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APRIL, 1981

ENVIRONMENTAL PROTECTION AGENCY  
BORN • CHICAGO, IL 60604 • WATER DIVISION

DEPARTMENT OF NATURAL RESOURCES  
BOX 7921 • MADISON, WI 53707 • BUREAU OF ENVIRONMENTAL IMPACT



# **Environmental Impact Statement**

# **Final Executive Summary**

## **Milwaukee Water Pollution Abatement Program**





EPA-5-WI-MILWAUKEE-WWTP/INT

FINAL ENVIRONMENTAL IMPACT STATEMENT  
MILWAUKEE METROPOLITAN SEWERAGE DISTRICT  
WATER POLLUTION ABATEMENT PROGRAM

Prepared by the

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION V

CHICAGO, ILLINOIS

and

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

MADISON, WISCONSIN

with the assistance of

ESEI - ECOLSCIENCES ENVIRONMENTAL GROUP

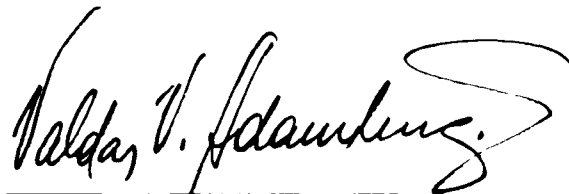
MILWAUKEE, WISCONSIN

APRIL 1981

U.S. Environmental Protection Agency  
Region V, Library  
230 South Dearborn Street  
Chicago, Illinois 60604

SUBMITTED BY:

HOWARD S. DRUCKENMILLER  
DIRECTOR  
BUREAU OF ENVIRONMENTAL IMPACT  
DEPARTMENT OF NATURAL RESOURCES



VALDAS V. ADAMKUS  
ACTING REGIONAL ADMINISTRATOR  
ENVIRONMENTAL PROTECTION AGENCY

North Milwaukee Library  
3310 West Villard Avenue  
Milwaukee, WI 53209

Oklahoma Library  
3501 West Oklahoma Avenue  
Milwaukee, WI 53215

Tippecanoe Library  
3912 South Howell Avenue  
Milwaukee, WI 53207

Oak Creek Public Library  
3620 South Howell Avenue  
Oak Creek, WI 53154

Shorewood Public Library  
2030 East Shorewood Blvd.  
Shorewood, WI 53211

Wauwatosa Public Library  
7635 West North Avenue  
Wauwatosa, WI 53213

West Allis Public Library  
1508 South 75th St.  
West Allis, WI 53214

Whitefish Bay Library  
5420 North Marlborough Drive  
Whitefish Bay, WI 53217

MATC North Campus  
5555 West Highland Road  
Mequon, WI 53092

Brown Deer Public Library  
5600 West Bradley Rd.  
Brown Deer, WI 53233

Greendale Public Library  
5666 Broad Street  
Greendale, WI 53129

Hales Corners Public Library  
5335 South 107th St.  
Hales Corners, WI 53130

Milwaukee Public Library  
814 West Wisconsin Avenue  
Milwaukee, WI 53233

Atkinson Library  
1960 W. Atkinson Avenue  
Milwaukee, WI 53209

East Library  
1910 E. North Avenue  
Milwaukee, WI 53205

Finney Library  
4243 West North Avenue  
Milwaukee, WI 53208

Forest Home Library  
1432 West Forest Home Avenue  
Milwaukee, WI 53204

Llewellyn Library  
907 East Russell Avenue  
Milwaukee, WI 53207

Mill Road Library  
6431 North 76th St.  
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MATC South Campus  
6665 South Howell Avenue  
Oak Creek, WI 53154

Marquette University Library  
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Milwaukee, WI 53233

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1025 North Milwaukee Street  
Milwaukee, WI 53201

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125 East Wells Street  
Milwaukee, WI 53202

Legislative Reference Bureau Library  
200 East Wells Street  
Milwaukee, WI 53202

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1900 Calhoun Road  
Brookfield, WI 53005

Elm Grove Public Library  
13600 West Juneau Blvd.  
Elm Grove, WI 53122

Maude Shunk Public Library  
P. O. Box 347  
Menomonee Falls, WI 53051

Muskego Public Library  
W182 S8200 Racine Avenue  
Muskego, WI 53150

New Berlin Public Library  
14750 West Cleveland Avenue  
New Berlin, WI 53150

Capital Library  
7413 W. Capitol Dr.  
Milwaukee, WI 53216

Martin Luther King Library  
310 W. Locust Avenue  
Milwaukee, WI 53212

Cudahy Memorial Library  
4665 S. Packard Avenue  
Cudahy, WI 53110

South Milwaukee Public  
Library  
1907 Tenth Avenue  
South Milwaukee, WI 53172

Center Library  
2620 W. Center St.  
Milwaukee, WI 53206

Butler Public Library  
12621 W. Hampton Avenue  
Butler, WI 53007

Duerrwaechter Memorial  
Library  
W 162 N 11810 Park Ave.  
Germantown, WI 53022

Franklin Public Library  
9229 W. Loomis Avenue  
Franklin, WI 53132

CHAPTER 1  
EXECUTIVE SUMMARY

## CHAPTER 1 - EXECUTIVE SUMMARY

### 1.1 INTRODUCTION

This Final Environmental Impact Statement (FEIS) addresses the Master Facilities Plan (MFP) proposed by the Milwaukee Metropolitan Sewerage District (MMSD) for the sewerage facilities within its planning area (Figure 1.1). The MMSD must meet the effluent limits established by the United States Environmental Protection Agency (EPA) and the Wisconsin Department of Natural Resources (DNR), and must also comply with two court orders. The orders require the MMSD to implement the following:

- . Discharges of raw or inadequately treated wastewater to area waters must be eliminated
- . Wastewater treatment plants must be improved to meet effluent limits so that receiving waters meet water quality goals
- . The solids removed from the wastewater must be disposed of in an acceptable way.

These goals must be achieved within a court established schedule.

To reduce the local costs of correcting its water pollution problems, the MMSD applied to the EPA for federal grant assistance under Section 201 of the Clean Water Act of 1977. The provisions of this Act require that facilities must be designed to incorporate the most economical means of meeting established water quality goals while recognizing environmental and social considerations. The National Environmental Policy Act of 1969 (NEPA) requires that an EIS must be prepared for major federal actions which could significantly affect the natural and man-made environments. Approval of the MFP has been determined to be such a major federal action.

The DNR must also approve many aspects of the MFP. The MMSD has requested state grant funding for parts of the MFP. Because of this state involvement, the Wisconsin Environmental Policy Act (WEPA) requires the preparation of an EIS.

An EIS analyzes the proposed action, reasonable alternatives, and their anticipated effects upon the environment. To minimize the duplication of efforts, this Final EIS was prepared as a joint EPA/DNR document.

The public is invited to comment on this Final EIS. Comments will be received from the date of its release through May 17, 1981. As required by state law, a public hearing on the Final EIS will be held in Milwaukee in May of 1981 to provide a forum for public comment. The comments and concerns expressed by citizens, EPA and DNR will be used to develop a Record of Decision for the MFP. The Record of Decision will set forth the EPA and DNR decision to approve, conditionally approve, or disapprove the MFP.

#### 1.1.1 The Problem

For the most part, the sewers in the MMSD service area are adequate for conveying domestic and industrial wastewater. The problem is the entry of groundwater (infiltration) and storm runoff (inflow) through cracked or broken sewer pipes, leaking manhole covers, faulty sewer connections, illegal connections of sumps and tile drains, and other sources. Infiltration and inflow (I/I) can greatly increase the flows in the sewerage system resulting in bypasses and overflows to area rivers and Lake Michigan.

During wet weather, the volume of wastewater and its rate of entry into the sewerage system in the MMSD service area often exceeds the sewers' capacity to transport wastewater to the treatment plants. As a result, in a year of average rainfall, 6.4 billion gallons of storm water and untreated sewage overflow into area waters. In addition, wastewater flows to the area's treatment plants exceed their capacity, resulting in violations of DNR effluent limitations.

There are two types of sewer systems conveying wastewater in the MMSD planning area. About 6% of the sewers in Milwaukee County, serving approximately 47% of its population, are combined sewers. They were designed to transport the storm runoff entering the system through roof leaders, street drains, and other connections, as well as industrial and domestic wastes. To prevent sewer backups, the Metropolitan Interceptor Sewer (MIS) system is designed to allow untreated wastewater from the combined sewers to overflow into surface waters when the capacity of the MIS is exceeded.

Separated sewers serve other portions of the MMSD service area. With this type of system, storm water is collected in one set of pipes and conveyed directly to the waterways. Domestic and industrial wastewater is conveyed separately to treatment facilities. Ideally, the flows in the sanitary sewers should not be affected by rainfall and infiltration of groundwater. However, some parts of the sanitary sewer system have deteriorated, allowing storm water and groundwater to seep into the sewers and manholes. In many buildings,





drains or sumps have been illegally connected to the sanitary sewer. As a result, I/I does enter the sanitary sewers. To prevent the backup of sewage into basements, sanitary sewers are also equipped with flow relief devices which discharge untreated sewage mixed with I/I into the area waterways.

In addition to causing combined sewer overflows and bypasses from the separated sewers, excessively high flows impair the operation of a wastewater treatment plant (WWTP). If the flow to the Jones Island and South Shore plants exceeds their capacity, wastewater must either be bypassed before treatment or after partial treatment. At Jones Island, the preliminary treatment and solids handling facilities are inadequate to handle flows greater than 140 million gallons per day (MGD) ( $6.1 \text{ m}^3/\text{sec.}$ ). The preliminary and primary treatment facilities at South Shore can handle peak capacities of 320 MGD ( $14 \text{ m}^3/\text{sec.}$ ). Secondary facilities bypass wastewater at flows over 240 MGD ( $10.5 \text{ m}^3/\text{sec.}$ ).

There are other sources of pollution to the waters of the area. Urban and rural runoff contains organic matter, pesticides and heavy metals. As part of their Water Quality Management (208) Plan, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) has recommended that pollutant loadings from non-point sources (urban and agricultural runoff) be reduced by a minimum of 25%. SEWRPC has designated each community within the MMSD planning area responsible for implementing the urban non-point source control measures to achieve this reduction of runoff pollution by 25%.

Combined sewer overflows, bypasses from the separated sewers, and non-point source loadings have resulted in the introduction and accumulation of pollutants and disease-producing organisms (pathogens) into area waters. Water quality in the MMSD service area is degraded by nutrients that stimulate plant growth and by organic pollutants which deplete the level of oxygen in the water. A potential health hazard is created by the pathogens and toxic substances including heavy metals.

#### 1.1.2 Master Facilities Plan

The preparation of the Master Facilities Plan, which is also referred to in this EIS as the Milwaukee Water Pollution Abatement Program (MWPAP), has been required by state and federal legislation and by two court cases. The Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act of 1977 establish national water quality goals. Patterned after the federal legislation, Chapter 147 of the Wisconsin Statutes establishes the same goals. The Clean Water Act and Chapter 147 mandate the achievement by 1983 of fishable

and swimmable levels of water quality in the waters of the Nation and State. Chapter 144 of the Wisconsin Statutes requires the planning and approval of wastewater treatment facilities designed to achieve these water quality standards.

In addition to federal and state guidelines, preparation of the MFP has been governed by two court orders. In December 1974, the MMSD challenged DNR effluent limitations for the Jones Island and South Shore treatment plants. In response, the DNR initiated a counter suit. These actions resulted in a stipulation in the Dane County Circuit Court setting a schedule of compliance for the MMSD. The following deadlines were established:

1. Improvements to Jones Island and South Shore WWTPs must be completed by July 1, 1982
2. The solids management program at the two WWTPs must be in operation by July 1, 1982
3. All dry weather overflows and bypasses must be eliminated by July 1, 1982.
4. All wet weather bypasses from the separated sewers must be eliminated by July 1, 1986
5. The combined sewer overflow (CSO) problem must be corrected, and applicable water quality standards must be met by July 1, 1993.

In 1971, the States of Michigan and Illinois charged that the MMSD and the City of Milwaukee were endangering the public health by improper wastewater disposal. The case was heard in the United States District Court for the Northern District of Illinois, and that court's decision was appealed to the United States Seventh Circuit Court of Appeals. The result of these proceedings was the Court's reaffirmation of the EPA and DNR effluent limitations, and the requirements that all dry and wet weather bypasses from separated sewers be eliminated by July 1, 1986 and that combined sewer overflows cease by December 31, 1989. The MMSD and the City of Milwaukee have appealed the scope and schedule of the CSO abatement project to the United States Supreme Court. It is expected that a decision will be rendered by the middle of 1981.

The MFP is a complex set of programs devised to comply with federal and state legislation and the two court orders. The requirements applicable to the plan include the following:

1. Detailed evaluation of different approaches to wastewater treatment for the MMSD planning area shown in Figure 1.1

2. Reduction of infiltration and inflow (I/I) by the rehabilitation of the sewer system. A sewer system evaluation survey (SSES) is now being completed. The SSES provides detailed information about the sources of I/I and the costs of reducing these sources. The SSES is used to determine the level of I/I removal which will minimize the total cost of conveying and treating I/I
3. Evaluation of alignments of interceptor sewer extensions to serve the areas designated in the Regional Land Use Plan
4. Evaluation of methods to expand and rehabilitate the Jones Island and South Shore wastewater treatment plants
5. Development of a total solids management program to determine methods to process and dispose of the solids removed from the wastewater
6. Abatement of combined sewer overflows (CSO) by the date established by the U. S. Supreme Court.

Numerous alternatives were developed for each component project of the MFP. In this summary, only those alternatives found to be the most feasible will be discussed.

#### 1.1.3 MMSD Recommended Plan and Feasible Alternatives

As part of the preparation and adoption of the Master Facilities Plan, the MMSD, as required by federal and state regulations, recommended alternatives for each major planning element. These major elements are as follows:

1. CSO Abatement and Peak Flow Attenuation
2. Wastewater Treatment
3. Solids Handling
4. Wastewater conveyance.

##### 1.1.3.1 CSO Abatement and Peak Flow Attenuation

The I/I study estimated that a 50% reduction of I/I would be less expensive than expanding area wastewater treatment facilities to treat the peak volume of I/I and wastewater. However, even with this reduction, wet weather flows to the wastewater treatment plants (WWTPs) would exceed their capacity. Because the court orders require the elimination

of all separated sewer bypasses, all flows tributary to this system would require treatment. Since the peak flows would exceed the capacity of the WWTPs, some storage would be needed for wastewater volumes in excess of treatment plant capacity. The stored wastewater would be pumped to the WWTPs when treatment capacity became available.

It was apparent that the facilities for storing excess flows from the separated sewer service area could also be used to abate CSO. Therefore, the MMSD evaluated joint-use facilities. The alternatives considered to be the most feasible for this joint purpose are described in Table 1.1. The MMSD recommends the Inline Storage Alternative.

#### 1.1.3.2 Wastewater Treatment

There are nine public wastewater treatment facilities in the MMSD planning area. Approximately 95% of the dry weather wastewater flow in the planning area is tributary to the Jones Island and South Shore WWTPs. The remaining dry weather flow is treated at public WWTPs in Thiensville, Germantown, New Berlin, Muskego (2 WWTPs), South Milwaukee, and the Caddy Vista subdivision in Caledonia.

Three organizational strategies were used to evaluate wastewater treatment for the MMSD planning area. These strategies, or system-levels, are described below:

1. The Local System-Level: The present localized approach to areawide wastewater treatment would continue. The Jones Island and South Shore WWTPs would serve Milwaukee County and some communities outside the County (contract communities). Other communities would operate their own wastewater treatment facilities.
2. The Subregional System-Level: The Milwaukee area would be divided into three smaller subregions. Each subregion would be responsible for operating its own wastewater treatment facilities. The Subregional System-Level Alternatives were eliminated from consideration because of cost and impacts on water quality.
3. The Regional System-Level: The MMSD would be responsible for treating all wastewater flows in the planning area. The flows would be treated at one or more WWTPs.

Strategies for CSO abatement were evaluated independently of the development of wastewater treatment strategies. The alternative considered to be the most feasible for each public wastewater treatment facility in the planning area is shown in Table 1.2.

TABLE 1.1

FACILITIES FOR CSO ABATEMENT AND  
PEAK FLOW ATTENUATION

Remote Storage	<ul style="list-style-type: none"> <li>• Complete sewer separation in 11% of the CSSA. No work on private property.</li> <li>• Partial sewer separation* in 18% of the Combined Sewer Service Area (CSSA). 757 acre-feet of storage provided for excess flows at a cavern storage site near 58th and State Streets.</li> <li>• Complete separation in 48% of CSSA; excess flows tributary to 236 acre-feet of near-surface storage.</li> <li>• Excess flows from separated sewers stored at the storage cavern at 58th and State Streets.</li> </ul>
Jones Island Storage	<ul style="list-style-type: none"> <li>• Complete separation in 11% of the CSSA. No private property work required.</li> <li>• Complete separation in 48% of the CSSA with necessary private property work.</li> <li>• Partial sewer separation in 41% of the CSSA. Excess flow stored in 437 acre-feet of near-surface storage.</li> <li>• Excess flows from the separated sewers stored in a 550 acre-feet cavern near the Jones Island treatment plant.</li> </ul>
CST Extension	<ul style="list-style-type: none"> <li>• Complete sewer separation in 11% of the CSSA. No private property work.</li> <li>• Partial sewer separation in 21% of the CSSA. Excess flows tributary to 235 acre-feet of near-surface storage.</li> <li>• No sewer separation in 68% of the CSSA. Excess flows tributary to 30-foot tunnels in bedrock and 1,334 acre-feet of cavern storage near Jones Island.</li> <li>• Excess flow from separated sewers tributary to 30-foot diameter tunnels and cavern storage.</li> </ul>
Inline Storage	<ul style="list-style-type: none"> <li>• Complete separation in 11% of the CSSA. No private property work.</li> <li>• Partial separation in 68% of the CSSA. Excess flows tributary to 20-foot diameter tunnels in bedrock and 767 acre-feet of cavern storage near Milwaukee County stadium.</li> <li>• Partial separation in 21% of the CSSA with 235 acre-feet of near-surface storage.</li> <li>• Excess flow from the separated sewers tributary to 20-foot diameter tunnels and cavern storage facility.</li> </ul>

\*Partial Separation - New pipes would be constructed to convey storm water from street drains directly to a waterway. Sewage and storm water from drains on private property (e.g., roof leaders) would be combined and conveyed to a treatment facility.

TABLE 1.2

MMSD RECOMMENDATIONS FOR WASTEWATER  
TREATMENT PLANTS (LOCAL ALTERNATIVES)

Jones Island	<ul style="list-style-type: none"> <li>. Expand treatment capacity to 300 million gallons per day.</li> <li>. Wastewater Treatment by Secondary Activated Sludge Process.</li> <li>. Disinfection by chlorination.</li> <li>. Site expansion by filling in 9.5 acres of Lake Michigan and using approximately 9 acres of Harbor Commission land.</li> </ul>
South Shore	<ul style="list-style-type: none"> <li>. Expansion of South Shore to 250 million gallons per day.</li> <li>. Wastewater Treatment by Secondary Activated Sludge Process.</li> <li>. Disinfection by chlorination.</li> <li>. Site expansion by enclosing 30 acres of Lake Michigan. At this time, 12 acres would be filled in. The remaining 18 acres would be filled as needed.</li> </ul>
Caddy Vista Subdivision	<ul style="list-style-type: none"> <li>. Existing facility would be demolished.</li> <li>. An advanced wastewater treatment plant would be constructed on the site.</li> <li>. Effluent would be discharged at the Root River.</li> </ul>
Germantown	<ul style="list-style-type: none"> <li>. Abandon existing facilities.</li> <li>. A new land application facility will be constructed on the site.</li> </ul>
Muskego Northeast	<ul style="list-style-type: none"> <li>. Abandon existing facility wastewater flows would be pumped to Vernon, Wisconsin, treated in aerated lagoons and discharged to infiltration-percolation ponds.</li> </ul>
Muskego Northwest	<ul style="list-style-type: none"> <li>. Facility would be abandoned. Wastewater flows would be combined with flows from Muskego Northeast and treated at the Vernon site.</li> </ul>
New Berlin Regal Manors	<ul style="list-style-type: none"> <li>. New aerated lagoon facility built at a site at Sunny Slope and Grange Streets.</li> <li>. Effluent transported to infiltration-percolation site in Vernon.</li> </ul>
South Milwaukee	<ul style="list-style-type: none"> <li>. No expansion.</li> <li>. Operation and maintenance procedures would be improved.</li> </ul>
Thiensville	<ul style="list-style-type: none"> <li>. Expand wastewater treatment capacity.</li> <li>. Treatment by existing processes.</li> <li>. Discharge of effluent to the Milwaukee River.</li> </ul>

For the Local System-Level, all the WWTPs listed in the table would be in operation. For the Regional Alternative, only the Jones Island and South Shore facilities would continue operating. The No Action Alternative (continuing the present sewerage system with no improvements) was also considered for comparison.

The MMSD's Recommended Alternative (referred to as the Mosaic Alternative in this EIS) combines aspects of the Local and Regional System-Levels. With the Mosaic Alternative, the Jones Island and South Shore treatment facilities would serve the entire planning area, except for South Milwaukee which would operate its own facility. All other public WWTPs would be abandoned. The MMSD recommends that two private wastewater treatment plants, School Sisters of Notre Dame and Wisconsin Electric Power Company also continue operations, and that the Muskego Rendering Company operate its own facilities for pretreatment of effluent before discharge to the local sewer system.

#### 1.1.3.3 Solids Handling

Closely related to the issue of expanding the Jones Island and South Shore WWTPs is the problem of disposing of the solids removed from the wastewater during treatment. Most of the solids from the Jones Island WWTP are now processed into the fertilizer Milorganite (about 70,000 tons per year). Any solids in excess of the capacity of the Milorganite process are landfilled (approximately 3,400 tons per year).

For most of the year, the solids from the South Shore WWTP (approximately 33,500 tons) are applied to agricultural land. However, after the growing season, when the ground is frozen, the sludge must be landfilled (about 10,500 tons per year).

The MMSD considered alternatives including landfill, land application, incineration, and composting for disposal of the solids from the two WWTPs. For the Jones Island WWTP, the MMSD proposes abandoning the production of Milorganite because it is energy intensive and contributes to air pollution in the Milwaukee area. (Milorganite production has been responsible for about 6% of Milwaukee County's annual input of particulates to the air.) Instead, landfilling of all solids was recommended. For the South Shore WWTP, land application was recommended. Solids from the South Shore plant would be stored during the winter for land application over the growing season.

The MMSD is currently preparing a facilities plan which will identify specific sites for solids disposal. A supplemental EIS on this facilities plan will be prepared by the EPA and DNR. The supplemental EIS will give special consideration to the impacts of site specific alternatives on the natural and man-made environments. It is currently anticipated that the Site Specific EIS supplement on agricultural spreading and landfill will be completed in mid-1984.

#### 1.1.3.4 Wastewater Conveyance

The MFP evaluates alternatives for conveyance of wastewater to WWTPs from communities and areas served by MMSD. The particular facilities and their configurations vary under each system-level alternative, and they are listed in Table 1.3. The facilities are the following interceptors: Franklin Northeast, Underwood Creek, Root River, Hales Corners, Franklin-Muskego, Oak Creek North, and Menomonee Falls-Germantown.

### 1.2 THE DRAFT EIS

#### 1.2.1 EIS Alternatives

##### 1.2.1.1 CSO Abatement and Peak Flow Attenuation

There are many controversial aspects to the Inline Storage alternative for abating CSO and attenuating peak flows. The partial and complete separation of sewers in the entire combined sewer service area (CSSA) would disrupt traffic and business. With partial and complete separation, urban runoff which contains organic pollutants and heavy metals would still be discharged into the lower reaches of the Milwaukee, Menomonee and Kinnickinnic rivers, and instream water quality standards might not be achieved. Also, the public has expressed concern over the potential for temporary and long-term impacts to groundwater from cavern storage facilities. In response to those concerns, the EIS has evaluated three other alternatives for CSO abatement and peak flow attenuation. These alternatives are described in Table 1.4.

TABLE 1.4

#### EIS ALTERNATIVES FOR CSO ABATEMENT AND PEAK FLOW ATTENUATION

Complete Sewer Separation	<ul style="list-style-type: none"><li>• All combined sewers completed separated</li><li>• Excess flow from the separated sewers would be stored in 20-foot diameter tunnels prior to transport to the WWTPs for treatment</li></ul>
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TABLE 1.3

INTERCEPTORS ASSOCIATED WITH  
DIFFERENT SYSTEM-LEVEL ALTERNATIVES

Local	. Northeast Side Relief System
Alternative	. Underwood Creek
	. Root River (Short Route)
	. Franklin Northeast
	. Oak Creek North
	. Franklin-Muskego (Franklin branch only)
Regional	. Northeast Side Relief System
Alternative	. Underwood Creek
	. Root River
	. Hales Corners
	. Franklin-Muskego
	. Franklin Northeast
	. Oak Creek North
	. Menomonee Falls-Germantown
Mosaic	. Northeast Side Relief System
Alternative	. Underwood Creek
(MMSD's	. Root River
Preferred	. Hales Corners
Alternative)	. Franklin-Muskego
	. Franklin Northeast
	. Oak Creek North
	. Menomonee Falls-Germantown

- |                              |  |
|------------------------------|--|
| Modified<br>CST/<br>Inline   | <ul style="list-style-type: none"> <li>• Complete sewer separation in 11% of the CSSA. Private property work required.</li> <li>• Partial sewer separation in 21% of the CSSA. Excess flows in the sanitary sewers stored in 235 acre-feet<sup>1</sup> of near-surface storage.</li> <li>• No sewer separation in 68% of the CSSA. Excess flow tributary to 30-foot diameter tunnels in bedrock and 1291 acre-feet of cavern storage at Milwaukee County Stadium.</li> <li>• 174 acre foot storage cavern at the Jones Island WWTP.</li> </ul> |
| Modified<br>Total<br>Storage | <ul style="list-style-type: none"> <li>• Complete separation in 11% of the CSSA. No private property work.</li> <li>• No sewer separation in the remaining portions of the CSSA. The flows from 68% of the CSSA would be tributary to 30-foot tunnels in bedrock and 1291 acre-feet of cavern storage at Jones Island.</li> <li>• Flows from the remaining 21% tributary to 715 acre-feet of near surface storage.</li> </ul>  |

<sup>1</sup>Acre-foot - "The volume that would cover one acre to the depth of 1 foot." (Webster's New Collegiate Dictionary, Springfield, MA; G & C Merriam Company, 1977.)

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The costs of the alternatives for the abatement of CSO and the attenuation of peak flows are shown in Table 1.5.

TABLE 1.5

COSTS (IN \$ MILLIONS) OF CSO/PEAK FLOW ALTERNATIVES

<u>Alternative</u>	<u>Capital Costs</u>	<u>Operation and Maintenance</u>	<u>Net* Present Worth</u>
Inline Storage	\$ 1658.53	\$ 27.01	\$ 1899.86
Complete Separation	1688.45	26.83	1968.22
Modified CST/Inline	1664.98	27.97	1931.50
Modified Total Storage	1682.56	28.48	1956.44

\*Net Present Worth includes the construction and materials costs, financing costs and operating costs through the year 2005.

The cost estimates for these alternatives are within the margin of error for the methods used in their calculation and are therefore considered equivalent. Thus, the decision to implement one of the alternatives will be based on factors other than cost.

## 1.2.2 Environmental Consequences

### 1.2.2.1 No Action Alternative

The alternatives considered in the MFP and EIS are complex solutions for a number of problem areas which overlap to varying degrees. Several wastewater treatment plants in the MMSD planning area cannot treat the flows they receive adequately to meet the effluent limits imposed by their discharge permits. In many areas, these sewers and WWTPs are receiving volumes of wastewater in excess of their capacities. Deteriorating sewers and manholes, illegal connections of drains and sumps, and in the case of combined sewers, connection with the storm drainage system, all contribute to the problem of overloaded sewers and treatment plants.

The results of this overloading include bypassing at the WWTPs, bypassing from separated sewers, and overflows from combined sewers. These bypasses and overflows discharge raw or inadequately treated wastewater to area waterways. These inputs introduce disease-causing pathogens and toxic substances into the waters of the planning area, degrading water quality. These substances also impair plant and animal life, endanger the public health, and limit the potential uses of the area waters.

The failure of wastewater treatment systems to meet effluent limitations and court-ordered clean-up deadlines in the case of MMSD, could result in legal penalties including fines for the responsible organizations.

In addition, sewer extensions for new development in all areas served by the MMSD might be prohibited. The Dane County Court Stipulation establishes a wasteload allocation system to remain in effect until the Jones Island and South Shore WWTPs consistently comply with EPA and DNR effluent limitations. The wasteload allocation system restricts the increment by which annual flows and pollutant loadings to the Jones Island and South Shore WWTPs may increase. If violations of effluent limitations continue to occur, no new connections would be allowed after 1986.

If sewer extensions are prohibited because of violations of the Dane County Court stipulation, the demand for lots suitable for septic tank development might increase, possibly entailing the loss of prime agricultural land or wildlife habitat. In most cases, the scattered type of development that occurs when lots of one acre or more are developed for single-family residences would not be consistent with the Regional Land Use Plan.

With the No Action Alternative, the impacts outlined above could occur. The action alternatives described in Section 1.1.3 are designed to modify or eliminate the adverse impacts and maximize the beneficial environmental impacts at the smallest practicable monetary cost. The environmental impacts of the action alternatives are described below.

#### 1.2.2.2 Action Alternatives

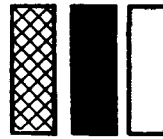
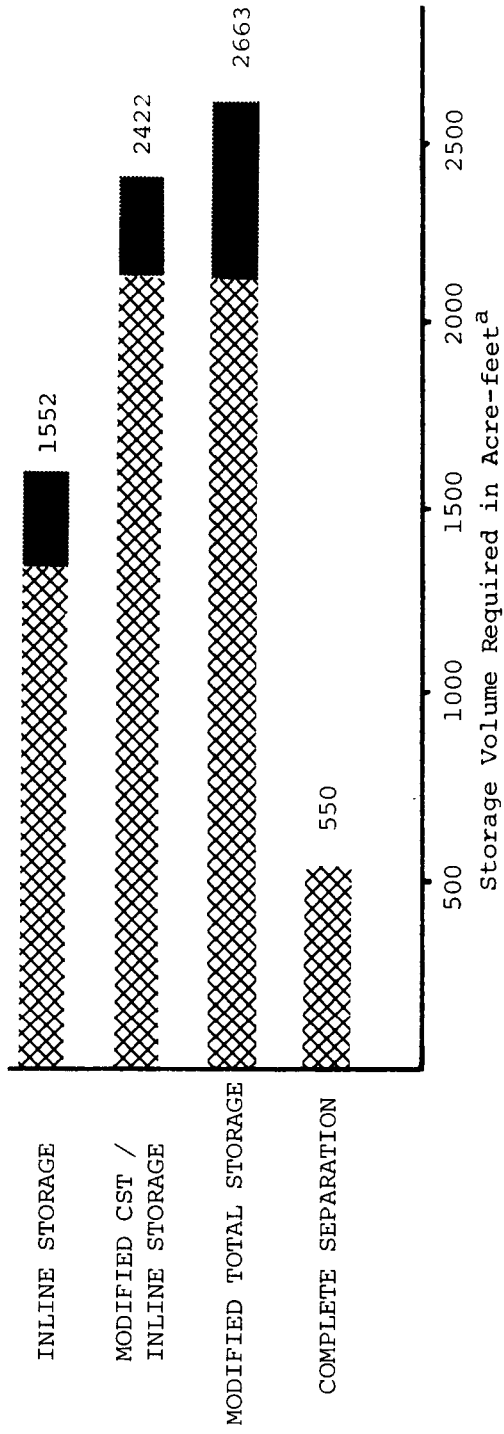
All of the action alternatives would share certain components. In all cases, the sewers in Milwaukee County would be reinforced and expanded based on the results of the sewer system evaluation survey. With any action alternative, the Jones Island WWTP would be expanded to treat 300 million gallons of wastewater each day and the South Shore WWTP 250 million gallons each day. Also, CSO and bypasses from the separated sewers would be eliminated.

Because these program components would be the same for any action alternative, some of the environmental impacts of the alternatives would be very similar. The elimination of bypasses of untreated wastewater into area waters would reduce the public health hazard from disease-producing organisms, making the waters more useful for recreation.

With any action alternative, all wastewater treatment facilities in the planning area would be capable of meeting effluent limitations in the discharge permits. As a result, all free-flowing portions of the rivers of the area should meet the water quality standards set for them by the DNR if SEWRPC's nonpoint source control program is implemented. Pollutant loadings to the Inner and Outer Harbors would be reduced, to varying degrees. However, water quality standards in the Inner Harbor might not be met because of pollutants accumulated in the sediments and pollution originating upstream of the MMSD service area.

#### 1.2.2.3 CSO Abatement and Peak Flow Attenuation

The four alternatives for CSO abatement/peak flow attenuation which are considered in the EIS differ in the amount of construction that would be needed and in the amount of storm water that would receive treatment. Figure 1.2 compares the amount of storage required by these alternatives. Figure 1.3 compares the percentage of the combined sewer service area which would be affected by open-cut construction with the four alternatives. The alternatives that would treat the most urban runoff would achieve the most improvement in water quality because they would decrease total pollutant loads and cause less disturbance (via scouring) of sediments in the receiving waters.



Deep Rock Storage

Near Surface Storage

Additional Near Surface Storage (required if no work on private property is allowed. This is not reflected in the total volume shown)

a: 1.0 acre-feet =  $1.23 \times 10^3 \text{ m}^3$

FIGURE

1-2

DATE

APRIL 1981

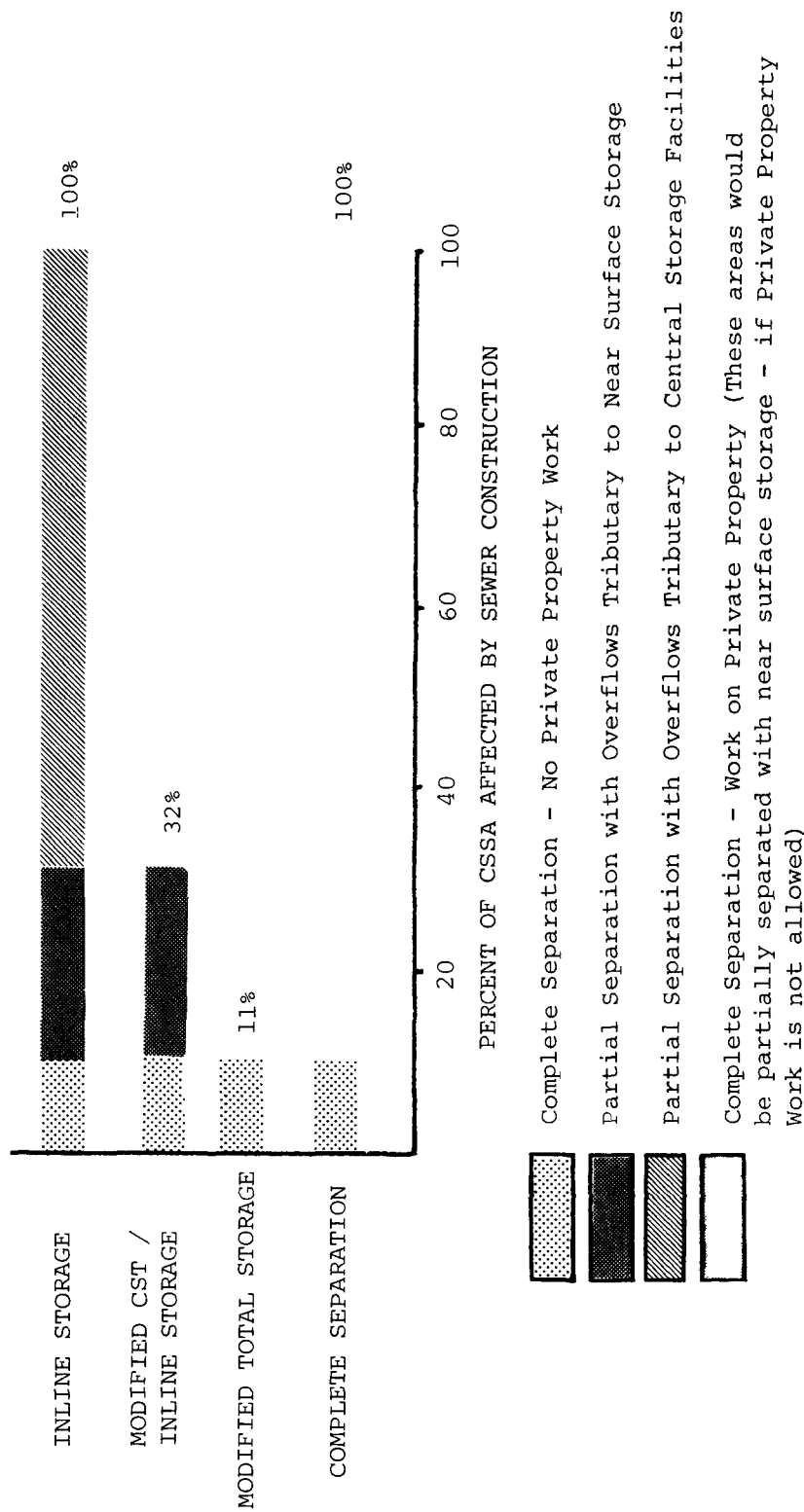
# STORAGE VOLUMES REQUIRED UNDER THE FOUR FINAL CSO/PEAK FLOW ALTERNATIVES

SOURCE MMSD

PREPARED BY



**ESEI** Environmental Sciences  
ENVIRONMENTAL GROUP



PERCENTAGE OF COMBINED SEWER SERVICE AREA  
AFFECTED BY OPEN CUT SEWER CONSTRUCTION

FIGURE

1-3

DATE

APRIL 1981

SOURCE MMSD

PREPARED BY



ESEI Environmental Sciences  
ENVIRONMENTAL GROUP

Any action alternative would improve sediment quality, but the sediments would remain highly polluted with organic matter and toxic substances. Disturbing the sediments (sediment scour) re-introduces these pollutants into the water. Levels of dissolved oxygen are lowered as the organic matter further decomposes. The Modified Total Storage Alternative would result in treatment of the greatest percentage of storm water and would eliminate CSO sediment scour, which is the mechanism whereby the highly polluted bottom sediments are resuspended by increased velocities in the vicinities of CSO outfalls. The Complete Separation Alternative would treat the least amount of storm water and increase the frequency of sediment scour near CSO outfalls.

The percentage of the CSSA that would be affected by each facility for CSO abatement and peak flow attenuation is shown in Figure 1.3. The Complete Separation and Inline Storage Alternatives would affect the greatest area and Modified Total Storage the least. Disruption of commercial areas would result in a loss of business during construction. This impact could be lessened by staging construction activities so that only a limited number of streets are disturbed at any one time. Local construction firms are equipped to construct new sanitary and storm sewers required under the alternatives relying on complete or partial separation. These approaches are more labor-intensive than the construction of large diameter tunnels in bedrock. As a result, the complete separation alternative creates the most potential employment opportunities for the local labor force. The Modified Total Storage Alternative creates the least local employment opportunities. The use of local construction firms for sewer separation alternatives would introduce more money into the local economy than a deep tunnel system that would rely on firms from outside the local economy.

Both EPA and DNR, as well as the public, have expressed concern that wastewater could seep out of large-diameter tunnels in the bedrock and contaminate deep groundwater; that groundwater could infiltrate the tunnels and lower local groundwater levels; or that both events could occur. These concerns have received detailed analysis, which is described further in Section 1.3.2.

#### 1.2.2.4 Wastewater Treatment

With all action alternatives, the South Shore and Jones Island WWTPs would be expanded as described in Table 1.1. The improvements to the WWTPs would require about three years of construction. The construction would increase turbidity and resuspend sediments in Lake Michigan due to material washed from construction sites. However, the implementation of modern construction techniques would minimize construction-related turbidity.

The MMSD Recommended Alternatives for the expansion of these WWTPs include lakefills which would remove small portions of Lake Michigan habitat. This habitat is used for spawning and feeding by some species of fish. The construction would also increase air pollution in Milwaukee County. The yearly increases in emissions are expected to be less than one percent of the annual county-wide totals.

Some residents of the City of South Milwaukee have raised concerns about the expansion of the South Shore treatment plant. They have complained about odors from the South Shore WWTP and feel that the expansion of the facility would aggravate the problem. Also, they are concerned that the expansion would be unsightly and would disrupt the view of Lake Michigan. There is concern that, as a result of these factors, property values near the plant may be affected. Partially in response to these concerns, the Draft EIS also evaluates two new alternatives: one requiring only six acres of lakefill and another that would require no lakefill (see South Shore Appendix).

The South Shore WWTP might be more visible after its expansion and would slightly affect the view of Lake Michigan. Odors, however, should be less of a problem than at present. The odors are created by inadequately processed solids reaching the exposed sludge lagoons. With the rehabilitation and expansion of the facilities, the solids should be properly treated and all solids handling processes would be enclosed. As a result, odor problems should be reduced.

The issue of property value is more difficult to assess. Records show that, historically, property values near the WWTP have not been depressed in comparison to other property in South Milwaukee. Therefore, there is no evidence to indicate that property values would be affected by the expansion of South Shore.

The MMSD recommended alternatives for the other public treatment plants are listed in Table 1.2. Implementation of these alternatives could require the disruption of traffic and access and could cause a slight increase in air pollution. However, these impacts would be moderate and temporary.

The Local, Regional, and the MMSD Recommended System-Level Alternatives would result in the abandonment of some or all of the local WWTPs. The cessation of effluent discharges would change the character of some streams from permanent to intermittent. As a result, the biological communities present in the affected rivers could change.



Under the various System-Level Alternatives, at most, three local treatment plants would discharge effluent to waterways in the MMSD planning area: Thiensville to the Milwaukee River, Caddy Vista to the Root River, and South Milwaukee to Lake Michigan. Improved effluent from the Thiensville plant should allow quality standards for that part of the Milwaukee River to be met. Bypassing at the Caddy Vista Plant would be eliminated. Effluent from the South Milwaukee treatment plant should not have a large impact on Lake Michigan because of its presently acceptable quality and relatively small volume.

Under the various System-Level Alternatives, up to four of the existing local WWTPs would be converted to treatment of wastewater by some form of land application. With this type of treatment, there would be some chance of groundwater pollution. This potential would be minimized by the careful selection of sites with soils acceptable for wastewater application and by the monitoring of sites.

#### 1.2.2.5 Solids Handling

The MMSD recommends abandoning Milorganite production at the Jones Island treatment plant because the Milorganite process is energy intensive and contributes to local air pollution. Instead, solids from Jones Island would be landfilled. During most of the year, the solids from the South Shore WWTP would be applied to agricultural land. During the winter months, the solids would be stored for later agricultural application.

Both of these alternatives would require large amounts of land. In a supplemental EIS to be prepared by EPA and DNR, Site Specific Analysis, the availability of sites and the environmental impacts of these solids alternatives will be studied in detail. If the necessary land is not available, the solids management alternatives may require further study.

Agricultural land would benefit from the organic matter and nutrients contained in WWTP solids. However, the solids also contain small quantities of toxic substances such as heavy metals and nitrate, and some public concern has been voiced about the environmental impacts of these toxic substances. The soils at solids application sites could retain the heavy metals in WWTP solids, possibly threatening their future use for agriculture. In addition, nitrate, if applied in amounts greater than can be removed by plant uptake, can contaminate groundwater and may cause human and animal health problems.

All farmers interested in receiving the solids from the South Shore WWTP would have to be informed of the proper management practices and potential hazards of solids application. This precaution and the adherence to DNR and EPA regulations would reduce the potential for soil and groundwater contamination. Abandoning the Milorganite process would reduce particulate emissions in Milwaukee County by 6% and energy consumption at the WWTP by 57%. However, abandoning the process would also cause the existing concentration of ammonia-nitrogen in the Jones Island WWTP to approximately triple (from 6 mg/l to 18 mg/l). Increased levels of ammonia-nitrogen in the Outer Harbor could be toxic to aquatic life.

Construction of an effluent outfall that would discharge treated effluent directly into Lake Michigan could alleviate this problem. However, pollutant loading to Lake Michigan would be increased by this action. The MMSD has performed a water quality study to determine how this increase in ammonia would affect the Outer Harbor. The MMSD also examined alternatives that would reduce the ammonia in the effluent. The results of this study are discussed further in Section 1.3.3.

#### 1.2.2.6 Wastewater Conveyance

All the System-Level Alternatives were designed to serve the same area. The Local Alternative would include six interceptors, and the Regional and Mosaic Alternatives would include eight interceptors. The direct environmental impacts of these interceptors would be related to their construction. Traffic and access to businesses and residences might be disrupted. Air quality would be affected by vehicle fumes and dust. Also, groundwater levels could be lowered. The elimination of septic tanks and overloaded sewer systems should, in the long-term, reduce groundwater pollution.

All the action alternatives would provide enough sewer service to accommodate population up to the levels forecast by the Southeastern Wisconsin Regional Planning Commission. However, if the population does not grow to planned levels, the expanded sewer service could encourage a scattered pattern of development in some areas. With a scattered pattern of development, the costs of municipal services (schools, general administration, and public safety, for example) in Germantown, New Berlin and Oak Creek could exceed the revenues from the increased tax base.

### 1.2.2.7 Cost

The costs for the Final System-Level Alternatives are shown in Table 1.6. These costs assume the implementation of the MMSD's Recommended Alternatives for the rehabilitation and expansion of the Jones Island and South Shore WWTPs, and for solids handling.

TABLE 1.6  
COSTS OF SYSTEM-LEVEL ALTERNATIVES  
ASSUMING DIFFERENT CSO SOLUTIONS  
(IN \$ MILLIONS)

	<u>CSO Component</u>	<u>Capital</u>	<u>O&amp;M</u>	<u>Net Present Worth</u>
<u>Local</u>		\$1692.39	\$28.48	\$ 1950.11
	Inline Storage	1722.31	28.30	2018.47
	Complete Separation	1698.84	29.44	1981.75
	Modified CST/Inline	1716.42	29.95	2006.69
	Mod. Total Storage			
<u>Regional</u>		1658.84	26.63	1896.06
	Inline Storage	1688.76	26.45	1964.42
	Complete Separation	1665.29	27.59	1927.70
	Modified CST/Inline	1682.87	28.10	1952.64
	Mod. Total Storage			
Mosaic:				
MMSD	Inline Storage	1658.53	27.01	1899.86
Recom-	Complete Separation	1688.45	26.83	1968.22
<u>mended</u>	Modified CST/Inline	1664.98	27.97	1931.50
	Mod. Total Storage	1682.56	28.48	1956.44

Current projections of the availability of Federal and State funds for water pollution abatement projects indicate that a maximum of approximately thirty-six percent of the MFP costs would be funded by either the federal or state government. The remaining portion of the costs would have to be financed locally, probably by the issuance of municipal bonds. To finance the debt service on the bonds, Milwaukee County is empowered to increase taxes on property within its boundaries. Communities outside Milwaukee County would be charged annually according to the existing Contract Formula. Operation and maintenance costs would be distributed separately and proportionately by the User Charge System.

Table 1.7 outlines the estimated average annual property tax rates that would result from the implementation of the final system-level alternatives. These costs were determined assuming that the MMSD would construct all elements of the alternatives, including rehabilitation and relief work both inside and outside the County, except that Muskego, South Milwaukee, Germantown, New Berlin, Caddy Vista, and Thiensville would construct their own facilities with the Local Alternative. For the Local Alternative, no Federal funding is assumed for this construction.

Historically, local communities have financed their own sewer rehabilitation and connecting sewers to the Metropolitan Intercepting sewer system. The MMSD plans to include these costs and the costs for CSO abatement in the City of Milwaukee and Village of Shorewood with other MFP costs, and to distribute the debt service to all communities involved. The ultimate acceptability and implementability of district-wide financing will, in all likelihood, be resolved in the courts.

### 1.2.3 Public Hearing and Comments

The Draft EIS was released to the public and to government agencies on November 14, 1980. This date marked the start of the 45-day public comment period for the Draft EIS. The agencies held a public hearing on December 18, 1980 to provide a forum for public comment. Due to the requests of both federal agencies and the public, the comment period was extended from January 2, 1981 to January 12, 1981. Although the December 18, 1980 public hearing did not raise any significant new issues, it, as well as the written comments received, did highlight the areas of the MFP that concerned the public. The groundwater impacts of the deep tunnels and cavern storage facility was a major concern of both citizens as well as professional and agency commenters. A second significant issue concerned the economic impact on the Milwaukee area of the MMSD Recommended Plan. Aside from these two major points, the comments also focused on issues of concern in the Draft EIS such as effluent outfall relocation, increased ammonia discharge, effects of land application of sludge, and lakefill alternatives for plant expansion.

### 1.3 ADDITIONAL ANALYSES/ISSUES RESOLUTION

Since issuance of the Draft EIS, substantial new information has become available through further EIS analyses, further facilities planning work by MMSD, and the receipt of research results from the University of Wisconsin-Milwaukee. This new information and the conclusions reached with respect to major issues raised on the Draft EIS are outlined below.

TABLE 1.7

EQUALIZED AVERAGE ANNUAL (1985-2005) PROPERTY TAX RATES  
BY SYSTEM LEVEL ALTERNATIVE (Assuming In-Line Storage)

<u>Alternative</u>	<u>Milwaukee County (State Law Requires Debt Service Recovery By Property Tax Method)</u>	<u>Contract Communities (Assumes Property Tax As Method of Cost Recovery, For Comparison Purposes)</u>	<u>Communities with Local Alternatives (Assumes Property Tax Method, For Comparison Purposes)</u>
No Action	\$ .63 per \$1000 \$31. on a \$50,000 home	Average = \$.34 per \$1000 Range <sup>1</sup> = \$.13 to \$.56 \$17. on a \$50,000 home	Not Available
Local	\$4.33 per \$1000 \$216. on a \$50,000 home	Average = \$1.82 per \$1000 Range <sup>1</sup> = \$.62 to \$2.82 \$91. on a \$50,000 home	Average = \$3.77 per \$1000 Range <sup>4</sup> = \$.59 to \$10 \$188 on a \$50,000 home
Regional	\$4.29 per \$1000 \$214. on a \$50,000 home	Average = \$1.81 per \$1000 Range <sup>2</sup> = \$.59 to \$2.54 \$90. on a \$50,000 home	All Communities Connected
Mosaic	\$4.37 per \$1000 \$218. on a \$50,000 home	Average = \$1.83 per \$1000 Range <sup>3</sup> = \$.59 to \$2.57 \$91. on a \$50,000 home	\$.59 per \$1000 For South Milwaukee <sup>5</sup> \$29. on a \$50,000 home <sup>5</sup>

<sup>1</sup> Bayside (Ozaukee County), Brookfield, Butler, Elm Grove, Menomonee Falls, Mequon

<sup>2</sup> Bayside (Ozaukee County), Brookfield, Butler, Elm Grove, Menomonee Falls, Mequon, Muskego, South Milwaukee,

Germanatown, New Berlin, Thiensville, Caddy Vista

<sup>3</sup> All Communities above except South Milwaukee

<sup>4</sup> Caddy Vista, Germantown, Muskego, New Berlin, South Milwaukee, Thiensville

<sup>5</sup> All other communities connected

<sup>6</sup> Tax rates assume District-wide financing of all MWPAP components, except local plants.

### 1.3.1 CSO Abatement and Peak Flow Attenuation

#### 1.3.1.1 Groundwater Impacts

A significant issue associated with the CSO and Peak Flow Attenuation Alternatives is the impact of a deep tunnel system on groundwater. Converse, Ward, Davis Dixon (CWDD), a geotechnical consulting firm, was retained by the EIS consultant to assess the impacts of transporting and storing CSO and separated sewer bypasses in a tunnel and cavern storage system in the Niagaran Dolomite Aquifer. CWDD reviewed the existing data and tentatively concluded that no significant adverse impacts would occur from either construction or operation of the system provided the tunnel alignment is carefully planned, constructed and monitored. However, the following studies and mitigative measures should be undertaken to ensure adequate protection of the groundwater.

- Review the available data from the Tunnel and Reservoir Project (TARP) in Chicago, and determine if comparisons are possible between the Chicago and the Milwaukee environments. If so, a more accurate prediction of infiltration should be made using this information.
- Conduct site specific studies to determine the location of fault zones and cones of depression due to high rates of groundwater pumping before final tunnel alignment is established.
- Utilize design and construction procedures such as tunnel lining to minimize infiltration or exfiltration during operation of the system.
- Establish a monitoring system which includes inspection and maintenance of structures to assure that any infiltration or exfiltration will be detected in a timely manner and promptly corrected.

#### 1.3.1.2 I/I Removal

Since the Draft EIS was issued, the MMSD has completed the draft SSES report and the preliminary results indicate that a cost-effective level for I/I removal may only be 13%. This figure will not be finalized until the final SSES report is adopted by the MMSD in May of 1981. Because the final SSES report was not available for incorporation into the Final EIS, the analysis of alternatives presented in the final EIS assumes that 48% of I/I would be removed. If the final I/I removal level is less than 48%, as is suggested by the draft SSES report, additional cavern storage will be required.

### 1.3.2 Ammonia Discharge/Outfall Relocation

Since the issuance of the Draft EIS, the EPA and DNR received the results of a study performed by the University of Wisconsin-Milwaukee which evaluates the impacts on the Outer Harbor of ammonia discharged in effluent from the Jones Island WWTP. This report concludes that the increased ammonia discharge would have no adverse effects on dissolved oxygen levels in the Outer Harbor. However, the toxic effects of the ammonia discharges would still be a serious issue. The discharge plume containing potentially toxic concentrations of un-ionized ammonia could extend up to 2600 feet from the Jones Island outfall. Therefore, EPA and DNR are recommending that the MMSD develop and analyze alternatives to mitigate the toxic effects of the ammonia discharge within the mixing zone. At a minimum, the following conditions must be achieved:

- (1) The effluent mixing zone should be limited to a range of 900 to 1200 feet from the Jones Island outfall
- (2) The passage between the Inner and Outer Harbor should be free from a toxic barrier which could be harmful to aquatic life
- (3) The acute un-ionized ammonia nitrogen toxicity standard (0.4 mg/l) should be met within the limited mixing zone as well as at the point of discharge
- (4) The chronic un-ionized ammonia nitrogen toxicity standard (0.4 mg/l) should be met at the boundary of the limited mixing zone.

Relocation of the Jones Island outfall from the Outer Harbor into the open lake was also considered in order to mitigate the ammonia impacts. This action is not recommended because it would merely transfer the water quality impacts to the open waters of the Lake. There are some estimates that approximately 40 percent of the pollutants in the effluent remain in the Outer Harbor and EPA and DNR believe this is preferable to transferring these materials to the high quality areas of the Lake.

### 1.3.3 Lakefills

The U.S. Fish and Wildlife Service has raised objections to the proposed Lake Michigan lakefills. Their concerns focus on the adverse impacts lakefills would have on spawning habitats in the near-shore areas of Lake Michigan. While this is a legitimate concern, the value of the affected areas must be weighed against the improved water quality resulting from the proposed project.

In the case of Jones Island, any lakefill recommended would replace a relatively unproductive area of Lake Michigan. There is, however, some concern regarding the lakefill's impact on navigation and operability of Slip Number 1 of the Milwaukee Harbor Commission. A recent wave analysis prepared by MMSD has demonstrated that the 5.7 acre lakefill could increase the wave energy input into Slip Number 1 by 56 to 60% over that entering under the existing configuration. However, the wave reflection and surging in Slip Number 1 could be mitigated for both the existing and proposed shore line configuration. The MMSD recommends, and the EPA and DNR concur, that a sophisticated mathematical model study or a hydraulic model study, or both, should be undertaken to refine the results in the preliminary report. The models should also evaluate the efficiencies of mitigation alternatives.

For the South Shore facility, the EPA and DNR concern for the aquatic habitat is greater, since the proposed fill is in the open water of Lake Michigan. In addition, many residents of South Milwaukee are concerned about potential operational impacts of the South Shore facility which has caused odor problems in the past. However, it is EPA's conclusion that the loss of approximately 400 feet of Lake Michigan shoreline is reasonable considering the potential water quality improvements that will result from an upgraded South Shore Facility. Although it would be technically feasible to expand the South Shore facility without using lakefill area, the resulting operational and reliability factors introduced by such an alternative make the lakefill alternative preferable from an environmental perspective.

#### 1.3.4 Fiscal/Economic Impacts

Another significant issue raised in comments on the Draft EIS concerned the ability of the Milwaukee economy to finance a program as costly as that proposed. While the Final EIS presents an analysis of the fiscal impacts under varying assumptions, the actual implementability of the plan will hinge on the ability to finance it.

One aspect of the plan which could be affected in scope and cost through additional analyses is the CSO element. The water quality impact studies which are required to establish minimally acceptable water quality standards under the provisions of the Clean Water Act require an analysis considering environmental, technical, and economic impacts of attaining water quality standards. This analysis should be initiated as soon as possible.



The limitations of State funds and decreasing Federal construction grant funds will result in a financial impact on the Milwaukee area. The EPA will continue to assist the DNR and MMSD in evaluating funding options to the extent possible.

#### 1.4 EPA PREFERRED ALTERNATIVE

##### 1.4.1 CSO Abatement and Peak Flow Attenuation

While considerable analyses have been completed concerning CSO abatement and peak flow attenuation, the complexity of the system, difficulty in quantifying water quality impacts, and changing assumptions such as the level of I/I removal have made this the most difficult plan element to evaluate.

Based upon information available at this time, the EPA recommends the Modified Total Storage system to abate CSO and attenuate peak flows from the separated sewer area. The level of protection provided by the Modified Total Storage system could range from two to five years, to meet applicable water quality standards. The aspects of the Modified Total Storage System providing a 2-year level of protection are outlined below:

- Complete Separation in 11% of the CSSA with no private property work.
- No sewer separation in the remaining portion of the CSSA.
- 68% of the CSSA tributary to 20-foot diameter tunnels and offline cavern storage at County Stadium and Jones Island.
- 21% of the CSSA tributary to near surface storage.

The aspects of the Modified Total Storage system providing a 5-year level of protection are outlined below:

- Complete separation in 11% of the CSSA with no private property work.
- No sewer separation in the remaining portion of the CSSA.
- 88% of the CSSA tributary to 20-foot diameter tunnels and offline cavern storage at County Stadium and Jones Island.
- 1% of the CSSA tributary to near surface storage.

The total storage volumes necessary to meet applicable water quality standards range from 1,400 acre-feet (for the two-year level of protection) to 2,550 acre-feet (for the five-year level of protection), assuming a 13% I/I removal rate by implementation of SSES recommendations.

The volume of offline cavern storage is affected by several factors and cannot be finalized until the MMSD, EPA and DNR resolve issues including the actual storage requirements resulting from greater I/I flows, the specific level of protection necessary to meet applicable water quality standards, and the specific sequencing of flow through the Jones Island and South Shore WWTP.

Although EPA has an estimate of the level of protection necessary to meet existing water quality standards, it is recommended that additional water quality analysis be conducted to definitively establish the minimum level of CSO control required to meet the provisions of the Clean Water Act. This analysis would evaluate the environmental, technical, and economic impacts of attaining water quality standards. The analysis should use dynamic modeling techniques to address the effects of all point and non-point pollutant loadings, as well as sediment oxygen demand.

The Modified Total Storage Alternative with a 2 to 5 year level of protection for CSO is assumed to meet applicable water quality standards but will not meet the more stringent requirements of the U.S. District Court Order to convey, store, and treat the storm of record for the past forty years. Therefore, EPA's Preferred Alternative to meet minimum water quality standards will not be implemented if the U.S. Supreme Court upholds the U.S. District Court Order. The U.S. District Court Order alternative for CSO Abatement and Peak Flow Attenuation would be a more costly, larger scale alternative than an alternative to meet water quality standards.

The differences between the alternatives to meet the U.S. District Court Order and applicable water quality standards are independent of I/I removal levels. EPA and DNR have decided not to quantify the costs or storage volume required for U.S. District Court decision due to uncertain reliability of some of the more crucial estimating assumptions.

Because of the large quantities of rock and overburden that would result from the construction of the alternative for CSO abatement and peak flow attenuation, the EPA recommends that the MMSD continue facilities planning to develop an environmentally sound, cost-effective method for spoil disposal. This planning output must be submitted to the EPA and DNR for approval prior to the start of construction.

#### 1.4.2 Wastewater Treatment

The EPA concurs with MMSD Recommended Plan for wastewater treatment because the total present worth of the Local Alternative is \$50 million more than the MMSD Recommended Plan. In addition, the MMSD Recommended Plan would use slightly less energy and resources and its annual operation and maintenance costs would be lower than other alternatives under consideration.

The Jones Island and South Shore WWTPs would serve the entire planning area except for South Milwaukee which would operate its own facility. All other public WWTPs would be abandoned. The two private wastewater treatment plants, School Sisters of Notre Dame and Wisconsin Electric Power Company should also continue operations, and the Muskego Rendering Company should operate its private facility for pretreatment of effluent before discharge to the local sewer system.

The EPA also concurs with the MMSD Recommended Plan with respect to liquids and solids treatment processes at the Jones Island and South Shore WWTPs. However, the MMSD recommendation for a 9.5 acre lakefill at the Jones Island WWTP and enclosing 30 acres and filling 12 acres at the South Shore WWTP are considered excessive by the EPA. EPA recommends limiting the Jones Island WWTP lakefill to 5.7 acres and the South Shore WWTP lakefill to 12 acres. The smaller lakefills would allow WWTP expansion to proceed without any major construction difficulties.

The EPA agrees with the MMSD recommendation to disinfect the final effluent from the Jones Island and South Shore WWTPs with chlorine gas. The MMSD's discharge permits require a chlorine residual of 0.5 mg/l in the final effluent. The MMSD recommends dechlorination with sulfur dioxide to achieve this effluent limit. However, the EPA recommends that dechlorination be used to reduce residual chlorine to at least 0.05 mg/l without causing excessive sulfur dioxide overdosing. Adequate system controls such as feed control should be used to minimize sulfur dioxide overdose and avoid the resultant unnecessary oxygen demand in the final effluent. This level of residual chlorine would also minimize the toxic effect of combined and free chlorine, while continuing to provide adequate pathogen removal.

EPA also recommends that the MMSD evaluate alternatives for ammonia-nitrogen control at the Jones Island WWTP and implement the most cost-effective alternative. Ammonia-nitrogen control is necessary due to the EPA's and DNR's interpretation of the effluent mixing zone and the existing DNR standard for un-ionized ammonia-nitrogen of 0.04 mg/l for the Outer Harbor.

#### 1.4.3 Solids Handling

The EPA is basically in agreement with MMSD's recommendations to landfill Jones Island sludge and to apply sludge from South Shore to agricultural land. The concern about toxic substances and heavy metals and their potential effects on area farmland is valid, but the controls proposed by MMSD should be sufficient to avoid any adverse effects. It is important that MMSD rigorously implement its pretreatment program to minimize all toxic discharges to its system. If the pretreatment program is successful, reduced levels of toxic substances and heavy metals may, in the future, allow land application of Jones Island sludge.

#### 1.4.4 Wastewater Conveyance

EPA is in agreement with MMSD's Recommended Plan for construction of intercepting and relief sewers. There are several cases however that are somewhat controversial, and one case where EPA cannot make a definite recommendation at this time.

EPA concurs with the MMSD that the Menomonee Falls-Germantown, Hales Corners and Oak Creek Interceptors should be constructed, but mitigating measures of institutional controls to limit development should be implemented through staging or with planned development in each sewer service areas. The Southeastern Wisconsin Regional Planning Commission (SEWRPC) and the local governments will need to work closely to prevent scattered development not in conformance with the Regional Land Use Plan. EPA also concurs with the MMSD that the Northeast Side Relief System, Underwood Creek, Root River and Franklin-Muskego Interceptors should be constructed.

The Franklin Northeast Interceptor was also recommended in the 208 Plan, but MMSD, at least initially, found it to be more cost-effective to upgrade several pump stations. They later changed their recommendation after strong opposition at public hearings. EPA believes that additional information is necessary concerning the existing on-site systems in the area and the ability to serve additional development on such systems. The 208 Plan conclusion was based primarily on the fact that the soils in the area are classified by the Soil Conservation Service as severely limiting. While this

factor must be taken into consideration it alone cannot serve as the basis for supporting an interceptor recommendation. Until further information is available, the EPA and DNR will be precluded from approving this portion of the facilities plan.

#### 1.4.5 Costs

The total system costs for EPA's Preferred Alternative assuming a 13% cost-effective I/I removal rate will range from \$1.47 billion for a 2-year level of protection for CSO to \$1.64 billion for a 5-year level of protection for CSO. The total system cost for U.S. District Court alternative would be higher because more storage is required for a greater level of protection.

### 1.5 ENVIRONMENTAL CONSEQUENCES

The environmental impacts of EPA's Preferred Alternative are very similar to the MMSD's Recommended Alternative. Section 1.2.2 describes the environmental impacts for all alternatives considered by the EIS including the MMSD Recommended Plan. Outlined below are the environmental impacts of EPA's Preferred Alternative which were not addressed in Section 1.2.2.

#### 1.5.1 CSO Abatement and Peak Flow Attenuation

The Modified Storage Alternative with a 2 to 5 year level of protection for CSO would have the same environmental impacts which are outlined in Section 1.2.2.3. However, EPA's Preferred Alternative would overflow to the receiving streams on the average once every two to five years. These overflows would disturb the highly polluted sediments, re-introducing these pollutants into the waterways. Levels of dissolved oxygen would be temporarily diminished as this organic matter decomposed.

#### 1.5.2 Wastewater Treatment

EPA's Preferred Alternative is identical to the MMSD's alternative except for the size of the proposed lakefills at both WWTPs. The South Shore WWTP lakefill preferred by EPA would enclose and fill only 12 acres compared to the MMSD alternative of enclosing 30 acres and filling 12 acres. EPA's Preferred Alternative would utilize approximately 400 ft. of Lake Michigan shoreline rather than 1000 feet.

The loss of 400 ft. is reasonable considering the potential water quality improvement that would result from the upgraded South Shore WWTP. The EPA also recommends limiting the Jones Island lakefill to 5.7 acre rather than the 9.5 acre as re-

commended by the MMSD. The limited lakefill would reduce the amount of aquatic habitat being permanently removed from the Outer Harbor by almost 50%.

#### 1.5.3 Solids Handling

The environmental impacts of EPA's preferred solids handling alternative would be identical to those of the MMSD Recommended Plan, since EPA has also recommended landfilling of all solids from the Jones Island WWTP and agricultural application of solids from the South Shore WWTP. The environmental impacts are discussed in Section 1.2.2.5.

#### 1.5.4 Wastewater Conveyance

The construction of interceptors would directly affect the natural environment of the MMSD planning. In addition, these interceptors would have a minimal secondary growth impacts in some areas. These impacts are outlined in Section 1.2.2.6.

#### 1.6 SUMMARY

This Executive Summary only briefly outlines the EPA and MMSD Preferred Alternatives for water pollution abatement and the effects of these alternatives on the environment of the planning area. The Chapters 2 through 5 of the EIS describe in more detail the legislation guiding the MFP, the development of alternatives, the environment of the MMSD planning area, and the environmental impacts of the alternatives. In addition, the appendices to this document provide technical information about the component projects of the MFP.