation in the Commonwealth;


EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
EFFECTIVE JULY 1, 1975
OFFICE OF THE SECRETARY
LAW ENFORCEMENT
CONSERVATION SERVICES
SOIL & WATER COMMISSION
UNDER SECRETARY
ENVIRONMENTAL QUALITY ENGINEERING
ENVIRONMENTAL MANAGEMENT *
METROPOLITAN DISTRICT COMMISSION *
FOOD & AGRICULTURE *
FISHERIES, WILDLIFE & RECREATIONAL VEHICLES
ENVIRONMENTAL SANITATION
WATER POLLUTION CONTROL
NATURAL RESOURCES
FORESTS & PARKS
BOSTON AREA (STAFF)
MDC (STAFF)
AGRICULTURE
MILK *
FISHERIES & WILDLIFE *
MARINE & RECREATIONAL VEHICLES *
WATERWAYS
WATER RESOURCES
RESERVATIONS
WEATHER AMENDMENT
RECLAMATION
MARINE FISHERIES *
PUBLIC ACCESS
OUTDOOR ADVERTISING *
PESTICIDES (STAFF)
SOLID WASTE
AIR POLLUTION EMERGENCIES
MINERAL RESOURCES
* RETAIN BOARD
REGIONAL COORDINATION THROUGH STAFF AND LINE OFFICES

- monitor the environment to identify changes and to insure sufficient and effective control practices; and

- represent and act on behalf of the Commonwealth in connection with federal grant programs.

To discharge these and other responsibilities specified in the law, the EOEA is divided into five departments under the office of the secretary. The chart on the facing page graphically depicts this new organization. The following is a narrative description of each department, noting changes to be accomplished when the new structure becomes fully operational on July 1, 1975.

Department of Environmental Quality Engineering

In addition to including those agencies previously consolidated under Phase I of the Modernization Program (i.e., Water Resources Commission, Division of Water Pollution Control, Division of Outdoor Advertising, Division of Mineral Resources of Department of Natural Resources, Pesticide Board), this new department will assume the powers and duties of the Bureau of Environmental Sanitation (now assigned as part of the Department of Public Health, to the Executive Office of Human Services) relating directly to the environmental activities of the EOEA. This transfer of responsibility is particularly important to the development of coordinated and consistent monitoring and enforcement programs.

The inclusion of the Division of Waterways (previously within the Executive Office of Transportation and Construction) will ensure that those agencies with responsibility for the navigable waters of the Commonwealth will be consolidated and will provide a single focus within the EOEA.

Department of Environmental Management

This new department contains the Board of Natural Resources and Department of Natural Resources (with certain exceptions as described in this section), and adds the Bureau of Solid Waste Disposal (previously within Department of Public Works of Executive Office of Transportation and Construction). This addition is particularly noteworthy in light of engineering studies relating to the utilization of incineration for the combined disposal of solid wastes and sludge from treatment works.

Department of Fisheries, Wildlife and Recreational Vehicles

This department consists of several divisions and advisory boards. However, not only is the autonomy of the divisions legislated, but an intricate system of checks on the appointment of divisional directors is also provided. Included within this department are the Public Access Board, Division of Fisheries and Wildlife (formerly Division of Fish and Game) and its Board, Division of Marine Fisheries and its Advisory Commission (all formerly within the EOEA), Division of Marine and Recreational Vehicles (formerly within the Executive Office of Public Safety), and an Advisory Board specifically created in the legislation.

The membership, method of appointment, and terms of each of these boards and commissions are specified in the law.

Department of the Metropolitan District Commission

This department represents the Metropolitan District Commission's entire organizational structure (i.e., Parks, Sewerage, Water, Construction) plus the powers and duties of the Boston Arena Authority, which was abolished as an independent entity.

The five-member commission will be retained as the overall policy board to direct MDC operations. However, the method of appointment of the full-time Commissioner has been significantly altered through assignment of the authority for this appointment to the Secretary of Environmental Affairs. Since gubernatorial approval is required for this appointment, as for each of the commissioners of the five departments in the EOEA, little substantive change may result.

Department of Food and Agriculture

This department comprises the Department of Agriculture, Board of Agriculture, Division of Milk Control, Milk Control Commission, Milk Regulations Boards, and State Reclamation Board.

The inclusion of the department is particularly important in relation to water quality and wastewater management based on the potential of non-point source pollution resulting from agricultural operations.

Finally, the Office of the Secretary of Environmental Affairs is charged with certain programmatic responsibilities in addition to the general supervision and administration of the entire structure. These include the Division of Law Enforcement and Division of Conservation Services, including the Committee for Conservation of Soil, Water, and Related Resources (all previously within Department of Natural Resources).

The effective date of the reorganization is July 1, 1975; the Secretary is charged with the completion of several activities and the preparation of a number of reports during the transitional period. These activities, combined with external pressures, could alter to some extent the structural realignment of this executive office.

METROPOLITAN DISTRICT COMMISSION
ORGANIZATIONAL ENTITY

The Metropolitan District Commission is an agency of state government which provides water, sewerage, and park services to member cities and towns in the Boston metropolitan area. It maintains the third largest police force in New England to provide security to parks and other facilities as well as to patrol certain boulevards and highways. The aggregate membership of the MDC is 54, with the Sewerage District representing 43 municipalities, the Parks District serving 37, and the Water District encompassing 33 cities and towns. The total combined population served by the districts is approximately 2,500,000 in a total area of almost 600 square miles. (The map at the end of this section--Exhibit II-7--shows the municipalities within one or more of the districts.)

Although it falls within the structure of state government, the MDC can be considered a multi-purpose metropolitan service delivery agency. As such, it provides one of the foremost national examples of integrated service delivery through a single administrative structure. A recent study noted that "MDC represents an institutional device quite in tune with reforms now advocated across the United States. It is metropolitan in scope; it possesses flexibility; and it has created a set of intergovernmental relations in the Boston area which encourage cooperation and coordination."

The Metropolitan District Commission is headed by one full-time commissioner and four part-time associate commissioners, each appointed by the Governor to serve coterminously with the

Chief Executive. Each is required to reside in the area served by the MDC and at least one member must reside within the City of Boston.

The Metropolitan District Commission has recently been reorganized into 14 divisions, six of which provide administrative support, and eight of which have operating responsibilities. This staff/line separation is depicted in Exhibit II-2.

The Staff Divisions and their reporting responsibilities are:

Division	Reports to:
Office of the Secretary of the Commission	Commissioner
Office of the General Counsel	Commissioner
Office of the Commissioner	Commissioner
Special Projects Office	Commissioner
Administrative Services	Executive Assistant
Central Services	Executive Assistant

The Operating Divisions and their reporting responsibilities are:

Parks Engineering	Chief Engineer
Engineering	Chief Engineer
Environmental Services	Chief Engineer
Environmental Quality	Chief Engineer
Sewerage	Chief Engineer
Water	Chief Engineer
Police	Executive Assistant
Parks	Executive Assistant

Administration

Responsibility for the overall administration of the MDC rests with the Commissioner, who serves as executive officer of the agency. While most decisions are made by the Commission as a whole, the Commissioner retains veto power. Actions may be taken only by majority vote, including that of the full-time Commissioner.

As a state agency, the MDC is affected by the administrative and management policies of state government (as established

METROPOLITAN DISTRICT COMMISSION
SECRETARY OF ENVIRONMENTAL AFFAIRS
METROPOLITAN DISTRICT COMMISSION
COMMISSIONER
PARK USERS BOARD
PARKS REGIONAL ADVISORY BOARDS
WATER USERS BOARD
SEWER USERS BOARD
OFFICE OF THE COMMISSIONER
SPECIAL PROJECTS
GENERAL COUNSEL
SECRETARY TO THE COMMISSION
CHIEF ENGINEER
EXECUTIVE ASSISTANT
POLICE
PARKS
EXECUTIVE ASSISTANT
PARKS ENGINEERING
ENGINEERING
CONSTRUCTION
SEWERAGE
WATER SUPPLY
ENVIRONMENTAL SERVICES
ENVIRONMENTAL PLANNING
ENVIRONMENTAL QUALITY
ADMINISTRATIVE SERVICES
CENTRAL SERVICES

by statute or regulation) which apply to all agencies. In addition, the realignment of agencies into an executive office structure places certain authority in the Office of the Secretary, which somewhat limits the MDC's administrative authority and flexibility.

A distinction is necessary between the MDC's authority to administer its operations and to formulate overall policy for the administration of its operations. The Massachusetts Legislature is the only governmental body with power to make policy decisions, extend the area served, and make appropriations for maintenance or construction. As an agency of the Commonwealth rather than a political subdivision, the MDC has no governing body. Despite this relationship with the General Court, the MDC possesses substantial autonomy in its day-to-day operations. The major internal reorganization is an example of the power of the Commissioner to implement administrative decisions.

Financing

The three essential elements of the MDC's financing system are budgeting, capital outlays, and assessments. While each is described separately, an obvious and basic interrelationshp exists among them.

Budgeting

Funds for the MDC's operation are provided each fiscal year through appropriations by the Massachusetts Legislature. The budget procedure is standardized for each executive office. The MDC budget for FY '75 is shown in Exhibit II-3.

Requests for appropriations for projected operating and maintenance expenses, debt service, and other special projects are prepared by the MDC and submitted to the Secretary for inclusion in the budget request of the EOEA. These requests are then reviewed and approved or rejected based either upon the priorities established by the EOEA or upon informal "earmarks" provided by the Executive Office of Administration and Finance (A&F).

The total budget request for the EOEA is then submitted to the Budget Bureau within A&F for review and adjustment. Based upon estimated revenues and guidelines established by the Governor, A&F prepares and submits a total budget for the executive, legislative, and judicial branches of government to the General

Exhibit II-3

MDC BUDGET - FY '75

	Items Subject to Assessment	Actual Total
Metropolitan District Commission		
I. OPERATIONS AND MAINTENANCE		
2410-1000 - Administration		841,000
MDC Water - 25%	210,350	
MDC Sewerage - 25%	210,350	
MDC Parks - 25%	21,0350	
2410-9051 - Microfilming Program		40,000
MDC Water - 25%	10,000	
MDC Sewerage - 25%	10,000	
MDC Parks - 25%	10,000	
2420-0100 - Metropolitan Water System		7,713,500
Operations and Maintenance	7,713,500	
MDC Water - 100%		
Special Projects	188,750	
MDC Water - 100%		
2430-0100 - Metropolitan Sewerage District		7,894,500
Operations and Maintenance	7,894,500	
MDC Sewerage - 100%		
Special Projects	106,000	
MDC Sewerage - 100%		
2440-0010 - Metropolitan Parks District		25,097,000
Maintenance		
MDC Parks - 39%	9,787,830	
2441-0090 - LEAA		6,740
MDC Parks - 39%	2,629	
Special Projects		1,168,500
MDC Parks - 100%	1,168,500	
2460-1000 - Construction Division		3,820,000
Maintenance		
MDC Sewerage - 49%	1,871,800	
MDC Water - 49%	1,871,800	
Operations and Maintenance Total	31,266,359	46,876,390
II. DEBT SERVICE		
0699-3800 - Interest payment on bonded debt		
MDC Water District Fund - 100%	4,983,675	4,983,675
0699-3900 - Maturing serial bonds		
MDC Water District Fund - 100%	6,493,000	6,493,000
0699-4800 - Interest payment on bonded debt		
MDC Sewerage District Fund - 100%	3,258,947	3,258,947
0699-4900 - Maturing serial bonds		
MDC Sewerage District Fund - 100%	4,504,000	4,504,000
0699-5800 - Interest on bonded debt		
MDC Parks District - 100%	1,956,389	1,956,389
0699-5900 - Maturing serial bonds		
MDC Parks District - 100%	4,011,000	4,011,000
Debt Service Total	25,207,011	25,207,011
Total	56,473,373	72,083,401

Court. Following a series of budget hearings and debate by the Senate and House of Representatives, the budget is enacted and signed by the Governor; it then serves as the basic fiscal management tool for each executive office and operating agency.

The one fundamental difference between the financial operations of the MDC and other state agencies is that the cost which is directly attributable to the water, sewer, and parks districts is eventually reimbursed to the Commonwealth by the cities and towns in the districts served.

. Capital Outlays

The capital budget for the Commonwealth includes projects over $10,000 for acquisition, construction, reconstruction, or repair of land or facilities. A procedure for review similar to that utilized for operating and maintenance requests applies to the capital budget, with the significant difference that a legislative petition is prepared identifying the project, its cost, and the proposed method of financing. After hearings and according to the priorities of the General Court, the capital budget is enacted and submitted to the Governor for his approval; it then serves as the basic tool for the Commonwealth in scheduling capital expenditures.

When necessary to finance large construction projects, bonds are sold by the State Treasurer pursuant to an act authorizing such issue and upon request of the Governor. General obligation bonds are backed by the full faith and credit of the state. Bonds are currently issued on the serial payment plan for a duration of years not to exceed 30. Since the debt resulting from the sale of bonds to finance MDC projects is not incurred for the benefit of the entire Commonwealth, it is classified as contingent debt. The interest and principal payments are annually assessed against the member municipalities. Other outlays are classified as direct debt and the repayment of such loans arises from revenues collected by the Commonwealth. Exhibit II-4 demonstrates the Commonwealth's commitment to environmental projects and contains both direct and contingent debt. It should be noted, however, that $43,143,000 (Items 5, 6 and 7) is MDC contingent debt for FY '75. The total contingent debt of the MDC as of June 30, 1973 was $261,766,000.

. Assessments

The costs of operations, maintenance, and debt service

Exhibit II-4

CAPITAL OUTLAY BUDGET - FY '75

Selected Environmental Outlays

Section	Item	Agency/Description	Amount
2.	2630-8751	EOEA/Conservation Services . land acquisition assistance to cities and towns under C.132.A	5,000,000
2.	2681-8752	EOEA/Water Resources . flood control and water diversion in Avon, Braintree, Holbrook and Randolph	250,000
2.	6004-8755	EOTC/Building Construction . renovations to sewage treatment facilities at state institutions	500,000
		Total Selected Items	5,750,000
3.	2490-8751	EOEA/Metropolitan District Commission . boulevard and highway improvements	9,200,000
4.	2611-8751	EOEA/DNR/Forests and Parks . land acquisition, development and improvement of outdoor recreation areas	8,600,000
4.	2681-8751	EOEA/DNR/Water Resources . mapping of wet lands	1,000,000
		Total Selected Items	9,600,000
5.	****-****	EOEA/MDC/Parks District . All projects - Total	14,200,000
6.	****-****	EOEA/MDC/Water System . All projects - Total	20,943,000
7.	2439-8751	EOEA/MDC/Sewerage District . Reading pumping station, extension of north metropolitan relief sewer	3,450,000
	2439-8751	EOEA/MDC/Sewerage District . sewer line and appurtenances in West Roxbury, Newton and Brookline	4,600,000
		Total Selected Items	8,050,000
		Environmental Outlay Total	67,748,000

(i.e., interest payments on bonded debt and principal payments on maturing serial bonds) are annually determined and subsequently apportioned through an assessment system for payment by the cities and towns within each of the three districts of the Metropolitan District Commission.

The basis for financing operations and maintenance for the sewerage district is the proportion that each municipality's population bears to the total district population. This basis has been fixed in law since 1906; no alternative method of apportioning costs has been determined to measure the value of the service rendered to a municipality.

The payment of debt service for the sewerage district is based upon the demand capacity ratio method. This method was established by Chapter 612 of the Acts of 1959 after the valuation basis of apportionment proved inequitable when dramatic shifts in population within the metropolitan area substantially altered the valuations employed. Under the demand capacity ratio method, the city or town is charged in the ratio of its capacity demand, based on the number and size of its connections, to the capacity available for it in the metropolitan trunk system.

This dual method of apportionment is then assessed against each member municipality. Exhibit II-5 presents the tax rate impact of these assessments on the member municipalities within the Metropolitan Sewerage District. The impact on local property owners ranges from $.30/thousand in the Town of Hingham to $4.26/thousand in the City of Chelsea. These deviations may be accounted for, in part, by the variations of property valuation assessment ratios as well as by the differences in demand upon the system.

GENERAL POWERS

As a state agency, the Metropolitan District Commission derives its powers from the General Laws of the Commonwealth. This strong, stable legal base covers all operations of the three districts that are administered by the MDC. Chapters 28 and 29 of the Massachusetts General Laws serves as the major source of the powers of the MDC. The mandate of the agency as it relates to the sewerage division includes the following specific references:

- To acquire by purchase, eminent domain, or other means any land, watercourses, rights of way, or easements.

Exhibit II-5

IMPACT OF SEWERAGE DISTRICT ASSESSMENTS ON PROPERTY TAX RATES OF MEMBER MUNICIPALITIES

	1973 Total Assessments	$1.00/$1,000.00[1]	Impact/$1,000.00
Arlington	343,464.46	353,469.00	.97
Ashland	33,211.56	42,816.00	.78
Belmont	160,661.23	256,652.00	.63
Boston	4,614,276.08	1,742,200.00	2.65
Braintree	176,212.56	157,324.00	1.12
Brookline	299,144.27	447,852.00	.68
Burlington	101,995.62	225,541.00	.45
Cambridge	896,486.99	323,000.00	2.78
Canton	98,101.07	171,101.00	.57
Chelsea	252,826.88	59,296.00	4.26
Dedham	187,059.35	250,357.00	.75
Everett	296,728.62	163,626.00	1.81
Framingham	242,964.48	520,676.00	.47
Hingham	42,068.66	141,298.00	.30
Lexington	196,026.94	235,785.00	.83
Malden	360,497.00	118,400.00	3.04
Medford	476,346.95	131,178.00	3.63
Melrose	223,639.85	233,678.00	.96
Milton	225,335.79	73,479.00	3.07
Natick	153,261.66	188,334.00	.81
Needham	175,029.84	312,120.00	.56
Newton	650,769.06	361,938.00	1.80
Norwood	154,379.52	290,881.00	.53
Quincy	611,221.02	250,681.00	2.44
Randolph	122,789.45	136,690.00	.90
Reading	88,001.04	178,460.00	.49
Revere	217,775.83	93,603.00	2.33
Somerville	530,668.76	138,921.00	3.82
Stoneham	124,999.59	63,331.00	1.97
Stoughton	85,572.38	168,286.00	.51
Wakefield	139,845.55	78.942.00	1.77
Walpole	75,207.23	129,701.00	.58
Waltham	316,505.26	490,655.00	.65
Watertown	238,789.76	95,672.00	2.50
Wellesley	132,130.75	277,526.00	.48
Westwood	70,386.78	138,990.00	.51
Weymouth	278,791.42	387,908.00	.72
Wilmington	68,692.60	134,051.00	.51
Winchester	215,425.97	197,833.00	1.09
Winthrop	130,122.77	83,664.00	1.56
Woburn	262,295.00	125,022.00	2.10

[1] Amounts required to raise municipal tax rate $1.00/$1,000.00 of valuation.

- To construct, control, operate, and maintain sewerage facilities for the Metropolitan Sewerage District.

- To order the removal of all sewage and pollutants from the Charles River and Basin and its tributaries below Waltham. MDC reserves the authority to approve all sewers, drains, or other outlets for drainage, substances, or wastes into any sewer under its control, or any sewer tributary thereto, within the north metropolitan sewerage district or the south metropolitan sewerage district.

- To levy additional assessment or assessments to communities whose sewage does not comply with the rules and regulations of MDC, provided that no such additional assessment shall be levied on any such municipality in any one year which shall exceed the lesser of an amount equal to one twentieth of one percent of the taxable value of such municipality, or the sum of two hundred thousand dollars ($200,000).

- To establish direction, control, and regulation over the connection of local sewers with its main sewers.

- To apportion to the member cities and towns the cash requirements for the retirement of debt and the costs of maintenance and operation of the system.

- To sell property, real or personal, no longer needed in performing sewage treatment functions.

- To contract with any city or town for extension of sewage disposal system and for reception and disposal of the sewage therefrom.

- To contract with any city or town for admission to the sewerage district.

- To hold public hearings and issue annual reports to the members.

METROPOLITAN SEWERAGE DISTRICT

Operations

The Metropolitan Sewerage District (MSD) is served by an

operating division of the MDC which provides sewage treatment and disposal services to 43 municipalities within the Boston metropolitan area. The area of coverage of the MSD is approximately 400 square miles, serving a population of over 2,000,000.

Originally, and until enactment of the 1959 statute which introduced the demand-capacity ratio method of cost apportionment, there were two districts served by the MDC, the North Metropolitan Sewerage District and South Metropolitan Sewerage District. The separation of the sewerage system into two units related to physical works as well as financing, since cities and towns were assessed according to the costs of their particular system. Only one district now exists, and all costs are apportioned by this method.

The MDC's Sewerage Division is headed by the Chief Sewerage Engineer, who serves as its Director. The FY '75 budget provides for 553 positions to provide services to the member municipalities of the MSD. The five subdivisions with the Sewerage Division are:

- Administrative Operations
- Lines
- Deer Island Treatment Plant
- Nut Island Treatment Plant
- Pumping Stations and Treatment Plants

The MDC facilities operated and maintained by the Sewerage Division include 225 miles of trunk sewers receiving discharge from nearly 4,200 miles of local sewers through approximately 1,800 individual connections. In addition to these sewer lines, the MDC maintains 12 pumping stations to transport the sewage to two treatment plants having a combined capacity to treat approximately 450 million gallons of sewage per day.

MSD is a wholesaler of sewage treatment services to 43 cities and towns. Sewage collected by each city and town's local sewers becomes the responsibility of MDC at the point of interception, from which it is conducted to one of the two primary treatment plants for processing. After processing, the treated sewage is discharged to Boston Harbor. Each of the two primary treatment plants is headed by a superintendent responsible for operations and maintenance. The superintendent is supported by clerical, laboratory, and drafting personnel. The 12 pumping stations are also under the direction of a superintendent, and a supervisor is

in charge of each of the two sewer lines which radiate north and south from the City of Boston.

Exhibit II-6 presents the total amounts appropriated in the FY '75 budget which are to be paid by the Sewerage District Fund. The total for the Sewerage Division of the MDC is $7,894,500 for direct operations and maintenance.

Construction/Pollution Control

Since 1945 and through subsequent enactments, the MDC has embarked upon an extensive Pollution Control Program on behalf of the Metropolitan Sewerage District. Over $140,000,000 has been expended on a number of projects designed to alleviate pollution within the Boston Main Drainage Basin and in Boston Harbor. These projects have eased the pollution problem by enlarging the overloaded sewer system's trunk line capacity through relief sewers to diminish overflows, pre-treatment headworks, treatment plants on Deer Island and Nut Island, two deep rock tunnels, a storm detention and chlorination station, and other facilities.

Construction projects of this type are assigned to the Engineering Division of the MDC, which is responsible for providing design and construction supervision. Following completion, the Sewerage Division maintains and operates the facilities on behalf of the communities within the MSD. As these resonsibilities for operating and maintaining the expanded facilities of the MDC increase, the cost to member municipalities will also increase to ensure the proper personnel to manage such an expansive system.

EXHIBIT II-6

DISTRIBUTION OF MDC SEWERAGE DISTRICT FUND:
APPROPRIATIONS - FY '75[1]

A. Operations and Maintenance

Item	Description	Amount
	STATE RETIREMENT BOARD	
0612-5000	Retirement Benefits/Administrative Division	6,525
0612-7000	Retirement Benefits/Sewerage District	197,650
	EXECUTIVE OFFICE OF ENVIRONMENTAL AFFIARS	
2000-0100	Office of the Secretary/Administration	34,224
2000-0200	Office of the Secretary/Environmental Impacts	19,500
2410-1000	MDC/Administration	210,350
2410-9051	MDC/Microfilm	10,000
2430-0100	MDC/Sewerage District/O&M	7,894,500
****-****	MDC/Sewerage District/Special Projects	106,000
2460-1000	MDC/Construction Division/Maintenance	1,871,800
	Operations and Maintenance - Subtotal	10,350,549
	B. Debt Service	
0699-4800	Interest Payment of Bonded Debt	3,258,947
0699-4900	Retirement of Maturing Serial Bonds	4,504,000
	Debt Service - Subtotal	7,762,947
	Combined Total	18,113,496

[1] C.431, Acts of 1974

EXHIBIT II-7

METROPOLITAN DISTRICT COMMISSION

DISTRICT MEMBERSHIP - 1972
PARKS-WATER-SEWERAGE
TOTAL MEMBERS - 54

MEMBER OF ALL THREE MDC DISTRICTS

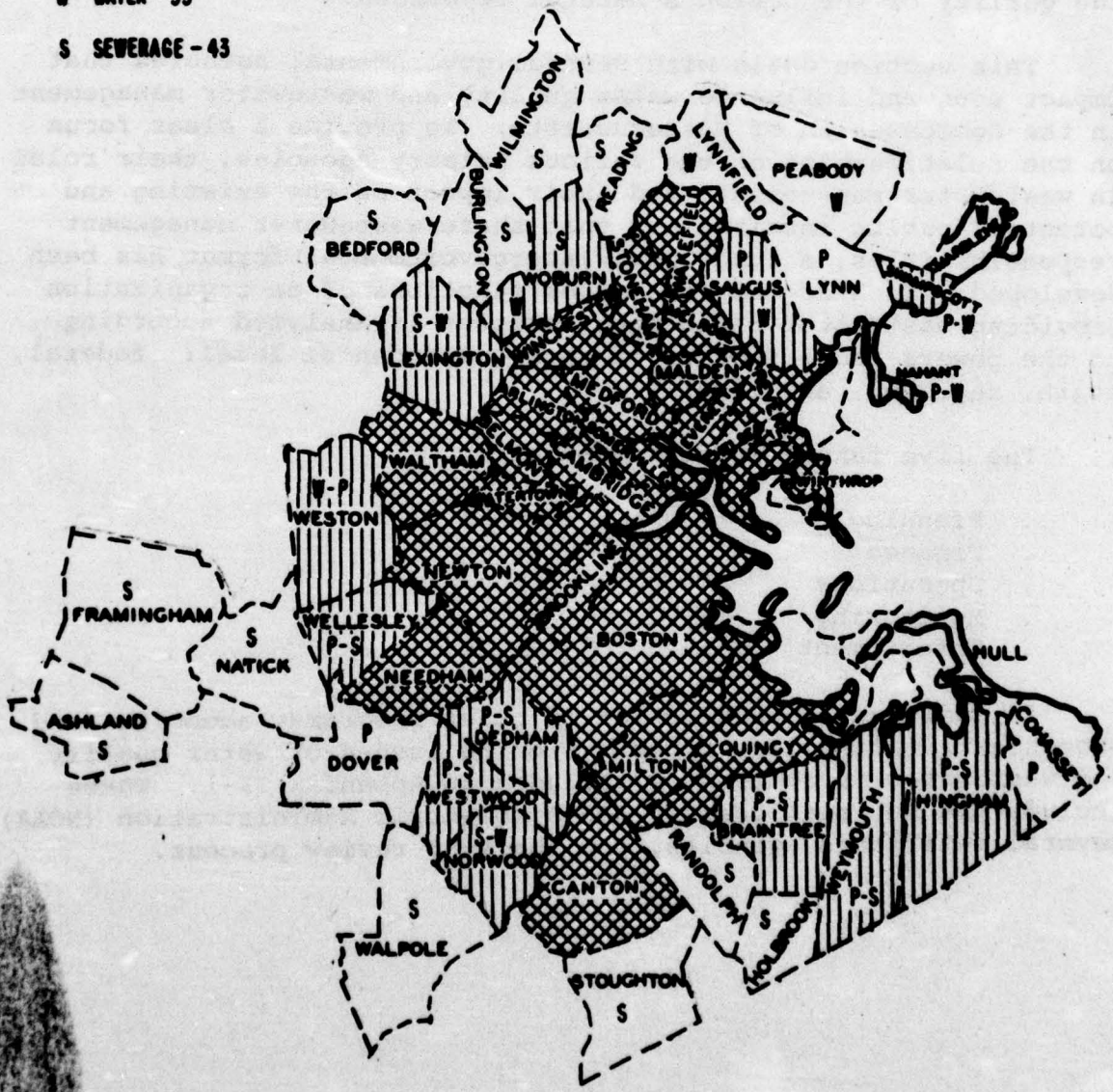
MEMBER OF TWO DISTRICTS

MEMBER OF ONE DISTRICT

P PARKS - 37

W WATER - 33

S SEWERAGE - 43



B. ROLE OF GOVERNMENTAL AGENCIES INFLUENCING WASTEWATER MANAGEMENT IN MASSACHUSETTS

The environment is a closed system of intricate inter-relationships among its major components of air, water, and land which affects and is affected by the full range of human activity. The interaction between human activity in pursuit of economic objectives and the quality of the environment has resulted in extensive pollution of all aspects of the environmental system. A growing public awareness of the need to restore a balance between man and the environment has led to the establishment of a number of governmental agencies and programs to restore the quality of the nation's natural resources.

This section deals with several governmental agencies that impact upon and influence water quality and wastewater management in the Commonwealth of Massachusetts. To provide a clear focus on the relationships of the various primary agencies, their roles in wastewater management, and their impact on the existing and potential public institutions that share wastewater management responsibilities, a functional/intergovernmental format has been developed. Each of the five major functions of an organization providing wastewater management services is analyzed according to the powers and authority of each governmental level: federal, state, regional, and local.

The five functions discussed are:

- Planning
- Finance
- Operations
- Monitoring
- Enforcement

In addition, a description of other programs, agencies, and processes relating less directly to the issues of water quality and wastewater management is included in Appendix II-1. These include the National Oceanic and Atmospheric Administration (NOAA), several interstate agencies, and the A-95 review process.

PLANNING

FEDERAL

Environmental Protection Agency (EPA)

With the enactment of P.L. 92-500 and subsequent appropriations to support its activities, the Environmental Protection Agency was empowered to provide funds to support planning activities at all governmental levels for the purpose of establishing a framework for water quality and wastewater treatment resourse allocation decisions. The EPA is responsible for overall coordination and review of the plans and programs undertaken by states, interstate agencies, areawide planning agencies, regional service delivery agencies, and local governments. The EPA is directed to provide technical and financial assistance to these agencies.

The primary sections of P.L. 92-500 that relate to planning are:

- Basin Planning - Section 303
- State Planning Process - Section 303
- Areawide Planning - Section 208
- Local Facilities Planning - Section 201

Each of these planning processes and its linkages is described in the subheading outlining the governmental level responsible for fulfilling the planning requirements.

One of the basic requirements of any planning process initiated under the Federal Water Pollution Control Act Amendments of 1972 is that the general public be provided an opportunity for complete participation in every decision and throughout each stage of any water pollution abatement program. Emphasis is placed at three levels under the guidelines issued by the EPA (40 CFR 105): 1) development of statewide programs, including priority lists for resource allocation; 2) preparation of basin and areawide plans involving selection among alternative systems and projects; and 3) case-by-case consideration of local projects and permit applications.

The specific elements suggested for minimum public participation include the following:

- dissemination of informational materials;

- technical and informational assistance to the public;

- consultation with interested persons and groups through committees, workshops, and advisory groups;

- notification of interested persons and organizations, including development of current mailing list (in addition to formal notices of public hearings);

- access to information about technical matters, discharges, applications, permits, and compliance schedules, including provision of copies at reasonable cost;

- consideration of information and evidence presented by citizens, including reports of violations;

- information on legal proceedings, where legally permissible; and

- consideration and availability of citizens' comments on proposals and decisions by public officials.

The flow chart, Exhibit II-8, depicts the relationships among functional activities over the course of the next decade to achieve the water quality goals specified in P.L. 92-500.

Department of Housing and Urban Development (HUD)

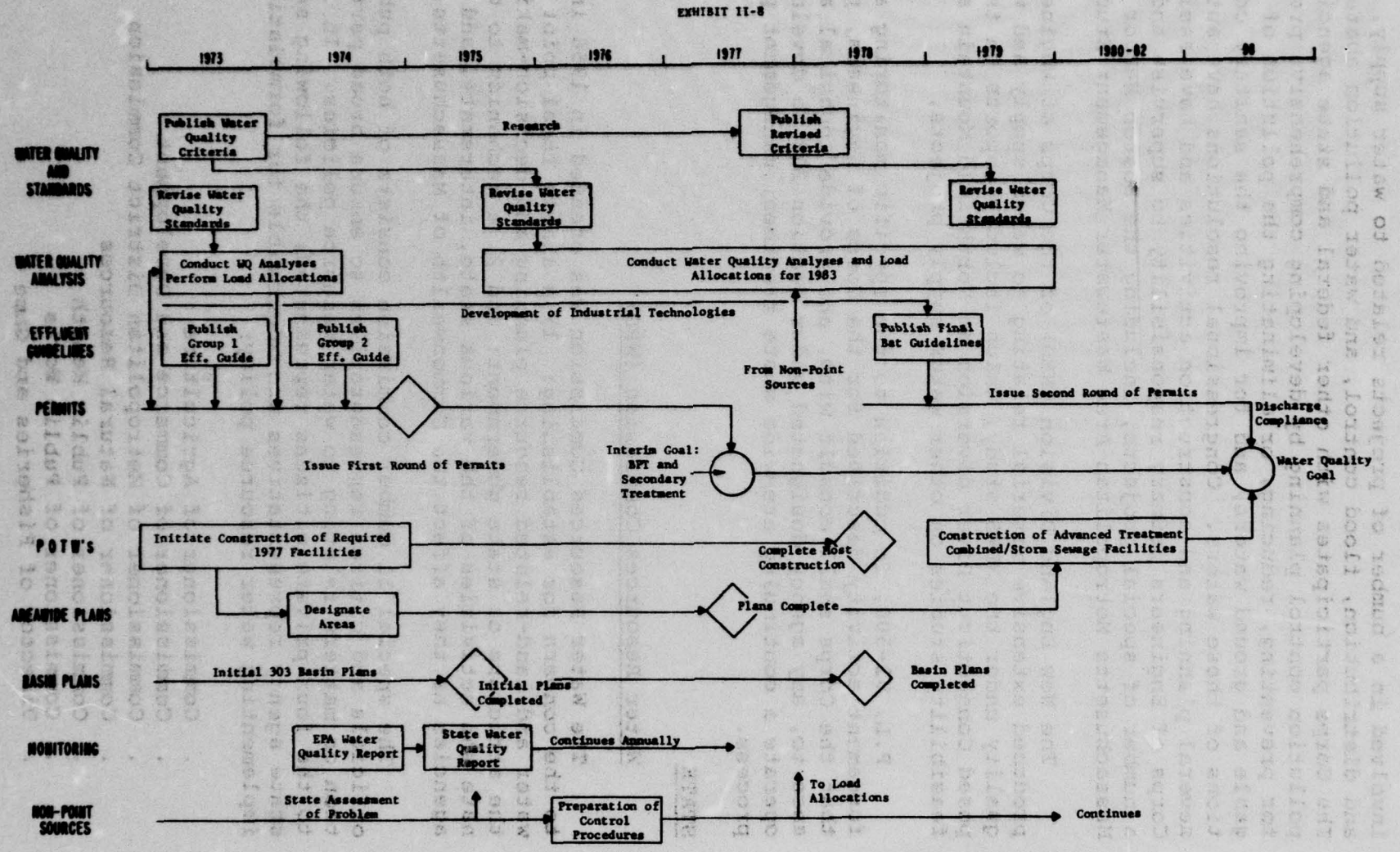
Under Section 701 of the National Housing Act of 1954, as amended, the Department of Housing and Urban Development issues planning grants to state governments, regional planning agencies, and local governments. The annual appropriation ranges from $50 to $75 million. Massachusetts public agencies involved in comprehensive planning derive a substantial percentage of their revenue from this program. For example, of a national total of $74,894,000 in FY '73, Massachusetts grantees were awarded $2,936,000, ranking sixth among 50 states.

The 701 program emphasizes comprehensive planning rather than functional planning although it has served as the source of funds to assist regional planning agencies in preparing regional sewerage plans. In addition, planning activities under this program support the intent of P.L. 92-500 to ensure proper consideration of land use, regulatory controls, growth policies, open space, and other related impacts of water quality and wastewater treatment.

Department of the Army/Corps of Engineers

The Corps of Engineers, New England Division, has been directly

EXHIBIT II-8


1973
1974
1975
1976
1977
1978
1979
1980-82
90
WATER QUALITY AND STANDARDS
WATER QUALITY ANALYSIS
EFFLUENT GUIDELINES
PERMITS
POTW'S
AREAWIDE PLANS
BASIN PLANS
MONITORING
NON-POINT SOURCES
Publish Water Quality Criteria
Research
Publish Revised Criteria
Revise Water Quality Standards
Revise Water Quality Standards
Revise Water Quality Standards
Conduct WQ Analyses Perform Load Allocations
Conduct Water Quality Analyses and Load Allocations for 1983
Development of Industrial Technologies
Publish Group 1 Eff. Guide
Publish Group 2 Eff. Guide
Publish Final Bat Guidelines
From Non-Point Sources
Issue Second Round of Permits
Discharge Compliance
Issue First Round of Permits
Interim Goal: BPT and Secondary Treatment
Water Quality Goal
Initiate Construction of Required 1977 Facilities
Complete Most Construction
Construction of Advanced Treatment Combined/Storm Sewage Facilities
Designate Areas
Plans Complete
Initial 303 Basin Plans
Initial Plans Completed
Basin Plans Completed
EPA Water Quality Report
State Water Quality Report
Continues Annually
State Assessment of Problem
Preparation of Control Procedures
To Load Allocations
Continues

involved in a number of projects related to water supply, storage and distribution, flood control, and water pollution abatement. The Corps participates with other federal and state agencies in pollution control planning by developing comprehensive programs for preventing, reducing, or eliminating the pollution of navigable and ground waters, and for improving the sanitary conditions of these waters. Congressional resolutions have authorized several planning and construction activities and have assigned the Corps of Engineers primary responsibility to supervise and direct a number of special projects, including the Boston Harbor - Eastern Massachusetts Metropolitan Area Wastewater Management Study.

The New England Division (NED) of the Corps of Engineers has produced extensive material relating to water supply and water quality under the NEWS study, which includes reports on the proposed Connecticut River diversion at Northfield Mountain and feasibility studies on other water supply projects.

P.L. 92-500, in addition to the specific monitoring and enforcement activity described for the Corps of Engineers, provides that the Corps shall consult with, and provide technical assistance to, any agency designated under Section 208 to develop and operate a continuing areawide waste treatment management planning process.

STATE

Water Resources Commission (WRC)

The Water Resources Commission was created in 1956 in response to the concern for establishing: 1) a single focal point for water and land-related resource planning and decision-making in the structure of state government; and 2) a mechanism to coordinate the activities of the various state, interstate, and federal agencies as they affect the Commonwealth of Massachusetts.

The special 11 member commission consists of both public officials and citizen representatives to ensure broad participation on matters relating to water resource policies. In addition to the four private citizens represented, the following seven state agency representatives are responsible for formulating and implementing water resource policy:

- Commissioner of Agriculture
- Commissioner of Commerce and Development
- Commissioner of Metropolitan District Commission
- Commissioner of Natural Resources
- Commissioner of Public Health
- Commissioner of Public Works
- Director of Fisheries and Game

Two divisions under the Water Resources Commision are directly responsible for water quality and conservation as well as water pollution prevention, control and abatement. The first, the Division of Water Resources, is responsible for providing input and guidance to water-related programs conducted by the Corps of Engineers, United States Geological Survey, Soil Conservation Service, and programs that implement the policies of the Water Resources Commission.

The second of the two divisions under the Water Resources Commission is the Division of Water Pollution Control, which is the major state water quality and pollution abatement monitoring, enforcement, and financing agency. The powers, duties, and responsibilities of this division relating to finance, operations, monitoring, and enforcement are treated in detail in subsequent sections of this report. The emphasis in this section is on the continuing planning process required of states under Section 303 (e) and the basin planning aspects of that process provided in Section 303 of P.L. 92-500.

Division of Water Pollution Control (DWPC)

Title III of P.L. 92-500 and the regulations promulgated by the EPA in support of this title (40 CFR 130 and 40 CFR 131) require states to establish a "continuing planning process" that focuses on areas for water quality improvement by providing the framework for the state strategy, program, report on water quality, and priority list for facilities planning and construction. Exhibit II-9 depicts the policy and program relationships for the state plan.

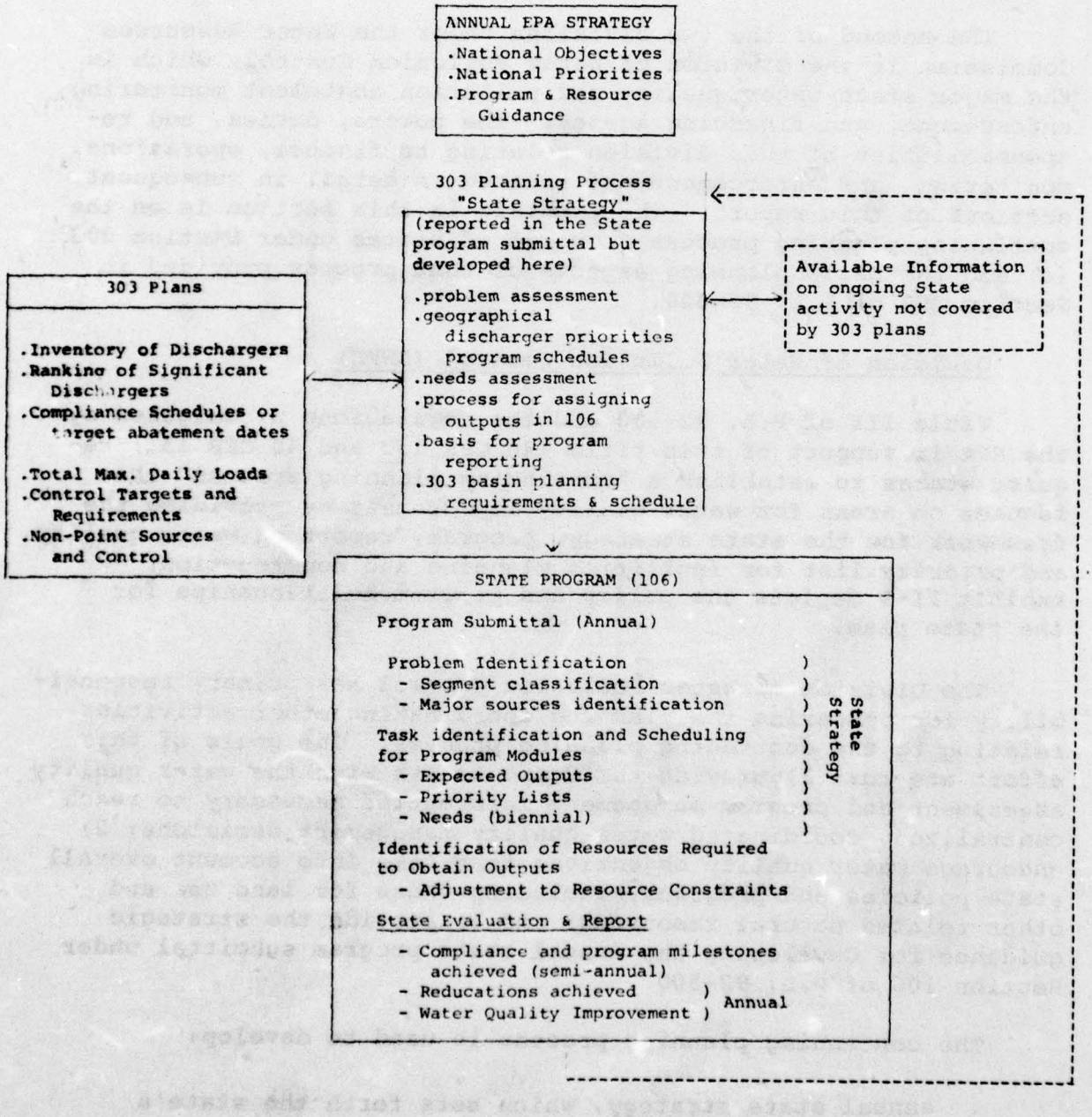
The Division of Water Pollution Control has primary responsibility for preparing the plan and coordinating other activities relating to the continuing planning process. The goals of this effort are to: 1) provide the Commonwealth with the water quality assessment and program management information necessary to reach centralized, coordinated water quality management decisions; 2) encourage water quality objectives that take into account overall state policies and programs, including those for land use and other related natural resources; and 3) provide the strategic guidance for developing the annual state program submittal under Section 106 of P.L. 92-500.

The continuing planning process is used to develop:

- annual state strategy, which sets forth the state's major objectives and priorities for preventing and

EXHIBIT II-9

STATE/FEDERAL: STRATEGY AND PROGRAM PLAN



controlling pollution;

- individual basin plans, which establish specific programs and targets for preventing and controlling water pollution in individual basins; and

- annual program plan, which establishes the results expected and identifies the resources committed for the state program.

Although each is an important and interrelated element of the total process, the critical planning element is the basin plan, as provided in Section 303 (e) of P.L. 92-500.

- Basin Plan

The basin plan forms the essential framework for planning and programming under P.L. 92-500. Facilities plans under Section 201, areawide plans under Section 208, and Level B plans under Section 209 are incorporated within the individual basin plan. Information on the basin water quality and source problems is developed from the basin planning effort. The DWPC has established segment classifications for each of the 489 hydrologic segments in the Commonwealth. Load analyses for water quality and effluent limitations for each segment are aggregated to form the complete basin plan. The basin planning process is designed to incorporate higher levels of detail and refinements as information from stringent monitoring and surveillance efforts become available

Basin plan elements include:

- point source management;
- significant discharge inventories;
- waste load analyses by segment;
- schedules of compliance;
- assessment of municipal needs; and
- non-point source problems.

The state continuing planning process results in the preparation and submission of the state strategy, including the water quality assessment required under Section 305 (b) and the state program under Section 106. The strategy is based upon the basin planning, areawide planning, and facilities planning efforts.

Metropolitan District Commission (MDC)

The MDC has responsibility for both project planning and long-range planning. The former relates to specific facilities from initial data collection and survey through execution to construction. The latter relates to an analysis of future needs based upon projected impacts of factors such as population, employment, housing, transportation, and land use. The potential of the MDC to link planning to operations and develop coordinated programs for both water and sewerage provides a significant advantage in overall water resource planning and wastewater management for the districts it serves.

REGIONAL

Metropolitan Area Planning Council (MAPC)

The primary responsibility for comprehensive areawide planning rests with the Regional Planning Agencies (RPAs) of the Commonwealth. Each agency, through assessments against member municipalities supplemented by state and federal grants, conducts comprehensive planning studies for the geographic area under its jurisdiction.

Although their authority is statutorily based, Regional Planning Agencies are not governmental institutions; their recommendations and plans are advisory only. Citizen involvement in the policy forumulation, planning, and administrative functions of each agency is provided through local representatives who serve on the governing body. The participatory process ensures that functional plans (e.g. sewerage, housing, open space, land use) are consistent with the overall goals and objectives of the area and that functional planning is viewed within a broad, comprehensive framework.

One functional plan merits particular note. Each Regional Planning Agency is required to prepare and maintain a Regional Sewerage Plan as a condition not only for certain federal funding for its own operations, but also to ensure grant eligibility for its member communities. The MAPC has a certified Regional Sewerage Plan covering its 101 municipal members.

The Boston Harbor - Eastern Massachusetts Metropolitan Area Wastewater Management Study involves 109 communities. The MAPC's boundary is reasonably consistent with the study area boundary.

The eight additional communities are in bordering RPAs, but are included as part of river basins within the study area.

Areawide Plans

P.L. 92-500 (under Section 208) establishes an areawide planning approach to be followed by agencies designated by the Governor that possess certain characteristics and capabilities.

The purpose of Section 208 of P.L. 92-500 is to encourage and facilitate the development and implementation of areawide waste treatment management plans. Areas are to be assisted in addressing difficult urban/industrial and non-point source water quality problems. To support agency efforts, the EPA has been appropriated $25 million in FY '74 and requested $100,000,000 for FY '75, both of which figures are below the level of authorization provided in P.L. 92-500.

The areawide planning process covers a two-year period and must be consistent with state efforts under Sections 303 (e) and 106. The Section 208 plan must contain the following major elements for the area:

- 20-year estimate of treatment works needs;
- urban runoff control systems;
- treatment works construction priorities;
- regulatory programs;
- management agency designation;
- non-point source problems;
- salt water intrusion control programs;
- groundwater protection programs;
- certifications of consistency with 303(e) and 209; and
- certification of public participation.

Sixteen areas in the Commonwealth have been identified as requiring areawide waste treatment management planning. Since the amount of funds available to support such planning is not based on an allotment system, available resources are not accurately identifiable. The TEAM (Treatment of Effluent through Areawide Management) pilot plan of study based upon the Southeastern Regional Planning and Economic Development District

estimates a two-year cost of over $500,000 per year to prepare a plan for an area encompassing 30 municipalities. The actual allocation for the MAPC to prepare the 208 plan for the Boston area exceeds $2 million.

Planning Board/Planning Department

Most of the towns in the Eastern Massachusetts Metropolitan Area have a Planning Board organized under Chapter 41 of the Massachusetts General Laws. This board is generally an elected body of five members serving on a part-time basis.

Most of the planning activity at the local level relates to the preparation and enforcement of zoning by-laws and sub-division rules and regulations. Except in those communities with a full-time, professional planning staff, long-range comprehensive planning is only undertaken when a municipality retains the services of professional planning consultants.

Many of the communities, either through local appropriation or under the provisions of HUD's 701 program, have provided for a master plan that considers the need for sewage collection systems. Most of the cities and several of the large towns have organized Planning Departments to discharge this planning responsibility. Headed by a professional planner assisted by staff specialists, these Planning Departments perform comprehensive local planning responsibilities relating to areawide and state-level wastewater planning.

Department of Public Works/Sewer Commissions

Most of the communities in the Eastern Massachusetts Metropolitan Area provide for the construction and maintenance of local sewer systems through either an elected Sewer Commission or a Department of Public Works with responsibility for several functions including sewers. These local agencies are responsible for project planning, although many communities have developed long-range plans for sewage collection, treatment and disposal.

Under the Facilities Planning requirements of Section 201 of P.L. 92-500, the responsibility for preparing the necessary preliminary plans rests with the governmental agency applying for assistance from the state and federal government. The specific provisions of the Section 201 submission are treated in the following section of this report.

FINANCE

FEDERAL

Environmental Protection Agency (EPA)

The Construction Grant Program for waste treatment works proviced under Title II of P.L. 92-500 is the most significant financial commitment by the United States government to assist states and local goverments in preventing, controlling, and abating pollution. The federal allotment by the EPA for Massachusetts in the first three fiscal years of the Act, as well as its relative ranking among the states, demonstrates the extent of federal commitment to Massachusetts and other urban states.

	1973	1974	1975
New York	221,156,000 (1)	331,734,000 (1)	490,654,200 (1)
California	196,352,000 (2)	294,528,000 (2)	457,420,100 (2)
Michigan	159,628,000 (3)	239,447,000 (3)	188,637,400 (7)
New Jersey	154,080,000 (4)	231,120,000 (4)	234,656,200 (4)
Illinois	124,978,000 (5)	187,467,000 (5)	252,311,700 (3)
Ohio	115,474,000 (6)	173,211,000 (6)	193,378,700 (6)
Pennsylvania	108,428,000 (7)	162,642,000 (7)	222,744,100 (5)
Maryland	85,164,000 (8)	127,746,000 (8)	54,128,100 (21)
Massachusetts	75,152,000 (9)	112,728,000 (9)	90,215,900 (11)
Florida	72,528,000 (10)	108,792,000 (10)	164,496,400 (8)
Indiana	67,324,000 (11)	100,986,000 (11)	63,678,100 (19)
Virginia	58,286,000 (12)	87,429,000 (12)	98,673,400 (10)
Texas	55,388,000 (13)	83,082,000 (13)	106,900,250 (9)
Minnesota	40,638,000 (14)	60,957,000 (14)	64,247,300 (18)
Connecticut	33,620,000 (15)	50,430,000 (15)	69,542,900 (15)

These 15 states are allotted more than 75% of the total funds available for wastewater treatment plants under the EPA's Construction Grant Program.

Federal financial assistance is available for 75% of allowable costs for new construction, expansion, and reconstruction for treatment works on the State Municipal Projects Priority List and fundable under the annual allotment.

In its Water Quality Strategy Paper (issued March 15, 1974), the EPA stated the objectives and priorities for financing treatment works to meet the effluent and ambient requirements (set forth in the Federal Water Pollution Control Act Amendments of 1972) for

1977 and 1983. The primary objective is to fund, on a priority basis, those treatment works that are: 1) most likely to improve water quality to meet the goals of the Act; 2) cost-effective; and 3) capable of being operated and maintained efficiently.

The State Municipal Projects Priority List should be based upon the following general priority recommendations of the Environmental Protection Agency which establish the preferred order for publicly owned treatment works:

1. projects necessary to meet existing water quality standards or to comply with the enforceable provisions of the law (i.e., treatment works providing primary treatment);

2. projects not necessary to meet water quality standards, but that must be installed to comply with the enforceable provisions of the law (i.e., treatment works providing secondary treatment);

3. projects against which the enforceable provisions of the law will not be applied until 1983, or against which many water quality standards will not be applicable until 1983 (e.g., storm and combined sewers); and

4. projects that are not dischargers (e.g., collection sewers or recycled water supply facilities).

Projects established as priorities in the state's 303(e) submission will ultimately be based upon input from both the state's program (establishing criteria for priority listing of treatment works under Section 106) and the areawide waste management plans developed by agencies designated and funded under Section 208. In addition, Level B plans developed under Section 209 (e.g., SENE study) will also be a factor in the development of the State Municipal Projects Priority List.

Three steps are involved in the construction grant process when a proposed treatment work is selected for funding from the 303(e) (H) State Municipal Projects Priority List. After October 1, 1974 a plan of study is required as part of the application for a Step 1 grant. The plan will describe the area served, specify the governmental entities involved, define the nature and scope of the project, print a schedule for completing tasks, and estimate the cost involved [40 CFR 35.920-3(a)(1)].

The three steps in the construction grant process for waste treatment works are:

Step 1 - Develop facilities plans and related elements.
Step 2 - Prepare construction drawings and specifications.
Step 3 - Fabricate and build treatment works.



Step 1

The facilities planning process (40 CFR 35.917 (b) and Section 201, P.L. 92-500) will indicate the need for the proposed facilities and, through systematic evaluation of feasible alternatives, demonstrate that the proposed measures represent the most cost-effective means of meeting established effluent and water quality goals, in consideration of environmental and social considerations.

The following requirements of the facilities plan are preconditions to a Step 2 grant for the preparation of construction drawings and specifications:

- infiltration/inflow analysis;
- sewer use by-law/ordinance commitment;
- cost effectiveness analysis;
- environemtnal impact assessments;
- identification of best practicable waste treatment technology;
- A-95 review;
- public participation;
- acceptance by local governments; and
- state review and approval.

Step 2

The preparation of construction drawings and specifications (40 CFR 35.920-3(b) and Section 203(b) P.L. 92-500) must conform to the State Municipal Projects Priority List under Section 303, goals of the state plan, areawide plan under 208 and state allotment. In addition, the applicant must address the following issues:

- agreement to pay non-federal share;
- legal, institutional, managerial, and financial capability;
- completed analyses and provisions for correcting infiltration/inflow;
- environmental impact assessments completed;

- operations and maintenance capability;
- schedule of user charge implementation;
- provision for industrial cost recovery; and
- NPDES permit.

Two specific pre-conditions relating to treatment works are critical to full federal financial participation: user charges for recipients, and cost recovery for industrial users The former relates to the proportionate distribution of operation and maintenance costs among all recipients of waste treatment services provided by the facility. The latter relates to the method by which industrial users of the treatment works are required to pay the portion of the construction costs that is allocable to the treatment of such wastes.

User Charges

P.L. 92-500 (Section 204) requires that a system of user charges be established for all recipients (residential, industrial, or commercial) to offset the operating and maintenance costs of the treatment works. The user charge system of cost apportionment, designed to ensure economic self-sufficiency, is geared to a proportionate distribution of costs by either individual user or class of user, or by constituents of the sewage to be treated.

For individual user charges, the proportionate estimated or measured flow contribution is compared to the total loading of the treatment works and the cost is apportioned accordingly. Whenever the range of concentration for any pollutant source exceeds that for normal domestic sewage, a surcharge may be imposed in addition to the basic user charge.

Although the user charge regulations promulgated by the EPA provide the option of apportioning costs by class of user, much work remains to be completed before such a system can be implemented. Such a classification system would permit the operation and maintenance costs to be determined for each class and assessed against each unit within that class based upon characteristics of the particular class for strength, volume, and delivery flow rates.

The operation and maintenance costs for which user charges are assessed include the cost of debt service as well as the cost of replacement of the treatment works and appurtenances required to ensure the effectiveness of the facility.

Industrial Cost Recovery

To ensure that industrial users of publicly owned treatment works are assessed a proportionate share of construction costs, P.L. 92-500 establishes an industrial cost recovery requirement, under which regulations are promulgated by the EPA. To qualify for a grant under Title II for a treatment works whose total loading includes provisions for industrial users, an implementation schedule for capital cost recovery must be included. Letters of intent from significant industrial users committing themselves to a payment scheduled based upon their expected use of the facility must be submitted in support of the implementation schedule.

P.L. 92-500 identifies industrial users in the following divisions:

Division A - Agriculture, Forestry and Fishing
Division B - Mining
Division D - Manufacturing
Division E - Transportation, Communications, Electric, Gas and Sanitary Services
Division I - Services

The share of the cost attributable to each industrial user is based upon factors contributing to the cost of the treatment works (e.g., volume, strength, delivery flow rate characteristics). Any change in these characteristics necessitates an adjustment of the required annual payments. The cost recovery period for industrial users is 30 years or the useful life of the treatment works, whichever is less.

Of the amounts collected from industrial users, 50% is returned to the federal government. Of the remaining amount, 80% (plus interest) is retained in a trust account for use in future reconstruction and expansion of the treatment works (n.b., distinguished from "replacement" costs, which are factored into user charges for operation and maintenance), with the remaining 20% to be used at the grantee's discretion.

Environmental Financing Authority

Under the provisions of Section 12 of P.L. 92-500, the Environmental Financing Act of 1972, an agency of the federal government was established in the Department of the Treasury to "assure that inability to borrow necessary funds on reasonable terms does not prevent any state or local public body from

carrying out any project for construction of waste treatment works determined eligible for assistance..."

The Environmental Financing Authority is authorized to purchase the general obligations of a municipality, state, or interstate agency which finances the non-federal share of the cost of the project. This optional financing mechanism is only available when bond counsel certifies that credit on reasonable terms is unavailable in the private market and that the public body will be able to meet a reasonable schedule of repayments of principal and interest.

The applicability of this section may be limited in most of the Eastern Massachusetts Metropolitan Area due to relatively high ratings for most municipalities. However, certain smaller municipalities that are rated below A or unrated, have a relatively high ratio of debt service to operation costs (+10%), and project significant population growth, may find the 40 year term advantageous in distributing the impact of the cost among both present and future users of the treatment works. This option should always be investigated in Step 1 - Facilities Planning Grant (under section 201) as part of the general cost/effectiveness analysis.

The remaining federal agencies play a secondary role in financing water pollution prevention, abatement, and control facilities. They are discussed to reflect the full range of federal resources available for the construction of wastewater facilities.

Housing and Urban Development (HUD)

Prior to the creation of the EPA, the Department of Housing and Urban Development was a major source of funds for the construction of local water and sewerage systems. These grants were generally directed to urban areas to advance HUD's primary programs of housing and urban renewal, and to promote efficient and orderly community and regional growth and development.

Basic water and sewer facilities grants were available to finance up to 50% of the cost of facilities other than interceptors and treatment plants. Authorized under the Housing and Urban Development Act of 1965 (P.L. 89-117), the funding program was linked to the areawide sewer plan certification process as a means of encouraging and supporting the planning process.

Although this grant program is no longer available as a categorical funding source, cities and towns receiving funds under the Housing and Community Development Act of 1974 are permitted to plan and construct local sewer facilities under their entitlements from this program.

Economic Development Administration (EDA)/
Department of Commerce

The EDA provides grants and low-interest loans to construct water and sewer systems if the activity will create opportunities for jobs in high unemployment areas. For a municipality to be eligible, it must be included in a Regional Sewerage Plan.

Under the Public Works and Economic Development Act of 1965, grants up to 50% and loans up to 100% are available to public agencies to construct sewerage facilities. Sewerage Facilities Loans up to 65% of the cost of facilities are also available for private businesses and industries at the government interest rate.

Farmers Home Administration (FHA)/
Department of Agriculture (USDA)

The Rural Development Act of 1972 authorized the Department of Agriculture to administer and coordinate a broad-based program to facilitate the development of rural communities through loans and grants for a variety of community facilities, including water and sewerage. The lead role for this effort is vested in the state government, and in Massachusetts is coordinated by the Executive Office of Environmental Affairs through its Department of Agriculture.

Under the Community Facility Loan Program, low interest loans are provided to local governments and private enterprises to construct, enlarge, extend, or otherwise improve community water, sanitary sewerage, solid waste disposal, and storm waste waster disposal facilities. Any such facilities constructed must satisfy the requirements of the Division of Water Pollution Control.

Although this program (geared to municipalities under 10,000 population in predominantly rural areas) has limited application within the Boston SMSA, several municipalities outside the SMSA but within the study area may find it helpful in the construction of local sewage collection systems. (For further information, refer to 38 FR 29020 et. seq., published October 18, 1973.)

STATE

Division of Water Pollution Control (DWPC)
Executive Office of Environmental Affairs

The Commonwealth of Massachusetts committed itself to an extensive financing program for water pollution abatement facilities several years prior to the passage of P.L. 92-500. With the establishment of the Division of Water Pollution Control, the Legislature authorized a $150 million financing program under the terms of the Water Pollution Control Loan Act of 1966. Funds under this bonding authorization were available for the planning and construction of facilities (including sewer lines and treatment plants) required to ensure cleaner water. Of the total amount authorized, $15 million was established as the annual maximum commitment (Chapter 687 of the Acts of 1966).

Under the provisions of Chapter 747, Acts of 1970, the DWPC was further authorized to expend $250 million to achieve the purposes of the Massachusetts Clean Water Act. This Water Pollution Control Loan Act of 1970 provides for an accelerated program for financing treatment works.

The degree of participation by the Commonwealth in financing the non-federal share of water pollution abatement facilities is provided in Section 33 of Chapter 21 of the M.G.L. as amended by Chapter 546, Acts of 1973, as follows:

- 15% of the eligible costs of a project approved for 75% construction grant under Title II of P.L. 92-500;
- 90% of the eligible costs of projects with an estimated value of $5 million or less when federal funds are not available in any fiscal year; and
- 7% of estimated construction costs as an advance for facilities planning under Section 201 of P.L. 92-500 whenever federal funds are unavailable.

In addition to the bonding authorizations provided to the DWPC, Chapter 21 establishes a method for reimbursing the project costs for facilities constructed in the period 1957-1966 to political subdivisions. The FY '75 budget of the DWPC includes $1,137,320 for this purpose.

Department of Commerce and Development (DCD)
Executive Office of Manpower Affairs

A $25 million loan program for industrial and commercial businesses to construct water pollution abatement facilities was authorized under Chapter 746, Acts of 1970. The Department of Commerce and Development was authorized to provide loans to ensure the economic well-being of the Commonwealth consistent with any plans of the DWPC. This program for the abatement of industrial wastes is reinforced under the terms of Section 38D of Chapter 63 of the M.G.L., which provides a deduction for the cost of construction, reconstruction, improvement, or erection of industrial waste treatment facilities from the income subject to taxation under the business and manufacturing corporation excise.

Metropolitan District Commission (MDC)
Executive Office of Environmental Affairs

As described in Part A of this section, the MDC, through bonds authorized by the General Court, is responsible for the construction of wastewater interceptor and treatment facilities within the Metropolitan Sewerage District. Although the bonds are authorized by the Legislature, the annual principal and interest payments are made by apportioning the cost to member municipalities. Revenue from state taxes is not utilized to retire the outstanding debt. Each municipality includes its share of the expense of debt retirement in its local property tax levy.

The funds of the Metropolitan District Commission are neither grants nor loans and, although the MDC is listed under the "state" subheading, the authorizations for debt service are for facilities within the MSD, paid for by its members.

The MDC functions as a holding company for a regional service delivery district and, since its creation, has facilitated the financing, operation, and maintenance of an extensive network of facilities. Although an agency of the Commonwealth, the MDC is an eligible recipient of grants for construction of treatment works.

REGIONAL

No major regional financing mechanism is presently available to fund wastewater projects. The absence of any regional entity

with taxing and revenue generating authority accounts for this situation, although water pollution abatement districts are authorized to issue general obligation bonds to finance the construction of facilities within their own service area. As previously noted, the MDC is a regional entity which carries out a construction program on behalf of the members of the Metropolitan Sewerage District. However, the state rather than the region is the financing mechanism.

The South Essex Sewerage District (SESD) currently serves the communities of Danvers, Marblehead, Peabody, Salem, and Beverly, and three public institutions in Middletown on the North Shore. This agency has undertaken the construction of a treatment facility to serve the entire geographic area within its boundaries. The district includes municipalities within its service area that are now contributing members and receive no direct service. The SESD is not a source of funds but rather operates as a regional entity which finances projects on behalf of its members. The cost is apportioned among the members of the district.

LOCAL

Under the terms of the Municipal Finance Law, cities and towns may incur debt both within and beyond the limit of indebtedness for the purposes of 1) constructing sewers, sewerage systems, and sewage treatment and disposal facilities; or 2) covering the total cost of a tie-in to the system of a contiguous municipality. The payment of any debt incurred is provided in the annual property tax levy according to the schedule of payments for principal and interest. Since local collection system construction is not a priority for financing under P.L. 92-500, the total obligation for this activity is a local responsibility.

In contrast to the financing costs of local collection systems, the municipal costs of treatment works account for 10% of the eligible costs for construction. This balance is the result of the difference between the 75% federal share provided under Sections 201 and 203 of P.L. 92-500 and the 15% state participation under Section 33 of Chapter 21, M.G.L.

In addition to this conventional financing system, cities and towns may utilize federal funds provided under the State and Municipal Fiscal Assistance Act of 1972 (General Revenue Sharing) to construct local sewerage systems and sewage treatment facilities. If the authorization for this program is extended beyond 1976, this device may be especially attractive since it will not

be included in the property tax levy. This option is available only in the absence of direct federal participation in the financing of the facility.

OPERATIONS

FEDERAL

Environmental Protection Agency (EPA)

No federal agency has direct responsibility for the operations of any water pollution facility or sewage treatment works. This responsibility usually resides with regional, intermunicipal, or local agencies. Although the EPA does not directly operate the facilities, P.L. 92-500 establishes operating standards (distinguished from discharge standards relating to water quality and effluent limitations), provides training and technical assistance, conducts research and demonstration projects, and strives generally to ensure that treatment works are operated efficiently. The EPA's efforts focus on the following areas:

- Technology Research

  To assist in the development of improved technology to ensure that the operations of publicly owned treatment works meet the 1977 and 1983 goals of P.L. 92-500, the EPA (under Section 105) conducts research projects for improving wastewater treatment plant operating efficiency, economy, and reliability. Operating and maintenance manuals prepared under authority of Section 304(c) are designed to provide "information on the processes, procedures or operating methods which result in the elimination or reduction of the discharge of pollutants." Upgrading the performance of present treatment plants involves an EPA effort to develop fully automated wastewater treatment systems to determine costs, reliability, and performance.

- Manpower Training

  In recognition that the efficient operation of treatment works requires qualified operators and personnel, the EPA is authorized under Section 104(g)(1) to finance pilot training programs for persons entering the field of operations and maintenance of treatment works and related activities. The EPA assists states in identifying and assessing manpower needs, and compiles a nationwide forecast of such needs for the Congress.

In addition to these training programs, Section 109 of P.L. 92-500 provides for grants or contracts with institutions of higher education to prepare undergraduate students to "enter an occupation which involves the design, operation and maintenance of treatment works." The EPA will provide a grant for 100% of the cost (up to $250,000) of the construction of a treatment works training facility.

. Technical Assistance

EPA staff will provide intensive technical assistance to selected "problem" plants to increase efficiency through the use of sound operating and maintenance techniques and procedures. This technical assistance, as well as general assistance, is authorized under Title I, Section 104 and Title V, Section 501 of P.L. 92-500.

. Construction Grant Application Review

As a precondition to funding, the construction grant application process requires a determination during the review by the EPA Regional Office that "the applicant... had made adequate provisions satisfactory...for assuring proper and efficient operation, including the employment of trained management and operations personnel, and the maintenance of such works in accordance with a plan of operation approved by the State water pollution control agency." (Section 204(a)(4)

The operation and maintenance review during the predesign stage ensures that the grantee will be able to operate and maintain the facility consistent with the design capability. No grant under Section 201(g)(1) may be made unless the grantee has satisfied the conditions of Section 204(b)(1)(c) that the applicant "has legal, institutional, managerial and financial capability to insure adequate construction, operation and maintenance of treatment works throughout the applicant's jurisdiction."

STATE

Metropolitan District Commission (MDC)

The Metropolitan District Commission is responsible for the operation of the total sewerage system, including treatment works,

for the Metropolitan Sewerage District. The MDC is a unique wastewater management entity that provides services to 43 municipalities on a regional basis, but maintains the status of a department of state government. Actual operations are performed by the Sewerage Division, which is headed by a Chief Engineer. This operating division is described under the Regional subheading and in Part A of this section.

Basically, the MDC is the board with overall policy, financing, management, and decision-making responsibility, and the Sewerage Division is the operating entity which provides service to MSD communities. No other state agency has operating responsibility for sewage treatment works.

The MDC currently possesses those essential elements indicated in Sections 204(a)(4) and 204(b)(1)(c) for operating agencies eligible for grants under P.L. 92-500. It also possesses the attributes of the operating and management agency which will be designated to plan for and receive grants from the EPA and to manage the treatment works within a described area, as provided in Section 208(c)(2), specifically:

- to manage treatment works and related facilities serving such areas;
- to design and construct, directly or by contract, new works and to operate and maintain new and existing works;
- to accept and utilize grants or other funds;
- to raise revenues, including the assessment of waste treatment charges;
- to incur short- and long-term indebtedness;
- to provide for the full participation by the public in the planning process;
- to ensure that each participating community pays its proportionate share of treatment costs; and
- to refuse to receive any wastes from any municipality or subdivision that does not comply with any provisions of an approved plan.

Division of Water Pollution Control (DWPC)

In addition to the DWPC's other powers, two provisions of Chapter 21 of the General Laws, as amended by Chapter 546, Acts of 1973, relate directly to the operations of wastewater treatment facilities.

- Section 27(9) provides that the DWPC shall adopt regulations requiring proper operation and maintenance of waste treatment facilities. This is consistent with the intent of P.L. 92-500 to delegate responsibility for operations and maintenance standards to the states.

- Section 27 (11) provides that the DWPC shall "arrange for personnel engaged in the work of water pollution prevention and abatement to take courses designed to instruct employees of water pollution control facilities... in the latest and most efficient methods of water pollution control and the latest developments in the operation and maintenance of plants and facilities for the prevention or abatement of water pollution."

Board of Certification of Operators of Wastewater Treatment Facilities

This Board, created by Chapter 781, Acts of 1970, outlines a procedure for the certification of qualified operators of wastewater treatment facilities. Any operator failing to be certified as competent is subject to a fine of $20 per day. This procedure will assist in the operation of wastewater facilities by ensuring trained, qualified personnel, consistent with the intent of P.L. 92-500.

REGIONAL

Metropolitan Sewerage District (MSD)

The Metropolitan Sewerage District is serviced through the Sewerage Division of the MDC. The MSD is a regional district of 43 communities, covering approximately 400 square miles in the Boston metropolitan area. The MSD's sewerage treatment plants are located at Deer Island and Nut Island and discharge into Boston Harbor.

As described in Section A, the MSD is self-supporting, financing its operations through an assessment system. Since the MDC has embarked on a comprehensive pollution control program, the annual costs for operations of the Sewerage Division and debt service

are approximately equal, a situation which, in most other circumstances, would be cause for critical concern.

The operations of the Sewerage Division of the MDC involve a full range of trained specialists in engineering, construction, maintenance, laboratory science, supervision, and treatment plant operations.

South Essex Sewerage District (SESD)

The SESD is a single purpose special district serving the communities of Danvers, Peabody, Salem, Beverly, and Marblehead, and three public institutions in Middletown. Created by special act of the Massachusetts Legislature, the SESD operates a system of trunk line sewers and a treatment plant on the North Shore.

Water Pollution Abatement Districts

Under the provisions of Chapter 21 of the Massachusetts General Laws, the DPWC can propose and require formation of water pollution abatement districts consisting of more than one city or town or parts of towns. The districts are controlled by a commission representing each of the towns or cities forming the district.

Each district has extensive powers, some of which are:

- to sue and be sued;
- to enter into contracts;
- to issue general obligation bonds and notes;
- to acquire, dispose of, and encumber real and personal property;
- to construct, acquire, improve, maintain, and operate abatement facilities;
- to exercise the power of eminent domain; and
- to apply for and receive financial assistance from the federal government.

The districts were intended to serve as the appropriate areawide management and operating agency for water pollution

control when first authorized in 1966 under the Massachusetts Clean Water Act. Since that time, however, amendments to Section 4A of Chapter 40, M.G.L. have authorized a contractual relationship between municipalities for water pollution abatement projects. This alternative "districting" arrangement provides the mechanism for general purpose government to contract for mutual benefit. The establishment of a district may not, therefore, be required, although these districts have the necessary legal, institutional, and financial capability to be designated as 208 management agencies. In addition, individual municipalities now qualify for funding of wastewater treatment facilities and have the same status under law as abatement districts.

LOCAL

Departments of Public Works/Sewer Commissions

The responsibility for operating any local sewerage system generally rests with either a DPW or a Sewer Commission, although larger cities and towns often create a separate department consisting of a Superintendent of Sewers and other staff, which may include engineers and operators with responsibility for sewerage. Any individual city or town may apply for financial assistance to construct a treatment plant and appurtenant facilities under P.L. 92-500 and may operate the treatment plant and maintain the sewer lines with local personnel.

Any local treatment plant is subject to the operating standards of discharge provided in P.L. 92-500 for publicly-owned treatment works and must receive a permit to discharge into the waters of the Commonwealth. These standards, more fully described elsewhere in this report, are for secondary treatment by 1977 and best practicable waste treatment technology (BPWTT) by 1983.

MONITORING

FEDERAL

Environmental Protection Agency (EPA)

Monitoring of water quality is fundamental to effective planning, efficient operations, productive financing, and sound enforcement. A monitoring and surveillance program is the only means of measuring progress toward the objective of the Federal Water Pollution Control Act Amendments of 1972. As with most aspects of P.L. 92-500, once the state demonstrates legal authority and capacity, it becomes the principal level responsible for a monitoring program.

The monitoring strategy through which a state demonstrates its capability to analyze water quality is an element in the state program (Section 106), state strategy (Section 303), areawide plans (Section 208), basin plans (Section 303), water quality reports (Section 305), permit program (Section 402), oil and hazardous substance surveillance (Section 311), and annual reports to Congress (Section 516).

The federal objectives for monitoring are described in the Water Quality Management Paper - Second Edition as follows:

- identify and assess quantitatively the magnitude of existing and potential water pollution problems not fully considered.
- measure the effectiveness of the permit and construction grants programs in terms of abatement efforts and the resultant water quality improvement;
- prepare assessments of present and future water quality; and
- continue conducting stream analyses in preparation for the second round of permits.

To assist in achieving these objectives, the EPA utilizes the following tools:

- National Water Quality Surveillance System (NWQSS)

  The system consists of selected segments located in municipal/industrial and agricultural/rural areas monitored for a consistent set of parameters at a

uniform frequency. The NWQSS is designed to complement state monitoring efforts. The data analysis to identify baselines and trends has a national perspective and is intended to generate outputs to assist the states in developing strategies, assigning priorities, preparing reports, and defining program goals.

- Water Quality Reports

  The EPA's reporting requirements under its monitoring program necessitate the collection and analysis of data from states and through its own monitoring programs. The reports on water quality in surface and ground waters and oceans, as well as projections of water quality in 1977, 1983 and 1985, require that the agency monitor portions of the nation's waters.

- Data Systems Design and Utilization

  Two federal data files, the General Point Source File (GPSF) and Water Quality File, are the main data storage and retrieval systems for point source and ambient data. The data are utilized in evaluating state performance in achieving the goals established in the annual state program and strategy, as well as in reporting.

  The information contained in these files is combined with economic, demographic, and other data to measure the costs and benefits of various approaches under P.L. 92-500.

The EPA has published guidelines under the provisions of Section 304(g) of P.L. 92-500 to assist states in monitoring water to identify certain constituents and permit laboratory testing to determine the presence and/or level of pollutants.

STATE

Division of Water Pollution Control (DWPC)

The DWPC is the principal agency of the Commonwealth with authority and responsibility for monitoring water quality, effluents, treatment works, and industrial wastes. This responsibility was vested in the DWPC under the provisions of Section 27 of Chapter 21, M.G.L. as most recently amended by Chapter 546 - Acts of 1973.

The specific statutory references to the DWPC's monitoring responsibility are to:

- require dischargers to establish monitoring, sampling, record keeping and reporting procedures and facilities, and to submit to the director data gathered therefrom and such other data as he shall reasonably request;

- examine periodically the water quality of the various coastal waters, rivers, streams, lakes, and ponds of the Commonwealth;

- require submissions for approval of reports and plans of abatement facilities on any part thereof, and inspect the construction thereof for compliance with the approved plans; and

- enter at reasonable times any property, public or private, for the purpose of investigating or inspecting any condition relating to the discharge or possible discharge of pollutants, and may make tests, inspect monitoring equipment, and examine any records.

The provisions of P.L. 92-500 require the states to develop monitoring strategies consistent with the overall goals of the Federal Water Pollution Control Act Amendment of 1972. The prime elements of a monitoring program are:

- self-monitoring by point sources;
- ambient and effluent monitoring;
- scheduled compliance through facility inspection; and
- stream surveys/reports of water quality.

This overall compliance monitoring program establishes opportunities for assistance to improve operations and performance or to suggest corrective or alternative measures that will produce the intended results. In addition, it constitutes the basis for identifying non-compliance as a pre-condition to stringent enforcement.

The development of Section 303(e) basin plans and the state program submission under Section 106 require monitoring strategies. A new section of Title 40 of the Code of Federal Regulations establishes (in Subpart D) the relationship between the monitoring and surveillance program and the basin plan. Section 131 stated that a basin plan is to be based upon and provide for

a monitoring schedule relating instream water quality to pollutant loading, water quality standards, and effluent limitations. The basin planning effort under 303 contains the following monitoring survey outputs (40 CFR 131.404):

- listing of all surface waters which do not comply with water quality standards;
- description of pollutant mass balances, including estimates of total pollutant loads to be controlled;
- input to the EPA water quality information system and verification of data;
- listing of stations, parameters, and frequencies to be monitored to provide compliance, progress measurement, and trend information; and
- proposed schedule for the subsequent monitoring survey to be undertaken in that basin.

In addition to the 303(e) basin planning effort, the annual program submission under Section 106 also requires that the DWPC submit a monitoring strategy outlining how the state intends to build toward a comprehensive monitoring program. At a minimum, the state monitoring efforts should achieve the following objectives:

- develop and maintain knowledge of the state's water quality, including basic knowledge of the quality of the groundwater in the state;
- obtain an understanding of the cause and effect relationships of the state's water quality; and
- assess the effectiveness of water pollution control programs, including the determination of compliance or noncompliance with legal requirements, such as permit conditions.

Bureau of Environmental Sanitation (BES)

Under the terms of legislation enacted in 1974, this unit of the Department of Public Health is to be transferred to the Executive Office of Environmental Affairs. Together with the Division of Water Pollution Control, it will be a part of the Department of Environmental Quality Engineering within the EOEA. This

transfer, while consolidating the major water quality monitoring sections, will not eliminate the public health responsibilities of the Department of Public Health relating to water contamination from pollutants. Of particular importance will be human health effects of microbiological pollutants, viruses, and other organic pollutants.

The Bureau of Environmental Sanitation is currently responsible for monitoring water supplies for human consumption and related uses, as well as for ensuring the elimination of any public health hazards (e.g., contamination of bathing and shellfish harvesting areas). The BES is particularly concerned with the subsurface discharge of sewage which may affect groundwater purity.

The BES works closely with a number of federal agencies as well as with the DWPC to ensure suitable supplies of water for human consumption and contact recreation.

REGIONAL

Metropolitan District Commission (MDC)

Through its Sewerage Division, the MDC operates two treatment plants, one at Deer Island and one at Nut Island. Each provides primary treatment to sewage prior to discharge into Boston Harbor. As publicly-owned treatment works, they are required to develop self-monitoring systems and to comply with Section 403 of P.L. 92-500.

Strength, volume, and flow characteristics are monitored and analyzed at the treatment plants. As a regional service provider for 43 communities, the MDC has established enforceable standards for municipalities discharging into its system to regulate the effects of noxious substances from residential and industrial sources.

LOCAL

Board of Health

Water quality monitoring and surveillance activities are a continuing responsibility of health agents and Boards of Health in the cities and towns of the Commonwealth. The purpose of the boards is to protect public water supplies from any health hazards resulting from contaminations from pollutants or inadequately treated discharges.

Specifications and regulations governing the placement and use of sub-surface disposal facilities (i.e., septic tanks, leaching systems) are enforced by these local entities to ensure protection of both groundwater and surface water supplies.

Sewer Commission

Any planned or operating treatment plant must develop a self-monitoring program to ensure that water quality standards and effluent limitations are met. Both federal law (P.L. 92-500, Sections 201 and 308) and state statute (Chapter 21, Sections 27(7) and 40) provide for a self-monitoring program to be verified by facilities inspection.

The local agency responsible for sewerage construction and treatment plant operations and maintenance will be responsible for the self-monitoring program at the treatment plant site.

ENFORCEMENT

FEDERAL

Environmental Protection Agency (EPA)

One of the most critical aspects of the entire water pollution prevention, control, and abatement effort is an effective enforcement program based on: 1) a properly managed permit program at the state level; 2) compliance monitoring by states to ensure progress in the treatment and reduction of pollutants; 3) constant review of water quality; and, where necessary, 4) utilization of the legal process to secure injunctive relief and/or to levy and assess fines for failure to comply with appropriate provisions of statute or regulation.

Although treated as separate functions, enforcement and monitoring are closely linked. Monitoring activities produce data regarding violations of water quality standards or effluent limitations, and thereby provide the basis for enforcement. Enforcement activities such as permitting, court order, or regulation establish standards for monitoring.

The National Pollution Discharge Elimination System (NPDES), authorized under Section 402 of P.L. 92-500, assists the Administrator of the Environmental Protection Agency, his delegated agents (Regional Administrators), or qualified states through their agents, to meet the objective of restoring and maintaining the integrity of the nation's waters by issuing, conditioning, or denying permits for the discharge of pollutants from point sources into the navigable waters, contiguous zone, and oceans of the United States.

Every point source is subject to two standards: the effluent, or technology, standard, and the water quality, or environmental, standard. The effluent limitation specified in a discharger's permit is calculated by comparing the technology standard for the source category with the water quality standard for the receiving waters, and adopting the more stringent level of control. The permit containing such limitations and schedules for compliance represents an enforceable standard and sequence of actions to ensure compliance. Failure to maintain the standard or meet the schedule results in the application of the enforcement powers by either the state or the federal government.

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The limitations established are designed to meet the following schedules:

By 1977

- publicly owned treatment works (POTW) - secondary treatment
- point sources other than POTWs' - best practicable control technology (BPT) currently available

By 1983

- publicly owned treatment works (POTW) - best practicable waste treatment technology (BPWTT)
- point sources other than POTWs - best available control technology (BAT) economically available

Enforcement by the federal government is based upon violations by dischargers of standards promulgated by the EPA. Under the authority of Title III of P.L. 92-500, these standards establish the base levels for:

- effluent limitations;
- water quality;
- new source performance;
- toxicity; and
- pretreatment.

Failure to comply with these standards (as provided in a permit issued under Section 402) or with standards relating to thermal discharges, ocean discharges or disposal of sewage sludge, is sufficient cause for the Regional Administrator to initiate an action for appropriate relief, either through the state or of his own accord after notice, to enforce the standards under the authority of P.L. 92-500.

Violators are subject to maximum penalties of $25,000 per day or one year imprisonment for first offenses, and $50,000 per day or two years imprisonment for subsequent violations.

Three additional enforcement powers are noteworthy, two relating to the legal powers of the EPA under P.L. 92-500 and a third relating to the power of a citizen to compel action by the EPA when standards are not properly enforced. When the state's administration of a permit program results in widespread violations, the EPA may intervene for a period of federally assumed enforcement (Sec. 309(a)(2)). To ensure prompt action (notwithstanding public hearing requirements), the Administrator, under the Emergency Powers granted in Section 504 of the Act, may seek injunctive relief to restrain any violation. Finally, any citizen may institute an action against a violator or against the Administrator to compel compliance with the law under Section 505 of P.L. 92-500.

Corps of Engineers - Department of the Army

The Corps of Engineers is responsible for the issuance of permits for the discharge of dredged or fill material into the navigable waters at specified disposal sites (Section 404). The standards for such discharge are jointly developed by the Corps and the EPA Administrator, and are comparable to the ocean discharge criteria established under Section 403(c) of P.L. 92-500.

The Corps of Engineers, EPA, National Oceanic and Atmospheric Administration (NOAA), Coast Guard, and other state and federal agencies are involved in a joint effort--Interagency Coordination Committee for Ocean Dumping--to monitor impacts of ocean dumping (including treatment plant discharges) requested under authority of:

- P.L. 92-500 - Water Pollution Control Act Amendments of 1972
- P.L. 92-532 - Coastal Zone Management Act of 1972
- P.L. 92-583 - Marine Protection Research and Sanctuaries Act of 1972

Enforcement of standards developed under these sections on treatment plants, industries, or vessels requires efficient monitoring to control ocean discharges.

STATE

Division of Water Pollution Control (DWPC)

The primary responsibility for enforcement rests with the

Division of Water Pollution Control which, under a law enacted in 1973 for the express purpose of securing the benefits of P.L. 92-500 for the Commonwealth, provides a level of enforcement authority comparable to that described in Sections 308, 402, and 504 of that Act.

Specific provisions describing the enforcement authority of the DWPC as provided in Chapter 21, as amended, include:

- adopt standards of minimum water quality which shall be applicable to the various waters or portions of waters of the Commonwealth [Sec. 27(5)];
- prescribe effluent limitations, permit programs and procedures applicable to the management and disposal of pollutants, including, where appropriate, prohibition of discharges [Sec. 27(6)];
- examine periodically the water quality of the various coastal waters, rivers, streams, lakes and ponds of the Commonwealth and publish the results...with the standard of water quality...[Sec. 27(8)];
- adopt...rules and regulations...necessary for the proper administration of the laws relative to water pollution control [Sec. 27(12)];
- undertake action whenever there is spillage, seepage or other discharge of oil into any inland or offshore waters, which spillage may be subject to a $10,000 per day fine or two years imprisonment [Sec. 27(14)];
- conduct facilities inspections for the purpose of determining whether there is compliance with permits issued (Sec. 40); and
- issue permits for point source dischargers subject to the conditions established by the DWPC to ensure compliance with effluent limitations, proper operations, self-monitoring, reporting, sampling and recording (Sec. 43).

Consistent with the penalties provided under P.L. 92-500, the Commonwealth may institute actions against violators in either a criminal prosecution (fines of $2,500 - $25,000 per day or imprisonment for not more than one year) or a civil prosecution (fines up to $10,000 per day). Similarly, emergency powers to protect the public health or welfare, as well as the livelihood

of any person, are vested in the Director under Section 46 of Chapter 21 as amended.

Although the DWPC has not yet been authorized by the EPA to assume full responsibility for the NPDES permitting program, substantial progress is evident in this area. A coordinated program between the DWPC and the EPA is currently in effect.

Fundamental to enforcement are the water quality standards and effluent limitations that establish the baseline for performance. Through a monitoring program to ensure compliance with these levels, the DWPC enforces the standard or limitation and compels actions designed to prevent, control, or abate the discharge of pollutants to the waters of the Commonwealth.

In 1967, Massachusetts was among the first states in the country to adopt water quality standards and effluent limitations for seven classifications of waters, four for fresh waters and three for coastal and marine waters. Under the general direction of the Water Resources Commission, the DWPC has sustained this effort. In 1973, the DWPC classified the 489 segments of Massachusetts waters as either "water quality" or "effluent limited," establishing a basis for point source discharge permitting, monitoring, and enforcement.

Bureau of Environmental Sanitation (BES)

The Bureau of Environmental Sanitation in the Department of Public Health (transferred to the EOEA, effective July 1, 1975) has a regulatory role under the statutory authority of Chapter 111 of the Massachusetts General Laws. Water quality standards relating to public health may be adopted only following approval by the Commissioner of Public Health.

BES has broad regulatory powers for promoting public health, safety, and convenience associated with water and related land uses. It can regulate water supply by requiring adequate treatment facilities; control issuance of permits by boards, cities, towns and other authorities; regulate discharge into coastal waters of sewage or other substances injurious to health, and notify the Attorney General of any violations.

While the BES does not possess the broad authority of the DWPC in the area of enforcement, it does possess the following statutory powers:

- to approve the site of sewage treatment, purification, and disposal facilities;

- to require towns or persons operating or planning a sewerage system to secure its advice and consent prior to legislative authorization of funds;

- to order improvements to existing sewerage systems after a public hearing;

- to require a town or person operating sewerage works to improve operations if pollution occurs or appears imminent;

- to order factories or other establishments to cease pollution of the Charles River or its tributaries; and

- to inspect sewerage facilities of cities, towns, and sewerage districts and recommend or order alterations.

REGIONAL

Metropolitan District Commission (MDC)

Under Chapter 705, Section 12 of the Acts of 1945, the MDC is authorized to adopt rules and regulations concerning the discharge of sewage, drainage, substances, or wastes into any sewer under its control, or any sewer tributary to its system of sewers. Under its authority, the MDC has the power to levy and collect from an offending municipality additional assessments as deemed necessary to compensate for the unlawful disposal of wastes into its system. However, such additional assessments must not exceed the lesser of an amount equal to one twentieth of one percent of the taxable value of the municipality, or $200,000.

This authority relates only to the service area of the regional Metropolitan Sewerage District and has not been strenuously applied. The MDC is subject to the enforcement authority of the DWPC, BES, and EPA. This "enforcement" authority relates only to the establishment of rules and regulations to enforce certain standards of construction or performance by member municipalities.

In summary, the rules provide for:

- construction of local sewers in a manner that separates storm wastes from ordinary sewage;

- restrictions regarding constituency of sewage;

- restrictions regarding garages where gasoline is used; and

- required installation, by the owner of any property serviced by a building sewer carrying industrial wastes, of a control or measuring device and other appurtenances to facilitate observation, sampling, and measurement of the waste. The records from the meters and measuring devices must be furnished to the MDC upon request.

LOCAL

No local agency has enforcement power in the area of water quality.

C. COMPARISON OF MDC WITH OTHER METROPOLITAN AGENCIES

Any attempt to compare the Metropolitan District Commission with the 12 metropolitan sewerage agencies profiled in Section I must be based upon the recognition that the MDC is a unique agency which functions in a unique environment to provide services to unique political jurisdictions. In many cases, therefore, differences between other sewerage agencies and the MDC do not readily provide the basis for objective judgment regarding a "preferred" approach. Procedures that enable one agency to function efficiently in its environment may be totally inappropriate for another.

Nevertheless, comparisons are useful to demonstrate approaches that have successfully achieved a high degree of effectiveness and efficiency in providing sewage services by metropolitan agencies. The comparisons focus on the differences between the agencies in three areas: organization, operations, and finance.

ORGANIZATION

The organization of the Metropolitan District Commission is described in Chapter II-A of this report. Briefly, the MDC is an agency of state government directed by one full-time and four part-time commissioners appointed by the Governor. The Massachusetts Legislature has sole authority to approve the operating budget, authorize bonds to finance capital construction, modify the service area, and restructure the cost apportionment system.

No other agency profiled is organized as an agency of its state government. As a result, significant differences include the following:

- The vast majority of the other agencies are governed by boards of directors or trustees either directly elected or provided for under the constituent unit principle.
- Many jurisdictions provide a referendum procedure to authorize debt, change rate structures, or otherwise alter financial obligations.
- Many agencies possess the full range of powers over functions relating to wastewater management, including monitoring and enforcement.
- The majority of agencies have a greater degree of control over the constituency of the sewage discharged by individual users into the interceptors, trunk lines, and treatment works.

- Many agencies have responsibility for the total sewerage system and exercise design review and approval over every aspect of the construction of facilities.

- The majority of the agencies are single-purpose districts which only provide sewage treatment services (the most notable exception is the Municipality of Metropolitan Seattle).

OPERATIONS

While no significant differences were found in the MDC's approach to intercepting, treating, and discharging, the following administrative differences were apparent:

- Inter-municipal agreements or contracts are often the vehicle through which a sewerage agency delegates enforcement responsibilities tc participating communities. In some agencies, the agreement serves as legislation providing the enforcement powers needed by the sewerage agency. In others, the agreement provides the foundation upon which the sewerage agency is financed.

- Several agencies, including wholesalers, have established monitoring sections to provide information required for billing and to control prohibited discharges. These inspections are regularly performed on an unannounced basis.

FINANCE

- The majority of the agencies studied finance major construction costs through the issuance of revenue bonds. This trend toward revenue financing has led to the levy of service charges on individual recipients of sewerage services in many agencies.

- Seven of the 12 agencies use the retail method of billing.

- Nine of the 12 agencies identify industrial wastewater discharges.

CONCLUSION

The Metropolitan District Commission is a multi-purpose service entity which has less direct participation and control by the public, assumes responsibility for finance and operations, but has limited authority for planning, monitoring, and enforcement.

Although cost comparisons are not based upon the same elements, the MDC is a lower-cost provider than most of the other metropolitan sewerage agencies.

It is important to reiterate that the MDC is a unique multi-service agency providing services on a regional basis and, as such, is sui generis among metropolitan agencies in the country.

Possible additions, reforms, or changes might strengthen the role of the MDC and assist it in providing services more efficiently, effectively, and equitably. Possible alterations in the service area boundary could be introduced through flexibility in the authority to expand or limit the area. Possible devices could be used to improve revenue collection through retail approaches or by changing the relationship of the MDC to the state legislature. Possible ways are available to permit a greater degree of citizen participation in the policy and financing systems of the entity. The profiles developed in Section I and described in greater detail in Addendum I will provide guidance in the development of an organizational structure capable of providing improved services.

It is important to note, however, that there is no "one best way" to provide services. The basic challenge is to identify the most appropriate structure for both eastern Massachusetts and the Commonwealth.

CHAPTER III

A. INTRODUCTION

B. INFLUENCING FACTORS

C. POSSIBLE GOALS AND OBJECTIVES

D. ORGANIZATIONAL CRITERIA

A. INTRODUCTION

This section of the report establishes the link between the existing policy and decision-making structure for the five functions of wastewater management and the proposed future configuration for the entire Eastern Massachusetts Metropolitan Area (EMMA). Chapter II described the overall intergovernmental framework for water pollution control and wastewater management. It depicted a structure containing a high degree of interaction and interdependence, with major governmental agencies sharing responsibility and exercising fairly well-defined powers. This section--Chapter III--will assess the extent of influence these agencies exert on the principal service-delivery agency in the EMMA: the Metropolitan District Commission (MDC).

In addition to institutional pressures, a variety of non-institutional pressures (e.g., natural topography, citizen awareness, philosophical currency) contribute to the overall atmosphere within which the MDC must operate. The purpose of this section is to structure the agencies and channel these pressures into an efficient and effective network of supporting influences that, while conforming to broad organizational criteria, have maximum potential for achieving the specific objectives and goals of a management entity.

This section will focus on those goals and objectives and offer broad criteria for measuring organizational alternatives. These goals, objectives, and criteria do not exhaust the full range of possible options. Others may be added, and the emphasis on those presently defined may shift as organizational alternatives are more fully defined. Nevertheless, the goals, objectives, and criteria represented in this section constitute the primary indices and measures which must be built into a viable wastewater management entity. To provide a common understanding of the terms used, "goals," "objectives," and "criteria" are defined as follows:

- Goals - Statements of an organization's overall purpose which provide long-term direction for its activities.
- Objectives - An organization's specific targets and strategies for achieving its goals. Objectives can be either short or long term and may be modified within the context of overall goals.
- Criteria - A series of broad measures to evaluate the potential of a proposed or existing organization to meet its stated goals and objectives.

B. INFLUENCING FACTORS

Water pollution control and wastewater management activities performed by the Metropolitan District Commission are subject to a variety of factors beyond that organization's control. Pressures arising from legislation, public attitudes, inflation, funding, politics or inter-governmental relations are typical of the externalities that both limit and expand the MDC's scope of operations and responsibility. Since these factors not only establish the overall limits within which the MDC must function but also influence the specific activities of any institutional structure responsible for managing wastewater treatment facilities in the Eastern Massachusetts Metropolitan Area, an understanding of the probable effects of these factors is essential to the process of goal definition.

The following influencing factors are expected to have a significant impact upon future operations of an areawide wastewater management entity:

- federal statutes and regulations;
- federal agencies;
- state statutes and regulations;
- state agencies;
- municipal governments;
- financing requirements; and
- physical limitations.

FEDERAL STATUTES AND REGULATIONS

Passage of the Federal Water Pollution Control Act of 1972 (P.L. 92-500) represents a significant commitment by the federal government to intensify its program of water quality preservation and restoration. Depending on the diligence with which it is enforced, the law will influence every element in the total wastewater management system, from each individual discharger to the largest treatment facility. A detailed description of the impact on the Act on the five major elements of wastewater management (i.e., planning, financing, monitoring, enforcement, and operations) is provided in Chapter II of this report.

To achieve its stated objective of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters, the Act establishes policies, specifies standards, and dictates procedures relating to the present and future activities of the governmental entities and individuals served by the Sewerage Division of the MDC. In addition, the Act significantly affects the MDC's decisions by creating pressures and establishing priorities for action.

P.L. 92-500 is the most significant of the factors influencing the MDC since it comprehensively treats so many specific water quality and wastewater management issues. By establishing, under law, the requirements for compliance, the federal government has provided a strong basis for enforcement and has, considering the difficulty and time involved in amending legislation, ensured a continuing statutory commitment to achieving water quality.

Consistent with the provisions of the law, the Environmental Protection Agency (EPA) has promulgated rules and regulations designed to achieve the levels of water quality necessary to meet 1977 and 1983 deadlines. Regulations governing state, areawide or facilities planning, construction grants, effluent limitations, performance monitoring, enforcement procedures, and operating techniques are indicative of the degree of involvement and control being exercised by the federal government in the area of water pollution control.

The pervasiveness of P.L. 92-500 may be best summarized through examples of impacts that will influence the actions and decisions of private citizens, corporations, municipalities, regional service delivery agencies such as the MDC, and the state.

Industrial managers will be interested in the industrial cost recovery provisions of Section 204 as well as the pretreatment and water quality standards established by the EPA. Direct financial participation by industry in the construction and modification of sewage treatment facilities represents a major effort to ensure an equitable distribution of costs to each user in proportion to the benefits received. Cost apportionment techniques based upon reasonable estimates of flow and measures of the characteristics of effluent will be of primary importance to industry, affecting the full range of decisions relating to relocation, expansion, production processes, etc. The economic impacts of P.L. 92-500 will extend far beyond the cost of a wastewater treatment facility itself.

Private citizens will also be affected by the passage and implementation of P.L. 92-500. Not only is each citizen provided maximum opportunity to participate in all decisions regarding public action which affects water quality, but statutory authority is provided under Section 505 of the Act to: require the EPA to enforce any standard or limitation; enjoin others from acting in a manner which adversely affects water quality; and force states and other governmental units to act in a manner consistent with the provisions of the law. The goal of P.L. 92-500 is to ensure well-informed and involved citizen/environmentalists to work with various public agencies in meeting the water quality targets of 1977 and 1983.

Private citizens may also be affected by actions of cities and towns throughout the Eastern Massachusetts Metropolitan Area relating to the cost of compliance as well as the distribution of that cost to users of the treatment facility. Federal financial participation in the construction or modification of facilities, as well as the growing awareness of the stringent standards of the Act, has generated substantial activity by local governments in applying for grants to provide the facilities required for sewage treatment. The techniques of cost apportionment vary among communities, but for those utilizing sewer user assessments, the distribution and impact of costs are altered through the elimination of the real property tax as the mechansim for distributing costs. In addition, cities and towns with public sanitary landfill sites near waterways or aquifers may be required to pursue alternative methods for solid waste disposal if the dump is a source of pollution.

A variety of state agencies are affected by P.L. 92-500 as well as by P.L. 92-583 and other environmental legislation. Regulations published by the EPA have laid the foundation for state efforts in the major functional areas of planning, monitoring, financing, operations, and enforcement. In addition, the development of planning and management structures, implementation strategies, coordination mechanisms, and interagency service delivery and information systems (all encouraged by federal legislation) has strengthened the position of the Commonwealth in dealing with water quality and water pollution control in a comprehensive, coordinated manner.

The impact (both positive and negative) of P.L. 92-500 is a significant factor determining the activities of the MDC as a regional service delivery agency for the area defined as the Metropolitan Sewerage District. The Federal Water Pollution Control Act

Amendments of 1972 encourage the construction of waste treatment works and appurtenant facilities in urban areas not adequately served by existing systems. The problems of an old and expansive regional sewerage agency (e.g., combined sewers, infiltration, inflow, physical deterioration, reconstruction, site availability, treatment processes, and disposal techniques) become relatively low priorities for financing and high priorities for enforcement. At the same time that the MDC is being compelled to address the matter of effluent limitations and water quality standards through positive corrective measures, it is faced with the reality that its current management structure, system of cost apportionment, and physical limitations reduce its capacity to apply for and receive federal funds.

To expedite the grant approval process, the MDC must become more directly involved in the management of its member communities' collection systems. New terms and conditions must be formulated as the basis of its relationship with member communities to enable it to meet federal regulations. This will require additional studies, amendments to the MDC's enabling legislation, and above all, acceptance of the changes by member communities and the public at large. The MDC must face the challenges of increased capital improvement programs and operating budgets; new disciplines for engineering design and construction; the need to participate in more comprehensive planning to deal effectively with the conflicting social pressures of economic development and resource conservation; and, the engineering aspects of air, water, and land use planning.

These challenges, many created by P.L. 92-500, are not without their beneficial effects. The role of the MDC in providing services to member municipalities will now be re-examined in terms of federally required quality of services as well as within the context of changing intergovernmental relations. A reassessment of the MDC's entire function as a regional service delivery agency will provide the basis for determining its most appropriate future course.

In addition, the MDC's extensive anti-pollution effort has assumed far greater importance and has been reinforced by the enactment of P.L. 92-500. The federal mandate, while creating some short-term problems, will enable the MDC to proceed more vigorously with its wastewater treatment programs as well as to develop long-term strategies and programs to restore water quality in the Eastern Massachusetts Metropolitan Area.

Finally, it is currently unclear whether the federal government

can continue to provide the resources or enforce the minimum water quality standards at a time when economic pressures demand that programs and actions be geared to stabilizing and expanding employment, and encouraging economic development. The federal government historically establishes and funds statutorily mandated programs with an initial significant commitment of resources, and a gradual subsequent reduction of funding. Urban renewal, housing, economic opportunity, and aerospace systems all exemplify this approach. One aspect of this pattern of diminishing federal commitment is that states and local governments are required to compensate with their own tax resources. Since the MDC's effort will involve a long-term construction program predicated upon the availability of federal funds to meet federal standards, it will be harder hit by a reduction in the level of resource commitment than will any other agency or governmental entity.

FEDERAL AGENCIES

Two federal agencies will have a particular impact on water pollution control and wastewater management activities in the Eastern Massachusetts Metropolitan Area and will influence the MDC in several critical areas. The EPA and the Corps of Engineers are responsible for programs and activities affecting wastewater management.

A clear distinction must be drawn between the federal statutes and regulations which establish the standards for performance and the federal agency structure which has responsibility for administering the programs and policies for achieving these standards. The EPA conducts a variety of related programs geared to the protection of the nation's land, air, and water resources. Each Regional Administrator applies national programs and policies to meet the requirements of the specific area under his jurisdiction. For example, the unique water quality problems of the New England region in general, and the Eastern Massachusetts Metropolitan Area in particular, require a response tailored to their specific geographic, hydrologic, and institutional realities. The regional office of the EPA shapes the broad national directives to fit the area's particular needs.

Although the organizational relationship between the MDC and the Corps is not as critical as that between the MDC and the EPA, the two entities share responsibility for projects to improve the water quality of the Boston Harbor and the navigable waters in the Eastern Massachusetts Metropolitan Area. The availability of this resource to wastewater management efforts undertaken by the

MDC may permit shared responsibility for necessary improvements in the waterways which flow into the Boston Harbor.

STATE STATUTES AND REGULATIONS

Since the authority for each of the agencies involved in state, regional, or local aspects of wastewater management functions is contained in the General Laws of the Commonwealth, only a major effort can restructure the organizational framework or redistribute functional responsibilities. By prescribing in great detail the specific areas of involvement, financing mechanisms, and levels of functional responsibility for planning, monitoring, enforcement, and operations, the General Laws represent an obstacle to the design of a comprehensive wastewater management system. A flexible and responsive system designed to capitalize upon financial incentives, comply with water quality standards, meet performance deadlines, and respond to shifting pressures requires a statutory base which authorizes and directs rather than prescribes and limits.

The existence of this comprehensive body of laws exerts both positive and negative influences on a wastewater management agency. The positve influences can be identified as follows:

- commitment by the state government to water pollution control and water quality restoration;
- clear and definite mandate for action on environmental matters;
- availability of federal, state, and local resources to respond to statutory priorities;
- ability to enforce statutory authority to secure compliance; and
- continuity and direction in general policies relating to wastewater management.

Negative influences of state statutes which will affect the performance and viability of present and future wastewater management agencies include:

- inflexibility in reorganizing the structure as a result of shifting priorities;
- duplication and overlap in responsibility between governmental levels;

- over-emphasis on legal authority rather than performance as the basis for existence;

- inability to refocus and redirect programs and policies; and

- over-concentration of non-delegable responsbility for many functions and activities.

State regulations have been employed by the MDC to establish performance standards and to restrict municipalities from discharging certain noxious substances into the interceptors and trunk lines under its control. Other agencies have utilized their regulatory powers to establish an enforceable standard while maintaining the flexibility to amend, delete, or expand the regulations based upon changes in the conditions subject to control.

The use of the regulatory authority of the major state agencies involved in wastewater management (principally the Metropolitan District Commission, Bureau of Environmental Sanitation, and Water Resources Commission within the Executive Offive of Environmental Affairs) will influence all service providers as well as all dischargers. As a regional service provider for the member municipalities of the MSD, the MDC will be subject to the regulations of other agencies responsible for monitoring, standard-setting, and enforcement. These regulations will influence the MDC's policies, practices, and operations and will require that the MDC become more involved in the wastewater activities of each city and town in its district to ensure compliance with all regulations promulgated by the Commonwealth.

STATE AGENCIES

Perhaps the single most influential factor affecting the MDC is the restructured Executive Office of Environmental Affairs. This organizational alignment (described in Chapter II of this report) consolidates all major environmental agencies into a single structure headed by a Secretary appointed by the Governor.

From a strictly organizational perspective, the Secretary must approve and may veto any action initiated by the MDC. In establishing the overall environmental policy for the Commonwealth, the Secretary will thus be constructing a policy framework within which the MDC must function. This framework will impact upon all five major functions of wastewater management since the

agencies currently responsible for performing these functions are all within the EOEA and are subject to the direction of the Secretary.

Below the level of the Secretary are the five departments, which either execute or must comply with established policy. These departments are similar to the MDC in all respects with the notable exceptions that they are not financed through assessments for specific services and are not service-providers in a less-than-statewide geographic area. One of these departments directly influences the MDC's wastewater management activities: the Department of Environmental Quality Engineering, which will include the Division of Water Pollution Control and the Bureau of Environmental Sanitation. This department has major responsibility for planning, financing, monitoring, and enforcement relating to water quality and wastewater management as provided not only by P.L. 92-500 but also by state statutes. As such, the department exerts the most direct influence on the MDC or any other management agency within the Eastern Massachusetts Metropolitan Area.

The role of the DWPC takes on increasing significance with the approach of national deadlines for water treatment processes and water quality measures. The enforcement of this and other monitoring and enforcement standards by the DWPC will clearly influence the operations of the MDC's Sewerage Division. In addition, the planning activities under Section 303(e) and the annual program under Section 106 of P.L. 92-500 will require a major financial commitment by the Commonwealth and the EPA to assist the MDC in meeting the required treatment levels. In these and related efforts, the DWPC's cooperation and assistance will be essential.

Several other state agencies influence the MDC in particular and wastewater management and water quality in general. Although their influences are less direct than those of the agencies with primary responsibility, their mere presence requires greater effort in coordination, information circulation, meetings, and other activities. These agencies include the Department of Community Affairs, Department of Commerce and Development, and the Executive Office of Administration and Finance.

MUNICIPAL GOVERNMENTS

The cities and towns within the Eastern Massachusetts Metropolitan Area (109) and the Metropolitan Sewerage District (43) are all independent, municipal corporations which provide services to their citizenry through an organizational structure characterized by independent, single-purpose boards and commissions (appointed in cities and elected in towns). Municipalities finance these services through a real property tax which accounts for approximately 90% of all local revenues. Municipalities in the MSD pay for the services provided by the MDC through an assessment system. Additional funds for sewage collection systems construction and maintenance for these communities, and all funds for sewage collection and treatment for communities outside the MSD, are appropriated and raised through taxation.

Accordingly, cities and towns are greatly concerned about the costs associated with water pollution control activities. Their concern, perhaps even their resistance, will have a definite influence upon the MDC's policy decisions. Many municipalities have experienced significant cost increases over the last several years which have been only partially offset through the infusion of general revenue sharing funds from the federal government. As the cost of providing services increases over the next decade, municipalities in eastern Massachusetts will be forced to increase tax levies and, as a consequence, tax rates, to meet service demands. Notwithstanding the combined state-federal contribution of 90%, some municipalities may thus resist a concentrated program of water pollution control.

As a regional holding company, the MDC exists to serve local governments' need for wastewater treatment on an areawide basis at a reasonable cost. A unique regional entity, the MDC has provided this service within the constraints of the institutional structure of state government. Two forces, each beginning to develop momentum, will significantly influence the relationship between the MDC and the municipalities; these are home rule and regionalism.

Home Rule

For many Massachusetts communities and for most citizens, "home rule" has two meanings: the first, home rule granted under Article LXXXIX of the Amendments to the Massachusetts Constitution, was adopted by the voters to establish a new state-local relationship (Section 8), permit the local adoption of city or town charters (Section 3), and permit the expanded use of local by-law and ordinance-making authority (Section 6).

Under this grant of authority, cities and towns may restructure their governments to be more responsive to environmental concerns, may enact strong sewer use by-laws and ordinances consistent with the requirements of Section 208 of P.L. 92-500, and may not be subjected to legislative action unless the law applies to a class of municipalities. Beyond these rather limited applications, constitutional home rule has little influence on the MDC's total wastewater management function.

However, the second type of home rule may have a significant influence on all aspects of water pollution control and wastewater management in the Eastern Massachusetts Metropolitan Area. The term has been utilized to describe a general attitude that the state government should not be permitted to establish minimum standards or uniform requirements for local governments. To those who espouse this philosophy, it is a violation of home rule for the state to administer the welfare program, require kindergarten classes in all school systems, make full-time building inspectors mandatory, or enforce water quality standards and effluent limitations.

Actions taken by the MDC in response to state and federal mandate or by the DWPC to force local action to improve water quality are thus described by opponents as a violation of home rule. The MDC, which has been perceived as a regional service delivery agency, is characterized as a state regulatory and enforcement agency which is not responsive to the communities in its Sewerage District. This anti-state government philosophy requires that the leadership of the MDC strive to preserve the regional service-delivery posture which has made it unique among state agencies.

Regionalism

Over the past several years, every proposal for a regional middle-tier service agency for metropolitan Boston has included a provision for greater community control for the MDC. One proposal would have made the MDC a body appointed by municipal representatives; another would have required municipal advisors to review and approve any additional costs for both operations/maintenance and capital construction; and a third, would combine the MDC and the regional transit authority in a single metropolitan structure.

The regionalism movement is nationwide in scope. Most metropolitan areas are striving to develop areawide solutions to a common set of problems which transcend municipal boundaries. Of central importance to any such solution is the management of water and sewer services by an entity controlled by the local

governments which pay for the service. Any proposals for a regional entity in eastern Massachusetts or the Boston metropolitan area will, therefore, include alternatives for the administration of the MDC. To the extent that these "solutions" are based upon criticism of the operations and general performance of the MDC rather than upon issues such as local control, support for the agency will erode, adversely affecting its capacity to perform as a regional service provider.

The significance of regionalism as an influencing factor may also be perceived in relation to the requirements of Section 208 of P.L. 92-500, which not only prescribe an areawide approach for wastewater planning but also describe the characteristics of the regional management entity. As a regional service delivery agency, the MDC is in a position to participate fully in the planning activity related to Section 208 in anticipation of assuming responsibility for implementation when the plan is completed.

FINANCING REQUIREMENTS

Although the total costs of the various engineering proposals being developed as part of the Boston Harbor - Eastern Massachusetts Metropolitan Area Wastewater Management study are not yet finalized, it seems likely that the contingent debt of the MDC will double over the course of the next 30 years. As of June 30, 1973, the "Debt Service Requirement to Maturity" of the Metropolitan Sewerage District along was $136,777,504.75, according to the state auditor's report. Based upon the present state and federal matching funds contributions, a potential resource of more than $800 million will be available to the MDC (more than $100 million from the Commonwealth and $700 million from the federal government).

Participation by the state and federal governments at the levels indicated is unlikely without a significant increase in both the EPA's annual entitlement to Massachusetts and a commensurate increase in the state's bonding authorization for the Division of Water Pollution Control. Provisions must also be made for financing debt service and normal operation and maintenance costs, which new facilities will increase significantly. Since the quality of the service will increase in relation to the cost, and the benefits will be responsive to growing citizen awareness of the need to improve the environment, this additional expense is more likely to be accepted by the member municipalities of the MSD as an expenditure in their interest if greater participation in decision making is also provided.

These assumptions relating to financing requirements are based upon the current organizational relationship between the MDC and state government. Any other arrangement will require a reassessment of the financing requirements for waste treatment facilities.

PHYSICAL LIMITATIONS

The most important influence on the MDC regarding wastewater management is, and will continue to be, the physical parameters which delimit the MDC's system of trunk sewers, pumping stations, and treatment facilities. Topography, population density, location and characteristics of watersheds, as well as location and characteristics of industry, are some of the natural physical limitations that must be dealt with by any wastewater agency.

The physical system itself is the subject of engineering studies aimed at determining needs based upon the adequacy of the present sewerage treatment plant and appurtenant facilities. These determinations, when endorsed by the MDC, will represent a major challenge to the management of the total wastewater treatment problem in the Eastern Massachusetts Metropolitan Area.

The commitment to improve the quality of water through the construction, reconstruction, or repair of the total sewerage system in the Eastern Massachusetts Metropolitan Area is more than simply a problem of infiltration/inflow, treatment levels, flow augmentation, and physical facilities. The policies and programs of the wastewater management entity must be related to the overall goal and directed toward the resolution of the interrelated issues of water quality, air pollution and land use.

These influencing factors create pressures, present opportunities, and impose constraints on the effective, efficient, and equitable management of any wastewater treatment system. In reviewing the goals and criteria fundamental to the viability of any service provider, the MDC must carefully assess the impact of these external factors on its overall structure and then determine the most appropriate strategy for rendering service to the present and future membership of the Metropolitan Sewerage District.

C. POSSIBLE GOALS AND OBJECTIVES

Goals define the purpose and indicate the overall direction of an organizational entity. Objectives define specific targets for which the organization is aiming in its progress toward goal achievement.

It is difficult to define the goals and objectives of an organization responsible for only a portion of a highly sensitive, socioeconomic phenomenon such as environmental change. Wastewater management affects and is affected by the problems of solid waste disposal, availability of pure drinking water, land use controls, availability of recreational waters, etc. It has been said that the problem of attempting to deal with the environment is that "every part of nature is attached to every other piece in the universe; therefore, you tamper with one piece with peril."

In selecting goals and identifying objectives, all influencing factors, as well as the adequacy of the organization's human and fiscal resources, must be considered. The previous subsection indicated a number of factors external to the MDC which influence decision-making. These factors should not be regarded as the only pressures that will impact the wastewater management system. Several influences less clearly categorized as "external" to the MDC also act as pressures and constraints on that agency's program development, policy formulation, decision-making, and implementation capability.

The statutory base of the MDC (Chapters 28 and 92, M.G.L.) and subsequent legislative enactments relating to sewerage service area, cost apportionment, etc. are intrinsic to the MDC's mode of operation. While the extent to which this body of law has (or is perceived to have) influenced the MDC's activities and management approach is difficult to measure; the fact that it has influenced it is irrefutable. Similarly, bureaucratic or systemic obstacles and delays may limit progress and impede performance by the MDC and other agencies involved in wastewater management. This influence clearly impacts the various activities of the MDC, but it is *not* external in the same sense as the other influencing factors described.

The process of goal selection must be based upon the resources that are available and attainable to a wastewater management entity in fulfilling its mandate. Human, fiscal, and natural resources are considered central factors in determining a realistic set of entity goals. It is important to note, however, that neither existing and potential constraints nor the current

unavailability of resources should inhibit the determination and selection of goals. Goals need not be in harmony with the present shape or direction of external forces. Negative influences may be eliminated, additional resources made available, technological advances discovered, or new programs initiated. The possible goals for a wastewater management entity are, therefore, simultaneously statements of purpose and instruments for change.

As goals are determined, the organization must also develop a tactical strategy for achieving those goals. The strategy is formulated as a set of objectives, or specific targets of achievement. The objectives determine the organization's programs, policies, direction, and progress.

Finally, it is important to consider principles that may be used as benchmarks or tests for assessing the ability of an organization to achieve its stated goals and objectives. These factors are indicated in the section on "Organizational Criteria."

In subsequent chapters, alternative organizational structures are developed. These alternatives will be assembled according to goal preference, constraints, system requirements, and present and future organizational needs. Alternatives will then be evaluated on the basis of their adequacy to meet the identified goals and criteria as well as on the constraints that could prevent their implementation.

Finally, selection of long-term structures and a short-term strategy will describe the roles and responsibilities of existing or future governmental organizations.

GOALS

Overall Goal

TO DEVELOP AND IMPLEMENT PROGRAMS AND POLICIES DESIGNED TO RESTORE AND MAINTAIN THE CHEMICAL, PHYSICAL, AND BIOLOGICAL INTEGRITY OF THE REGION'S WATERS.

Possible Goals for a Wastewater Management Entity

- Highest quality wastewater transmission and treatment services that technology will permit.
- Flexible regional service area consistent with territorial scope.
- Sufficient authority to establish minimum standards of performance within the regional service area.
- Ability to establish and implement new policies and programs which benefit the region as a whole on approval of the agency "executive."
- Capacity to utilize the full range of financing mechanisms to secure the lowest cost for constructing needed facilities.
- Sufficient independence from prescriptive legislation involving membership, cost apportionment or operating techniques, administrative procedures, and program development (similar to the status of a single municipality under the provisions of the Home Rule Amendment).
- Accountability to the direct beneficiaries of the service provided (i.e., residents and property owners who provide the agency's fiscal resources).
- Ability to refuse any new connection or to prohibit new users based upon insufficient capacity of the treatment facility.
- Provision of wastewater services in coordination with related and supporting services (e.g., water supply, solid waste disposal, land use controls) in a multi-purpose manner within a defined region.
- Comprehensive, interactive, and mutually reinforcing planning process which supports the activities of the wastewater agency and assists in the attainment of its objectives.
- Ability to integrate the functions of wastewater management within an intergovernmental service delivery system which minimizes conflict and promotes cooperation.

- Record of performance which will attract and retain a highly motivated and technically competent professional staff dedicated to providing the highest quality services.

- Recognition by public officials and other citizens within the region that the policies and programs of the wastewater management agency are consistent with the overall needs of the region.

- Full participation by interested citizens in the development of regional priorities for wastewater treatment services.

- Proper construction, operation, and maintenance of all wastewater facilities in conformance with operating standards intended in their design.

- Incorporation of social, economic, financial, historical and cultural values in the programs, plans, and policies of the wastewater management entity.

OBJECTIVES

Objectives are strategic approaches designed to assist the wastewater management agency in achieving its goals. They may be represented as a sub-set of goal statements or linked to the functions constituting the overall mission of the entity. The latter approach has been employed in this subsection.

Planning

Planning involves the formulation of areawide strategies through the cooperative efforts of federal, state, regional, and local governments. Planning includes devising a workable system for allocating resources within an area and developing a management system capable of organizing, directing, implementing, and maintaining an effective program of pollution abatement. Some alternative planning objectives could include the following:

- Development of a planning capability within the wastewater management entity to represent the technical aspects of sewage transmission and treatment within an overall plan for the region.

- Active participation in the wastewater "planning" activities prescribed in Sections 303(3) and 208 of P.L. 92-500 relating to state and regional plans for achieving water quality.

- Establishment of a defined and workable structure for soliciting and promoting citizen involvement in the development of plans for regionalized wastewater service delivery.

- Collection, analysis, and storage of data pertinent to wastewater management, including topography, demography, land use, and hydrology.

Finance

Financing ensures the availability of adequate funding for the construction of wastewater projects and the distribution of system costs to participating communities and service beneficiaries. The financial impact on communities, users, and non-users arising from the need for greater services in the EMMA will necessitate the evaluation of the following financial strategies and objectives:

- Alternative cost apportionment techniques which will provide economic self-sufficiency while ensuring that industrial, commercial, institutional, and residential users are charged in proportion to their use of the treatment facility.

- Availability of the range of financing alternatives to provide greater flexibility and ensure the most appropriate method of generating funds for facilities construction.

- Reduction of legislative and executive control over the budgeting and administration of a sewerage service delivery agency, the funds for which are not provided through state taxes.

- Receipt of federal funds under the provisions of P.L. 92-500, as well as matching state funds, to minimize the direct cost of constructing needed facilities.

Operations

The role of the construction, operation, and maintenance function is critical. It requires continuous monitoring to ensure suitable treatment plant design, sufficient staffing, adequate training and supervision, and performance according to design standards. Some possible objectives are the following:

- Improvement of facilities consistent with advances in technology and the need for improved treatment and disposal of sewage.

- Development of training programs for agency personnel and recruitment of a talented professional staff in the various disciplines required for wastewater management in order to keep abreast of technological advances.

- Provision of technical assistance to the city, town, and district personnel with responsibility for local collection systems.

- Preparation and promulgation of adequate and enforceable standards for wastewater treatment plant operations.

Monitoring

The importance of the monitoring function cannot be underestimated. Although it is closely related to enforcement, diligent monitoring can identify a violation and intervene before significant damage to the environment results. Efficient monitoring should include a broad range of collected data and frequent samples. Some possible objectives that would contribute to meeting monitoring requirements are the following:

- Establishment of a coordinated multi-agency monitoring system designed to generate the data necessary for filing water quality reports in 1975, 1977 and 1983, as required by P.L. 92-500.

- Participation by all point sources, including publicly owned treatment works, in a program of self-monitoring and reporting on progress toward compliance.

- Construction and operation of adequately equipped monitoring stations designed to measure the quality of the various waters in the region and to identify sources of pollution.

- Training and deployment of citizen environmentalists to observe and monitor changes in the quantity flow and constituency of effluents discharged into the waterways of the region.

Enforcement

Enforcement is a pervasive function that should be both preventive and punitive. To be effective, enforcement should be swift, avoiding long delays in reaching settlement. Strategies could include some of the following:

- Complete state assumption of responsibility for the permit system and its use to provide a schedule for compliance specifically related to the specific needs of the Commonwealth.

- Training or recruitment of a team of attorneys able to institute legal process against flagrant violators and to provide prompt resolution of the issue.

- Development of a unified policy statement relating to the enforcement of water quality standards and effluent limitations.

- Continuing reclassification of segments relating to appropriate use consistent with the needs of the region for water supply and recreational opportunity.

D. ORGANIZATIONAL CRITERIA

An organization should operate as a system of responses to new events, policies, situations, and plans as well as to the individuals it affects. The purpose of establishing organizational criteria acceptable to all parties involved is thus to avoid conflicts and polarization in the development of alternative organizational structures. Since no single test of a proposed organization's effectiveness is likely to be conclusive, the following list of organizational criteria should serve as the basis for comprehensive evaluation.

CLEAR AND SUFFICIENT AUTHORITY

The organizational framework should have an adequate statutory base to perform the various functions of wastewater management. This does not imply that the statutory powers and functional responsibilities should be vested in one agency or entity; they may be distributed among several agencies. The important point is that they should be collectively adequate, with a clear definition of roles to minimize duplication of effort and foster cooperation.

RESPONSIVENESS TO PHYSICAL, ECOLOGICAL, AND ENGINEERING CONSIDERATIONS

Since a wastewater system is first and foremost a physical system, an organization must facilitate implementation of engineering solutions and recommendations if it is to operate effectively. Engineering and ecological considerations may dictate the nature and size of district operations within the proposed organization as well as influence water quality and effluent controls, enforcement policies, and interfaces with other organizations.

ECONOMIC EFFICIENCY

Efficient economic performance implies fiscal responsibility, sound financial structure, and an acceptable balance between costs and benefits. Economic efficiency specifically relates to such factors as the ability to:

- provide quality service at reasonable costs;

- finance programs and construct facilities at reasonable costs; and

- benefit from economies of scale in performing various functions.

SUPPORT OF OTHER GOVERNMENTAL INSTITUTIONS

A wastewater management system is but one part of a multi-institutional response system designed to meet environmental challenges. It must thus be capable of supporting the programs and policies of other organizations and sufficiently flexible to adjust to new priorities for service delivery. Similarly, it must be capable of recognizing and utilizing those resources of other institutions that will assist in the pursuit of its own mandate. Some aspects of this need for mutual reinforcement include the ability to:

- work cooperatively with other institutions to attain common goals;

- respond affirmatively to new trends and priorities;

- recognize and resolve inter-governmental conflicts; and

- establish necessary linkages with metropolitan planning agencies and service providers.

MANAGEABLE FRAMEWORK

The internal efficiency of the proposed organization must be maintained through the institution of proper lines of authority, associated responsibility, accountability, and other sound management practices. Some aspects of intra-organizational stability must deal with the ability to:

- recruit, retain, and motivate employees;

- coordinate functional activities effectively;

- restructure internal organization in response to changing needs; and

- demonstrate public accountability.

ACTIVE CITIZEN INVOLVEMENT

Wastewater management is service-oriented. Wastewater decisions impact heavily on the social and economic functioning of communities. Mechanisms for community control and inter-organizational cooperation must function effectively and continuously. Some aspects of responsiveness are the ability to:

- provide opportunities for participation in planning and policy formulation by citizen representatives from the area served; and
- respond to the needs of the citizens within the service area.

POLITICAL FEASIBILITY

An innovative and efficient proposal that is not politically feasible will not gain the acceptance it requires for implementation. For example, a proposal requiring massive changes in governmental structure should expect to meet political resistance even if it has the potential for attaining the major goals of a wastewater system.

CHAPTER IV

A. APPLYING CRITERIA TO EXISTING INSTITUTIONAL NETWORK

B. BARRIERS TO GOAL ATTAINMENT AND IMPLICATIONS OF NO CHANGE IN INSTITUTIONAL NETWORK ON LEVEL AND QUALITY OF WASTEWATER SERVICES

C. DESIGNING ALTERNATIVE WASTEWATER MANAGEMENT ENTITIES

D. ORGANIZATIONAL VARIATIONS FOR WASTEWATER MANAGEMENT

A. APPLYING CRITERIA TO EXISTING INSTITUTIONAL NETWORK

Exhibit IV-1 depicts the current distribution of authority for wastewater management. The functional/intergovernmental matrix reveals that responsibility for aspects of a single function exists at various governmental levels. A coordinated approach will be required to achieve the overall water quality goal of P.L. 92-500.

The institutional network of agencies currently involved in the management or delivery of wastewater services represents a significant resource. However, to achieve the federal goal of water quality while responding to the goals and objectives enumerated in Chapter III, clear lines of authority must be developed to replace the current pattern of inadequate, overlapping, or diffused areas of responsibility.

Comparison of the existing institutional network to the organizational criteria presented in Chapter III highlights the need for improvement.

CRITERION #1 - CLEAR AND SUFFICIENT AUTHORITY

A substantial body of laws forms the statutory base for performance of the functions of wastewater management. The Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) establish the fundamental federal responsibilities for these functions and provide a framework for state, regional, and local activities aimed at improving water quality. A single, rational approach to the issue of water pollution control and wastewater management, however, does not provide the degree of flexibility the Commonwealth of Massachusetts may require to meet its own specific needs.

In response to federal law, the Division of Water Pollution Control's (DWPC) authority has been significantly increased. Major responsibility for financing, monitoring, and enforcement has been added to its statutory authority. In addition, the enactment of legislation relating to a restructured Executive Office of Environmental Affairs (EOEA) has placed the major state agencies sharing wastewater management responsibilities within a single Cabinet-level office. A major question regarding MDC's status within this superstructure remains unresolved.

Regional responsibilities for all functions of wastewater management are not clearly defined. What effect will the reorganized EOEA have on MDC's regional holding company status for the 43 communities of the MSD? How will the management entity requirements of Section 208 of P.L. 92-500 be satisfied? What are the responsibilities of the constituent municipalities within the Metropolitan Sewerage District (MSD)? What are their rights? What is the appropriate relationship between MAPC and MDC? These and a number of other issues must be resolved to satisfy this criterion.

EXHIBIT IV-1

Functional/Intergovernmental Listing of Current Agencies in the Wastewater Network

	Federal	State	Regional [1]	Local
Planning	Environmental Protection Agency	Water Resources Commission (DWPC)	Metropolitan Area Planning Council	Planning Boards
Finance	Environmental Protection Agency	Water Resources Commission (DWPC)	Metropolitan District Commission	Cities & Towns
Operations			Metropolitan District Commission	Sewer Commissions
Monitoring	Environmental Protection Agency	Water Resources Commission (DWPC)	Metropolitan District Commission	Sewer Commissions
Enforcement	Environmental Protection Agency	Water Resources Commission (DWPC)	Metropolitan District Commission	

1. The MDC is treated as a regional holding company for the communities in the MSD and not as a state agency.

Local governments possess broad responsibility but limited authority relating to certain aspects of wastewater management. Municipalities within the proposed MSD service area have been assigned a major role in planning, financing, and monitoring. Municipalities outside the recommended MSD area may also share responsibility for the operations function for sub-regional or inter-municipal facilities. Many municipalities are neither properly organized nor adequately staffed to handle the local aspects of these functions. Furthermore, they lack sufficient statutory authority to carry out their responsibilities.

The possible inconsistency of local actions with areawide and state plans may adversely affect treatment plant operations and render cost allocation systems inequitable. Performance standards and their enforcement relating to on-site septic systems must be considered. Local monitoring responsibility for industrial pretreatment facilities must be clearly described consistent with regional, state and federal authority in this area.

In summary, the existing institutional network does not meet the first criterion for wastewater management.

CRITERION #2 - RESPONSIVENESS TO PHYSICAL, ECOLOGICAL, AND ENGINEERING CONSIDERATIONS

The inter-governmental network must support the physical objectives of areawide wastewater treatment. The organizational structure must be affirmative, supportive, and coordinated in its approach to the physical system. It must be able to facilitate the processing of requests to construct treatment works to resolve water quality problems.

Although P.L. 92-500 recognizes the need for active citizen participation and establishes a two-year areawide planning time frame, it places strongest emphasis on meeting water quality targets in 1977 and 1983. The act provides substantial funds for financing the physical structures (e.g., interceptors, pumping stations, treatment plants) required for improved wastewater treatment. An organization must have the capacity to take advantage of these resources.

Existing governmental institutions have in general responded slowly to the challenge and opportunity of P.L. 92-500 as well as to the ecological and environmental pressures to improve water quality. DWPC has moved swiftly and affirmatively to provide increased state funding for treatment facilities and acquire statutory authority for monitoring and enforcement. However, several neutralizing forces within the current inter-governmental framework have hindered an effective response to the physical requirements of wastewater management.

The state/regional character of MDC is not presently capable of responding to the physical, ecological, and engineering considerations of P.L. 92-500. The constraints imposed upon MDC by certain provisions of that law have impeded its immediate affirmative response to other aspects of P.L. 92-500. The organizational structure of MDC's sewage disposal activities (i.e., a regional holding company for member municipalities statutorily linked to state government) is not easily modified. Approvals from the executive and legislative branches as well as the cities and towns of the sewerage district must be negotiated. Closer coordination of areawide planning was required, optional financing mechanisms had to be examined, and physical engineering alternatives had to be designed. This entire process has negated the possibility of a swift response.

Because of this inflexibility, the existing inter-governmental structure is unable to satisfy the criterion of responsiveness to physical, ecological, and engineering considerations.

CRITERION #3 - ECONOMIC EFFICIENCY

A number of studies, most notably those conducted by the Municipal Public Works Administration and the Advisory Commission on Intergovernmental Relations, have indicated that economies of scale are possible through an areawide approach to sewage treatment. The unit cost of operation and maintenance and construction decreases as the treatment plant size increases in MGD. An areawide approach similar to that which has evolved for the MSD is thus generally more efficient than numerous scattered, small plants.

Economic efficiency can presently only be measured based upon an independent analysis of capital costs, segregated from operation and maintenance costs. This distinction is important. Although the level of financial participation by federal and state agencies for facilities construction costs has increased significantly, no additional funds have been provided to offset increases in operation and maintenance costs.

Any evaluation of the capacity of the existing institutional network to satisfy the criterion of economic efficiency can only be based upon inexact orders of magnitude, as no cost/benefit or cost/efficiency studies have yet been undertaken.

One general guide to cost/efficiency is comparison of an entity to others providing a similar service. Chapter I of this

report contains profiles of major sewerage agencies throughout the country, with operation and maintenance and capital costs identified. Recognizing that (1) none of the profiled agencies is institutionally linked to state government, (2) administrative costs are quite different, and (3) maintenance costs vary according to the age of the facilities, it may be stated that MDC's sewage disposal costs are comparatively cost/efficient. Costs are at the lower end of the scale for both operation and maintenance and capital expenditures. However, given the volatile nature of the current state-local bond market, no judgment regarding the criterion of economic efficiency can be made at this time.

CRITERION #4 - SUPPORT OF OTHER GOVERNMENTAL INSTITUTIONS

Wastewater management is a complex, multi-functional process involving agencies at all levels of government. It affects and is affected by numerous other program areas. A properly functioning wastewater management system responds to the needs and is reinforced by the resources of other governmental institutions. It fits within a clearly defined inter-governmental structure, and possesses specific authority and responsibility to carry out its mission. Duplication and overlapping jurisdictions are minimized. Coordination replaces competition and conflict.

The current wastewater management network (with the exception of MDC) is organized on a single-purpose basis; it displays no constructive linkages at governmental levels, no coordination between governmental levels, limited capacity to relate to other program areas, and no clear definitions of authority or responsibility throughout the entire system. Although ad hoc efforts have been established to address this situation, the flexibility necessary for effective cooperation is lacking in the current system. While part of the problem may stem from poor organization at various government levels, or from traditional conflicts between government levels, the most obvious factor is the lack of appropriate institutional structures or procedural mechanisms with the capacity to provide quality wastewater management services in a manner that supports other activities.

The reorganization of EOEA became effective on July 1, 1975. The new arrangement offers potential for coordinating the state's responsibility in wastewater management since the principal state agencies will all be within a single structure. However, one effect of this restructuring will be to obscure the regional nature of the sewerage service provided to MSD municipalities. Since an additional level of review and approval (i.e., Secretary of Environmental Affairs) will be imposed on this activity, municipalities may have difficulty both in assigning responsibility and gaining

accessibility. Local-regional relationships will be either poorly defined or eliminated. A close relationship with other regional service providers and with local sewer agencies will be difficult to achieve if the responsibility for providing wastewater service is overshadowed by the state superstructure.

The existing organizational network does not satisfy the criterion regarding support of other governmental institutions.

CRITERION #5 - MANAGEABLE FRAMEWORK

No single agency or governmental level is responsible for all functions of wastewater management. Problems relating to the overall framework both in terms of clear authority and intergovernmental support affect the manageability of the agencies that do share responsibility for wastewater management.

State agencies must adhere to the laws and regulations governing personnel, management, budgeting, financial control, reporting, and overall administration. The inflexible system within which these agencies operate does not respond quickly to new demands of priorities. MDC's management framework has performed well in such an environment. However, even MDC's best efforts to overcome the weaknesses inherent in the state management system have not been entirely successful. Civil Service regulations and low salary levels have had an impact upon MDC personnel. Fragmented responsibility among several agencies has made coordination difficult and time-consuming. Budget restrictions and expenditure controls on all state agencies have had an adverse impact on MDC although no state funds were involved. State procurement and payment systems have prolonged construction efforts. Public perceptions of MDC's operations are affected by the mismanagement of the monolithic structure of state government.

The current institutional network, therefore, does not satisfy the criterion of manageability.

CRITERION #6 - ACTIVE CITIZEN INVOLVEMENT

Public participation has become a fundamental precondition of the program development, policy formulation and project planning aspects of wastewater management. While opportunities to participate were previously available, the Federal legislation clearly

states the need for greater public participation in water pollution control and wastewater management activities. Current opportunities are haphazard and unstructured, although MAPC's Technical Advisory Committee does provide for continuing review by citizen representatives and MDC's annual meeting with officials from member municipalities does provide a limited opportunity for citizen input.

Three factors impede the existing institutional network from satisfying the citizen participation and responsiveness elements of this criterion:

- The fragmented organizational structure renders citizen participation meaningless at any governmental level or with any single agency, as no single forum or input process is available.
- The decision-making process is slow and remote. Assigning responsibility and accountability to a single official or agency is generally not possible.
- Clear, concise, understandable information relating to the implications of decisions, opportunities to participate, or the bases and process of appeal is unavailable to citizens.

The existing institutional network is thus unable to satisfy the criterion of active citizen involvement in decision-making.

CRITERION #7 - POLITICAL FEASIBILITY

The measure of any proposed entity or organization responsible for wastewater management is its degree of public and political acceptability, reflected in willingness to change from an existing management structure to a different, alternative structure. While the present structure was acceptable at the time of its adoption, that fact is an insufficient measure of current acceptability. Accordingly, this criterion is inapplicable to the existing network.

It should be recognized that change, while easily recommended, is difficult to achieve. However, political feasibility is often increased by the commitment and dedication of the proponents of new ideas which provide opportunities for greater efficiency and effectiveness.

B. BARRIERS TO GOAL ATTAINMENT AND IMPLICATIONS OF NO CHANGE IN INSTITUTIONAL NETWORK ON LEVEL AND QUALITY OF WASTEWATER SERVICES

The current inter-governmental framework for performing the basic functions of wastewater management has been identified and measured against the criteria for an effective entity. The existing network is characterized by apparent contradictions (e.g., simultaneous duplication and absence of authority), lack of responsiveness and accountability, absence of clear lines of authority, fragmented responsibility, and overall uncertainty regarding the management of a multi-faceted service.

On the other hand, MDC is able to achieve economies of scale in both its debt service and operation and maintenance costs. Levels of funding available from federal and state sources represent significant new assets that will mitigate some of these adverse impacts. Planning programs provide an opportunity to relate sewage treatment to other program areas and develop a better understanding of programmatic, functional, and governmental linkages.

By evaluating the positive and negative effects of the current institutional network, it is possible to determine the basis for the development of management alternatives. This predesign stage will indicate the scope of the following elements:

- required changes to satisfy statutes, regulations, or criteria;
- recommended alternatives for improving management potential and optimizing goal attainment;
- desirable options that contribute to overall performance; and
- considerations for future action.

INSTITUTIONAL IMPACTS

Various agencies are responsible for wastewater decisions at all governmental levels, reflecting the generally accepted approach of distributing aspects of a function among a number of governmental levels. For examples, states are often

authorized under federal law to delegate responsibility to regional agencies to coordinate local activities. Such an inter-governmental distribution of aspects of the planning function is illustrated by the relationship of Sections 201, 208, and 303 (e) of P.L. 92-500.

One of the benefits of such an approach is the concentration of resources to resolve commonly perceived problems. P.L. 92-500 capitalizes upon the full range of resources available at state, regional, and local levels by gearing various systems toward a single purpose (i.e., clean water). Similarly, the existing system of sewage collection, treatment, and disposal in Eastern Massachusetts relies upon the cooperative efforts of the cities and towns and MDC.

A coordinative approach, however, will only function efficiently if each governmental level and each agency at that level has the authority to develop and implement plans or programs, formulate policy, and commit resources to the aspect of the overall function for which it is responsible. Failure to grant such authority to levels and agencies will result in failure to achieve the intended results.

What are the implications for the institutional network of maintaining the status quo? Can adverse impacts be predicted? At what level and on which agencies will the impacts be greatest? What are the existing strengths in the statutory base for wastewater management? The institutional implications of maintaining the status quo at the state, regional, and local levels can be forecast as follows:

State Level

The major impact at the state level will fall upon MDC, as it presently does not meet all the management entity requirements of Section 208 of P.L. 92-500. The missing elements include the authority to:

- assure in implementation of an areawide waste treatment management plan that each participating community pays its proportionate share of treatment costs (Sec. 208 (c) (z) (g)); and
- refuse to receive any wastes from any municipality or subdivision thereof, which does not comply with any provisions of an approved plan... (Section 208 (c) (2) (H)).

Furthermore, the public participation requirements of 40 CFR 105, issued by EPA, will be difficult to meet. Although advisory

committees may be established to assist, it is unlikely that they will assume the level of participation intended in the regulations. This will be particularly true if a single advisory committee responsible for all aspects of environmental policy is created for the Executive Office of Environmental Affairs. The direct involvement required for wastewater management may be absent under this generalized approach to citizen involvement.

The possibility that the MDC may not be able to take full advantage of the resources available under P.L. 92-500 warrants concern if any of the proposals presented to the General Court regarding the restructuring of MDC are accepted without sufficient consideration of the implications for areawide wastewater management.

Finally, it is clear that without substantial changes in the statutory base of MDC, the goals and objectives established for a wastewater entity will not be achieved. Greater independence and flexibility are the minimum changes that must be implemented if MDC is to operate effectively.

Regional Level

Duplication of effort, program conflicts, and counter-productive management solutions are the potential byproducts of maintaining the status quo in existing regional institutions. MAPC has been designated the Section 208 planning agency for Eastern Massachusetts. As a regional holding company, MDC provides wastewater treatment services to a significant portion (in terms of population and land area) of this region. Two of the influencing factors described in Section III (i.e., home rule and regionalism) will have a significant impact on any cooperative efforts between MDC and MAPC, exerting tremendous pressure upon the existing regional institutions if no change occurs.

For the first 50 years of its existence, MDC functioned as a regional agency within the structure of state government. This unique institutional arrangement was devised prior to the development of concepts such as metropolitanization, regional planning, or councils of government. When the combined efforts of local governments failed to accomplish an adequate level of performance, the functions were assumed by the next higher level of government, the state. As an independent, relatively autonomous agency with direct access to the Governor and the legislature, MDC conducted regional sewerage, water, parks, and police programs effectively and efficiently. Accordingly, MDC earned a high degree of acceptability.

Over the last several years, however, MDC has become increasingly absorbed into the state's cabinet structure. An executive office has been placed between MDC and the Governor or legislature, its independence has been limited, and its accessibility is questionable. In short, MDC has become more a state agency providing areawide services than a regional agency within the state structure. This distinction is critical when viewed in terms of regionalism and home rule.

Regarding regionalism, MAPC has proposed legislation to establish a Metropolitan Service Commission to handle areawide planning, sewage disposal, solid waste, transporation, and municipal services. This proposal recommends that the sewerage division of MDC be transferred to the new regional entity. Potential conflict regarding which governmental level is best suited for areawide wastewater management could seriously jeopardize MDC's level of service and ease of grant approval. Any proposed management system must strike a balance between the interests of the localities and the regionalized state service delivery system.

Regarding home rule, it is clear that municipal governments will be unwilling to entrust to a state agency the administration of any program for which a viable alternative is available. As MDC becomes more closely identified as an agency of state government, local officials of the 109 municipalities of the EMMA may, if no change occurs, respond as follows:

- Communities inside the proposed service area of the MSD will create some form of regional, locally controlled wastewater management entity.

- Communities outside the MSD but within the EMMA will construct small treatment facilities to serve a limited area, sacrificing economies of scale and ease of areawide management.

Local Level

The role of cities and towns must change if areawide wastewater management is to achieve its goals and objectives. The existing municipal institutional arrangements for sewage collection, treatment, and disposal have a limited perspective of the purpose and benefit of wastewater management.

Local governments, particularly towns, are fragmented and compartmentalized into single-purpose boards and commissions. Independent agencies are responsible for sewers, water, planning, conservation, health, recreation, and economic development. Coordination is negligible or sporadic in most communities.

Consequently, the environmental aspects of effective wastewater services are neither recognized nor addressed.

Effective areawide wastewater management will require the full participation and cooperation of local governments. Changes in institutional relationships at the local level must therefore be encouraged either through model enabling legislation or model by-laws and ordinances. Lack of change will severely diminish the benefits of areawide wastewater management.

The preferred structural alternative must have, as one of its elements, the capacity to provide technical assistance to the cities and towns within its service area in order to confirm the partnership relationship between the municipalities and the management entity. This support would take the form of assistance in the development and implementation of sewer use by-laws or ordinances, user charge systems and billing techniques.

Barriers to Goal Attainment

The previous section attempted to estimate the effects from an institutional point of view of maintaining the status quo. In addition to those impacts on the intergovernmental structures for service delivery there are impediments to attaining the identified goals of wastewater management which must be mitigated through the design of management options. Although the goals are offered for a future entity, the barriers to their attainment are identified by noting the incapacity of the present structure to achieve the goal. MDC's capacity to achieve these goals depends largely on its ability to overcome the following barriers:

Goal 1 - Highest quality wastewater transmission and treatment services that technology will permit

Barriers:

- age and obsolescence of existing facilities;
- lack of land for expansion of treatment plants; and
- high cost of improvement to current system.

Goal 2 - Flexible regional service area consistent with territorial scope

Barriers:

- service area boundary confined to current users;
- limited control over local actions within drainage basin;
- statutory change required to alter boundary;
- no policy regarding optimum service area; and
- no control over current federal, state, or local approvals relating to future users.

Goal 3 - Sufficient authority to establish and enforce minimum standards of performance within the regional service area

Barriers:

- limited control over local collection systems;
- difficulty in identifying specific violators;
- lack of enforcement authority; and
- cost of staff and equipment to ensure compliance.

Goal 4 - Ability to establish and implement new policies and programs which benefit the region as a whole on approval of the agency "executive"

Barriers:

- status of MDC within EOEA requires Secretary's approval regarding policies;
- current statutes are prescriptive and limiting;
- inter-agency and inter-governmental competition causes delays;
- legislative approval of funds required; and
- lack of clarity relating to state or regional status of MDC.

Goal 5 - Capacity to utilize the full range of financing mechanisms to secure the lowest rate for constructing needed facilities

Barriers:

- legislative change required to permit additional means of financing;

- significant outstanding debt for previous bonds with mandated repayment schedule; and

- additional administrative staff needed to implement new financing mechanisms.

Goal 6 - Sufficient independence from special legislation involving membership, cost apportionment, operating techniques, administrative procedures, and program development

Barriers:

- current status as state agency within Cabinet structure;

- significant legislative change granting greater independence required; and

- municipal resistance, if not accompanied by stronger local participation.

Goal 7 - Accountability to the direct beneficiaries of the service provided (i.e., residents and property owners who provide the agency's fiscal resources)

Barriers:

- lack of clarity regarding state or regional status of MDC;

- no present mechanism for meaningful citizen participation in planning, policy formulation, or program development;

- obscure decision-making process; and

- lack of comparative data relating to efficiency, performance, or effectiveness.

Goal 8 - Ability to refuse any new connnection or to prohibit new users based upon insufficient capacity of the treatment facility

Barriers:

- clearer legislative provisions required;

- limited control over local actions; and

- legislative authority needed to alter service area, membership, etc.

Goal 9 - Provision of wastewater services in coordination with related and supporting services (e.g. water supply, solid waste disposal, land use controls) in a multi-purpose manner within a defined region

Barriers:

- dispersion of program responsibility among a number of agencies at various governmental levels;
- lack of agreement on size and configuration of multi-purpose region;
- lack of uniformity of current district boundaries;
- need for major legislative changes; and
- difficulty of coordinating services at different stages of development.

Goal 10 - Comprehensive, interactive, and mutually reinforcing planning process which supports the activities of the wastewater agency and assists in the attainment of its objectives

Barriers:

- inability of MDC to meet specific management entity requirements of Section 208;
- separation of areawide planning and wastewater operations;
- need for legislative change to clarify planning relationships; and
- general lack of authority to implement plans at regional level.

Goal 11 - Ability to integrate the five functions of wastewater management within an intergovernmental service-delivery system which minimizes conflict and promotes cooperation

Barriers:

- legislative changes required to clarify roles and responsibilities while providing flexibility to adjust to new conditions;
- lack of clarity in state/regional character of MDC;
- regional and local resistance to broader state role;

- bureaucratic and administrative delays related to coordination of functions; and

- disagreement regarding purpose and mission of wastewater management entity.

Goal 12 - Record of performance which will attract and retain a highly motivated and technically competent professional staff dedicated to providing the highest quality service

Barriers:

- administrative restrictions of state government regarding hiring new employees;

- Civil Service statutes and regulations restricting flexibility in hiring and assigning staff;

- inadequate salary ranges for mid-level professional staff;

- administrative and bureaucratic procedures affecting MDC and its personnel; and

- legislative changes required to provide flexibility.

Goal 13 - Recognition by public officials and other citizens within the region that the policies and programs of the wastewater management agency are consistent with the overall needs of the region

Barriers:

- lack of clarity regarding state or regional status of MDC;

- absence of agreement regarding viability and need for regional approaches to program management; and

- regional/local resistance to broader state role.

Goal 14 - Full participation by interested citizens in the development of regional priorities for wastewater treatment services

Barriers:

- nature of Executive Office decision-making process inhibits full participation;

- legislative decision-making process inhibits full participation;

- lack of information upon which to base judgments; and
- lack of agreement regarding regional area for which priorities are being developed.

Goal 15 - Proper construction, operation and maintenance of all wastewater facilities in conformance with operating standards intended in their design

Barriers:

- lack of authority to limit service area to ensure against overloading;
- inadequate control over local actions; and
- lack of authority to provide appropriate monitoring and enforcement.

Goal 16 - Incorporation of social, economic, financial, historical and cultural values in the programs, plans and policies of the wastewater management entity

Barriers:

- lack of number of staff required for this type of planning process;
- lack of data or generally accepted standards relating to impact of other values; and
- inability to secure type of cooperation agreements required for multi-dimensional program.

Such an analysis clearly indicates that some positive action will be required to ensure that the future wastewater management entity is capable of overcoming these barriers. Whether the future entity is a strengthened, more independent MDC or a new structure, change is essential.

C. DESIGNING ALTERNATIVE WASTEWATER MANAGEMENT ENTITIES

This section presents several alternative structures for performing the five functions of wastewater management. Each alternative is described through the following format:

- concept;
- characteristics;
- functions;
- advantages;
- disadvantages;
- evaluation; and
- recommendation.

In recognition of the importance and difficulty of choosing among viable options, a high level of detail has been provided. This information should facilitate careful assessment of each alternative structure by focusing on those issues most critical to effective wastewater management.

Only potentially viable alternatives are presented. Others that were considered inappropriate for the specific purpose of wastewater management or unsuited to the basic governmental structure of the Commonwealth of Massachusetts are not included.

Certain functional or organizational characteristics, although described for only one alternative, may be incorporated into a number of options. Further, an alternative may be inappropriate as a short-range solution and still have sufficient hypothetical advantages to warrant consideration as a long-term option. Since a subsequent section of this report deals with the future development of the preferred organizational structure, this factor must be considered during the selection process.

WASTEWATER MANAGEMENT OPTIONS

Alternative A

CONCEPT: State agency with statewide responsibility for wastewater management.

CHARACTERISTICS

The state agency would be responsible for providing wastewater management services on a statewide basis. Theoretically, it would expand the boundary of the Metropolitan District Commission to encompass the entire Commonwealth but provide services through a series of operating districts, one of which would be the MSD.

The agency would be responsible for ensuring adequate performance by all existing treatment plants, facilities, staff and resources presently located throughout the state and would approve all new facilities. It would acquire all existing facilities and be responsible for the construction, operation, and maintenance of treatment works and appurtenant facilities (Exhibit IV-2).

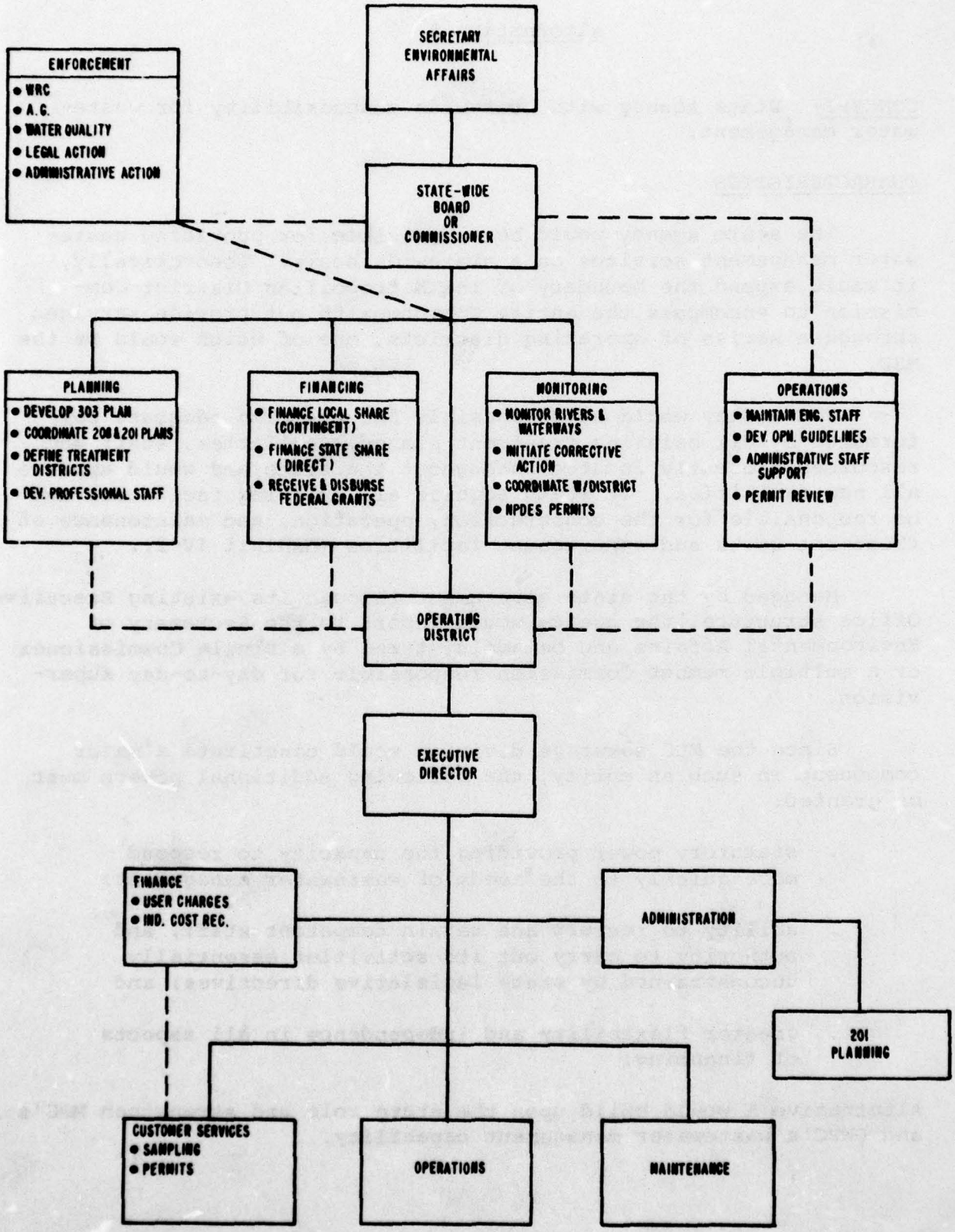
Managed by the state government through its existing Executive Office structure, the agency would report to the Secretary of Environmental Affairs and be administered by a single Commissioner or a multiple member Commission responsible for day-to-day supervision.

Since the MDC sewerage division would constitute a major component in such an entity, the following additional powers must be granted:

- statutory power providing the capacity to respond more quickly to the needs of wastewater management;
- ability to recruit and retain competent staff, and authority to carry out its activities essentially unconstrained by state legislative directives; and
- greater flexibility and independence in all aspects of financing.

Alternative A would build upon the state role and strengthen MDC's and DWPC's wastewater management capability.

EXHIBIT IV-2
ALTERNATIVE A
STATE-WIDE AGENCY



FUNCTIONS

Planning

The agency would be responsible for preparing the state's plan under Section 303(e) of P.L. 92-500, and for coordinating all areawide plans under Section 208 and all facilities plans under Section 201. This would not be a comprehensive planning function including other program areas (e.g., land, use, water transportation, recreation), but would instead be directed specifically to wastewater services.

The agency would coordinate the plans prepared by each of the regional entities in order to develop a comprehensive statewide plan for the number, location and capacity of all treatment plants located within the state. It would have the authority to review, approve, and ensure implementation of those plans of areawide agencies. The state agency could regulate phasing and specific location of treatment plants throughout the state in order to encourage population growth, control resources, and provide the necessary economies of scale in the construction and operation of treatment works. Through a series of memoranda of agreement, it would coordinate with each of the regional planning agencies in the state in the preparation of Section 208 plans.

The agency would be responsible for ensuring that wastewater management is handled effectively on an integrated areawide/state basis. This would ensure both a regional and local sensitivity to the needs of the municipalities in the location of treatment plants.

The central staff of trained professional planners brought together from existing agencies would constitute the core planning resource for this agency, although regional input and additional technical resources could be provided under contractual arrangements with the RPAs.

Financing

As a state entity, the agency would finance the local share of construction costs in the same manner as MDC, i.e. through the state legislature as contingent debt. This debt would be repaid through assessments against the municipalities benefiting from the construction and operation of these treatment plants. General obligation bonds would be issued and retired according to the schedule established by statute. Operation and maintenance costs would be handled by assessments against the municipalities within

the defined district served by the treatment plant, with actual charges determined by the state agency and reported to localities through the Cherry Street process.

With responsibility for Section 303(e) and Section 106 submissions, the agency would coordinate the financing of the 10% local share, 15% state match, and 75% federal contribution. The budget for operation and maintenance and capital costs would be prepared at the agency level and then submitted through the Secretary of Environmental Affairs to the Governor's office, and then to the state legislature for final approval. Although this 6-8 month process would permit review and evaluation at all levels, it would be too slow to respond effectively to the immediate needs of districts or municipalities for construction funds. However, centralization of the financing function would allow identification of the full scope of the required commitment by the Commonwealth to construct wastewater treatment facilities.

Operations

The operating requirements of the state agency would necessitate the establishment of independent regionalized treatment districts throughout the state. The traditional approach of assigning responsibility for an activity at the lowest possible level at which economy and effectiveness are possible requires that operations be regionalized. Coordination problems would have to be overcome through the establishment of linkages with other regional and state agencies sharing wastewater responsibility.

The treatment districts would provide services within the area defined by the state agency. All engineering staff, treatment plant superintendents and laboratory specialists would be state employees assigned to specific districts. Guidelines and standards would be established by the state government to ensure standardized operations.

Although these treatment districts would be linked to the structure of state government, they would continue to relate to the cities and towns within the district. The state would determine the specific configuration of municipalities constituting a district. Problems relating to levels of service provided by the wastewater treatment district itself, however, would be handled by the state. A single municipality could be an operating "district" under this scheme.

At the outset, the districts would have flexible boundaries comprising a central urban area surrounded by smaller municipalities. As the districts became operational, the boundaries would become fixed. New districts would be created to serve other areas and, in time, the entire state would be covered by treatment districts. The alignment of boundaries and the determination of service areas would be a state responsibility. At the state's discretion, municipalities could be shifted from one district to another depending on the engineering benefits to be attained.

Monitoring

Responsibility for monitoring would rest with the state, and staff specialists would be deployed to each of the districts to monitor all rivers and waterways, for the purpose of determining water quality standards and assigned to treatment plants to ensure that effluent limitations for each discharger were being met. As the quality of monitoring advanced through technology (e.g., instream monitoring stations for water quality, hydrological testing), computers could be utilized to provide these data to the state for analysis. As the state assumes full responsibility for permitting, this would allow for an effective, standardized statewide approach to improving water quality.

Enforcement

Enforcement would continue to be a state responsibility, since state statutes provide for specific penalties to be exacted by the Superior Court against violators. The provisions of P.L. 92-500 permitting individual citizens or municipalities to seek injunctive relief from the appropriate federal district court would continue in full force and effect. This concentration of enforcement authority in state government would provide a significant power base from which to act against offenders polluting streams or waterways.

Enforcement responsibility would rest with the Water Resources Commission which would be organizationally independent of this alternative management structure. This separation of operations and enforcement will permit a more objective appraisal of treatment plant performance and encourage corrective action by violators.

ADVANTAGES

Several advantages of a single powerful state agency responsible for all aspects of wastewater management are indisputable, particularly in relation to planning capability, monitoring efficiency, and improved enforcement. It is clear that a single state agency would be able to affect constructive action more

immediately than would a number of smaller regionalized districts. Staff specialists in the areas of planning, monitoring, and enforcement could be combined within a single agency structure leading to economics and reducing the potential for duplication.

The elimination of water pollution problems through improved wastewater management would be an attainable goal for a statewide agency since a single uniform standard for wastewater management would be promulgated throughout the state. In some respects, the agency would be similar to the Department of Public Works which handles all road construction centrally through a regionalized system of staff specialists responsible for activities within that geographic area.

The single state agency would be able to coordinate all wastewater management activities at both the district and area-wide levels. All plans would be carefully reviewed, and judgments made solely on the basis of providing the most efficient and effective service throughout the state. Greater knowledge and awareness at the state level for treatment plant design, engineering alternatives, planning techniques, as well as general improvements in technology, could be applied to benefit each district in the state.

Concentrating all resources at the state level would replace fragmented, non-productive approaches with a coordinated, centralized system. Staff specialists would develop broad professional skills to be applied to all aspects of wastewater management. Under this approach, emergency situations could be addressed quickly through the reconcentration or reallocation of staff resources to resolve specific problems.

P. L. 92-500 concentrates significant authority at the state level for planning, financing, monitoring, enforcing and supervising operations. The Commonwealth of Massachusetts has responded by enacting legislation that capitalizes on the availability of federal resources for construction projects under Section 201 and planning for state wastewater management under Section 303(e). This alternative would build upon that effort.

Finally, the construction of an effective sewerage system and the timing of that construction have the potential to assist the state government in realizing some of its other goals. Population concentrations, which have tended to assemble around existing facilities, could be directed to less densely populated areas of the state spurring appropriate growth patterns. Economic development could be channeled more effectively to specific areas and the state could apply significant resources to construct the necessary facilities to attract and retain major industrial plants.

DISADVANTAGES

Several disadvantages are also involved in the establishment of a state agency with statewide responsibility for wastewater management, particularly in the areas of finance and operations. A state agency would operate within a structure of government that is often cumbersome and slow to respond. The budgeting process, with an eight month lead time, does not permit immediate response to water pollution problems. In addition, as the state experiences greater service costs, the availability of resources required for wastewater management will not be sufficient to meet the needs identified in the areawide and state planning process.

As a regional holding company within state government, MDC operates quite differently from a single state agency. MDC is a regional entity providing services to 43 member municipalities through a coordinated state structure. Costs for services provided by MDC are clearly identified, and funds collected from municipalities are used solely to offset those costs. Municipalities own the facilities (e.g., interceptors, treatment plants, pumping stations).

If the state assumes responsibility for water pollution control and wastewater management, it will be required to assume the full cost of such an environmental effort including, perhaps the purchase of all facilities previously constructed with local funds. A massive coordination effort would be required by the state to handle financing problems. In addition, establishing a single water quality standard applicable throughout the state would constitute a major administrative burden.

A series of regional treatment districts would have to be established to perform operational functions. The few districts that are formally organized are concentrated around heavily populated areas. The large population concentration in the Eastern Massachusetts Metropolitan Area makes it possible to manage a single regional entity from a state level. Since the level of service currently provided within the MSD is generally not required in other areas of the state, transformation to a single state agency structure may be premature. In addition, responsiveness to citizens or cities and towns would be reduced significantly by establishing a state agency, since the cost of administrative staff required to coordinate the many activities of wastewater management would reduce its overall efficiency.

Finally, the development of a standard state approach applicable to all cities or towns would in many cases be inappropriate. Variations in local collection system capacities, levels of expertise, and overall regional needs often require solutions geared specifically to the area served.

EVALUATION

Seven criteria for measuring wastewater management structures have been established. Rather than attempt to place all responsibility and authority in a single entity, the criteria evaluate whether the powers, duties, responsibilities and authority necessary to provide services are available to the overall structure.

- Criterion 1 - Clear and Sufficient Authority. The proposed organizational entity satisfies this criterion.

- Criterion 2 - Responsiveness to Physical, Ecological and Engineering Considerations. Alternative A satisfies this requirement.

- Criterion 3 - Economic Efficiency. The entity proposed only partially satisfies this criterion, as the concentration of resources and centralization of responsibility might reduce economic efficiency. In addition, the centralization of professional support staff and a decentralized operations network would require substantial administrative costs for effective management.

- Criterion 4 - Support of Other Governmental Institutions. The entity would fail to satisfy this criterion on the basis that regional and local levels would be frustrated in their capacity to coordinate water, recreation, transportation and related activities with the overall sewerage function. Possibilities do exist, however, for close cooperation among state agencies. For example, relationships within the Executive Office of Environmental Affairs through the Division of Water Pollution Control and the Bureau of Environmental Sanitation could be easily effected. Functional planning coordination could also be achieved at the state level as the Commonwealth moves towards a more centralized planning system. Through a contract with an areawide planning agency, coordination of 208 planning activities would also be possible.

- Criterion 5 - Manageable Framework. It is questionable whether the entity could provide services effectively within the framework of state government. The Civil Service system would discourage the recruitment, training, retention and motivation of employees. Coordination of other functional activities would probably be diminished. The capacity to restructure internal organizational responses to meet changing needs would require state statutory change. Finally, in terms of accountability, the state government has not demonstrated its capacity to assume responsibility and perform a single function effectively and efficiently.

- Criterion 6 - Active Citizen Involvement and Responsiveness. Alternative A fails to satisfy this criterion. The state agency would be within the Executive Office of Environmental Affairs in a state government system traditionally characterized by executive and legislative delays. Citizens have little opportunity to participate in the planning, policy formulation, or decision-making processes.

  The structure would be perceived as serving an overall state purpose rather than one specifically responsive to the needs of the citizens within a service area.

- Criterion 7 - Political Feasibility. It is questionable whether this alternative is politically feasible (i.e., acceptable to those responsible for political decisions as well as the citizens within the districts). Since the agency would be a single-purpose agency within a multi-purpose structure, linkages to water, recreation, and other programs might improve political feasibility at the state level. However, the entity might not be acceptable to the cities and towns of the MSD unless it offers a financial advantage.

RECOMMENDATION

Alternative A should be further investigated and efforts made to develop it more fully, recognizing that the cost of acquiring all existing facilities might be prohibitive.

Alternative B

CONCEPT: Independent, single-purpose, regional sewer district with authority for wastewater management.

CHARACTERISTICS

A single-purpose district would be established by state statute, and assigned specific responsibility for sewage treatment operations and ancillary responsibility for other functions. Rather than an agency of state government, it would be an independent regional district providing services to member municipalities.

The MSD, MDC's existing sewerage division, and staff from the Engineering Division would be separated from state government and authorized to operate as an independent holding company. It would be headed by a board elected from defined areas within the region which would formulate policy decisions, approve capital and operating budgets (including grant requests), and appoint an executive director to provide daily management and supervision. The entity would not be directly responsible for any other activities (e.g., regional planning, water supply and distribution, recreation). (Exhibit IV-3.)

MSD's present 43 municipalities would constitute the district's service area, with additional members permitted to join on a voluntary basis with the approval of the policy board upon recommendation of the executive director. All sewerage facilities presently held by MDC would be transferred to the new regional entity and all outstanding obligations would be assumed according to a transition schedule provided in the enabling legislation.

FUNCTIONS

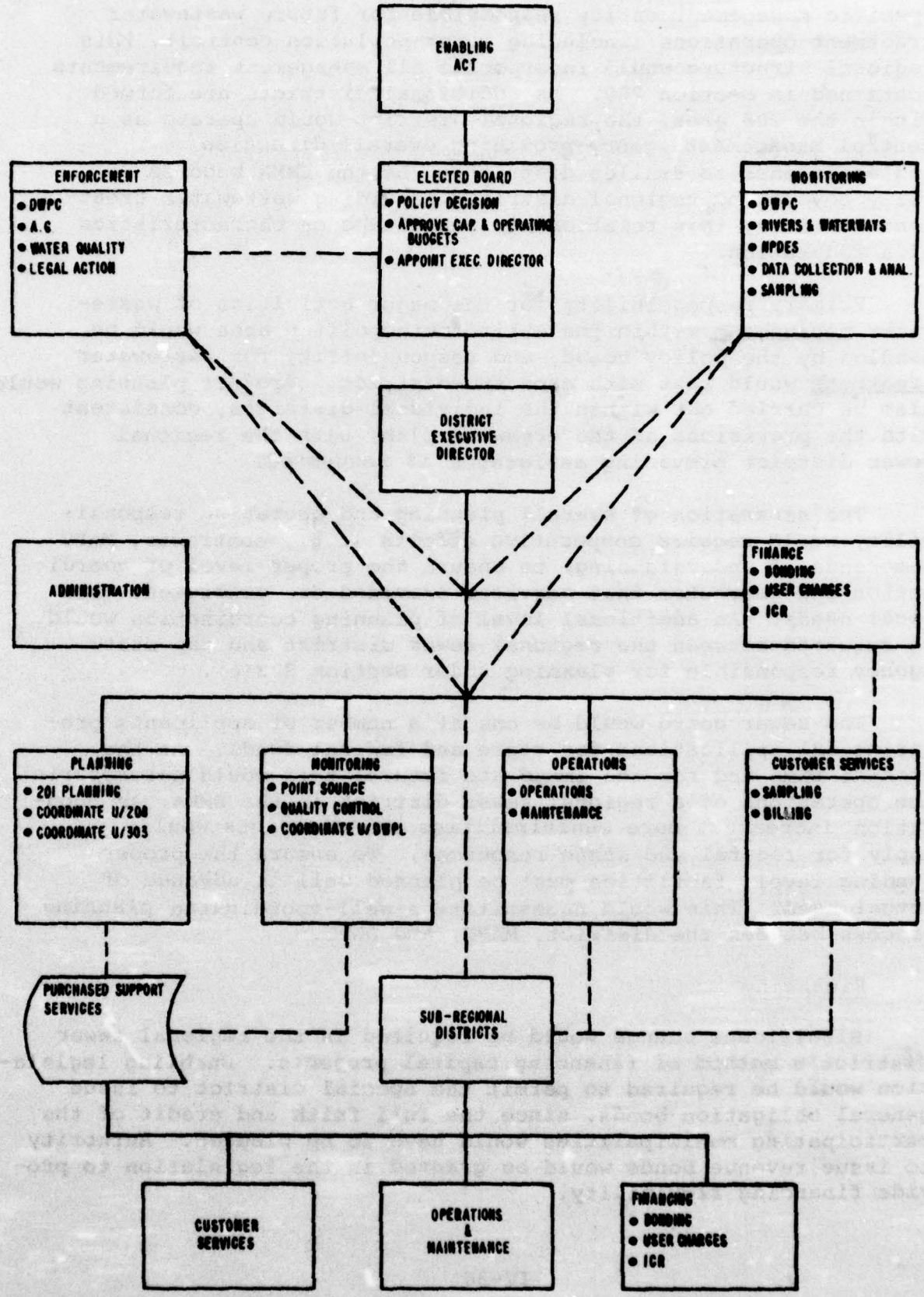
Planning

The Metropolitan Area Planning Council would assume areawide planning responsibility, with facilities planning under Section 201 of PL 92-500 performed by the regional district. However, as the major service provider within the region, the entity would provide significant input to the planning process.

Since the purpose of the 208 process is to recommend a

EXHIBIT IV-3

ALTERNATIVE B
SINGLE PURPOSE INDEPENDENT DISTRICT



specific management entity responsible for future wastewater treatment operations (including water pollution control), this regional structure would incorporate all management requirements contained in Section 208. As additional districts are formed within the 208 area, the regional district would operate as a central management agency providing overall direction and assistance to smaller districts. As the EMMA becomes fully covered by regional districts providing wastewater treatment services, this relationship would take on characteristics of a federation.

Primary responsibility for the major activities of wastewater management within the entire metropolitan area would be handled by the policy board, and responsibility for wastewater treatment would rest with each sub-district. Project planning would also be carried out within the individual districts, consistent with the provisions of the areawide plan, with the regional sewer district providing assistance if requested.

The separation of overall planning and operating responsibility would require cooperative efforts (e.g., contracts, MAPC memoranda of understanding) to ensure the proper level of coordination and guarantee that services provided are consistent with local needs. An additional level of planning coordination would be required between the regional sewer district and the state agency responsible for planning under Section 303(e).

The sewer board would be one of a number of applicants preparing 201 applications for state and federal funds. At the present time and for the immediate future, this would not restrict the operations of a regional sewer district in the EMMA; as population increases, more municipalities and districts would apply for federal and state resources. To ensure the proper funding level, facilities must be planned well in advance of actual need. This would necessitate a well-coordinated planning process between the district, MAPC, and DWPC.

Financing

Significant change would be required in the regional sewer district's method of financing capital projects. Enabling legislation would be required to permit the special district to issue general obligation bonds, since the full faith and credit of the participating municipalities would have to be pledged. Authority to issue revenue bonds would be granted in the legislation to provide financing flexibility.

The Commonwealth of Massachusetts presently operates as a "bank" for MDC. The state has an A-1 rating and floats general obligation bonds, pledging its full faith and credit. However, it is contingent rather than direct debt, since repayment is guaranteed through an assessment against the cities and towns which benefit. If the district were required to enter the bond market, pledging its own full faith and credit, it might not be able to secure rates as favorable as the Commonwealth secures through the State Treasurer.

As an independent agency, the sewer district would be required to have a treasurer and administrative staff responsible for selling bonds to finance capital construction. Operation and maintenance costs for the regional sewer district would be provided through an assessment against the member municipalities or charges to individual users. The former would continue MDC's wholesaler aspect while the latter would be consistent with the intent of P.L. 92-500. The implementation cost for converting to a retail system would be borne directly by the member municipalities and charged as part of operation and maintenance costs. The sewer district would become a retailer rather than a wholesaler.

Direct billing would be possible either through the district's central administrative staff or by the individual municipalities responsible for collecting and transmitting revenues to the central office. This would require the sewer district to borrow in anticipation of revenue since collections from individuals or municipalities would not be immediate. A revolving fund would be required to facilitate collection of payments under the wholesale or retail concept. A similar arrangement now exists in the state government's treatment of MDC sewer costs.

The full cost for both operation and maintenance and capital costs for the district would be determined by the policy board for the ensuing fiscal year. The budget would be prepared by the executive director and become effective upon approval by the policy board.

Operations

The regional sewer district's operations would be self-contained in the district, which would be responsible for all treatment facilities. Since wastewater treatment is effectively conducted at the regional level and since the operations would be the same as those performed by MDC's sewerage division, the transfer from a state-supervised regional system to a regional system

could be easily accomplished.

Greater flexibility in recruiting and retaining qualified professional staff and technicians would be provided. Reconstruction, replacement, and repair of facilities could be handled efficiently by an independent sewer district since the administrative requirements presently imposed on state agencies would be eliminated and the purchasing of necessary equipment and supplies would be facilitated.

MDC's operations are currently supervised and monitored by the Division of Water Pollution Control within the same Executive Office. Accordingly, disagreements over levels of service or levels of treatment can be negotiated. If responsibilities for wastewater management were transferred to an independent regional entity, DWPC might be expected to assume a more rigid role and demand improved treatment levels at Deer and Nut Islands. While this should not be considered a fundamental impediment to the change, it does represent a potential problem.

Monitoring

Monitoring must be conducted at all levels (e.g., by industrial point source dischargers, municipalities responsible for collection, regional districts responsible for interception and treatment, state agencies responsible for maintaining water quality) to be effective. The regional sewerage district would be responsible for monitoring all discharges into its system both prior to treatment and at the treatment plant. It would also regulate the type and degree of monitoring to be conducted by individual users and municipalities.

Since Section 208 of P.L. 92-500 specifies that the management entity is to have the capacity to conduct an on-going monitoring program to ensure adherence to water quality standards, the proposed entity would be required to conduct a continuing program of water pollution control and water quality measurement. A regional sewer district would be capable of conducting an effective areawide monitoring program consistent with the requirements of Section 208. Furthermore, DWPC's regular monitoring program would support such a program.

A coordinated monitoring program could be established, with responsibility for certain activities assigned to state staff. This shared responsibility would likely result in cost savings.

DWPC would continue to establish water quality standards and effluent limitations as it assumes full responsibility for permitting under the NPDES program.

Enforcement

The regional sewer district would be responsible for enforcing the standards established in any permit issued by DWPC. Rules and regulations established by the district and approved by the policy body would form the basis for determining compliance by municipalities and commercial, residential, and industrial users. Under the terms of state statute, and provisions of P.L. 92-500, however, DWPC would continue to exercise major enforcement responsibility at the state level.

Through its own monitoring program or through data provided by the regions, the state government would mandate certain performance standards for the district. The state government's enforcement authority would be directed to ensuring compliance with water quality standards and effluent limitations throughout the region. For example, since the Deer Island and Nut Island treatment plants may not meet the requirements of P.L. 92-500 regarding the best practical waste treatment technology by 1983, DWPC would be able to enforce performance standards upon the regional sewer district. If the federal standards were enforced, the regional sewer district would be responsible for a multi-million dollar effort to construct the facilities required to meet the treatment standard.

ADVANTAGES

The regional sewer district would operate as a single-purpose district, directing a concentrated effort toward resolution of the single problem of water pollution control through effective wastewater treatment. No longer affected by the bureaucratic and political considerations that state government imposes upon current operations, the regional sewer district would be able to function more effectively and secure the professional staff required to perform wastewater activities efficiently. Its budget and funds needed to achieve the highest level of service could be voted and approved by the policy board without delay.

Linkages with other regional service-providers, most notably MAPC, could be easily established based on a common constituency. The district would offer the identifiable benefit of improving water quality for all citizens throughout the region.

The funds collected through assessments against the member municipalities would be applied solely for the purpose of providing wastewater services. Member municipalities would be more willing to cooperate with the district than with a service provider within the bureaucracy of state government. The regional sewer district policy board would satisfy the requirement for a management entity under P.L. 92-500 to include citizen participation in all aspects of management and decision-making.

Over the next 20 years, several programs and activities (e.g. transportation, water, housing, parks and recreation, economic development) will be treated on a regional basis. The regional sewer district would be compatible with this trend toward regionalization. In addition, as these program areas achieve a level of service comparable to that presently available within the EMMA for sewage disposal, a closer union could be achieved through some form of umbrella agency.

DISADVANTAGES

Several constraints would reduce the effectiveness of the single-purpose regional district. These include state interference in all operations as well as reluctance on the part of member municipalities to provide the level of funding needed to achieve the standards established in P.L. 92-500. The municipalities presently face a major crisis relating to the level of property taxation necessary to support existing services, as reflected in the recent outcry when water rates were raised to ensure economic self-sufficiency for the MDC.

The last 20 years have witnessed a developing concern that single-purpose districts are unable to provide the coordinated service required in a metropolitan area, for the following reasons:

- All other programs become secondary to the primary interest of providing the basic service.
- The impact on other legitimate program activities is rarely considered.
- Service is often performed for its own sake rather than to benefit specific constituencies.

A significant disadvantage to a single-purpose district on a regionalized basis is that it would be strongly regulated by

state government. In addition, the larger muncipalities located in the core area would constitute a power base capable of directing resources to their own area rather than developing areas. If the policy board is elected, these population centers would have the authority to control all decisions unless some district election concept could be established to balance these interests.

EVALUATION

Alternative B can be considered in terms of the organizational criteria as follows:

- Criterion 1 - Clear and Sufficient Authority. Strong enabling legislation would have to be enacted if the regional district were to perform adequately. Since state agencies possess substantial authority, and since the state legislature would be requested to enact the legislation, it seems reasonable to assume that the district would not be granted all the powers necessary for it to function independent of state interference. As a consequence, major coordination difficulties might diminish the clear authority a regional district requires to carry out the mandate for wastewater services.

- Criterion 2 - Responsiveness to Physical, Ecological and Engineering Considerations. Alternative B is clearly able to achieve a level of physical services that constitutes effective wastewater management. The staff of the regional area would be concerned specifically with regional issues encountered in providing treatment for the citizens of the district. Since these services would be provided within a district which generally conforms to the physical characteristics of the drainage basin, attention would be directed to physical, ecological, and engineering considerations.

- Criterion 3 - Economic Efficiency. The district should be able to provide services at reasonable cost through realization of economies of scale. However, unless an effective financing system which allows flexible financing at low interest were provided, economic efficiency might not be possible.

- Criterion 4 - Support of Other Governmental Institutions. Provision of such support might prove difficult in a complex inter-governmental setting. Not only would the state control and constrain the district's operations, but other regional institutions might be concerned

about the single-purpose district usurping some of their service responsibilities. Those institutions might attempt to have the regional service district subsumed within a broader umbrella agency before it is able to demonstrate its capacity to provide additional services.

Since no regional system presently exists to provide services, the joining of a wastewater management special district to other less mature political institutions might diminish the district's capacity to respond effectively to the water treatment goals established in P.L. 92-500.

- Criterion 5 - Manageable Framework. Alternative B appears to have the capacity to:

  - recruit and motivate employees;
  - effectively coordinate activities and functions to provide wastewater management;
  - respond to both internal and external pressures for reorganization; and
  - demonstrate public accountability.

  Both the municipalities and citizens of the district would have a controlling influence on all projects and programs undertaken. Its organization would not be constrained by rules and regulations regarding the level and quality of professional staff required to perform wastewater management functions.

- Criterion 6 - Citizen Involvement. If properly structured, Alternative B would have substantial potential for promoting active citizen involvement and responding to the needs of the EMMA's member municipalities and citizens. The agency would exist solely to serve the area, and would therefore identify needs, balance costs with ability to pay, and be directly accountable to a policy board composed of local officials.

- Criterion 7 - Political Feasibility. Any proposal for a single-purpose independent wastewater management district is likely to encounter resistance from the executive and

legislative branches of state government and from agencies proposing a multi-purpose regional structure which includes sewage treatment.

The executive branch opposition would likely be based on the argument that the state has a compelling interest in the sewerage service provided in the metropolitan area. Additionally, the separation of this function from other state services would be considered detrimental to overall service coordination.

The legislative branch would be reluctant to provide the level of independence required for a regional entity to function effectively. In addition, problems relating to the classification of employees, transfer of civil service status, etc. would be cited.

RECOMMENDATION

Despite problems relating to political feasibility, this alternative warrants careful consideration. A regionalized approach controlled by those who pay for the service presents a viable possibility.

Alternative C

CONCEPT: Multi-purpose regional district responsible for a variety of programs including wastewater management.

CHARACTERISTICS

A multi-purpose district could be created either as a voluntary association similar to a council of government or as a regional middle tier government. In addition to the powers, duties, and responsibilities provided for a single-purpose district (Alternative B), the multi-purpose district would have responsibility for one or more of the functions of land use planning, water supply and distribution, solid waste disposal, transportation, and parks and recreation. Additionally, it would provide a mechanism for the areawide coordination of functional plans prepared by other entities. Specific enabling legislation approved by the municipalities within the area served would be required to establish this alternative.

The multi-purpose governing body would consist of locally elected officials from constituent areas, who would appoint an executive director to supervise day-to-day multi-functional operations. The district would be an independent organizational entity separate from the structure of state government. The MDC (with the exception of the police function) would be transferred to this new entity. (Exhibit IV-4.)

An outside boundary would be established for the regional area, with smaller sub-units designated to handle specific functions (e.g. water, sewer, transportation) within the overall boundary. For other services, municipalities could voluntarily participate on either a contract or a fee basis.

FUNCTIONS

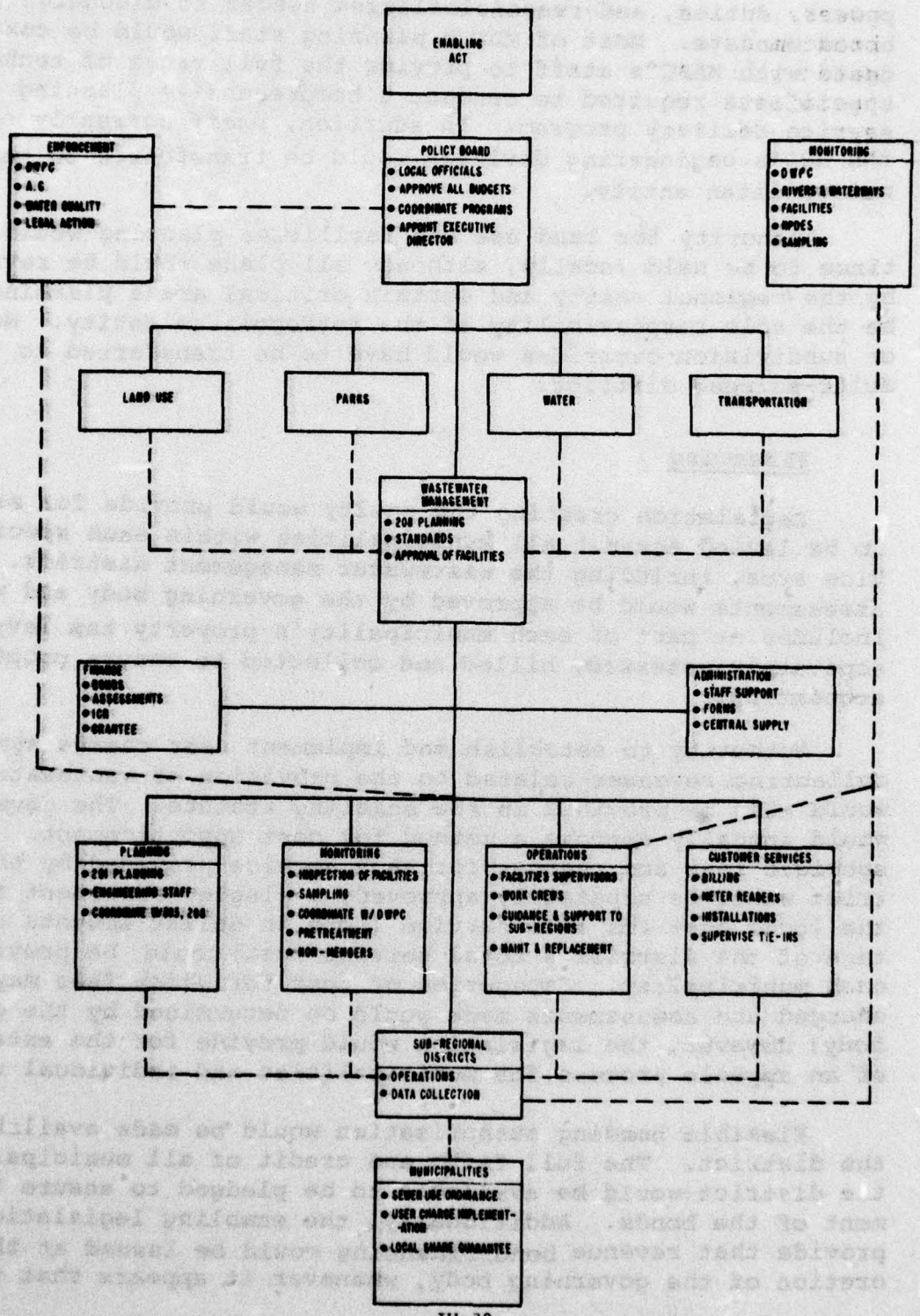
Planning

All areawide planning (i.e., both that required under Section 208 of P.L. 92-500 and that currently performed by regional planning agencies) would be consolidated under this option. By providing total wastewater management services, the multi-purpose district would establish the necessary linkage between the operations and planning functions.

EXHIBIT IV-4

ALTERNATIVE C

MULTI-PURPOSE REGIONAL DISTRICT



The legislation establishing this multi-purpose district would grant it the authority and responsibility to satisfy the management entity requirements of P.L. 92-500, as well as other powers, duties, and responsibilities needed to discharge its broad mandate. Most of MDC's planning staff would be consolidated with MAPC's staff to provide the full range of technical specialists required to conduct a comprehensive planning and service delivery program. In addition, staff currently employed the MCD's engineering division would be transferred to this new metropolitan entity.

Authority for land use and facilities planning would continue to be held locally, although all plans would be reviewed by the regional entity and certain critical areas planning would be the sole responsibility of the metropolitan entity. No zoning or subdivision overrides would have to be transferred to the multi-purpose district.

Financing

Legislation creating the entity would provide for assessments to be levied against all municipalities within each specific service area, including the wastewater management district. These assessments would be approved by the governing body and would be included as part of each municipality's property tax levy or separately assessed, billed and collected to ensure proper accounting.

Authority to establish and implement user charge systems for collecting revenues related to the provision of wastewater services would also be provided in the enabling statute. The governing body would annually approve a method for cost apportionment. Although specific fees and charges for each service provided by the district would be separately approved, a single assessment indicating the local cost for each service (both in dollar amounts and percentage of the district's total service cost) could be provided for each municipality. Categories of cost for which fees may be charged and assessments made would be determined by the governing body; however, the legislation would provide for the establishment of an appeals process for municipalities and individual users.

Flexible bonding authorization would be made available to the district. The full faith and credit of all municipalities in the district would be available to be pledged to ensure the retirement of the bonds. Additionally, the enabling legislation would provide that revenue bond financing could be issued at the discretion of the governing body, whenever it appears that this

method would provide benefits to the entire district.

The legislation would also permit the State Treasurer to continue to issue contingent debt on behalf of the member municipalities receiving wastewater management services. This service would be available whenever it is determined that the cost of financing the construction, reconstruction, replacement, or repair of needed facilities would be prohibitive under any alternative financing system. The governing body would appoint a treasurer responsible for all bond sales required for construction of facilities and for short term borrowing in anticipation of revenue.

An annual audit of the entity would be conducted to identify all costs, expenditures, disbursements, revenues, and receipts for each service area. A system would be created to identify those administrative costs which clearly relate to each function; no average administrative cost distribution system would be permitted.

Operations

Areawide wastewater treatment services would be provided by the multi-purpose district. Operations would be carried out on an areawide basis, with all employees supervised by trained specialists.

As additional treatment facilities are constructed outside the current MSD service area, the governing body would ensure that there would be capacity to realize economies of scale. Sub-regional boundaries appropriate for effective operations would be jointly decided by the affected municipalities and the governing body based upon the recommendation of the executive director.

The governing body would establish standards of performance for all treatment plants within the total area served by the multi-purpose district, consistent with EPA and DWPC regulations. Since the multi-purpose regional entity would be involved in programs related to water supply, water quality, and water-related recreation, concern for quality of operations would be paramount. Environmental, ecological, and engineering principles would characterize both the design of waste treatment facilities and the actual operations of sewage treatment plants.

Monitoring

Subject to state or federal law and regulation, the multi-purpose regional district would be responsible for certain monitoring activities. The principal agency of the Commonwealth responsible for monitoring activities, however, would continue to be DWPC.

Under this alternative, monitoring activities would assume greater importance than simply ensuring compliance with permit conditions. For an agency responsible for all water-related activities (e.g., drinking water supply and distribution, recreational programs), monitoring of sewage discharged into the region's waterways or the adjoining harbor becomes a critical function. Accordingly, the district could more easily justify the expenditure of public funds to acquire the sophisticated equipment required to monitor both water quality and discharged effluee ents. However, as the federal Water Quality Surveillance System becomes more operational and as the state assumes greater responsibility in this area, the district might be expected to benefit from the commitment of these resources. Monitoring activities carried out by district staff would consequently become less labor intensive, permitting expenditures for automated instream monitoring stations.

In addition to monitoring activities within the boundaries of the sewer district, it is important that the regional district assume monitoring responsibility for municipalities not currently served by a wastewater treatment plant. Upstream pollutants from both point and non-point sources could diminish the overall quality of the service provided by the regional district. This monitoring cost would be factored into the overall assessment against the present non-user municipalities within the overall regional district. Based on data from these field monitoring activities, greater regulatory controls over land use, water consumption, and on-site septic systems might be more readily developed as part of the district's technical assistance program to local governments.

Enforcement

Principal responsibility for enforcement would rest with the state government. As the agency responsible for issuing permits for point source dischargers, DWPC currently has major authority to enforce discharge and treatment standards. In the absence of an effective and affirmative state government program, the federal

EPA may intercede to ensure compliance. Finally, individual citizens may secure injunctive relief against specific dischargers or municipalities for failing to meet wastewater treatment standards. Under the enforcement powers granted to state and federal agencies, a discharger or an entity responsible for providing regional wastewater treatment services may be fined for failing to meet the appropriate standards of federal or state law. This may constitute a major potential impediment to cost effective wastewater treatment.

It presently seems that the treatment plants at Deer Island and Nut Island will be unable to reach the 1977 and 1983 standards of secondary treatment for publicly owned treatment works. To achieve this higher level of treatment would demand a significantly greater investment than is presently recommended. Since DWPC does not now support the concept of secondary treatment at Deer and Nut Islands, the difference in enforcement between the "state" MDC and Alternative C is speculative.

ADVANTAGES

The advantages of a multi-purpose district include the following:

- fixed outside boundary;
- close coordination of water and sewer services;
- consideration of wastewater treatment and sewage collection, treatment, and disposal within broad comprehensive framework;
- capability to build talented, professional team capable of undertaking all aspects of wastewater management;
- potential for coordinated investment in treatment plants consistent with regional population growth and economic development patterns;
- governing body composed of municipal or locally elected officials;
- clearer distribution of authority between region and state government;

- ability to respond more flexibly to region's needs; and
- realization of economies of scale for water and sewer functions.

These advantages are significant. A properly structured multi-purpose entity would provide fundamental services on an areawide basis to the member municipalities in the metropolitan region. Since the district would have direct responsibility for providing water and sewer services, it is important that it have corresponding authority to proceed aggressively and flexibly in response to new situations. While the need for this authority would be reduced somewhat if a council of government approach were adopted, a metropolitan council plan would require clear legislative authorization. For example, the Metropolitan Council of Minneapolis/St. Paul is structured so that the Governor of Minnesota is authorized to appoint the members of the governing body from state senatorial districts within the overall region. A combination of local officials and state appointees could be a transitional approach to facilitate the transfer of certain functions to regional administration.

The major functional benefit to the region would be in the area of planning. Its responsibility for several related program areas would enable the district to structure an interactive, comprehensive program that capitalizes on the region's total resources. Staff capability would increase significantly with the addition of state environmental specialists currently assigned to MDC to MAPC's core staffs.

The ability to plan for water and sewer services in the context of a comprehensive water resource management approach would provide significant benefits to the multi-purpose district. Operations would be managed and controlled by a regional entity, financing would be more flexible, and responsibility for monitoring and enforcement would be clearly defined.

DISADVANTAGES

One of the most significant disadvantages of a multi-purpose district arises from the significant variations of the proposed entity's service components in regard to the following elements:

- financing;
- stage of development;

- legal authority;
- service area; and
- governmental level.

Each of these factors would require careful assessment prior to any change. To assume that all service components could be simultaneously integrated and function effectively would be a serious over-simplification.

Three other factors relating to the transfer of certain state activities to a multi-purpose regional district merit consideration:

- The actual cost of providing service for state programs (e.g., water, parks, sewerage, mass transit) might not be properly identified since all central administrative costs would not be reflected in the agency's budget. These cost elements would increase the amount users would be required to pay.
- The mass transit deficits currently subsidized by the state government would place a tremendous financial strain on the entity and might jeopardize its viability. Any adverse impact on financing flexibility required for the construction of wastewater facilities would present a major obstacle.
- Regional level staff are unfamiliar with the issues of unionism and collective bargaining. As state employees are transferred to the new entity, this lack of experience might cause administrative and service delivery problems which would increase the entity's overall cost of operations.

These problems are significant when considered in relation to the wastewater management goals of P.L. 92-500. A one-stage comprehensive approach to organizational development would cause delays that an incremental, phased approach would avoid. Grant funds which would have been otherwise available to address water pollution and wastewater treatment problems have been committed to other projects. While funds may be available for future wastewater treatment projects, the federal government frequently changes its priorities, leaving states and municipalities to provide services without the required level of funding. Any action which

might produce this result should be carefully evaluated.

EVALUATION

Evaluation of Alternative C against the criteria established for a wastewater management entity is somewhat limited by the alternative's conceptual nature.

- Criterion 1 - Clear and Sufficient Authority. The legislation required to establish a multi-purpose entity with clear and sufficient authority to conduct the district's multiple programs must be based on a major review of general laws and special acts relating to provision of service on a regional bais. Great care must be taken to eliminate any statutory gaps that could adversely affect service delivery. Furthermore, since several state agencies would be affected by such legislation, it can be expected that the complex nature of the statute would cause confusion relating to service-delivery authority.

  For these reasons, the multi-purpose district option is deemed unable to satisfy this criterion.

- Criterion 2 - Responsiveness to Physical, Ecological, and Engineering Considerations. Alternative C would satisfy the most stringent test of this criterion. The combination of program elements related to land use, water, sewerage, transportation, solid waste, and recreation would lead to a comprehensive planning and development strategy consistent with the entire region's environmental, ecological, and engineering needs.

  Programmatic inter-relationships of this type are critical to the success of wastewater planning and management efforts. In many situations they can only be accomplished through a series of inter-governmental agreements, combined task forces, or memoranda of understanding. This approach often results in delay, compromise, and limited progress. The multi-purpose regional district would not be forced to resort to these inter-governmental negotiations to accomplish program linkages.

  The combined staffs of MDC, MBTA, and MAPC constitute a resource with a great deal of experience and sensitivity to the regional issues confronting the EMMA. Their

familiarity with the physical, social, economic, and cultural factors that would impact upon the entity's plans and programs constitutes a significant asset.

- Criterion 3 - Economic Efficiency. The disadvantages of a multi-purpose regional district raise some critical issues relating to the measure of economic efficiency possible under this option. Since the conceptual basis for this alternative remains flexible (e.g., the MBTA may or may not be included, the state may continue to issue contingent debt, the service area may be the entire region or only a specific sub-area), definitive conclusions are impossible.

  Nevertheless, the number of questionable elements involved suggests that Alternative C would not be able to achieve the desired level of economic efficiency. Two elements in particular--administrative expenses and potential increased labor costs--would be likely to incur major additional expenses for the new regional entity. The costs would be factored into the operation and maintenance portion of wastewater treatment costs, resulting in higher assessments to local governments.

- Criterion 4 - Support of Other Governmental Institutions. Linkages must be established by the regional entity with both the state government and each local government. The former is critical to ensure that the functions of monitoring and enforcement carried out by the state's DPWC lend support to the district's areawide wastewater management program. If the entity continues to rely upon the State Treasurer to facilitate the issuance of bonds, the support of this state institution becomes critical. Since this relationship is rooted in the district's demonstrated capability and accountability in providing services at a reasonable cost, any decrease in performance is likely to have serious adverse effects on state-regional relations.

  For a multi-purpose regional district controlled by a governing body composed of local officials, regional-local relations are critical. The continuing support of local officials will thus dictate the effectiveness, and ultimately the survival, of this option. One potential difficulty is inherent in this relationship. Certain aspects of the regional decision-making process would

require that some municipalities relinquish their traditional independence on behalf of the broader "regional community." While this trade-off would generally be justifiable on the basis of economies of scale, municipal officials would at times be forced to justify their approval in terms of areawide rather than local impact. This broader perspective would only be possible if the district were able to demonstrate effective service.

- Criterion 5 - Manageable Framework. For a number of reasons (e.g., cost segregation, staff specialization, ease of transition), the degree of programmatic and staff integration that might be expected of a multi-purpose regional management entity would not be feasible in the first phase of implementation. As a consequence, the manageability criterion for any of the agencies to be transferred to this new structure is unlikely to change. However, policy coordination and service delivery outreach are management benefits that would be evident immediately at the governing body level of the multi-purpose district.

  This criterion must be applied to specific issues of improved areawide wastewater management in terms of the immediate impact of any restructuring rather than of long-term management potential. Only marginal improvements would be possible under this structure in the first phase of implementation. Although long-term benefits appear likely, time and timing considerations relating to facilities planning and construction to meet the 1977 and 1983 goals of P.L. 92-500 do not permit a favorable assessment with regard to manageability.

- Criterion 6 - Active Citizen Involvement. Alternative C is predicated upon direct citizen participation in all aspects of its programs. It would provide the citizens of the district's cities and towns the opportunity to exercise direct control over the regional entity to ensure that their service needs are met.

  The regional district's multi-faceted program structure would afford a high degree of responsiveness to the area's problems. Integrated policies and strategies that deal with the totality of these programs would enhance attainment of the region's social, economic, environmental, and cultural goals.

MAPC's current citizen participation mode would be strengthened and expanded to permit maximum opportunities for and benefits from citizen involvement. Public hearings would precede the inception of any major program or activity, and progress meetings with citizens would be held throughout their duration. General meetings would serve as forerunners for discussing regional needs and problems.

- Criterion 7 - Political Feasibility. Concern is growing that existing regional structures are insufficient and should therefore be replaced by some form of locally controlled, multi-purpose regional entity. Both MAPC and the Greater Boston Chamber of Commerce have already introduced legislative proposals to create some new form of regional governance. The Governor's Task Force on Metropolitan Government has recommended a structure similar to the umbrella multi-jurisdictional organization proposals of ACIR.

  These proposals all include provisions for an areawide wastewater management component, MDC, under the authority or direction of local officials. This effort to restore the regional character of MDC appears to have widespread support.

  Since a multi-purpose regional district would involve a drastic change in the traditional approach to state-regional-local government in Massachusetts, it might encounter strong opposition. The enabling legislation required must therefore be clearly and carefully drafted to ensure a smooth transition. This process would involve at least one year to develop the required statutes and a 5-10 year transition period.

  Considering the factors involved and the growing support for this concept, Alternative C satisfies to some extent the criterion of political feasibility, although the opposition of the executive and legislative branches to this structure cannot be overlooked.

RECOMMENDATION

Alternative C is not recommended as the short-term structure for wastewater management. However, it merits consideration as a long-term approach to handling a variety of programs and activities.

Alternative D

CONCEPT: Modified Metropolitan District Commission with centralized administration and decentralized operations.

CHARACTERISTICS

This option would require that MDC be granted extensive flexibility, independence, and autonomy within the Executive Office of Environmental Affairs structure. MDC would continue to be responsible for the functions of sewerage, water, parks, and police, but would operate as an independent state agency restricted only by the broad policy or statutory considerations enacted by the Secretary of Environmental Affairs, Cabinet, or State Legislature.

The governing body for the state agency would be a commission of five full-time members, each assigned a specific area of responsibility. Each would be appointed by the Governor based on experience and qualifications to undertake the specific responsibility of the division. The chairman of the commission would be responsible for MDC's overall administrative, management, and performance aspects, and one commissioner would be responsible for each of the programs of water, sewerage, parks, and police. The five members would meet regularly to establish general policy and to coordinate the provision of services to the member municipalities. All support services (e.g., engineering, planning, construction assistance, laboratory facilities) would be handled centrally, and cost accounting techniques would be employed to apportion the accompanying costs among the four basic program areas (Exhibit IV-5).

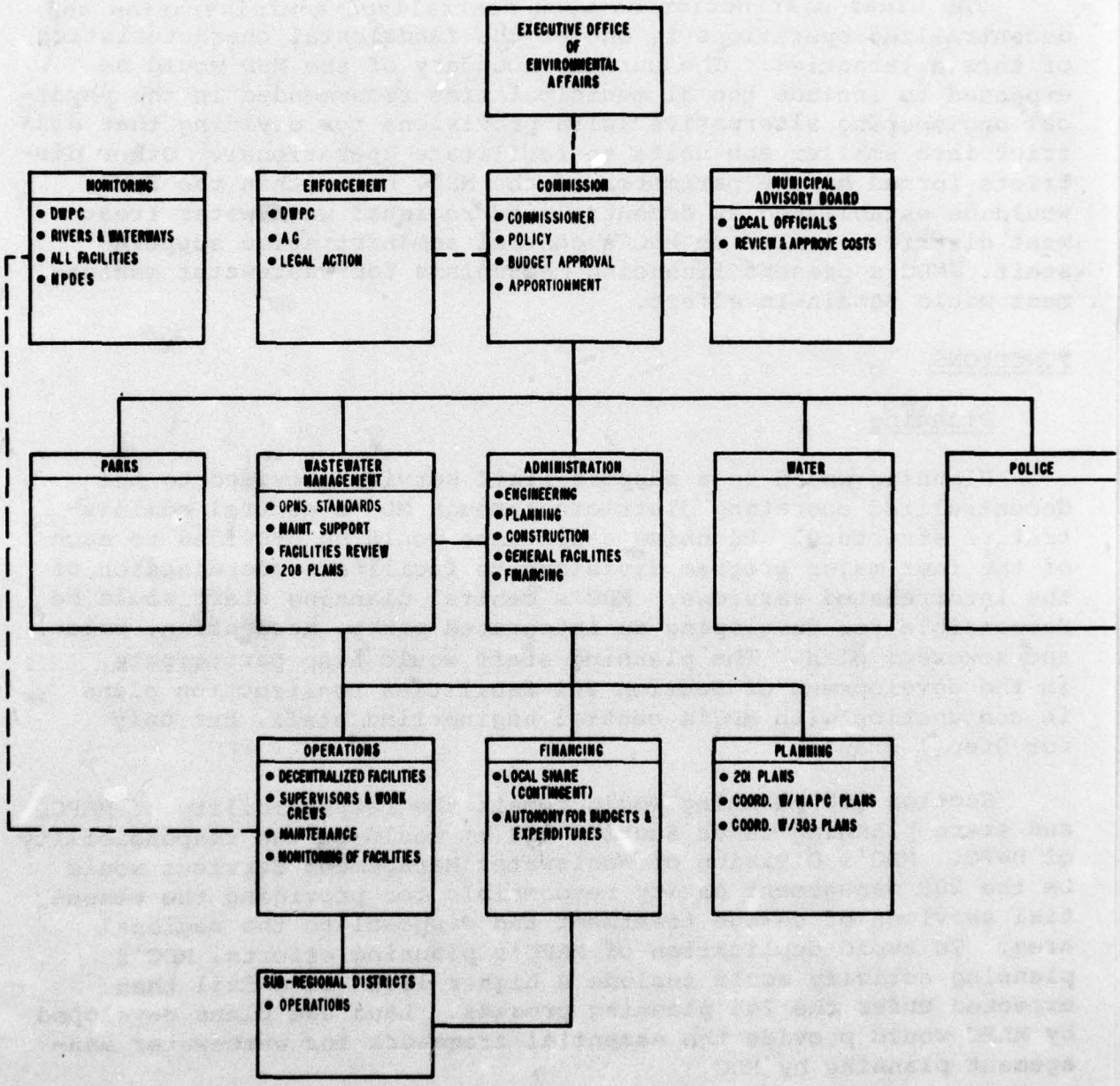
The "Sewer Users", which currently assist MDC in formulating equitable cost apportionment ratios, would be reconstituted as a broad Municipal Advisory Committee to assist MDC in establishing overall wastewater management policies.

This option would maintain MDC's regional holding company status despite the commission's association with state government. Fiscal and administrative regulations for other state agencies would not apply to MDC, although funds would continue to be appropriated by the legislature, which would also retain the authority to enact general statutory guidelines.

EXHIBIT IV-5

ALTERNATIVE D

STRENGTHENED METROPOLITAN DISTRICT COMMISSION



The Division of Wastewater Management Services, headed by a full-time commissioner, would be responsible for all wastewater treatment and disposal activities within the MSD. A core staff of specialists would work in the central office, with the majority of staff deployed to specific facilities for maintenance and operations.

The clear distinction between centralized administration and decentralized operations is one of the fundamental characteristics of this alternative. The current boundary of the MSD would be expanded to include the 51 municipalities recommended in the physical engineering alternative (with provisions for dividing that district into smaller sub-units to facilitate operations). Other districts formed on the perimeter of the MSD, but within the EMMA, would be established as decentralized regional wastewater treatment districts linked to MDC's central administrative support staff. MDC's present financing mechanisms for wastewater management would remain in effect.

FUNCTIONS

Planning

Planning would be a support staff service provided to the decentralized operating districts through MDC's central administrative structure. Planning assistance would be provided to each of the four major program divisions to facilitate coordination of the interrelated services. MDC's central planning staff would be responsible for developing an integrated parks, recreation, water, and sewerage plan. The planning staff would also participate in the development of Section 201 facilities construction plans in conjunction with MDC's central engineering staff, but only for Step 1 grants.

Section 208 planning would remain the responsibility of MAPC, and state planning under Section 303(e) would be the responsibility of DWPC. MDC's Division of Wastewater Management Services would be the 208 management entity responsible for providing the essential services of sewage treatment and disposal to the regional area. To avoid duplication of MAPC's planning efforts, MDC's planning activity would include a higher level of detail than expected under the 208 planning process. Land use plans developed by MAPC would provide the essential framework for wastewater management planning by MDC.

All treatment facility project plans developed by MDC would be subject to a public hearing requirement as well as the approval of the National Environmental Policy Act (NEPA) and the Massachusetts Environmental Policy Act (MEPA) as well as the approval of the

Municipal Advisory Committee. This local input and review would ensure coordination with the plans developed by MAPC as well as other state, regional, and local entities. An increase in the number and technical competence of MDC's planning staff would be required under this alternative.

Financing

Since this wastewater management option would remain institutionally linked to state government, present financing mechanisms for debt service relating to capital construction would remain in effect. The state would continue to issue contingent debt to be repaid by the member municipalities according to the schedule established by the State Treasurer. Since the new entity would require a high degree of flexibility from the state budgetary and fiscal control provisions of the law, it is important that MDC possess decision-making authority relating to expenditures of appropriated funds, without unnecessary restraints imposed by the state government on an entity which does not spend state revenues.

This flexibility is critical if Alternative D is to provide the level of wastewater management services intended under both P.L. 92-500 and state statutory authorizations. MDC would be authorized to establish whatever cost apportionment method would ensure that services are provided efficiently, equitably, and consistent with the region's needs, with the approval of the Municipal Advisory Committee. No statutory change or approval would be required for MDC to change cost apportionment methods, provided that the Municipal Advisory Committee's approval had been secured.

Budgets submitted by MDC would be subject to amendment only by an extraordinary vote of the General Court. No additions to the amounts requested or inclusion of new projects would be authorized. Funds would be appropriated at the program level rather than by line-item and subsidiary expenditure account.

Operations

Under Alternative D, MDC's operations would be totally regionalized and decentralized. Sub-districts could be established within the current MSD boundary to facilitate operations and to track costs associated with specific treatment plants. All future district operations within the EMMA would be coordinated through MDC's central administrative support unit. The Commissioner of the Division of Wastewater Management Services would be responsible for ensuring the highest level of service and supervising all operations. This individual would supervise the technical aspects

of wastewater services, but would not be involved with the administrative or support functions required to reinforce the basic services.

This system would permit concentration of resources and facilities toward the specific goal of achieving 1977 and 1983 water quality standards established by the Environmental Protection Agency and P.L. 92-500. Relieved of day-to-day administrative responsibilities, the division could focus on the quality of wastewater treatment and discharge. This distinction between centralized administration and decentralized operations would ensure an appropriate balance between overall policy considerations and the direct provision of wastewater services.

Each district would operate as a sub-regional administrative unit rather than an independent regional entity responsible for providing wastewater service. With the proper degree of independence from state regulations and statutory restrictions, operations would be able to achieve a higher level of efficiency and performance. The decentralized system would have to be closely supported by the central administrative staff unit, however, as well as free from day-to-day administrative responsibilities. Since the entity would be responsible for water and water-related recreation activities as well as sewerage treatment and disposal, it can be expected that operations would achieve the high level of efficiency required to support other programs and activities.

Monitoring

While responsibility for monitoring would reside at the state level, staff specialists would be deployed (1) to each of the districts to monitor the state's rivers and waterways, for the purpose of determining water quality standards and (2) to treatment plants to ensure that effluent limitations for each discharger were being met. As the quality of wastewater advanced through technology (e.g., instream monitoring stations for water quality, hydrological testing), computers would be utilized to provide these data for analysis at the state level. As the state assumed full responsibility for permitting, this would facilitate an effective, standardized statewide approach to improving water quality.

Enforcement

Enforcement would continue to be a state responsibility, since state statutes provide for specific penalties to be exacted by the Superior Court against violators. The provisions of P.L. 92-500 permitting individual citizens or municipalities to seek injunctive

relief from the appropriate federal district court would continue in full force and effect. This concentration of enforcement authority in state government would provide a significant power base from which to move against offenders who were polluting streams or waterways. As a result, a higher standard of performance could be expected.

ADVANTAGES

Alternative D builds upon MDC's current organizational structure, strengthening and improving the existing entity. If the 1977 and 1983 water quality deadlines are to be met, an institutional alternative which does not involve total transfer of authority, responsibility, or resources between governmental levels should be regarded as the preferred near-term option.

Relieved of administrative and bureaucratic restrictions that inhibit performance, the restructured, independent MDC would be able to conduct an effective areawide service delivery program. Restoration of its regional character would allow MDC greater flexibility, which would enhance its potential for assisting cities and towns. Decentralized operations would contribute to this regional identification and facilitate the formation of additional treatment districts within the EMMA.

Building the staff capability required to perform the highly technical aspects of wastewater management would be accomplished most readily under Alternative D. As an agency wholly supported by local funds, MDC would not be subject to the financial and management controls imposed upon agencies supported by state revenues.

Coordination with other state agencies would be facilitated by preserving MDC's link to state government. For example, DWPC's monitoring and enforcement activities would be carried out without any decrease in effectiveness since intra-governmental coordination is likely to prevent the irreconcilable differences that frequently characterize inter-governmental relationships. Responsibility for each of the functions of wastewater management would rest with an agency either in or directly connected to state government. An integrated program response that balances needs and available resources would result.

Inter-governmental cooperation would also be facilitated under Alternative D. Since MAPC and MDC would share common regional goals, they could be expected to cooperate more fully on wastewater management issues. Greater citizen involvement in all

aspects of areawide sewage treatment and disposal would result from this regional cooperation particularly in light of the role of the Municipal Advisory Committee.

Finally, MDC's current financing advantages would be preserved under this option, although the existing process of legislative approval of project requests and budgets would be replaced with a more flexible system. The issuance of contingent debt to finance capital projects would be the basis upon which the State Treasurer would authorize debt for MDC.

DISADVANTAGES

In many respects this alternative would require the state legislature to approve a discredited organizational concept. The previous structure of executive departments was often characterized by agencies "in but not of" the departments. Statutory limitations on the number of authorized departments, as well as political considerations regarding favored agencies, perpetuated this system and created reporting and management chaos. The realignment of all agencies within ten cabinet offices was designed to eliminate this chaos by establishing a well-defined structure for programmatic and fiscal management. An independent, autonomous MDC could thus be viewed as a step backward in the consolidation process.

Since the entity would have both state and regional characteristics, it might not be able to clearly represent either government level. This lack of clear distinction between government levels could cause public accountability and acceptability problems.

Several programmatic disadvantages could also result from selection of this alternative as the preferred wastewater management option for the MSD. Program conflicts between the entity and both MAPC and local governments could be likely. MDC's water, sewerage, recreation, and parks planning process might infringe on MAPC's comprehensive planning authority. Since the scope of MDC's planning responsibility is less than comprehensive, issues relating to land use, economic development, and transportation might not be included. MAPC plans, however, would be based upon the interaction of these elements with water supply and distribution, sewage treatment and disposal, open space location and utilization, and land and water-based recreation. This difference in perspective could produce conflicts regarding approaches to regional service delivery.

Similarly, local governments might relate to MAPC plans for certain programmatic concerns and to MDC plans for others. The

consequence of no single, regional framework could be duplication and inconsistency.

EVALUATION

This alternative can be assessed in terms of the organizational criteria as follows.

- Criterion 1 - Clear and Sufficient Authority. To satisfy this criterion, major changes would be required in MDC's statutory base. Statutes would have to establish the entity's independence and provide an exemption from administrative regulations promulgated by any other state agency. In addition, the new entity's organizational structure and the composition of its governing body would need to be specified. This would involve a major drafting effort and require the support of the Secretary of Environmental Affairs, Governor, and legislature. Citizen groups representing environmental issues would have to lobby actively for the enactment of such legislation, and continuing support would be necessary to prevent new statutory restrictions in subsequent years.

  While Alternative D may be able to satisfy this criterion in the near term, its capacity to withstand future infringements is questionable.

- Criterion 2 - Responsiveness to Physical, Ecological and Engineering Considerations. As a regional holding company responsible for serving the MSD's member municipalities, the entity would be able to respond to the physical demands of the wastewater management system. The level and effectiveness of this response would depend upon the degree of flexibility MDC were permitted.

  As a multi-purpose entity, MDC would structure an all-encompassing approach to meeting the area's ecological and environmental concerns; it would recognize that sewerage operations impact upon water quality, which affects recreational opportunities and park land utilization. By combining environmentally linked program areas, MDC would be able to coordinate physical delivery systems.

  Although the issue of future districts, which will clearly have an impact on the physical, ecological and engineering considerations, has not been resolved, Alternative D

satisfies this criterion.

- Criterion 3 - Economic Efficiency. No longer restricted and constrained by cumbersome administrative procedures, MDC would be able to achieve the full measure of economic efficiency. The comparatively low cost of the basic service would sustain this level of efficiency. Facilities construction, financed through state bonding mechanisms, would continue to be efficient as long as the state's credit rating does not fall below its present level. The impact of the deficit financing and tax programs undertaken by the Commonwealth are matters of critical concern.

  Since the entity would continue to provide services on an areawide basis, economies of scale relating to all aspects of the centralized administration/decentralized operations approach would be realized.

- Criterion 4 - Support of Other Governmental Institutions. Alternative D would maintain MDC's unique state/regional nature. Greater independence at the state level, however, would improve its regional service delivery, increasing the potential for effective inter- and intra-governmenal coordination. State agencies responsible for functions that impact upon wastewater operations would be able to relate to MDC as a state entity, while regional and local entities would perceive it as a regional holding company. This cooperation would be enhanced as the new wastewater management entity demonstrates its capacity to provide quality services. However, if its programs and activities replace or duplicate those of other institutions (e.g., EOEA, MAPC), the new entity might meet with opposition from state, regional and local sources.

  The centralized administration/decentralized operations nature of the entity would reinforce the state/regional distinction that originally characterized MDC. As a result, the new entity would be able to capitalize on the intergovernmental distribution of responsibility recommended in P.L. 92-500.

- Criterion 5 - Manageable Framework. The new structure would require a reorganization of MDC's internal divisions consistent with the executive responsibilities of the full-time commissioners. Staff divisions would serve as administrative and support units and operating divisions would

be reduced to four (e.g., sewerage, water, parks, and police). Linkages and program interaction would be achieved through the centralized engineering and planning staffs as well as direct inter-divisional communication and contact.

MDC would be authorized to reorganize or establish offices and bureaus within the five divisions. This flexibility would permit the new MDC to realign its internal structure in response to changing needs or new requirements. Staff specialists would be recruited for each division and would be promoted on merit principles, since strict adherence to Civil Service procedures would not be required.

The entity's overall framework might become unwieldly unless a carefully designed administrative and staff support management structure were created. While each operating division would continue to handle certain administrative tasks (e.g., equipment purchases, recruitment, ordering of supplies, budget preparation, cost control), the centralized unit would be responsible for overall financial management.

Criterion 6 - Active Citizen Involvement. Citizen participation in all aspects of the agency's planning and policy formulation activities is recommended in P.L. 92-500. To accomplish this goal, MDC would have to pursue a policy that maximizes opportunities for participation, since the unique institutional structure of Alternative D is not conducive to such involvement.

The role of the Sewer Users would be changed to that of a Municipal Advisory Committee to increase the role of local officials and private citizens in shaping the direction and policy of the new wastewater management entity. Even this step, however, might not provide the level of participation intended by federal regulations.

The division of responsibility between the centralized administration and decentralized operations creates potential conflict between the technocratic nature of service delivery and the democratic process of policy formulation. Citizens might also be confused regarding the most appropriate point of entry to the organization to participate in decision-making.

- Criterion 7 - Political Feasibility. A major philosophical shift would be required of the executive and legislative branches of state government for this alternative to be implemented. While elimination of administrative controls over agency operations would enhance the potential for performance, it would be regarded a dangerous deviation from the traditional approach to agency supervision.

  Legislation establishing this alternative would be difficult to enact; the potential exists for deletions of required sections or the addition of crippling amendments. Future legislative changes could also restrict the entity. As a consequence, Alternative D does not satisfy the criterion of political feasibility.

RECOMMENDATION

If its political feasibility problems can be overcome, this alternative represents the most appropriate near-term option for wastewater management in the EMMA.

Alternative E

CONCEPT: Public authority responsible for planning, financing, and operating wastewater treatment facilities.

CHARACTERISTICS

A public authority, headed by a board appointed by the Governor, would be responsible for providing and maintaining all sewage treatment and disposal facilities in the EMMA. Although a state agency, the authority would operate independently, unrestricted by most of the statutes and regulations affecting other agencies. For organizational purposes only, the authority would be within the Executive Office of Environmental Affairs.

The authority would issue tax-exempt bonds under the existing contingent debt provisions that apply to MDC. In addition, the authority would have statutory power to issue revenue bonds. Its governing board (appointed for staggered, overlapping terms) would be responsible for approving budgets, rates, and long-term debt for facilities construction as well as for formulating overall policy. An Executive Director, selected by the board, would be responsible for day-to-day administration (Exhibit IV-6).

The authority's service area would comprise the 51 municipalities recommended for inclusion in the MSD. New members would be added upon petition of the interested community's town meeting or city council. The board, however, would have the right to deny membership and refuse to accept a municipality's wastes based upon the city or town's failure to meet prescribed standards for local sewage collection systems or refusal to enact required zoning by-laws or ordinances.

MDC's sewerage division staff, as well as support staff assigned to other operating and staff divisions involved in the delivery of sewerage services, would be transferred to this entity.

FUNCTIONS

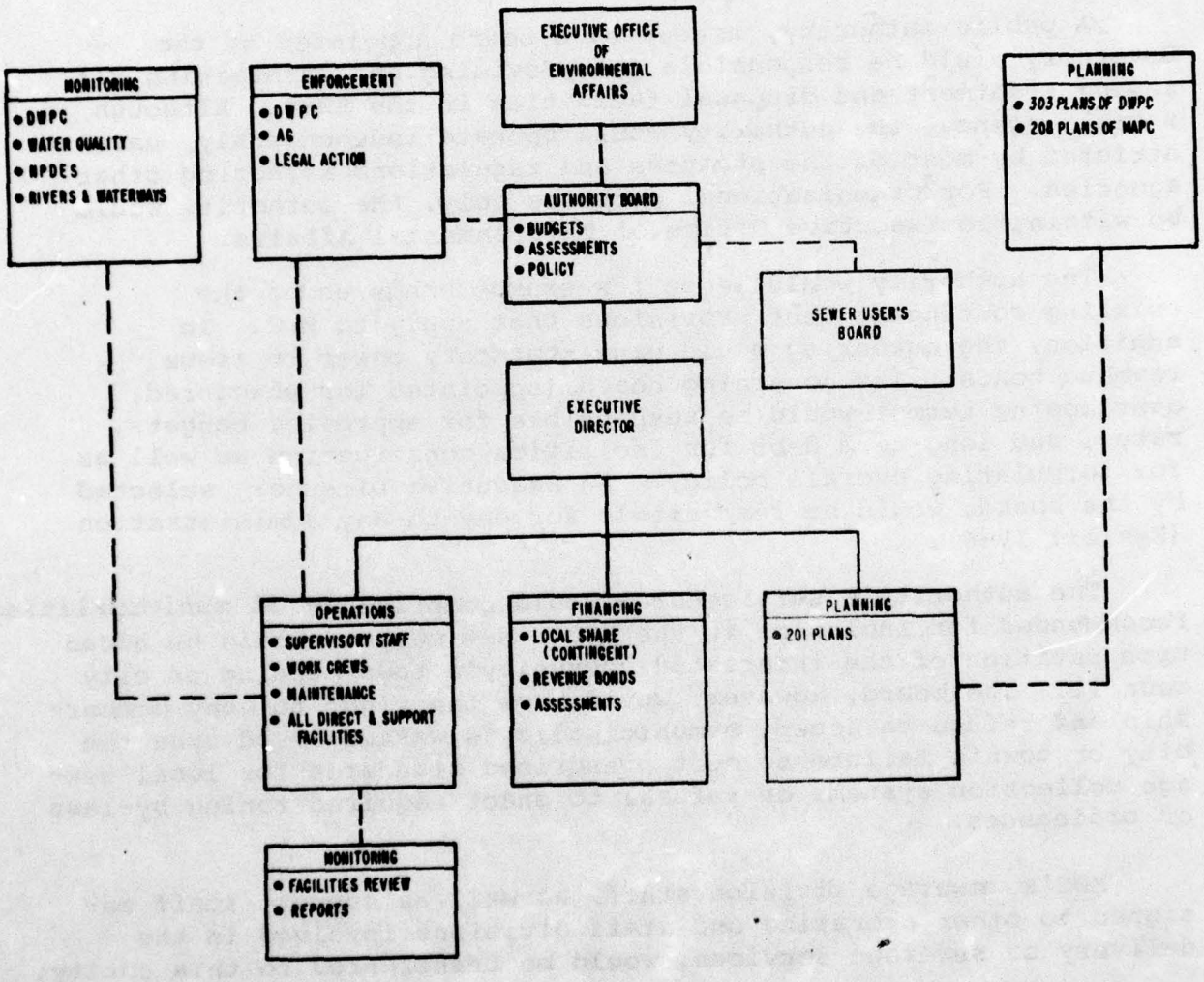
Planning

Under the provisions of this option, planning would be geared

EXHIBIT IV-6

ALTERNATIVE E

PUBLIC AUTHORITY



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WASTEWATER ENGINEERING AND MANAGEMENT PLAN FOR BOSTON HARBOR - --ETC(U)
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to the location, size, and service area of sewage treatment and disposal facilities. The entity would not engage in comprehensive planning nor be concerned with even the more restricted concept of environmental planning. As a consequence, it would be affected by the plans of other entities (most notably MAPC and DWPC) possessing authority for state level and areawide planning.

The entity would be responsible for the Section 201 (facilities planning) activities required by P.L. 92-500 and would serve as the designated management entity required for Section 208 purposes. Population projections, economic and technologic trends, and related data would be utilized to plan the location, design, and configuration of future facilities. Planners and engineers currently employed by MDC would constitute the entity's planning staff.

MAPC would conduct Section 208 planning, which would primarily involve establishing wastewater management policies and priorities in the EMMA. Consequently, MAPC would have a direct impact on the performance of the new entity, whose emphasis on operating efficiency might conflict with some elements of MAPC's comprehensive, integrated approach to wastewater management. The potential for such conflict would increase as the planning process matures and concentrates more on regulatory programs and impact analyses, as required under Section 208.

The state, in its Section 303(e) plan and Section 106 annual program strategy, would exercise substantial control over the authority's facilities planning activity, particularly in regard to the establishment of priorities for funding wastewater treatment facilities. Competition for resources would intensify as other areas of the state begin to develop carefully planned approaches to meeting federal standards.

Financing

The financing mechanism for wastewater treatment facilities would continue to be contingent debt issued by the Commonwealth to be repaid by the cities and towns of the MSD. However, the authority's board, rather than the legislature, would assume a direct role in approving budgets and specific projects.

In addition, revenue bond financing would be permitted if the board decided that fees and charges rather than assessments were to be applied for specific projects. This flexibility would permit the authority to structure its financing in either a

wholesale or retail service delivery mode. The Sewer Users which presently assist MDC in approving ratios for assessment, would continue to function as an advisory committee to the board. Final authority for establishing rates would rest with the authority, however.

The authority would assume MDC's existing debt, to be repaid according to existing repayment schedules. New debt would be incurred and apportioned through methods determined by the board.

Operations

This authority would first and foremost represent an operating entity responsible for providing quality areawide wastewater treatment and disposal services to participating municipalities at the lowest possible cost. The authority would operate and maintain all facilities presently held by MDC on behalf of its constituent cities and towns.

The authority's operations would be monitored and regulated by the Division of Water Pollution Control. Water quality standards established in P.L. 92-500 would constitute the entity's operating targets. Since the entity would not be concerned with other program areas (e.g., water, land use, transportation, parks and recreation), its operations would be directed to general issues of environmental quality only through constructive pressure from local, areawide, and state entities.

MDC's operations staff would be transferred to this new entity, and additional staff would be recruited and retained independent of Civil Service restrictions. This freedom from administrative regulations would enable the authority to respond more immediately to problems and opportunities, as well as minimize administrative time and expense.

Monitoring

Although DWPC would assume major monitoring responsibility, the authority would be required to address the issue more carefully than would a purely governmental entity. For example, to ensure the steady, uninterrupted flow of revenues from users, the authority would have to monitor point source dischargers and pretreatment facilities. While such monitoring would be important regardless of the method of financing employed by the authority, it would become a critical consideration if revenue bonds

were issued to support facilities construction. Any disruption as a result of non-compliance with NPDES permits would seriously affect the authority's viability.

The areawide wastewater treatment management plan prepared under Section 208 requires that the entity establish a regulatory program to ensure that commercial and industrial wastes meet applicable pretreatment standards. Accordingly, the authority would have to conduct an effective monitoring program consistent with the goals of the state plans for water quality.

The monitoring of volume, strength, and flow at the treatment plant would also be required to ensure that the operating facility is in conformance with a state-issued permit under Section 402 of P.L. 92-500. Any change in sewage characteristics would have to be reported to DWPC. Since it is unlikely that the authority would be able to meet the 1977 and 1983 treatment standards established in Section 301, an effective monitoring program would be critical to ensure that current treatment processes achieve their full potential and that water quality does not deteriorate.

Enforcement

Statutory authority to enforce permit provisions and to identify discharge violators would rest with DWPC. As the enforcement arm of state government, DWPC would determine whether the authority's publicly owned treatment works were meeting the standards prescribed by law or required by permit. Penalty provisions established by law include the authority to close down the facility if progress in improving the operations is not evident. In addition, the federal enforcement authority of both the EPA and the National Oceanic and Atmospheric Administration (NOAA) would continue to impact upon the authority's ocean discharge operations at Deer and Nut Islands.

The authority would require enforcement authority over certain matters (e.g., construction and maintenance of local collection systems, adequacy of pretreatment by industrial dischargers) that affect areawide sewage treatment and disposal. While this enforcement might not take the form of penalties, it would have to include sufficient enforcement authority to refuse to accept any wastes from any municipality within the service area. Prior to this final enforcement decree, it is important that the authority possess adequate enforcement power to invoke corrective action.

ADVANTAGES

The major advantage of this option is that an independent instrument of state government would be charged with sole responsibility for wastewater treatment and disposal. Authorities have traditionally been established whenever a specifically identifiable problem required concerted action that was sufficiently critical to justify the elimination of statutory, bureaucratic, political, or administrative restrictions. The authority would make the fundamental policy decisions relating to the location and timing of facilities, issuance of debt, and establishment of rates and charges, without any political influence.

Attainment of the 1977 and 1983 water quality standards is a sufficiently critical goal to justify granting an entity the power to direct resources to a specific problem by moving quickly and professionally to improve and construct facilities. The authority would retain talented staff in all areas of administration and operations to assist in this effort. Higher operating efficiency would likely result from this concentration of resources since the entity's survival would depend upon its ability to provide quality services.

Flexible financing mechanisms would permit the entity to capitalize upon shifts in the bond market and achieve favorable rates for facilities construction. This would be accomplished through either state-issued contingent debt or revenue bonds.

DISADVANTAGES

The basic disadvantages of this option relate to accessibility and control. The authority's independence would cause it to be less concerned with either equity or cost than with effectiveness and quality of service. Responsiveness to citizen concerns regarding impacts upon other program areas and coordination with other services would be regarded as beyond the scope of the authority's concern. An effective wastewater management process must include provisions for coordinating the interrelated aspects of water, sewer, parks and general land use. An authority would be unlikely to recognize or respond to these interrelationships.

The public participation requirements of P.L. 92-500 stipulate that citizens participate actively in the policy formulation, strategy definition, and evaluation stages of the agency's decision-making process. These regulations issued by the EPA (40 CFR 105) mandate a continuing and substantive involvement in

monitoring the agency's programs. While an authority could establish the process for citizen involvement, substantive involvement would be unlikely to reach the level intended by law.

The absence of effective controls over the entity's costs also represents a disadvantage. Although the Sewer Users would continue to serve in an advisory capacity, cost determination would be a responsibility of the entity's Executive Director and financial management staff.

This absence of control would also apply to financing, especially if revenue bond financing were utilized; the authority would be responsible to the bond holders to ensure the required level of revenues for repayment. This conflict regarding the identity of those to whom the entity is responsible would have obvious disadvantages if cost controls were required.

EVALUATION

This option can be assessed in terms of the evaluation criteria as follows.

- Criterion 1 - Clear and Sufficient Authority. New legislation would be required to establish an authority responsible for wastewater management. While other authorities have been established under Massachusetts law (e.g., Massport, MBTA), none has required detailed distribution of aspects of functions between governmental levels. Authorities generally have total responsibility for all functions relating to the service provided. An authority with only partial responsibility would be dependent on a number of other entities for support. Since such relationships are difficult to establish in statutory terms, the entity might not have the clearly stated mandate required.

- Criterion 2 - Responsiveness to Physical, Ecological and Engineering Considerations. The authority would be primarily responsible for the operations of all wastewater treatment and disposal facilities. As an operating entity, it would be required to respond to those aspects of the physical system that relate to sewage treatment and water pollution control.

  Although the physical, ecological system involves the total environment, the authority would be responsible for only one aspect of a single component. It would rely upon

intergovernmental cooperation and coordination to ensure an integrated response to the total physical system. Since its own activities would be responsive to the specific physical considerations of wastewater management, Alternative E satisfies the basic elements of this criterion.

- Criterion 3 - Economic Efficiency. An authority that is independent of political constraints and has sufficient financing flexibility to provide favorable rates would be capable of achieving some measure of economic efficiency in its debt service costs. However, the absence of controls over staff size and salaries as well as other administrative features might increase the operation and maintenance costs that would be apportioned to municipalities.

  Since the authority's viability would depend upon economic efficiency and program performance to compensate for the absence of control, failure to satisfy this criterion could result in the dissolution of the authority in favor of a more conventional governmental structure. Accordingly, it is assumed that the entity will:

  - provide quality service at reasonable costs;
  - finance programs and construct facilities at reasonable costs; and
  - realize economies of scale in performing various functions.

- Criterion 4 - Support of Other Governmental Institutions. An independent authority would have a clearly defined but limited mandate to provide wastewater services. Within this specified area, it would have significant power and responsibility; however, it would not be concerned with the comprehensive inter-governmental program delivery system.

  Conflicts often emerge when an entity pursues its single purpose without regard to impacts on other programs, agencies, or governmental entities. Within the institutional network of future wastewater entities, the authority would have difficulty responding to the needs of other organizations. This would be particularly true with

respect to the Section 201, 208, and 303 inter-governmental planning process, which would have an impact on all aspects of the entity's service delivery system.

The authority's organizational independence and flexibility could be diminished if the areawide or state planning process imposed requirements that forced the entity to modify its operations. As a consequence, the authority would be constrained in its efforts to achieve the goals and objectives of wastewater management.

Consequently, it appears unlikely that an authority would satisfy the criterion regarding inter-governmental support and cooperation.

- Criterion 5 - Manageable Framework. Unhampered by procedural restrictions, the authority would be able to satisfy the following indicators of manageability:

  - recruit, retain, and motivate employees;
  - coordinate functional activities effectively;
  - restructure internal organization in response to changing needs; and
  - demonstrate public accountability.

Organizationally efficient and capable of responding to both external and internal pressures, the authority would have proper lines of authority and clearly defined programs. As a single-purpose entity, it would be able to focus its resources on the establishment of effective administrative and financial management systems. These program delivery support systems would in turn enhance the authority's capacity to provide wastewater services.

- Criterion 6 - Active Citizen Involvement. As discussed, a substantive citizen participation process would be lacking under this alternative. Although an authority would be required to fulfill the public participation standards of P.L. 92-500, the impact of that process on the authority's decision-making structure would be marginal.

- Criterion 7 - Political Feasibility. The acceptance of

this alternative is unlikely. Past attempts to establish powerful, independent authorities has met serious opposition. Many legislators and citizen groups would regard an authority as an improper entity for areawide wastewater management.

Authorities have only been accepted as viable solutions when the magnitude and cost of the service to be provided are clearly beyond the bureaucracy's capacity. This type of entity is usually established only following the demonstrated inability of other entities to perform. At the present time, although sewage disposal constitutes a major environmental problem, other entities appear capable of providing the service.

RECOMMENDATION

No attempt should be made to advance this alternative unless all other options are deemed inappropriate.

D. ORGANIZATIONAL VARIATIONS FOR WASTEWATER MANAGEMENT

The five basic organizational alternatives described in the preceding section represent the principal alternatives for wastewater management in the EMMA. Modified versions of these alternatives based on restructured modes of operation, service areas, or governing bodies may also be viable options for providing sewage treatment and disposal services.

Four variations are briefly outlined in this section:

- non-profit single-purpose public utility;
- federation of independent single-purpose sewer districts;
- dual-purpose water and sewer district; and
- statewide authority.

Any of these variations can be further developed if considered a near-term preferred alternative or a future evolutionary option of the selected entity.

NON-PROFIT SINGLE-PURPOSE PUBLIC UTILITY

A utility would have all the characteristics of an authority except that it would:

- practice retail mode of service, with charges assessed against individual users or classes of users (generally based on metered water consumption);
- use revenue bond financing for capital facilities more extensively;
- be subject to approval and regulation of rates by higher level authorities;
- maintain relatively large Board of Directors composed of both municipal officials and gubernatorial appointees;
- have fixed boundary and clearly defined service area; and
- assess fees and charges for all additional services other

than those factored in the rates for operation and maintenance costs.

A utility would be able to utilize the user charge system of apportioning costs and would therefore be clearly consistent with the provisions of P.L. 92-500. However, it would be restricted in its authority to expand the service area in correspondence with the needs of the municipalities in the MSD. One factor limiting the capacity of the entity to apply the user charge system efficiently would be its reliance upon the numerous municipal water companies and independent purveyors that provide water supply and distribution services for water consumption information.

The utility would be responsible for providing wastewater services throughout the entire region, but would not be concerned with other programs or services. This single-purpose approach might inhibit a comprehensive, integrated approach to areawide wastewater managment. Since a number of agencies would be responsible for certain critical elements of the wastewater planning, management, and service delivery system, a utility would be limited in its ability to carry out an effective program.

The administrative requirements for this option would be costly. The installation of meters and their maintenance, the establishment of a direct billing concept for individual users, and the need to enter the bond market more frequently with different types of negotiable instruments (e.g., general obligation bonds, revenue bonds, notes in anticipation of revenue) would all require highly trained staff able to conduct the utility's complex financial negotiations.

Although the utility would be non-profit, it would be required to maintain financial self-sufficiency. Consequently, present basic charges for wastewater management services would increase in the utility's first two years of operation. Additional administrative expenses would also have to be factored into the basic charges for individual users.

The utility would require eminent domain authority to carry out its construction program. Rather than a state, regional, or local governmental entity, the utility would be a quasi-political entity established by the enabling legislation providing general wastewater services throughout the area.

Evaluation

A utility would be able to satisfy all the criteria for

wastewater management except the following:

- support of other governmental institutions;
- active citizen involvement; and
- political feasibility.

Therefore, it would be difficult to implement regardless of any advantages it might offer.

FEDERATION OF INDEPENDENT SINGLE-PURPOSE SEWER DISTRICTS

This variation is an extension of Alternative B (i.e., single-purpose regional district). Its fundamental characteristics include:

- several independent wastewater treatment districts throughout Eastern Massachusetts joined together for the common purpose of providing areawide services;
- governing body responsible for overall policy composed of representatives from each of the special purpose districts within the region;
- division of the MSD service area into two or more districts for administrative purposes;
- establishment of core staff of generalists responsible for providing overall planning services throughout the region;
- stipulation that each region satisfy specific management entity requirements of Section 208 of P.L. 92-500; and
- establishment of management board for each district to determine rates, approve bond issues, and formulate wastewater treatment policy.

Under the federated approach, a central administrative unit would be responsible for providing financial and planning coordination services to each of the independent districts. Operations would be handled at the district level, although the policies governing those operations would be established by the federated governing body consistent with the standards of P.L. 92-500 and DWPC regulations. Costs for central services would be apportioned

to the independent districts according to actual use, and all charges would be factored into each district's costs for subsequent apportionment to the member municipalities.

A close relationship with MAPC would be essential to the effective functioning of this two-tier federation. MAPC's responsibility for Section 208 planning and its general statutory mandate to provide comprehensive areawide planning services would have a significant impact on all aspects of the federation's programs. Since the federation's boundaries would be consistent with those of MAPC, some level of planning coordination would be possible. Future areawide planning responsibility would continue to rest with the regional planning agency.

Each district would be responsible for financing both operation and maintenance and capital costs. Determination of those costs would be the responsibility of each independent distrct, although the central administrative tier of the federation would handle the actual billing. Similarly, bond sales could be aggregated at the central administrative unit to derive the most favorable interest rate for the overall district.

This organizational variation would be the most appropriate when new independent treatment districts are formed. At the present time, MDC is the only areawide service provider. However, smaller municipal plants are being approved and constructed.

If this variation were adopted as a near-term option, coordination of new Section 201 construction activities and the general operations of all treatment works by municipalities outside the MSD service area might be difficult. Accordingly, until the entire area is covered with the number and types of treatment districts required, this alternative cannot be implemented. When feasible, it could be implemented in a manner that satisfies the criteria for a wastewater management entity and achieves the goals and objectives for the operations and financing functions. It would not, however, be able to accomplish the goals and objectives for planning, monitoring, or enforcement. Finally, it should be noted that a federated approach is usually established to coordinate a number of functions rather than a single function in a multipurpose setting.

Evaluation

A federation of districts would be a logical future structure for wastewater management only if the near-term option selected is

the single-purpose district (i.e., Alternative B). One of the benefits of this approach is its encouragement of rational utilization of available resources by distinguishing between central administrative and support service costs and treatment plant operation costs.

A two-tiered federation would also permit distribution of responsibility for aspects of functions between governmental levels. Local agencies would be assigned responsibility for certain activities, and the next higher level would assume responsibility for programs and actions having areawide implications. Although this two-tiered federation plan is usually associated with a regional/local distribution, it is adaptable to the regional/sub-regional system described for this variation.

DUAL-PURPOSE WATER AND SEWER DISTRICT

MDC's current water and sewer responsibilities would continue to be jointly administered, but by an independent regional district. The district could thus provide these services as aspects of a combined water resource management program.

Staff from all current MDC divisions (including construction and engineering) would be transferred to this new entity, which would assume full responsibility for areawide service. The proposed boundary for the MSD would represent the outside boundary for wastewater management service. The municipalities currently providing their own water service would be offered the option of either continuing to do so or joining the combined areawide entity. Western Massachusetts communities now served by MDC would continue to be serviced under contract with this new entity.

This variation represents a compromise between the single-purpose regional district (Alternative B) and the multi-purpose plan (Alternative C). By addressing the related issues of water and sewage jointly, the variation would be able to respond effectively to the water pollution control and wastewater management standards established in P.L. 92-500.

MAPC would continue to be responsible for Section 208 planning. Responsibility for facilities planning under Section 201, however, would be assumed by the dual-purpose entity. Sewage treatment facilities would be designed to improve both the water quality and water supply capacity of the district's water division.

Greater economies of scale would be possible through combination of these two program elements in a single management structure.

However, combination of program elements at the highest level of the regional district would require corresponding combination at both the supervisory and operating levels. Consequently, state agency responsibility for supervising the activities of the dual-purpose district would be most efficiently conducted by a single entity. This would be possible at the state level since the Executive Office of Environmental Affairs now incorporates the major supervisory agencies that deal with both wastewater management and water supply. The Water Resources Commission within that secretariat would be the principal agency of the Commonwealth responsible for coordinating the activities of the water and sewer district.

At the local level, the combination of water and sewer activities would present difficulties. Municipal water supply and distribution are performed by numerous independent districts and privately owned water companies. The difficulty associated with coordinating water and sewer activities at this level would affect the capacity of the dual-purpose entity to provide quality, integrated services to the 51 cities and towns constituting the service area.

The capacity to establish other combined districts between the service area boundary and the EMMA's outside boundary would be severely restricted. The legal status, level of maturity, financing mechanisms, and staff capabilities for sewage collection, while somewhat inadequate, are far greater than those available for water supply and distribution. Accordingly, this option would provide no capacity to expand and achieve additional economies of scale.

Finally, since the source of water for most of the 51 municipalities within the combined district is outside the proposed jurisdictional boundary of the dual-purpose entity, the specific benefits of relating water supply and quality issues to sewage treatment and disposal issues would not be decisive. The lack of direct programmatic interrelationships between water quality and treatment levels would constitute a physical constraint on the selection of this variation for areawide wastewater management.

Evaluation

A dual-purpose district would offer significant benefits if

the water supply source were located within the sewer service area. Under those circumstances, an integrated water resource management program could be developed. Under existing conditions, however, this would not be possible.

MDC's experience in carrying out a program for water supply and sewage treatment does not necessarily justify the conclusion that a dual-purpose entity could perform these same responsibilities. A greater degree of integration would be required under this variation than under the current MDC arrangement.

This variation would be difficult to implement as a combined management entity without extra-territorial powers to control the integrity of the water supply and permit water division projects from other areas of the state. It is unlikely that the legislature would provide this power without retaining rights of continuing review and approval. This situation would reduce the entity's necessary policy formulation, planning, programming and service delivery flexibility.

STATEWIDE AUTHORITY

This option is a variation of Alternative A, a state agency responsible for wastewater management. By reconstituting a state agency as a state authority with flexible and independent bonding power, the state would be able to coordinate all water quality activities through a single powerful authority with statewide jurisdiction. The differences between Alternative A and this option relate primarily to administrative and organizational features rather than specific modes of operation. Planning, financing, monitoring, and enforcement would remain the same.

Wastewater management districts would be created throughout the state, although the basic powers, duties, and responsibilities relating to statewide wastewater management would rest with the authority. A five-member board appointed by the Governor would form the executive body.

Massive coordination problems could result from this variation. It is unlikely that participating municipalities would achieve economic efficiency. Furthermore, signficant increases in the level and technical competence of the staff would be required to implement this variation. The costs associated with such personnel upgrading could seriously diminish the efficicies and economies expected from areawide wastewater management. The scope of the authority's jurisdiction would be so extensive that it would inhibit regional problem definition and resolution

on matters relating to sewage treatment and disposal.

A single state authority would be able to perform financing and operations functions effectively. Each treatment district would utilize the state authority to facilitate the sale of bonds which would be repaid through assessments against the member municipalities. Revenue bond financing would not be required.

The authority's role would be similar to that of a bond-bank, without the need for a separate credit rating. Since the authority would utilize the state's bonding procedure and credit rating, it would not be a separate financing authority. Operations would be handled by each treatment district subject to the policies and procedures of the state authority. Assistance would be made available to new or smaller districts by the technical staff of either the authority or by more experienced entities.

Other administrative functions (e.g., purchasing, billing) could be handled centrally by the authority's support staff. This would reduce the overall costs of each treatment entity and ensure greater economies of scale.

Evaluation

A statewide authority would present timing and coordination problems for effective wastewater management. Although responsibility for operations would rest with the treatment districts, overall authority would remain at the state level. Consequently, the inter-governmental cooperation essential to coordinated management would be difficult to achieve.

To function effectively, the authority would have to be freed from many traditional legislative and administrative controls. This would immediately separate the entity from other regional and state agencies that share responsibility for wastewater management. Inter- and intra-governmental relations might be difficult to sustain.

A statewide system would also present unique management problems since the treatment and disposal requirements for each area of the state are unique. Some areas might be most appropriately assisted through improved zoning, while others might need better control of on-site septic systems. The variety of options would create difficulties in the administration of a statewide wastewater program, as well as require additional staff specialists.

In conclusion, this variation presents major coordination problems and should be considered only in the absence of any other viable option.