

**EIS801072DS**

NOVEMBER, 1980

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

DEPARTMENT OF NATURAL RESOURCES

BOX 7921 • MADISON, WI 53707 • BUREAU OF ENVIRONMENTAL IMPACT



# Environmental Impact Statement

## Draft Executive Summary

### Milwaukee Water Pollution Abatement Program



DRAFT 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 - ECOSCIENCES ENVIRONMENTAL GROUP  
  
MILWAUKEE, WISCONSIN

November 1980

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

SUBMITTED BY:

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UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY  
REGION V  
230 SOUTH DEARBORN ST  
CHICAGO, ILLINOIS 60604

REPLY TO ATTENTION OF

NOV 3 1980

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NOTICE OF PUBLIC HEARING

The public hearing on the Draft Environmental Impact Statement (EIS) on Milwaukee Metropolitan Sewerage District's Water Pollution Abatement Program will be held on Thursday, December 18, 1980 at the Milwaukee Area Technical College, 1015 N. Sixth Street, Milwaukee, Wisconsin. There will be an afternoon session beginning at 2:00 p.m. and an evening session at 7:00 p.m. The Wisconsin Department of Natural Resources and this Agency will present the same material at the afternoon and evening sessions. Both written and oral presentations will be accepted. Time limits may be imposed on oral presentations, so that all speakers may be included. Written statements will be accepted from those unable to attend the hearing or who have extensive comments.

The Draft EIS will be distributed during the week of November 10, 1980. The Draft EIS and its Appendices will be on reserve for public examination at 36 libraries located throughout the City of Milwaukee and the surrounding suburbs. Any comments on the Draft EIS should be submitted to the Agency by Friday, January 2, 1981.

We welcome your attendance at the hearing.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Charles H. Suffin".

Charles H. Suffin  
Director, Water Division



UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY  
REGION V  
230 SOUTH DEARBORN ST  
CHICAGO, ILLINOIS 60604

REPLY TO ATTENTION OF  
5WEE

NOV 14 1980

TO ALL INTERESTED AGENCIES, PUBLIC GROUPS AND CITIZENS

The Executive Summary for the Draft Environmental Impact Statement (EIS) on Milwaukee Metropolitan Sewerage District's Water Pollution Abatement Program is attached. The Draft EIS and its appendices are on reserve for your examination at the public libraries listed on the following page. A limited number of additional copies are available from this office upon request.

Pursuant to the National Environmental Policy Act and regulations (40 CFR Part 6, November 6, 1979) promulgated by this Agency, any comments on this Draft EIS should be submitted by Friday, January 2, 1981. Comments or inquiries should be sent to Gene Wojcik, Chief, EIS Section, Water Division at the above address.

We welcome your participation in the EIS process.

Sincerely yours,

A handwritten signature in cursive script, reading "Charles H. Sutfin", is written over the typed name and title.

Charles H. Sutfin  
Director, Water Division

Attachment

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.  
Milwaukee, WI 53225

MATC South Campus  
6665 South Howell Avenue  
Oak Creek, WI 53154

Marquette University Library  
1415 West Wisconsin Avenue  
Milwaukee, WI 53233

Milwaukee School of Engineering  
1025 North Milwaukee Street  
Milwaukee, WI 53201

Citizens Governmental Research Library  
125 East Wells Street  
Milwaukee, WI 53202

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

Brookfield Public Library  
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

CHAPTER 1  
EXECUTIVE SUMMARY

## 1.1 INTRODUCTION

This Draft Environmental Impact Statement (DEIS) 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 also must comply with two court orders. The orders require the MMSD to implement the following:

- . Discharges of raw or inadequately treated sewage to area waters must be eliminated.
- . 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.

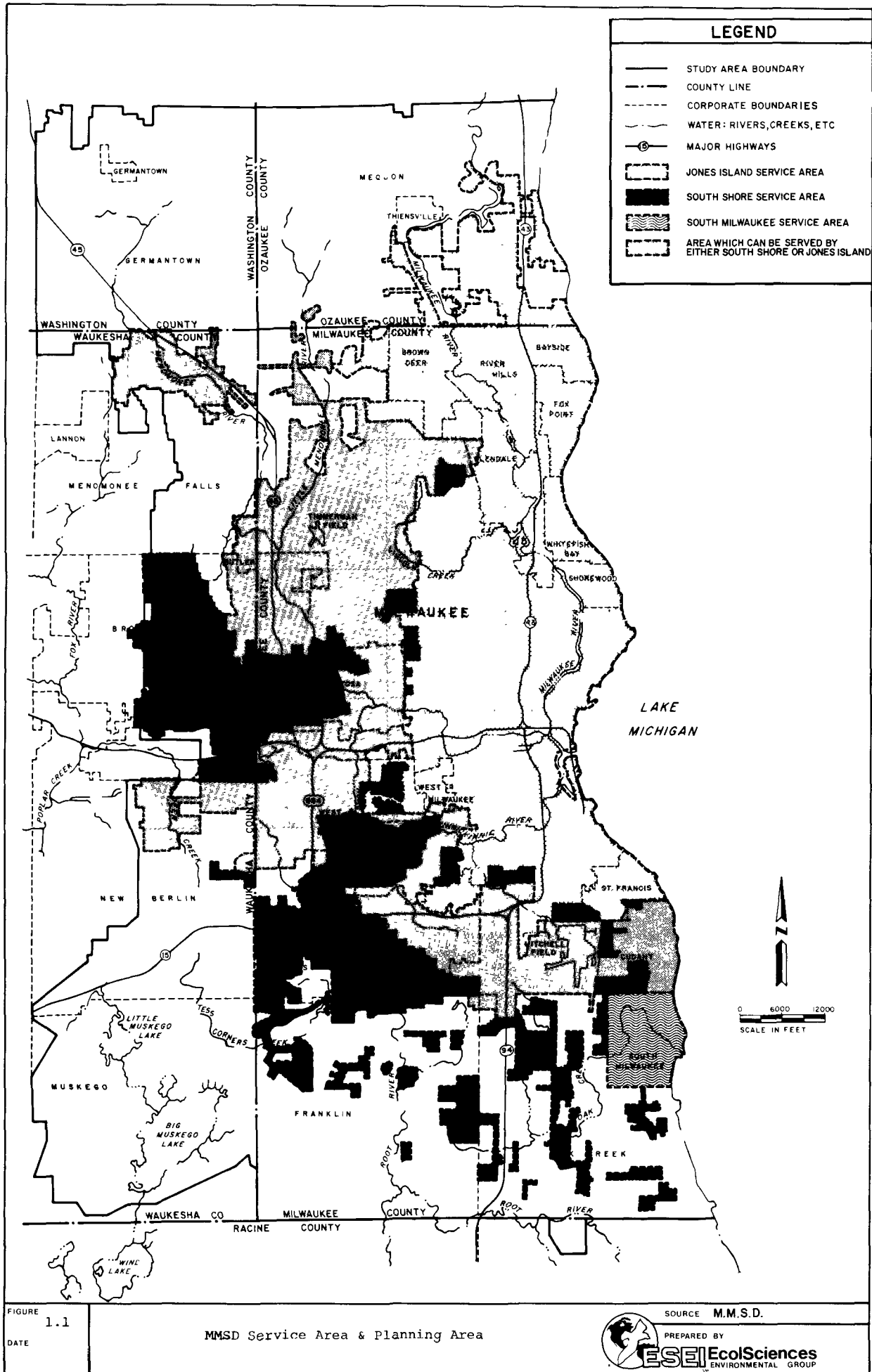
These goals must be achieved within a court ordered schedule.

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 specify planning for a 20-year period, and 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 federally funded actions which could significantly affect the natural and man-made environments.

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

An EIS analyzes the proposed action, its feasible alternatives, and their anticipated effects upon the environment. To minimize the duplication of efforts, this DEIS is a joint EPA/DNR document.

The public is invited to comment on this DEIS. Comments will be received from the date of its release through January 2, 1981. Because some of the actions involved in the MWPAP are controversial, and in response to the requirements of federal and state regulations, a public hearing on the





DEIS will be held in December, 1980, to provide a forum for public comment. The comments and concerns expressed by citizens and government agencies will be used to develop a final EIS (FEIS) which will include an EPA preferred alternative for each element of the Master Facilities Plan (MFP). Following the release of the FEIS, there will be a second comment period and public hearing, after which the EPA and DNR will act on the MFP. The EPA and DNR could approve, conditionally approve, or disapprove the MFP.

## 1.2 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. Clear water can greatly increase the flows in the sewerage system resulting in bypasses and overflows.

During wet weather, the volume of wastewater and its rate of entry into the sewerage system (flows) 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 annually. 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 percent of the sewers in Milwaukee County, serving approximately 47 percent 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 sanitary waste. 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 Milwaukee County. With this type of system, storm water is collected in one set of pipes and conveyed directly to the waterways. Sanitary and industrial wastewater is conveyed separately to treatment facilities. Ideally, the flows in the sanitary sewers should not be affected by rainfall. However, some parts of the sanitary sewer system have deteriorated, allowing storm water to seep into the sewers and manholes. In many buildings, drains or sumps have been illegally connected to the sanitary sewer. As a result, clear water 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 clear water 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. 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 ( $6.1 \text{ m}^3/\text{sec.}$ ). The preliminary and primary treatment facilities at South Shore can handle peak capacities of 320 million gallons per day ( $14 \text{ m}^3/\text{sec.}$ ). 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. Some portions of Metropolitan Milwaukee (See Figure 1.1) do not receive municipal sewer service, so any development must take place using septic systems. Failing septic systems can pollute surface and ground waters. The EPA and Wisconsin DNR have established effluent limitations for all treatment facilities in the state. Most WWTP's in the Milwaukee area violate these limitations periodically and are subject to state enforcement actions.

All of these events 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 substances which deplete the level of oxygen in the water. A potential health hazard is created by the pathogens and toxic substances including heavy metals.

### 1.3 THE MILWAUKEE WATER POLLUTION ABATEMENT PROGRAM (MWPAP)

The planning phase of the MWPAP has been directed 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 target 1983 for the achievement 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, planning for the MWPAP 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 total 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.

The MWPAP is a complex set of programs devised to comply with federal and state legislation and the two court orders. The requirements of the program 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 underway to compile

detailed information on the conditions of the sewers. The purpose of the evaluation is to determine the level of I/I removal which would 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 by the date established by the U. S. Supreme Court.

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

#### 1.4 MMSD PREFERRED ALTERNATIVES

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

The infiltration/inflow (I/I) study estimated that a reduction of I/I by half 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 required 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 CSOs. 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.

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 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>
ST tension	<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>
e	<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>

#### 1.4.2 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:

- With the Local System-Level, the present localized approach to area-wide 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.
- With 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 environmental impacts.
- With 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.

The alternative considered to be the most feasible for each public wastewater treatment facility in the planning area is shown in Table 1.2.

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 Mosaik Alternative in the EIS) combines aspects of the Local and Regional System-Levels. With the Mosaik Alternative, the Jones Island and South Shore treatment facilities would serve the entire planning area, except for South Milwaukee.

Jones  
Island

TABLE 1.2  
MMSD RECOMMENDATIONS FOR WASTEWATER  
TREATMENT PLANTS (LOCAL ALTERNATIVES)

- Expand treatment capacity to 300 million gallons per day.
- Wastewater Treatment by Secondary Activated Sludge Process.
- Disinfection by chlorination.
- Site expansion by filling in 9.5 acres of Lake Michigan and using approximately 9 acres of Harbor Commission land.
- Expansion of South Shore to 250 million gallons per day.
- Wastewater Treatment by Secondary Activated Sludge Process.
- Disinfection by chlorination.
- 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.
- Existing facility would be demolished.
- An advanced wastewater treatment plant would be constructed on the site.
- Effluent would be discharged at the Root River.
- Abandon existing facilities.
- A new land application facility will be constructed on the site.

Abandon existing

which would operate its own facility. All other public WWTPs would be abandoned. The MMSD recommended 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 their private facility for pretreatment of their effluent before discharge to the local sewer system.

#### 1.4.3 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, application, incineration, and composting for disposal of the solids from the two WWTPs. For the Jones Island, the MFP proposes abandoning the production of Milorganite because it is energy intensive and contributes to air pollution in the Milwaukee area. (Milorganite production has about 6% of Milwaukee County's annual energy consumption.) Instead, landfilling



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>

which would operate its own facility. All other public WWTPs would be abandoned. The MMSD recommended 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 their private facility for pretreatment of their effluent before discharge to the local sewer system.

#### 1.4.3 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 MFP 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 Planning Study to identify specific sites for solids disposal. A supplemental EIS, entitled Site Specific Analysis will parallel the MMSD's study and will give special consideration to the impacts of site-specific alternatives on the natural and man-made environment. The Site Specific EIS supplement on agricultural spreading will be completed early in 1982, and the supplement on landfill early in 1983.

#### 1.4.4 Wastewater Conveyance

The MFP includes facilities for conveyance of wastewater to WWTPs from the communities and areas served by the MMSD. The particular facilities and their configurations vary under each system-level plan, and they are listed in Table 1.3. The facilities considered are the Northeast Side Relief System, the

TABLE 1.3

INTERCEPTORS ASSOCIATED WITH  
DIFFERENT SYSTEM-LEVEL ALTERNATIVES

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

Franklin-Muskego, Franklin-Northeast, Oak Creek, Menomonee Falls-Germantown, Underwood Creek, Root River and Hales Corners Interceptors.

## 1.5 ENVIRONMENTAL IMPACTS

### 1.5.1 No Action

The MWPAP is a highly complex project dealing with a number of problem areas which overlap to varying degrees. Several wastewater treatment plants in the MMSD planning area are inadequate to treat the flows they receive adequately to meet the effluent limits imposed by their discharge permits. In many areas sewers and WWTPs are receiving volumes of wastewater in excess of their capacity. 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 this problem. The results of this overloading include bypassing at the WWTPs and from storm and sanitary sewer outfalls and CSOs which spill raw or inadequately treated sewage into area waters. 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.

Without sewer extensions, development would be encouraged to occur in presently sewered areas. However, the Dane County Court Stipulation established 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, and anticipated growth levels for the area might not be achieved.

If sewer capacity is restricted, the demand for lots suitable for septic tank development might increase, possibly entailing the loss of prime agricultural land or wildlife habitat. However, development on lots with septic tanks would probably not be extensive because the state and counties are expected to enforce their standards for the determination of soil suitability for septic tank development. Most (about 90%) of the soil in the planning area is not suitable for development

with septic tanks on lots less than one acre. Also, some communities in the planning area do not allow development with septic tanks. 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 Use Plan.

With the No Action Alternative, the impacts outlined above could occur. The action alternatives described in section 1.4 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.

#### 1.5.2 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 up to 300 million gallons of wastewater each day and the South Shore WWTP up to 250 million gallons each day. Also, CSOs 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 alternative 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 meet their Wisconsin effluent discharge limitations. As a result, all free flowing portions of the rivers of the area should meet the standards set for them by the DNR. Pollutant loadings to the Inner and Outer Harbors would be reduced, but water quality standards would not be met because of pollutants accumulated in the sediments, and pollution originating upstream of the MMSD service area.

#### 1.5.3 CSO and Peak Flow Attenuation

##### 1.5.3.1 EIS Alternatives

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.

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

Alternative	Capital Costs	Operation and Maintenance	Net* Present Worth
Inline Storage	1636.38	27.30	1899.86
Complete Separation	1686.30	26.88	1968.22
Modified CST/Inline	1662.83	28.30	1931.50
Modified Total Storage	1676.38	29.67	1952.51

\*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 for their calculation. Thus, the decision to implement one of the alternatives will be based on factors other than cost.

#### 1.5.3.2 Environmental Impacts

The four CSO abatement/peak flow attenuation alternatives 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. Figures 1.2 and 1.3 compare the amount of storage and construction required by these alternatives. The alternatives that would treat the most urban runoff would achieve the most improvement in water quality because they would decrease actual pollutant loads and cause less disturbance of sediments in the receiving waters.

Any action alternative would improve sediment quality, but the sediments would remain highly polluted by 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 decomposes. The Modified Total Storage Alternative would result in treatment of the greatest percentage of storm water. The Complete

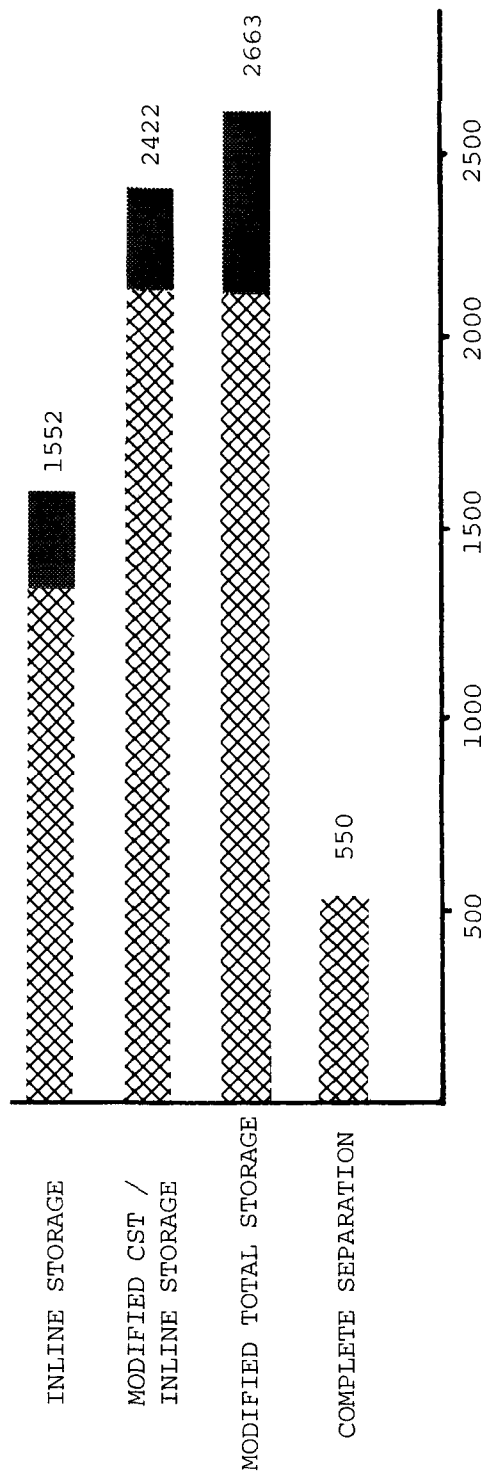
TABLE 1.4

EIS ALTERNATIVES FOR CSO ABATEMENT  
AND PEAK FLOW ATTENUATION

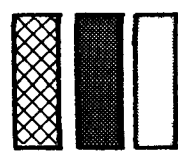
Complete Sewer Separation	<ul style="list-style-type: none"> <li>. All combined sewers completely separated.</li> <li>. Excess flow from the separated sewers would be stored in 20-foot diameter tunnels.</li> </ul>
Modified CST/ Inline	<ul style="list-style-type: none"> <li>. Complete sewer separation 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 Total 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>

\*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., root leaders) would be combined and conveyed to a treatment facility.

<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.)



Acre-Feet of Available Storage



Deep Rock Storage

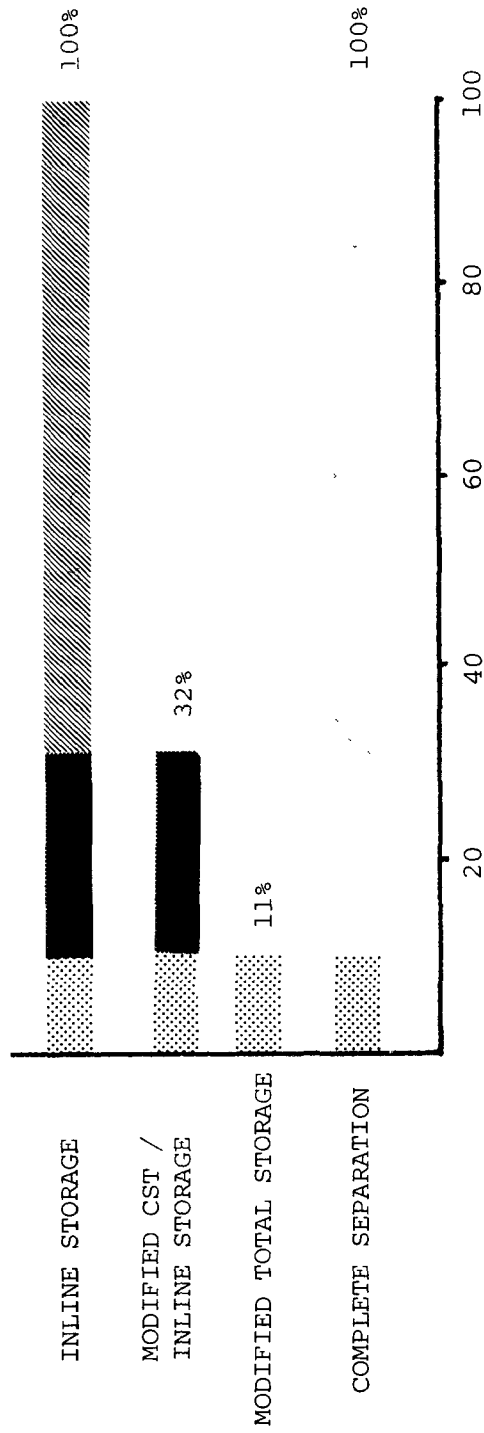
Near Surface Storage

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

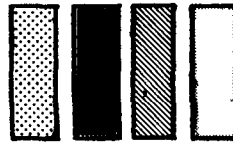
(1ac-ft =  $1.23 \times 10^3 \text{ m}^3$ )







PERCENT OF AREA AFFECTED BY SEWER CONSTRUCTION



Complete Separation - No Private Property Work

Partial Separation - Near Surface Storage

Partial Separation - Central Storage Facilities

Complete Separation - Work on Private Property (These areas would be partially separated with near surface storage-if Private Property Work is not allowed \*)

FIGURE

1-3

DATE

## AREA AFFECTED BY OPEN CUT SEWER CONSTRUCTION

SOURCE M.M.S.D.

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Separation Alternative would treat the least amount of storm water and could increase the frequency of sediment scour.

The percentage of the CSSA that would be affected by each CSO peak flow abatement/attenuation facility 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. The use of local construction firms for sewer separation alternatives would introduce money into the local economy. Constructing a deep tunnel system would require the reliance on firms outside the area, causing a loss of income to the local economy.

#### 1.5.3.3 Areas of Controversy

Concern has been expressed that wastewater could seep out of the facilities and contaminate deep groundwater, that groundwater could infiltrate the facilities, lowering local groundwater levels, or that both could occur.

If the piezometric surface of an aquifer (the height to which water would rise in an open well) is higher than the elevation of wastewater stored in a cavern or tunnel, groundwater would tend to seep into (infiltrate) the storage facility. On the other hand, if the upper surface of the wastewater in the storage facility is higher than the piezometric surface of the aquifer, wastewater would tend to leak from (exfiltrate) the facility, contaminating local groundwater. Excessive infiltration could lower groundwater levels, possibly causing wells to dry up. If groundwater levels are greatly lowered, exfiltration could occur when the tunnels and caverns fill. Figure 1.4 illustrates the relationship between the piezometric surface of the aquifer and infiltration and exfiltration.

There are two specific groundwater characteristics which could increase the chances of groundwater pollution. There may be isolated areas near the proposed deep tunnel and cavern storage facilities in which the piezometric surface is much lower than the surface throughout the majority of the area. If the piezometric surface is very low, exfiltration could occur whenever the tunnels are used. In addition, there are a number of abandoned wells near the proposed deep tunnel routes which could transmit wastewater exfiltrating from the facilities vertically through the three major aquifers in the Milwaukee area, potentially contaminating even the deep sandstone aquifer.

The MMSD has undertaken a pre-design, subsurface study to evaluate groundwater conditions. This study will attempt to locate any areas of low piezometric surface and all abandoned wells. If any of these areas are found near the proposed deep tunnel conveyance routes or near the cavern facilities, it may be necessary to move the facilities or to protect against exfiltration by measures such as artificial groundwater recharge. Any improperly abandoned wells would have to be sealed. During construction, all cracks encountered in the bedrock formation would be filled, and the tunnels and caverns would be lined with concrete. Furthermore, a maintenance program should be established to monitor groundwater levels, the levels of wastewater in the tunnels and to inspect the facilities for cracks or deterioration. With proper construction and operating practices, the deep tunnel and storage facilities should not adversely affect the groundwater in the area.

#### 1.5.4 Wastewater Treatment

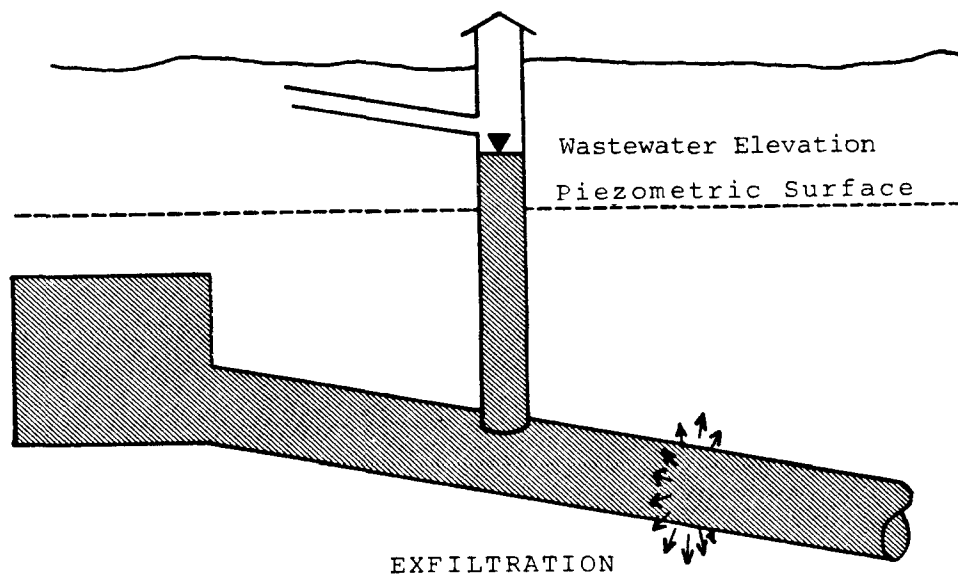
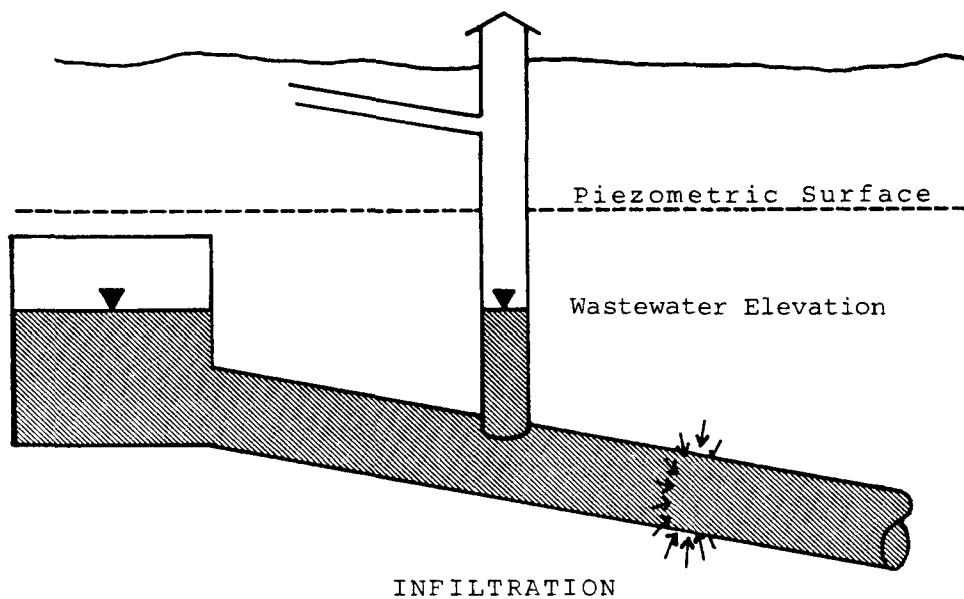
##### 1.5.4.1 Jones Island and South Shore WWTPs

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 preferred alternatives for the expansion of these WWTPs 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.

##### 1.5.4.2 Areas of Controversy

There is some question of the legality of the proposed lakefill in the Outer Harbor for the Jones Island WWTP because it could interfere with navigation. The MFP and the EIS include another alternative which would avoid the lakefill in the Outer Harbor. With this alternative, facilities would be constructed on land now occupied by General Cargo Terminal Number 1. The MFP found this alternative to be about \$6 million less expensive than lakefill. The land would be used jointly by the MMSD and the Milwaukee Harbor Commission. This alternative is described in more detail in the Jones Island Appendix to this document.



FIGURE

DATE 1.4

November  
1980

Infiltration and Exfiltration Possibilities  
for Deep Storage Facilities Based on the  
Relationship of Piezometric Surface to  
Wastewater Elevation

SOURCE

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Also, some residents of the City of South Milwaukee have raised concerns about the expansion of the South Shore treatment plant. They have complained about foul odors from the South Shore WWTP and feel that the expansion of the facility would aggravate the problem. They are concerned that the expansion would be unsightly and would disrupt the view of Lake Michigan. There is also concern that, as a result of these factors, property values near the plant may be affected. In response to these concerns, the EIS has also evaluated 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 minimized.

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.

#### 1.5.4.3 Other WWTPs

The preferred 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, if these impacts should occur, they would be moderate and temporary.

The Local, Regional, and the MMSD preferred 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.

At most, only 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, and 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 quality and relatively small volume.

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.

#### 1.5.5 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. 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 future supplement to the EIS, (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.

Abandoning the Milorganite process would reduce particulate emissions in Milwaukee County by 6 percent and energy consumption at the WWTP by 57 percent. However, another consequence of abandoning the process would be an increase of the annual input of ammonia from the Jones Island WWTP from 1.6 million pounds (.7 million kg) to 6 million pounds (2.7 million kg). Increased levels of ammonia in the Outer Harbor would lower the level of dissolved oxygen in the water and could be toxic to fish.

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 is currently performing a water quality study to determine how this increase in ammonia would affect the Outer Harbor. The MMSD is also examining alternatives that would reduce the ammonia in the effluent. The EPA and DNR are awaiting the results of these analyses and will include in the FEIS measures to minimize the ammonia discharges to Lake Michigan.

#### 1.5.5.1 Areas of Controversy

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 could seep into groundwater, potentially endangering the health of local well-users.

All farmers interested in receiving the solids from the South Shore WWTP would have to be informed of the potential hazards of its use. This precaution and the adherence to DNR and EPA regulations would reduce the potential for soil and groundwater contamination.

#### 1.5.6 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 for population to reach the levels designated by the Southeastern Wisconsin Regional Planning Commission. However, if the population does not grow to planned levels, the expanded sewer service would encourage a scattered pattern of development. 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 would exceed the revenues from the increased tax base.

#### 1.5.7 Other Issues

##### 1.5.7.1 Political Systems

If either the MMSD's recommended plan or the Regional Alternative, is adopted, the MMSD would be responsible for treating most or all wastewater flows in the planning area. The communities in the planning area that now manage wastewater treatment facilities would no longer control the conveyance and treatment of their wastewater.

### 1.5.7.2 Cost

The costs for the final system-level alternatives is shown in Table 1.6. These costs assume the implementation of the MMSD's preferred 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>				
	Inline Storage	1696.21	28.94	1955.12
	Complete Separation	1726.13	28.47	2023.48
	Modified CST/Inline	1702.66	30.64	1986.76
	Mod. Total Storage	1716.21	31.32	2007.77
<u>Regional</u>				
	Inline Storage	1656.25	26.90	1894.84
	Complete Separation	1686.17	26.43	1963.23
	Modified CST/Inline	1662.70	28.60	1926.51
	Mod. Total Storage	1676.25	29.27	1947.52
<u>Mosaic- MMSD Recom- mended</u>				
	Inline Storage	1636.25	26.90	1894.87
	Complete Separation	1686.17	26.43	1963.23
	Modified CST/Inline	1662.70	28.60	1926.51
	Mod. Total Storage	1676.25	29.27	1947.52

Current projections of the availability of Federal and State funds for water pollution abatement projects indicate that approximately thirty-six percent of the MWPAP 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 by the User Charge System.

Table 1.7 outlines the average annual property tax rates that would result from the implementation of the final system-level alternatives. These costs were determined assuming that Milwaukee would construct all elements of the alternatives, including



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