

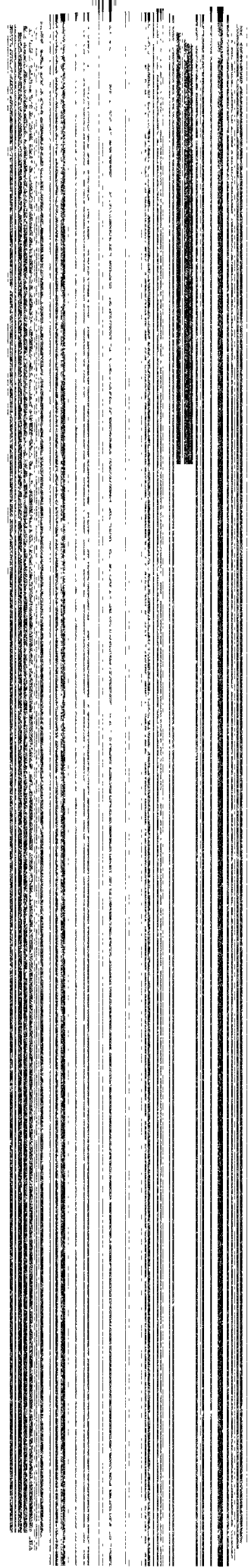
DRAFT

ENVIRONMENTAL IMPACT STATEMENT

**WATER QUALITY MANAGEMENT
PLANNING FOR THE HURON
RIVER BASIN PORTION OF
SOUTHEAST MICHIGAN**

**PREPARED BY U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION V, CHICAGO**

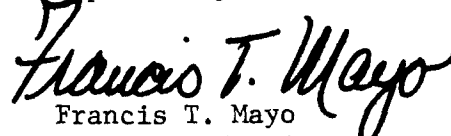
FEBRUARY, 1973



DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE
HURON RIVER BASIN PORTION
OF THE
INTERIM WATER QUALITY MANAGEMENT PLAN FOR THE SOUTHEAST
MICHIGAN METROPOLITAN - REGIONAL AREA

PREPARED BY
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

Approved by:


Francis T. Mayo
Regional Administrator

February 1973

U.S. Environmental Protection Agency
Region 5, Library (5PL-15)
230 S. Dearborn Street, Room 1670
Chicago, IL 60604

SUMMARY SHEET

This Draft Environmental Impact Statement was prepared by the United States Environmental Protection Agency, Region V.

1. This draft statement is submitted prior to federal approval of the Huron River Basin portion of the Interim Water Quality Management Plan for the Southeast Michigan Water Resources Commission.

If the proposed plan is approved, a single wastewater treatment plant will be built at the mouth of the Huron river to serve the entire service area.

2. Brief Description of Proposed Plan

The proposed plan, identified as Plan II in the "Plans for Water Quality Management - Phase I Southeastern Michigan Area" provides for the construction of a major new secondary wastewater treatment plant with 90% phosphorus removal at the Huron River discharging to Lake Erie. The plan also includes an interceptor system that would extend inland to serve portions of Western Wayne, Eastern Washtenaw and Southwestern Oakland Counties, Michigan. Under this plan, existing treatment plants on the Huron River within the 1990 service area would be abandoned.

3. Major Alternatives Considered

a. Plan IB - This plan provides for the Ann Arbor area in Washtenaw County to be served by a tertiary treatment plant with phosphorus removal at Ann Arbor. The balance of the 1990 service area, which is the same as that for the proposed plan, will be served by a new secondary treatment plant, with 90% phosphorus removal, at the mouth of the Huron River discharging to Lake Erie. The interceptors provided for in this plan would extend along the Huron River to the City of Ypsilanti and north through Wayne County to White Lake Township in Oakland County.

b. Plan III - This plan provides for the abandonment of the existing plants on the Huron River and the construction of an interceptor extending from a new secondary wastewater treatment plant at the mouth of the Huron River northwesterly adjacent to the Huron River at Ann Arbor. An interceptors would transport the wastewater from the Washtenaw County area and the Wayne County area south of Plymouth to the proposed Huron River Plant. The balance of the area would be serviced by the existing Detroit Wastewater Treatment Plant through an interceptor extending from the Detroit

Plant northwesterly along the Rouge River to Plymouth Road, westerly along Plymouth Road to Hannan Road and then northerly to White Lake Township in Oakland County.

c. Plan IV - This plan proposes two interceptor systems and two inland tertiary treatment plants with phosphate removal within the service area - one at Ann Arbor and one at Ypsilanti. The wastes from the balance of the Washtenaw County area and the Wayne County area south of Plymouth Township would be handled by the proposed Huron River treatment plant. The remainder of the wastes in the 1990 service area would be handled by the Detroit Treatment Plant.

d. Plan V - This plan briefly explored two alternatives to the possibility of disposing the treated sewage effluent on land by spray irrigation. The first alternative would provide land disposal for the entire service area. The second alternative would provide land disposal for sewage effluent generated from the Ann Arbor, Ypsilanti City and Ypsilanti Township area. The remainder of the service area would be treated at the proposed Huron River Treatment Plant.

4. The following Federal, State, and local agencies are being requested to comment on this Draft Environmental Impact Statement:

Council on Environmental Quality

Department of Agriculture

U.S. Army Corps of Engineers, Detroit District

Department of Commerce

Department of Health, Education, and Welfare

Department of Housing and Urban Development

Department of the Interior

Department of Transportation

Governor of Michigan

Michigan Water Resources Commission

Michigan Department of Public Health

Southeastern Michigan Council of Governments

Oakland County Planning Commission

Washtenaw County Planning Commission

Wayne County Planning Commission

City of Detroit

City of Ann Arbor

City of Ypsilanti

Others

5. This Draft Environmental Impact Statement is being made available to the public, to the Council on Environmental Quality and to other agencies as noted above in February, 1973.
6. On the basis of the analysis and evaluation set forth in this Statement, and after weighing the environmental, economic, technical, and other benefits against environmental costs and considering available alternatives it is concluded that the action called for is the approval by the U.S. Environmental Protection Agency of the proposed Plan II.

The Interim Water Quality Management Plan for the Southeast Michigan Metropolitan - Regional Area, as proposed by the Michigan Water Resources Commission and the Southeastern Michigan Council of Governments, recommends Plan II for the Huron River Basin portion of Southeast Michigan.

Acknowledgement

Portions of this Environmental Impact Statement were taken directly from the "Environmental Assessment - Phase I Plans

for Water Quality Management, Southeastern Michigan Area," prepared by the Michigan Water Resources Commission and dated February 1972.

Specifically, many of the cost figures, projected population and waste loadings, and description of the proposed plan and major alternatives were taken from the assessment.

HURON RIVER WATERSHED

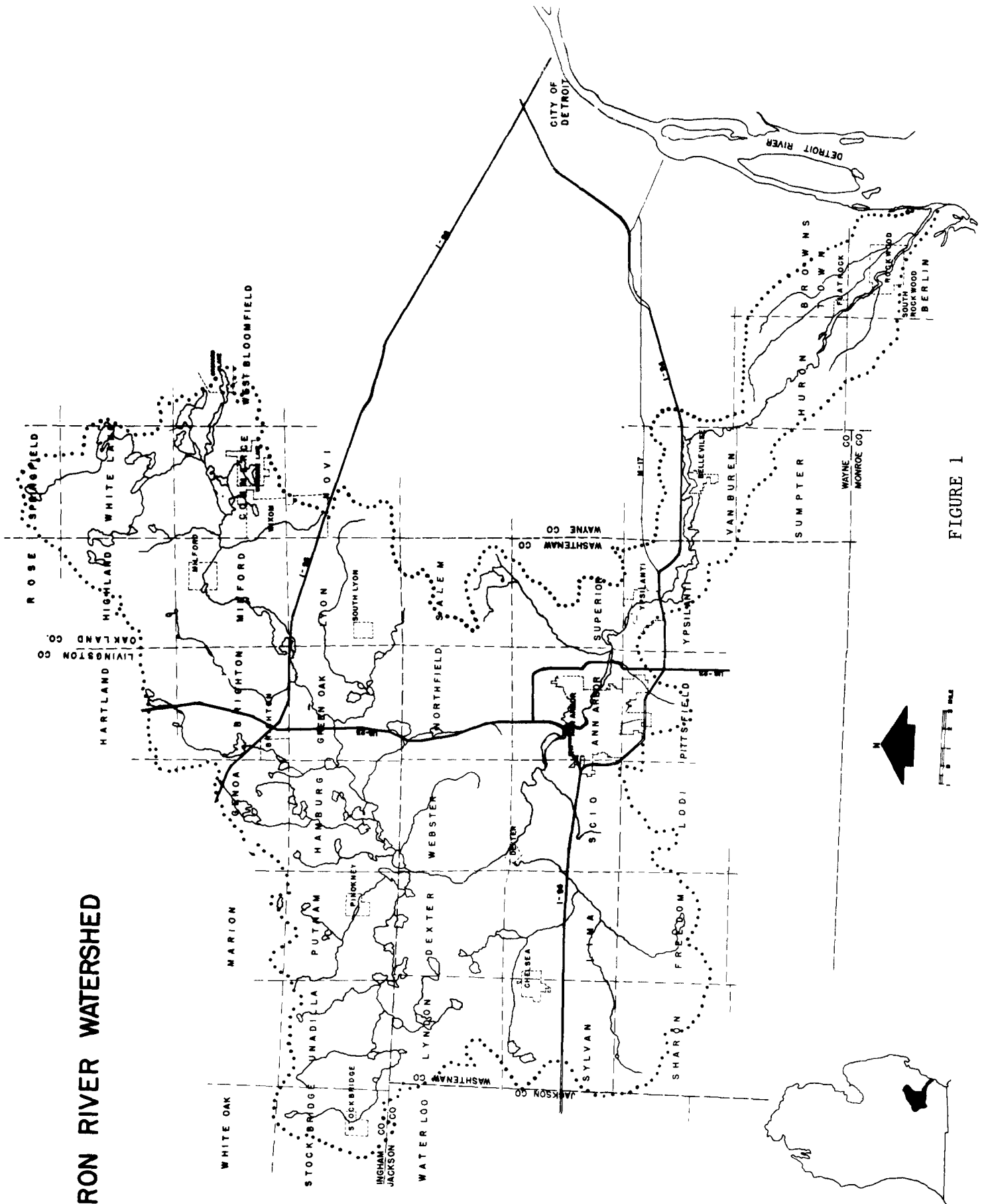


FIGURE 1

WATER QUALITY MANAGEMENT PLANS FOR THE SOUTHEASTERN MICHIGAN AREA PHASE I

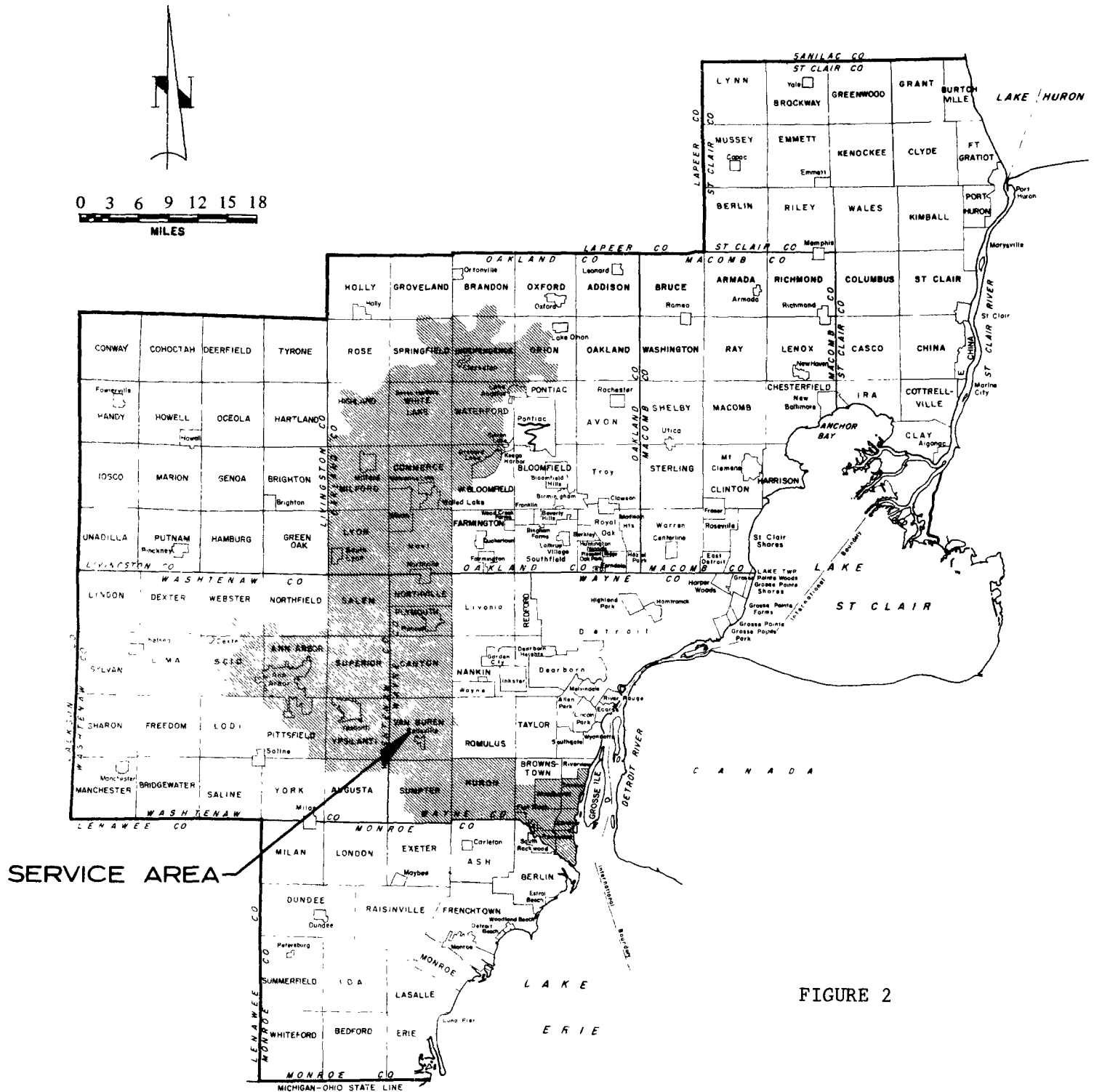


FIGURE 2

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1. CONCLUSIONS

Our evaluation of the proposed plan and the three major alternatives indicated that the economic differences are so minimal that they do not offer a decision on a cost effectiveness basis. Also, the environmental consequences appear to be quite similar except that the proposed plan will treat all the service area wastewaters at one treatment plant and will provide maximum protection for the Huron River and meet all water quality standards for Lake Erie. The proposed Plan II has been endorsed by the Southeast Michigan Council of Governments and the Michigan Water Resources Commission, and the EPA has concluded that the proposed Plan II is the most environmentally compatible solution to the wastewater management problems of the Huron River Basin area. The proposed treatment system, when built, will comply with all policies, guidelines, and permits issued pursuant to the new Federal Water Pollution Control Act Amendments of 1972. All interested Federal, State, and local government agencies, as well as other interested parties will be given the chance to review this Draft Environmental Impact Statement and we welcome any further comments and views on the matter.

II. DESCRIPTION OF PROPOSED ACTION

A. BACKGROUND

An interim water quality management plan for the Southeast Michigan Metropolitan - Regional Area has been prepared by the Michigan Water Resources Commission and approved by the HUD designated area-wide planning organization, the Southeast Michigan Council of Governments (SEMCOG), in accordance with the 40CFR35.150 planning requirements. The plan has already been approved by Region V of the Environmental Protection Agency with the exception of the Huron Basin area. The plan that has been approved describes a system of major interceptors which, with a few exceptions, carry all municipal sewage to a number of major wastewater treatment plants on the St. Clair River, Detroit River and Lake Erie. The Huron Basin portion of the plan, which has not yet been approved by EPA, considers a number of alternative treatment systems to be discussed in the environmental impact statement. Upon approval of a plan for the Huron Basin, the entire Southeast Michigan area will have a plan for water quality management.

B. HISTORY OF AREA

1. Population

The Southeastern Michigan area comprises the most intensely urbanized and industrialized portion of Michigan. Some 4.7 million

person resided in the area in 1970. Based on population projections developed by the Southeast Michigan Council of Governments, the Southeast Michigan area is projected to sustain a 20 percent population increase by 1980, with an additional 25 percent increase in the following decade. By 1990, the area's population is anticipated to be half again as large as the 1970 population.

2. Economy

The Southeastern Michigan region supports a highly developed industrial complex. The Nation's automobile industry's fabricating and assembling operations continue in the area. The chemical and allied products industry and the food and kindred products industry are also substantial. The economy of the region is now shifting somewhat from its historically heavy emphasis on manufacturing toward a growth in trades and services. To some extent this trend toward diversification may be an indication of increasing stability of the Southeastern Michigan economy, with a resulting reduction in the large inflows and outflows of population.

Tentative projections indicate that by 1990, manufacturing activity in this region, as measured by employment, will increase by roughly one-sixth beyond 1970 levels and that mining will grow

by about one-eighth. Agricultural employment is expected to drop by one-third as urbanization progresses and as production technology continues to require less labor.

3. Land Use

The Southeastern Michigan area comprises a complex variety of land uses for residential, commercial, industrial, agricultural and recreational purposes. By the late 1960's over 21 percent of the land in the region as a whole was urbanized, with the Detroit Metropolitan counties of Wayne, Oakland and Macomb being 55 percent, 38 percent and 28 percent urbanized, respectively. As of 1969, the long-prevailing trend toward fewer acres of farmland harvested was still continuing. The major factor contributing to this decrease in farmland appears to be the continued enlargement of the Detroit Metropolitan Area.

For the entire Huron River Basin portion of the Southeastern Michigan area, land use in 1965 was approximately 20% residential, 5% commercial and industrial, 10% public recreation, and 65% undeveloped or vacant. SEMCOG has estimated that by 1990 these land use categories may shift to 35% residential, 5% commercial and industrial, 10% public recreation, and 50% undeveloped or vacant.

C. PURPOSE OF PLAN

The portion of the Southeast Michigan Water Quality Management

Plan which pertains to the Huron Basin Area has been a controversial issue since its inception, and the purpose of this environmental impact statement is to evaluate the impacts of the alternatives considered so that a final plan for the Huron Basin Area may be selected.

The Huron Basin Service Area includes portions of eastern Washtenaw, southwestern Oakland and western Wayne counties, the two largest cities being Ann Arbor and Ypsilanti, and involves a major portion of the Huron River Basin and portions of the Rouge River Basin. The Huron Basin Area is presently in need of new and/or improved wastewater collection and treatment facilities in order to comply with the water quality standards and implementation schedules for the area and provide for the population growth of the area as projected by SEMCOG for a minimum of the next two decades.

The purpose of the plan for the Huron River Area is to determine the most cost-effective, environmentally compatible wastewater collection and treatment strategy for the Tri-County area that will serve to the year 1990 and will best meet the water quality standards for Southeast Michigan presented below.

D. WATER QUALITY

1. Water Quality Standards

The Federal Water Quality Act of 1965 (Public Law 89-234)

provides that the state adopt water quality standards with respect to interstate waters. The Water Resources Commission Act (Act 245, P. A. of 1929, as amended) provides for establishing pollution standards by the Michigan Water Resources Commission. Based upon the latter statutory authority, the State Water Resources Commission in January of 1968 adopted Water Quality Standards for Michigan Intrastate Waters. Following is a listing of the designated water uses and the stream reaches within the Southeastern Michigan Metropolitan Area (St. Clair, Macomb, Wayne, Washtenaw, Monroe and part of Livingston and Oakland Counties) to which they apply.

(A-1) Domestic Water Supply - All existing public water intakes in normal daily use will be protected for domestic water supply at the point of intake.

Huron River at Ann Arbor - Washtenaw County

Huron River at Flat Rock - Wayne County

Huron River at Geddes Pond (Ypsilanti) - Washtenaw County

River Raisin at Dundee - Monroe County

(A-2) Industrial Water Supply - All public waters in the area are protected for industrial water supply.

(B-1) Recreation, Total Body Contact. Natural lakes and the designated reservoirs or portions of streams and

artificial lakes on public waters in this area are protected for total body contact. The following reservoirs and portions of streams are designated for total body contact. Huron River at Belleville Lake-Wayne County-T 35, R.8E, ^{to} Sec. 34 Huron River at Ford Lake.

(B-2) Recreational, Partial Body Contact. All public waters will be protected for partial body contact.

(C-1) Fish, Wildlife and other Aquatic Life - Intolerant Fish, Cold Water Species: All waters designated under the authority of P. A. of 1967 by the Director of the Michigan Department of Natural Resources will be protected for tolerant fish, cold-water species except that in those instances below municipal and industrial discharges where subsequent findings indicate that existing water quality is below cold-water, intolerant fish standards.

(C-2) Fish, Wildlife and other Aquatic Life - Intolerant Fish, Warm Fish Species: All waters not designated for intolerant fish, cold-water species, tolerant fish, warm water species or commercial and other uses will be protected for intolerant fish, warm water species.

(C-3) Fish, Wildlife and other Aquatic Life - Tolerant Fish, Warm Water Species:
River Raisin - from the first dam above the mouth to

the west city limits of the City of Monroe.

(C-4) Fish, Wildlife and other Aquatic Life - Intolerant Fish, Warm Water Fish, Anadromous: Waters protected for intolerant fish, cold-water species will be protected for anadromous fish.

(D) Agricultural - All public waters will be protected for agricultural use except the following:

River Raisin from the first dam above the mouth to the mouth - Monroe County.

Rouge River from the Michigan Avenue Bridge to the mouth - Wayne County.

Willow Creek from I-94 Bridge near Ypsilanti to its confluence with Huron River (Belleville Lake)

(E) Commercial and Other Use - The following public waters will be protected for commercial and other.

River Raisin from the first dam above the mouth to the mouth.

Willow Creek from I-94 Bridge near Ypsilanti to its confluence with the Huron River (Belleville Lake).

Most waters in the area are protected for industrial water supply and partial body contact.

2. Present Water Quality Problem Areas

The major water quality problems of the Huron River Basin

and the Michigan waters of Lake Erie mainly result from municipal discharges. There is little evidence of agricultural or independent industrial sources of pollution. Below is a more detailed discussion of the water quality problems in the area.

a) Lake Erie

Portions of the Michigan shore of Lake Erie are affected by polluttional discharges from the Southeast Michigan area. The western end of Lake Erie receives the discharges of the Detroit, Huron, Raisin and Maumee Rivers. This produces a large area west and south of the Detroit River mouth, which is relatively rich in nutrients and contains increased levels of other constituents. Nuisance algae conditions are significant in the Michigan waters of Lake Erie. Nuisance conditions arise when algae cells become so numerous as to cause adverse tastes to water supplies, turbid and green-brown water color, and depleted dissolved oxygen during algae die-off.

The luxuriant growth of algae and other plants is attributed to the increasing impact of fertilizing nutrients from municipal and industrial wastes, and land drainage.* As a result, extensive remedial programs have been implemented in the Lake Erie Basin to remove phosphorus, the principal

*International Lake Erie Water Pollution Board. "Report to the International Joint Commission on the Pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River." Vol. 2, Lake Erie, 1969.

nutrient most amenable to control, from all municipal and industrial waste discharges.

b) Middle Rouge River

Although the Middle River Rouge Valley has been largely preserved for park and recreational uses, degradation of the river has limited its full utilization for these purposes. The causes of water quality degradation include combined sewer diversions, trash accumulation, industrial waste discharges, and soil erosion in the upper reaches from new housing developments. In communities such as Westland, Plymouth, Northville, Garden City, Dearborn Heights, Redford Township, and others, combined sewer systems outlet into the Rouge Valley Interceptor System. When heavy rains occur, diversion gates allow a combination of stormwater and raw sewage to overflow into the Middle Rouge River. In a 1966 survey* staff members of the Water Resources Commission found the water quality of the Middle River Rouge to be seriously degraded, particularly its lower reaches. Indications of this degradation were: low dissolved oxygen concentrations; high concentrations of oxygen demanding substances, inorganic nutrients, and coliform bacteria; and visible films of oil.

*Michigan Water Resources Commission, "Water Quality Evaluation of the Middle River Rouge Basin," October 1967.

c) Huron River Basin

The Huron River can be divided generally into two water quality sections: The Upper Basin upstream of Ann Arbor, and the Lower Basin downstream from Ann Arbor.

Water Quality in the Upper Basin is generally fair to good except for isolated instances. The main water quality problem in the Upper Basin is nutrient enrichment, particularly in lakes which form part of the mainstream of the Huron River. Lakes that have experienced nuisance algal conditions include Gallagher Lake, Brighton Lake, Ore Lake, Strawberry Lake, Baseline Lake and Whitmore Lake. For most of these lakes, upstream sewage treatment plant discharges were regarded as major sources of nutrients.

Throughout the Upper Huron Basin, lakes are being subjected to strong developmental pressures for residential and other purposes. The bulk of the area's population relies on septic tank-tile field wastewater disposal systems. Substantial potential exists for environmental degradation through groundwater and lake contamination from septic tank disposal systems.

Water quality in the Lower Huron is affected by wastewater discharges from the Ann Arbor, Ypsilanti, Ypsilanti Township, Flat Rock and Rockwood municipal sewage treatment plants, and by stormwater discharges and land runoff.

Two major types of use impairments have been noted in the Lower Huron River impoundments. Belleville Lake, a designated total body contact recreation area, has been closed to swimming at times by the Wayne County Health Department because of elevated coliform levels. Both Belleville and Ford Lakes have experienced intensive algal blooms during summer periods. Certain of these algal blooms have been followed with fish kills. One such incident was reported on September 12, 1968 at Ford Lake. Investigators found that there were several hundred dead fish along the north shore from Bridge Road to Grove Road near David Avenue. Every cove on the downwind side of the lake had an overabundance of algae. In certain areas, the algae was so thick the water had the consistency of thick pea soup. These impoundments act in effect as settling ponds or final oxidation ponds, especially during periods of summer drought flow when water flows slowly through impoundments.

E. PROPOSED PLAN

The proposed plan, endorsed by the EPA, Michigan Water Resources Commission, and SEMCOG, identified as Plan II in the "Plans for Water Quality Management - Phase I Southeastern Michigan Area," calls for a single major new sewage treatment plant near the mouth of the Huron River discharging to Lake Erie

about one mile offshore from Point Mouillee. The 1990 service area for Plan II includes the following areas: Wayne County: The Cities or Villages of Belleville, Flat Rock, Gibraltar, Northville, Plymouth, Rockwood and South Rockwood, Trenton, Woodhaven and portions of all of the following townships; Brownstown, Huron, Sumpter, Van Buren, Romulus, Canton, Plymouth and Northville.

Oakland County: The Cities or Villages of Novi, Walled Lake, Wolverine Lake, Orchard Lake, and Clarkston and portions of all of the following townships; Commerce, White Lake, Springfield, and Novi.

Washtenaw County: The Cities of Ann Arbor and Ypsilanti and portions of all of the following townships; Augusta, Ypsilanti, Superior, Salem, Pittsfield, Ann Arbor and Scio. Certain areas in the proximity of the interceptor service area are not within the 1990 project service area. The communities outside the 1990 service area are as follows:

1. West Bloomfield Township, Waterford Township, Independence Township, Orion Township and Pontiac Township. They will be served by the Clinton-Oakland Interceptor System where they have sufficient capacity to 1990.
2. Lyon Township, Milford Township, Highland Township,

Milford, South Lyon and Wixom. These communities will be served by the existing plants at South Lyon, Milford and Wixom, improved and expanded as needed, or by other new interim plants. This area's projected population density for 1990 does not appear to warrant extensive and expensive interceptor construction. The remainder of the Huron River Watershed, located west and outside of the service area boundaries, is primarily rural and agricultural, with a few small towns.

The map, Fig. 3, outlines the 1990 service area. The proposed plan calls for a major interceptor to be constructed from a proposed Huron River Wastewater Treatment plant at Lake Erie northwesterly parallel to the Huron River to Hannan Road. At Hannan Road the system branches to the north and also to the west. The west branch is the Van Buren Arm which picks up the existing Ypsilanti Township plant. The extension westerly beyond the Ypsilanti Township plant is known as the Ann Arbor Arm and picks up the City of Ypsilanti and the City of Ann Arbor plants and their connecting service areas. The Hannan Road Interceptor extends north from the Van Buren Arm junction through Canton, Plymouth and Northville Townships and extends through Oakland County in the North Arm to White Lake Township.

The predicted 1990 sewage flow to the treatment plant from the service area is estimated to be 121 MGD, of which Ann Arbor, the

the largest single contributor, will send 33 MGD to the plant. The proposed plan will eliminate all municipal discharges to the Huron River from Ann Arbor to the mouth. Cost estimates for the proposed Plan II are shown in Table 1.

TABLE 1

Cost Estimates for the Proposed Plan II

	<u>Millions of Dollars</u>
Huron River Interceptor	37.55
Hannan Road Interceptor	21.98
North Arm	20.49
Van Buren Arm	23.66
Ann Arbor Arm	14.35
Ann Arbor Retention Basin	5.00
Ypsilanti Township Retention Basin	5.00
Huron River Plant	32.80
Total to Huron River Plant	160.83
Detroit River Rouge Interceptor	59.11
Redford Arm	<u>4.31</u>
Total Project Cost	\$224.25
Annual operation and maintenance in 1990 = \$2.14 Million	
Annual amortization cost*	=\$17.54 Million
total annual cost in 1990	=\$19.68 Million

* 25 year at 6%

III. Environmental Impact of Proposed Plan

A. Impact of Proposed Plan on Lake Erie

By implementing the proposed plan, wastewater from the Lower Huron Basin Study area would be conveyed to the proposed treatment plant at the mouth of the Huron River, and would be discharged **after** treatment to Lake Erie.

The projected waste loadings to Lake Erie from the proposed treatment plant are shown in Table 2 below.

Table 2

Waste Loadings to Lake Erie from the Huron River Treatment Plant

<u>Waste</u>	<u>Effluent Concentration</u>	<u>Pounds Per Day</u>	
<u>Constituents</u>	<u>mg/l</u>	<u>1975</u>	<u>1990</u>
5-Day Biological Oxygen	20 mg/l	12,150	20,194
Suspended Solids	18.5 mg/l	11,240	18,682
Total Phosphorus	0.67 mg/l	408	678
Ammonia Nitrogen (NH ₃ -N)	6.0 mg/l	3,646	6,059
Total Nitrogen		8,872	14,746
Flow (Mgd)		73	121

These figures represent gross waste discharges. The actual net increased loadings to Lake Erie will be less because the Huron River treatment plant will handle some wastes which are currently being discharged to Lake Erie via the Detroit River by the Wayne County Treatment Facilities located on the Detroit River and the Detroit

Wastewater Treatment Plant. Also, some wastes currently being discharged to the Huron River eventually reach and enter Lake Erie.

The proposed Huron River Treatment Plant will discharge daily effluent containing carbonaceous material which will demand 20, 194 pounds of oxygen (as measured by the 5-day BOD test) and 14,746 pounds of total nitrogenous oxygen demand to Lake Erie by 1990. This discharge, however, is not expected to cause substandard dissolved oxygen conditions if the following two conditions, which are provided for in the plan, are met: (1) the suspended solids concentrations in the effluent are kept low to minimize sedimentation of organic materials; and (2) the effluent is well dispersed in the Detroit River current.

The magnitude of the decrease in oxygen levels can be approximated. In 1990, the proposed Huron River plant will discharge an estimated 121 mgd, or 187 cfs. The average flow of the Detroit River is about 185,000 cfs. Previous studies of the Detroit River just above the location of the proposed outfall show that about 10 percent of the flow of the Detroit River passes between the Michigan shore and a point one mile from the shore. Using this portion of the River flow for assimilation, the wastewater effluent would be diluted with river water by about a ratio of 1 to 100 (187 cfs versus 18,500 cfs). On this basis, the ultimate oxygen demand from the effluent would deplete the dissolved oxygen demand of the river

downstream from the discharge point by a maximum of 1.0 mg/l. Under the aegis of the International Joint Commission (IJC), water quality data was collected from 22 river sampling ranges in the Detroit River, including Range DT 3.9 located immediately upstream from the discharge location of the proposed Huron River Treatment Plant. In 1970, the average dissolved oxygen concentration at this range was 7.6 mg/l. Therefore, the average dissolved oxygen content could be lowered from 7.6 mg/l to 6.6 mg/l. This is well above the standard of 5.0 mg/l.

Consideration has also been given to the impact on Lake Erie that would result from possible treatment plant malfunction, accident or failure. Taking the worst possible situation where complete failure of the treatment processes occurred, it is highly improbable that any serious impact would occur at the Monroe water supply intake located twelve miles away. Bacterial levels could, however, be elevated along the Michigan shoreline of Lake Erie and thereby impair water related recreational uses for a short time. The affect on dissolved oxygen reduction in Lake Erie from treatment plant malfunction resulting in raw sewage entering the lake can be grossly estimated. The average daily per capita discharge of oxygen-demanding substances is 0.25 pounds ultimate carbonaceous BOD/capita-day and 0.20 pounds ultimate nitrogenous BOD/capita-day. For a 1990 population of 695,000 people, the raw sewage would contain a total of 313,000 pounds ultimate BOD/day.

For a sewage flow rate of 121 MGD, the concentration of ultimate BOD would be 310 mg/l, and when diluted in Lake Erie at a ratio of 100:1 the concentration is 3.1 mg/l. Using this figure of 3.1 mg/l, the dissolved oxygen would theoretically drop from 7.6 mg/l to 4.5 mg/l. Although this figure is below the standard of 5.0 mg/l, it is improbable that dissolved oxygen could ever drop below the standard because the above gross analysis did not consider that ultimate oxygen demand is exerted over a period of 20 days or longer, that natural re-oxygenation of the Lake water is constantly occurring, and complete malfunction of the plant resulting in total discharge of raw sewage is highly unrealistic.

The most serious water pollution problem in Lake Erie is the increasing eutrophication of the Lake resulting from the increased input of fertilizing nutrients from municipal sources, industrial wastes and land drainage. Phosphorus and nitrogen are recognized as the most important nutrients from municipal sources, industrial wastes and land drainage. Phosphorus and nitrogen are recognized as the most important nutrients responsible for the eutrophication of Lake Erie. Experience shows that phosphorus is most often the controlling material in stimulating algae growth.

According to a 1969 report by the International Joint Commission (IJC), the 1966-1967 loading of total nitrogen to Lake Erie was over 177,000 short tons, while the loading of total phosphorus to the

Lake during the same period was about 30,000 short tons. Nitrogen entering Lake Erie is contributed mostly from uncontrollable natural sources, whereas over 70% of the total phosphorus is contributed from controllable municipal and industrial sources.

The following Table 3 from the IJC report shows the inputs of total phosphorus in short ton/year to Lake Erie in 1966-67. The table shows the phosphorus input by source and also by basin.

Table 3
Phosphorus Discharges to Lake Erie in 1966-67

<u>(Short tons/year)</u>				
<u>Basin</u>	<u>Municipal</u>	<u>Industrial</u>	<u>Other</u>	<u>Total</u>
West	13,420	1,212	6,643	21,275
Central	4,622	331	1,738	6,691
East	<u>1,048</u>	<u>480</u>	<u>480</u>	<u>2,132</u>
Total	19,090	2,023	8,985	30,098

It is apparent that the West Basin receives the majority of the phosphorus load which includes 2,240 short tons per year in Lake Huron outflow. The Huron River contributed only 430 short tons per year during the 1966-67 period, or about 2 percent of the amount discharged into the Western basin.

According to a 1969 report by the International Lake Erie Water Pollution Board to the IJC, the current phosphorus loading to the Western basin highly exceeds that level beyond which algae growth in the Western basin of Lake Erie will be sustained.

According to the report, the phosphorus load would have to be reduced from 21,275 short tons to 550 short tons to arrest eutrophication. The elimination of all municipal and industrial waste discharges, however, would leave an annual phosphorus loading of 6,643 short tons from other sources which would still result in Lake Erie remaining in an eutrophic state. The Control Board report to the IJC suggests the future possibility of removing all phosphorus from detergents and achieving 95 percent removal of controllable phosphorus as a means of striving to achieve a low concentration of phosphorus. This problem is addressed further in the appendix under the terms of an international agreement signed in April 1972. This international agreement has set the allowable limit of phosphorus concentration in municipal effluents at 1.0 mg/l.

The proposed plan for the Huron River area would result in removing 90 percent of the phosphorus from the major waste sources to the Huron River. The phosphorus concentration in the proposed plant effluent will be 0.67 mg/l. Total phosphorus loadings from the Huron River plant to Lake Erie are estimated to be 408 pounds per day in 1975 and 678 pounds per day in 1990. This is equivalent to 70 short tons/year and 123 short tons/year, respectively. These levels of phosphorus reduction exceed the required levels of reduction by the United States-Canadian Great Lakes Water Quality Agreement. The anticipated 1990 load of 123 short tons per year from the proposed

plant is small compared to the total load of phosphorus being discharged into the Western basin, and implementation of the proposed plan will have little effect on the eutrophic condition of the Western basin of Lake Erie. The limit of 1mg/l of phosphorus in municipal waste treatment plant effluents to Lake Erie has been deemed, by the international agreement, to be the desirable Lake-wide goal to be attained. Should future evidence show that higher levels of phosphorus removal are necessary, the proposed plant would be designed to meet such requirements.

B. Impact of Proposed Plan on the Detroit River

Under Plan II, no wastewater from the service area would be discharged to the Detroit River. A small net decrease in wasteloads to the Detroit River would result from the diversion of a small volume of wastewater to the proposed Huron River Treatment Plant. The effects of this diversion on the Detroit River would be positive in nature, but in all likelihood would be negligible.

C. Impact of Proposed Plan on the Lower Huron

Under the proposed plan, wastewater from the existing municipal wastewater treatment plants at Ann Arbor, Ypsilanti, Ypsilanti Township, Flat Rock and Rockwood would be transported via the proposed Huron River interceptor to the treatment plant at the mouth of the Huron River. Significant reduction would be achieved in wastewater discharges to the Lower Huron. The following Table 4 presents 1970-71 wastewater flows from the six plants that would be eliminated.

Table 4

Average Loadings to the Huron River
From 1970-71 Reports to Michigan Department
of Public Health

Plant	(MGD) Flow	(lbs/day) BOD 5	(lbs/day) SS	(lbs/day) P
Ann Arbor	14.5	2780	5260	253
Ypsilanti	6.4	1388	1533	163
Ypsilanti TWP.1	2.28	244	314	27
Ypsilanti TWP.2	4.67	432	605	26
Flat Rock	0.74	271	267	16
Rockwood	0.31	309	176	37
	28.98	5424	8155]	522

Implementation of the proposed plan would satisfy current wastewater treatment needs at Ann Arbor, Ypsilanti and Ypsilanti Township and would improve water quality in the Lower Huron. Existing stream concentrations of BOD, suspended and dissolved solids, and nutrients would be lowered. In particular, water quality improvement is anticipated in the stream impoundments of the Lower Huron. Algae growth should decrease as the nutrient loads are reduced. This will further more reduce diurnal dissolved oxygen variation and depletion. Current water use impairments in Ford and Belleville Lakes due to algal blooms and associated fish kills will also be reduced.

In addition to the removal of daily wastewater discharges, the

Lower Huron River, under the proposed plan, would not be subject to reduced water quality due to treatment plant upset, breakdown or accident.

A few water quality problems will remain in the Huron River. Stormwater runoff contributes pollutants to the Lower Huron. This problem is not addressed by any of the alternative plans. However, studies are being carried out to determine the measures needed for alleviating the stormwater runoff problem and recommendations are expected to be forthcoming in the near future. No definite system for stormwater runoff control can be recommended until final approval of the water quality management plan is made. In addition, previously existing sludge deposits might provide sources of BOD and nutrients for some time. Overall, while some water quality problems will persist, considerable improvement in the water quality of the Lower Huron will be realized.

Since implementation of the proposed plan would satisfy presently determined needs for improved treatment and would bring about considerable improvement in the quality of the Lower Huron, the existing and prospective uses of the Lower Huron River would be enhanced.

With regard to fish management opportunities in the Huron Basin, there has been a growing interest within the last two years in rehabilitating the warm water fisheries of the Huron River System.

Above the present effluent outfalls of Ann Arbor and Ypsilanti City and Township the water quality in the Huron River is relatively

good, and capable of supporting a game fishery. Accordingly, on October 3, 1972 the Michigan Department of Natural Resources, Division of Fisheries treated approximately 23 miles of the Huron River between Delhi Mills and Superior Dam with rotenone, a fish toxicant, to remove the present fish population with the purpose of restocking this reach of the river with game fish. Prior to the treatment of the river, a list of the species of fish living in the river between Dexter and Ypsilanti was compiled (see appendix). After toxification of the reach of river, the most numerous fish removed were Carp (75%) which constituted approximately 90% of the weight of the fish removed. It is anticipated that this reach of the river will be restocked with largemouth and smallmouth bass, hybrid sunfish, walleye, and tiger muskellunge. After improvement of water quality in the Huron River below Superior Dam, it is anticipated that a similar project could be implemented between the Superior Dam and the Flatrock Dam. Below the Flatrock Dam, the Huron River flows freely to Lake Erie offering no barrier to the Carp and other species of fish living in Lake Erie. From the standpoint of fish management potential, the Division of Fisheries* of the Michigan Department of Natural Resources, believes that alternative wastewater management proposals which remove the effluents from the river system for disposal on land or directly into Lake Erie would be superior.

The recreational use of the waters of the Lower Huron Basin have also created considerable public interest. Improved water quality

*November 15, 1971 memo from Fisheries Division Michigan Department of Natural Resources.

would enhance the recreational prospects of the Lower Huron.

Local communities have proposed increased recreational use of the river by boaters, swimmers and fishermen. The Joint Ypsilanti Recreational Organization (JYRO) has proposed the use of State Recreation Bond Funds for the acquisition of park property on Ford Lake. JYRO has prepared plans for some 400 acres of park development abutting Ford Lake. Downstream between Belleville Lake Dam and river's mouth, the Huron-Clinton Metropolitan Authority maintains a large amount of recreational land. The Authority's Lower Huron Metropolitan Park encompasses approximately 1,000 acres. A second major facility, Willow Metro Park, is located just downstream. It is partially developed and offers picnic and playground facilities. The Authority is also engaged in developing a third major facility in this area, the Oakwoods Metro Park. A one-half million dollar development program is phased for the 1970-1974 period for this park, including the construction of a nature interpretative center. Finally, a further major park is planned for the mouth of the Huron, the proposed Pointe Mouillee Metropolitan Park. Up to 1986, this area is proposed for use as a dredge spoil disposal site for the U. S. Army Corps of Engineers. Thereafter, the Huron-Clinton Authority would develop the site as a major park.

Development of the above mentioned recreation areas and parks, and water quality improvement in the Huron River should result in

increased recreational activities in and along the Huron River.

Although intense use of recreational facilities has the potential of causing environmental degradation (motorboat noise and gasoline spill, picnic trash, smoke, etc.), this would probably be insignificant.

D. Impact of Proposed Plan on the Middle River Rouge

Presently, there are seventeen sewer diversions to the Middle River Rouge, seven of which are located west of Hannan Road. During dry weather periods, all waste flows are picked up by the interceptor. However, during periods of moderate or heavy precipitation, the interceptor's capacity is exceeded and a combination of stormwater and untreated wastes is diverted into the Middle River Rouge.

The Rouge Valley Interceptor was originally designed on the basis of intercepting 0.5 cfs flow per 1,000 population for combined sewer areas and criteria has proved to be substantially inadequate. The interceptor system proposed by Plan II is designed to collect all existing flows originating west of Hannan Road which are now collected by the Rouge Valley Interceptor. By providing relief to the Rouge Valley Interceptor System at Hannan Road, it will be possible to intercept 1.0 cfs flow per 1,000 population for combined sewer areas in the remainder of the Rouge Valley Interceptor's service area.

The net effect anticipated is that existing overflows to the west of Hannan Road would be handled by the new Huron River Interceptor System and, secondly, increased performance of the Rouge Valley

Interceptor System in the area east of Hannan Road. In general, the following values were used in the design of the proposed Huron River Interceptor System: flows equal to 0.40 cfs per 1,000 people for areas with separate sanitary sewers, and flows equal to 1.00 cfs per 1,000 people for areas with combined sewers. The amount and frequency of wastewater diversion to the Middle Rouge River, and to a lesser extent to the Lower Rouge River, would be reduced. The quality of these streams would be improved as would the value, utility and aesthetics of the numerous streamside recreational areas.

E. Impact of Proposed Plan on the Upper Huron Watershed

The proposed plan will provide service to a four-township area in southwestern Oakland County, of which the bulk of the population is currently served by septic tank wastewater disposal systems. This area is extensively endowed with natural lakes. As a result of the area's relative proximity to the Detroit urban area, these lakes are being subjected to strong developmental pressures for residential and other purposes. In 1970, this service area contained a population of 41,245. By 1990, the population is expected to reach 120,000.

Considering the present population levels and recent growth rates, substantial potential exists for environmental degradation through groundwater and lake contamination from septic tank disposal systems. The proposed interceptor system is designed to alleviate the existing potential for groundwater and lake pollution, and will also lessen the

need to build additional wastewater treatment plants on the Upper Huron in the future.

IV. ADVERSE IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSED PLAN BE IMPLEMENTED

Implementation of Plan II will result in decreased flows in the Lower Huron. Using 1970 data on municipal wastewater treatment plant discharges, about 45 cfs of wastewater which is currently discharged to the Huron River would be diverted to the interceptor as illustrated in the following Table 5.

Table 5

Average Flows to the Huron River from
1970-71 Reports to Michigan Department of Public Health

<u>Plant</u>	(mgd) <u>Flow</u>
Ann Arbor	14.5
Ypsilanti	6.48
Ypsilanti Twp. #1	2.28
Ypsilanti Twp. #2	4.67
Flat Rock	0.74
Rockwood	<u>0.31</u>
	28.98
	(45 CFS)

The diversion will only be significant in the Ann Arbor-Ypsilanti Area.

Both Ann Arbor and Ypsilanti currently obtain part of their water supply from the Lower Huron. Ann Arbor currently obtains about 85

percent of its water supply from the Huron River at Barton Pond which is on the upstream side of Ann Arbor. Its wastewater outfall is situated downstream of Ann Arbor, a distance of about 3.5 miles below Barton Pond. Ann Arbor, therefore, currently reduces the flow of the river within this 3.5 mile reach by the amount of its withdrawals. For nearly all of this 3.5 mile reach, water levels are maintained by the Argo, Geddes and Superior Dams.

The U. S. Geological Survey stream gauging station at Ann Arbor is located within the 3.5 mile reach which is affected by Ann Arbor's diversion. The 7-day, 10-year low flow estimated for this location is 54 cfs. It is estimated that without Ann Arbor's diversion, 7-day, 10-year low flows would be roughly 70 cfs above Ann Arbor.

Ypsilanti currently withdraws about 20 percent, about 2 cfs, of its annual water supply from the Huron River at Geddes Pond. Immediately following implementation of the interceptor system, 7-day, 10-year low flows in the Lower Huron below Ann Arbor would be expected to be reduced from roughly 52 cfs by the diversion of Ann Arbor's and Ypsilanti's wastewater from the river.

Low flows could be further reduced in the future depending on future water supply withdrawals by Ann Arbor and Ypsilanti. The maximum withdrawal rate of the Ypsilanti Huron River water intake is 7.5 cfs. For Ann Arbor, the peak daily water demand for 1990 has been projected at 58 cfs. Using this figure as a basis, the peak

monthly demand for 1990 is estimated at 33 cfs. The peak 7-day demand is then roughly estimated at 45 cfs. Ann Arbor's present groundwater capability is 10 cfs. Thus, 35 cfs of the peak 7-day demand will have to come from the Huron River or from other sources.

Assuming that Ypsilanti would withdraw 7.5 cfs and Ann Arbor 35 cfs for a total of 42.5 cfs, the 7-day, 10-year low flow in the Lower Huron would be reduced from 70 to around 27.5 cfs. Should Ann Arbor and Ypsilanti decide to obtain their water from a Great Lakes source, low flows would not be a problem.

Ann Arbor does have the capability, however, to augment low flows to some extent through use of the Barton, Argo and Geddes Impoundments. The City of Ann Arbor developed its present water supply program in 1964 on the ability to withdraw sufficient water from the river to meet the City's projected water supply needs to 1980 and still bypass 50 cfs or more over the Geddes Dam "during a recurrence of the minimum recorded flow in the Huron River." The 50 cfs stream flow value was agreed upon by the City and the State as a basis for approval of the Ann Arbor wastewater treatment program established in 1961.

If it is assumed that Barton Pond would be drawn down one foot, Argo Pond 2.5 feet and Geddes Pond 2.5 feet, low flow augmentation of 18.3 cfs for 30 days could be provided. With such augmentation, the 1990 7-day, 10-year low flow would be (27.5 cfs + 18.3 cfs) roughly 45.8 cfs.

(The reader is referred to Appendix D, to letters to Mr. Jerome Maslowski dated December 27, 1971, and to Mr. Ralph Purdy dated August 1, 1972, regarding water diversion from the Huron River.)

The Water Resources Commission's engineering consultants recommended that consideration be given to flow augmentation for the Huron River. Cost data were developed for three flow augmentation alternatives which are fully presented in the appendix of the report titled Plans for Water Quality Management Phase I Southeastern Michigan Area.

These cost estimates have not been fully refined since the necessity of low flow augmentation has not been established. For example, the alternative of purchasing Detroit water assumes that Ann Arbor's and Ypsilanti's total supply would be purchased from Detroit. It might be more economical to purchase only a portion of the total supply needed and to retain the Huron source as well as groundwater sources. There is also the possibility that further groundwater sources can be developed. The U. S. Geological Survey is presently studying the groundwater potential of the Washtenaw County area. When these studies are completed, Ann Arbor plans to further investigate groundwater sources. Greater use of groundwater would lessen Ann Arbor's dependence on the Huron River and would therefore lessen the amount of river water subject to diversion to the interceptor system.

The Lower Huron from Ann Arbor to Lake Erie is 33.6 miles long. About one-half of this distance is free-flowing and the remainder is influenced by back water from impoundments or Lake Erie. In reaches with backwater influence, the effects of low flow for short periods would be minimized.

In summary, the need for low flow augmentation in the Lower Huron under Plan II has not been established and is not endorsed by the proposed plan. The essential question is whether the reduction of the 7-day, 10-year low flow from about 70 cfs to somewhere around 45.8 cfs (the flow that could be maintained with the use of flow augmentation from the Barton, Argo and Geddes Impoundments) is of such significance to warrant further low flow augmentation. If any environmental degradation could occur from reduced flows it is unknown at this time. If justification for further low flow augmentation is documented, solutions are available to satisfy such needs and the alternatives considered should be refined to obtain the most cost-effective solution. Legal implications may also arise due to the reduced low flows. In that event, the cost of compensating damaged riparians should also be evaluated as an alternative to further flow augmentation through structural means.

The proposed plan will result in the discharge of increased amounts of treated wastewater volumes and constituents directly to Lake Erie as the population of the service area grows. By 1990, for example, the plant would be discharging 20,194 pounds/day of oxygen consuming substances, 18,682 pounds per day of suspended solids, and

678 pounds per day of total phosphorus. Any adverse effects are anticipated to be minimal. However, lower loadings may be required in the future.

The discharge point of the Huron River Treatment Plant proposed under Plan II is to be located on the bottom of Lake Erie one mile from shore. Plans for the proposed Pointe Mouillee Metropolitan Park call for extending the existing shoreline through contained dredge spoil disposal about one-half mile into the lake. It is anticipated that the proposed park site would be used for spoil disposal purposes until 1986 and that park development would occur after that date. It may be possible that the plant's discharge could adversely affect water quality along the shoreline of the proposed park under certain weather conditions. The probability of this occurring has not been determined. It should be subject to detailed evaluation, and warranted modifications, if any, should be incorporated into the final design of the plant's outfall. It is not anticipated that there will be any substantial cost increase for any warranted outfall modifications above the estimate included in the total cost for the outfall.

The land area proposed to be used as the site of the Huron River Treatment Plant is presently undeveloped. Plantings of trees are anticipated to enhance the site's aesthetics. The proposed treatment plant site is separated from and will not pre-empt the proposed site of the Pointe Mouillee Metropolitan Park. No land use conflicts

are anticipated nor will any relocations be necessary.

The proposed plan includes provision for sludge disposal through incineration, temporary storage in ash lagoons and ultimate deposit. At this stage of planning, a definite site for ash disposal from the proposed Huron River Plant has not been selected, although it most likely will be landfilled. The entire matter remains under study for possible change to another method such as cropland disposal of sludge or chemical jelling. Considerable latitude remains available until the water quality management plan is approved, and all alternatives for sludge disposal have been examined. If incinerators are used, they will be designed to meet all air quality standards. Construction of the interceptor system will result in some unavoidable environmental degradation on a temporary basis. The project involves approximately 89 miles of principal interceptor lines, a considerable portion of which will parallel streams or roads. Interceptor construction may result in temporary increased erosion and siltation, and elevated turbidity levels in the area's streams. A certain amount of vegetation would also have to be removed. Depending upon the final location of the interceptor routes, some existing recreational lands may be needed. The above effects resulting from construction activities would also apply to any new collecting sewer systems initiated in conjunction with the interceptor system.

Detailed route selections for the interceptors have not yet

been determined. Completion of the detailed plans are awaiting adoption of the regional plan. Upon adoption of the plan, considerable effort will be made to coordinate the final route determinations with interested park and other local officials so as to minimize any environmental or other disturbances. In addition, all proper construction techniques will be utilized to prevent or minimize adverse effects that could occur during construction of the interceptor system.

The interceptor system will be constructed through and adjacent to areas that are presently urbanized, with no portions of the system extending into undeveloped outlying areas. The interceptors will be sized to serve these developed areas plus the growth expected to occur in the service area as predicted by SEMCOG. SEMCOG has based its prediction for areas of development and population density through the use of its computer model, with the acronym SEMOD. This model predicts the area and location of development and population density based, among other things, on the general population growth rate for the Southeast Michigan area, and the past and present experience of land use planning policies as practiced by the local units of government. Representative members from local areas familiar with the land use planning policies of their areas, assisted in programming SEMOD so that the local experience, wants and requirements would be reflected in the prediction of new development areas and population densities.

Current State regulations place land use planning responsibility

at the local government level. SEMCOG has predicted areas of development and population density for 1990 through consideration of these local land use policies. Given the predictions of land use, SEMCOG has proposed a Regional Recreation and Open Space Plan which is offered as a guide to local planning agencies. This plan suggests the delineation and preservation of regional public recreation and open space land, and agricultural reservations.

As land use planning continues at the local government level, it seems likely that urban sprawl may continue at a somewhat faster rate than if land use planning was dictated at a regional level. While it is ^{im}possible to foresee, implementation of the proposed interceptor system will probably not affect planned land use, however, it may accelerate current growth rates. Such growth, while in accordance with land use plans for the area, may result in the need for additional public expenditures for public services such as schools, stores, and power supplies.

Admittedly, the availability of new sewer service can result in pressures on local governments to allow growth and development to occur at a faster pace and with increased density, contrary to what had been previously planned and deemed desirable. It will be the responsibility of local land use planners to guide expected urban development through a smooth and proper transition of growth outward from presently developed areas. The alternative is scattered, haphazard, leap-frog

type development which inevitably puts a terrific strain and expense on public services of all types. It is the obligation of the public to be assured that their local governments have the necessary power to establish and enforce wise land use controls, and that their local governments are willing to control development.

Pro and Con of Proposed Plan II

Plan II has the advantage of providing maximum protection for the Huron River, as well as meeting water quality standards in Lake Erie. Even the possibility of temporary treatment plant malfunction will not significantly degrade any waters. The planned location site is in a relatively isolated area. The need for sewage treatment plants and sludge incinerators in urban areas will be eliminated.

The negative side of Plan II is that flow rates in the Huron River will be decreased. The environmental consequences of decreased flow are, at this time, unknown. Also, the City of Ann Arbor is opposed to being part of Plan II. If Ann Arbor were to remain alone, their per capita costs would be somewhat lowered, but the remaining service area population would have increased per capita costs.

V. ALTERNATIVES TO THE PROPOSED ACTION

Many alternatives were considered before arriving at the proposed plan. The most feasible alternatives considered along with the proposed plan are presented below. The 1990 service area for the alternatives is the same as that for the proposed plan.

A. Alternative Plan IB

Plan IB would consist of two major wastewater treatment plants within the service area. A new major wastewater treatment plant, capable of handling an average 1990 flow of 88 MGD, would be constructed at the mouth of the Huron River with the discharge to Lake Erie. In addition, the existing treatment plant at Ann Arbor would be expanded to serve the projected 1990 flow of 33 MGD and would be upgraded to provide tertiary treatment. With the exception of the Ann Arbor area, wastewater from the service area would be conveyed to the Huron River plant by the same interceptor system included in Plan II. Both the Ann Arbor plant and the Huron River plant would provide 90% phosphorus removal. (See Fig. 4)

1. Cost Estimates

Table 6 is a summary of Alternative Plan IB project costs.

Table 6		Millions of Dollars
Huron River Interceptor	30.36	
Hannan Road Interceptor	21.98	
North Arm	20.49	
Van Buren Arm	15.47	
City-Township of Ypsilanti Interceptor	5.06	
Township of Ypsilanti Retention Basin	5.00	
Huron River Plant	26.00	
Total to Huron River Plant		124.36
Ann Arbor Plant	18.34	
Ann Arbor Retention Basin	5.00	
Total to Ann Arbor Plant		23.34
Detroit River Rouge Interceptor		59.11
Redford Arm		4.31
TOTAL PROJECT COST		211.12

Annual operations and maintenance cost in 1990 equals \$ 2.78 million

Annual amortization cost*	equals \$16.52 million
Total annual cost in 1990	equals \$19.30 million

*25 years at 6%

2. Impact on Lake Erie

The impact of alternative Plan IB on Lake Erie does not differ significantly from the proposed plan. The projected direct gross waste loadings to Lake Erie from the Huron River Treatment Plant under Plan IB are as shown in the following Table 7.

Table 7

PLAN IB

Waste Loadings to Lake Erie From the Huron River Treatment Plant

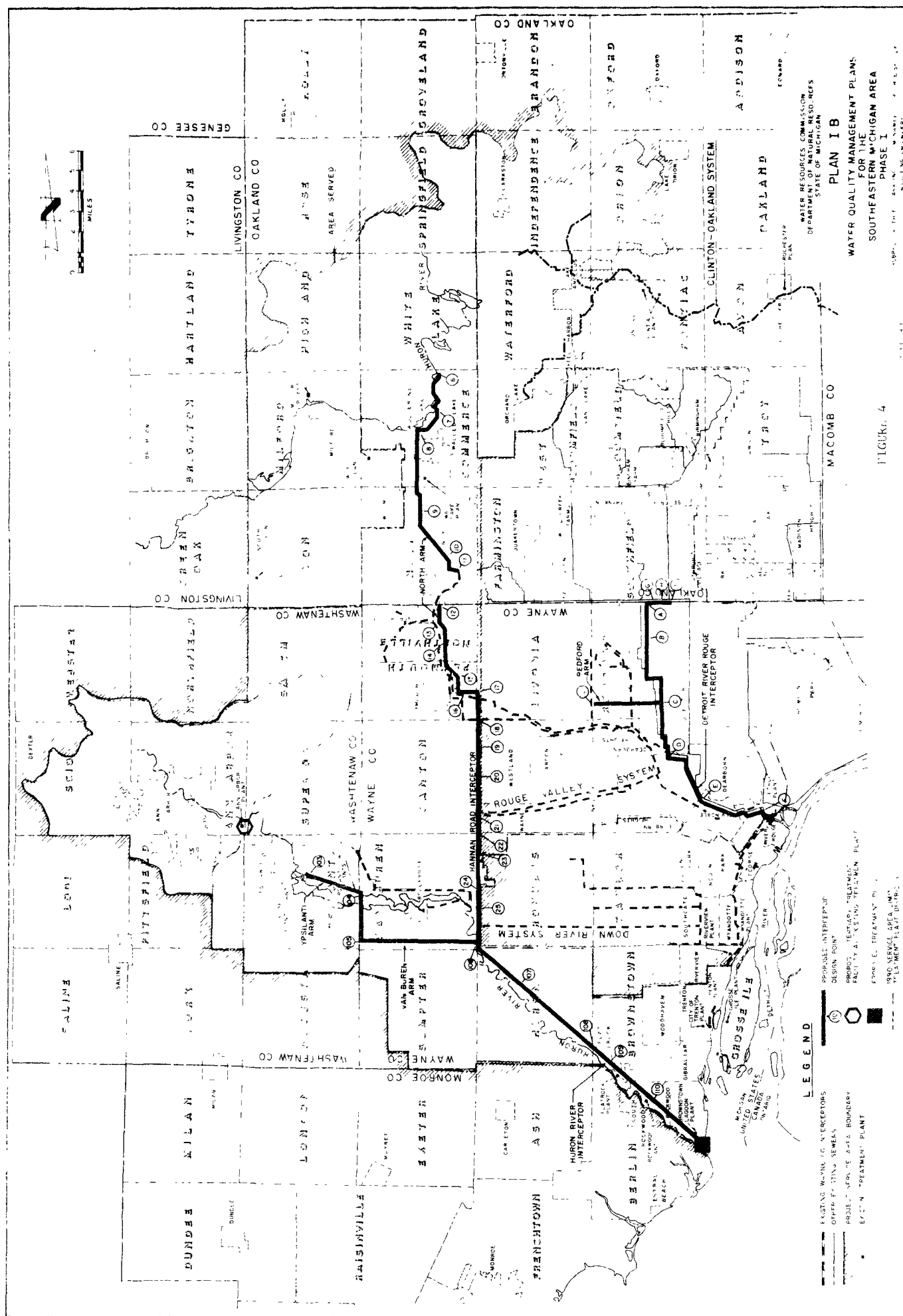
<u>Waste Constituents</u>	<u>Effluent Concentration (mg/l)</u>	<u>Pounds Per Day</u>	
		<u>1975</u>	<u>1990</u>
BOD 5	20	8,545	14,687
SS	18.5	7,905	13,587
TP	0.67	287	493
NH3-N	6.0	2,564	4,407
TN	14.6	6,240	10,727
<u>Flow:</u>			
(MGD)		51.2	88

As with the proposed plan, alternative Plan IB would discharge a large amount of oxygen consuming substances to Lake Erie. This discharge would reduce the amount of pollutants discharged directly to Lake Erie by about 25 percent as compared to Plan II and, thus, should

not cause substandard dissolved oxygen conditions as long as the following two conditions, set forth in the plan, are met: first, the suspended solids concentration in the effluent should be kept low to minimize sedimentation of organic materials. Second, the effluent should be well dispersed in the Detroit River current.

As in Plan II, the magnitude of the decrease in oxygen levels under Plan IB can be approximated. Using 10 percent of the flow of the Detroit River for assimilation, the discharge of 88 MGD (136 cfs) from the Huron River Treatment Plant would result in a calculated dissolved oxygen depletion of about 0.7 mg/l. This would lower the average dissolved oxygen content of the receiving waters of Lake Erie to a minimum of 6.9 mg/l, as compared with the reduction to 6.6 mg/l under the proposed plan. The reduction in the dissolved oxygen content of the receiving waters of Lake Erie resulting from alternative Plan IB or from the proposed plan will meet water quality standards.

As with the proposed plan, consideration has also been given to the impact on Lake Erie that could result from treatment plant malfunction, accident or failure. Taking the worst possible situation where complete failure of the treatment processes occurred, it is highly improbable that any serious impact would occur at the Monroe water supply intake located 12 miles away. Bacterial levels could be elevated along the Michigan shoreline of Lake Erie and thereby impair water related recreational uses. The dissolved oxygen content, however,



100

100

100

100

100

100

would not be reduced to less than 5.3 mg/l.

As stated in the discussion of the proposed Plan II, the primary water quality problem in Lake Erie is generally considered to be accelerated eutrophication brought about chiefly by high plant nutrients. Under Plan IB, total direct phosphorus loadings from the Huron River Treatment Plant are estimated at 285 pounds per day in 1975 and 490 pounds per day in 1990. This is equivalent to 52 short tons/year and 90 short tons/year, respectively. Although these direct loadings are approximately 30% less than the phosphorus loadings that would be discharged directly to Lake Erie from the Huron Plant proposed under Plan II, most of the phosphorus discharged into the Huron River at Ann Arbor would eventually be discharged into the Detroit River. Thus, the total phosphorus loading to Lake Erie with Plan IB would be nearly identical as with Plan II.

3. Impact on the Detroit River

Under Plan IB, no wastewater from the service area would be discharged to the Detroit River. A small net decrease in waste loads to the Detroit River would result from the diversion of a small volume of wastewater to the proposed Huron River Treatment Plant. The effects of this diversion on the Detroit River would be positive in nature, but in all likelihood would be negligible.

4. Impact on the Lower Huron River

Under Plan IB, wastewater from the existing municipal waste-

water treatment plants at Ypsilanti, Ypsilanti Township, Flat Rock and Rockwood would be transported via the proposed Huron River Interceptor to a new treatment plant at the mouth of the Huron River. (See Table 5, p. 28. The Ann Arbor Service area would then be the only remaining area discharging municipal wastes to the Lower Huron River. The waste loadings anticipated at the Ann Arbor plant are shown in Table 8.

Table 8
Waste Loadings from the Ann Arbor
Treatment Plant in 1970-71 and Projected
for 1975 and 1990

	<u>1970-71*</u>	<u>1975**</u>	<u>1990**</u>
Average Flow (MGD):	14.5	21.6	33.0
<u>Wastes Constituents:</u>	<u>Pounds Per Day</u>		
BOD5	2,644	721	1,102
SS	2,895	1,803	2,754
TP	828	121	185
NH3-N		90	137
TN		2,632	4,022

* Secondary treatment provided

** Assumes Tertiary treatment (nitrification, sand filtration and phosphorus removal).

As a result of the tertiary treatment plant at Ann Arbor, however, waste loadings to the Lower Huron would be reduced (but not totally eliminated) and the resultant water quality would be improved due to the reduction of BOD, suspended and dissolved solids and nutrients.

Algae growths should decrease as the nutrient loads are reduced.

This will reduce diurnal dissolved oxygen variation and depletion which would alleviate algal growth conditions and associated fish kills in Ford and Belleville Lakes.

Nutrients could still cause a serious problem in these downstream impoundments. By 1990, approximately one-half of the streamflow below the proposed Ann Arbor treatment plant would consist of treated wastewater during drought conditions. Even with tertiary treatment included in this plan, nutrient concentrations could cause a problem in the slackwaters of the impoundments. However, the reduced oxygen consuming demand and ammonia concentrations in the effluent should permit compliance with the downstream dissolved oxygen standards. While it is possible to minimize the risk of treatment plant breakdowns, accidents or similar malfunctions, through duplicate components and other means, such risks cannot be completely anticipated or eliminated.

Plan IB would reduce the 7-day, 10-year low flow from 70 cfs to approximately 63 cfs. Such a reduction could have only a minimal effect on the downstream environment and would be in compliance with the minimum flow of 50 cfs as established for the Lower Huron River.

5. Impact on the Middle River Rouge

As in the proposed Plan II, alternative Plan IB would provide relief to the Rouge Valley Interceptor System. The new Huron River Interceptor System will handle the existing overflows to the west of Hannan Road, thereby resulting in improved performance of the Rouge Valley Interceptor System in the area east of Hannan Road. As a

result, the amount and frequency of wastewater to the Middle Rouge River and the Lower Rouge River would be reduced and the quality of these streams would be improved. In addition, the value, utility and aesthetics of the numerous streamside recreational areas would be increased.

6. Impact on the Upper Huron Watershed

This area is close to the Detroit urban area and is being subjected to strong developmental pressures. At present, the area is served by septic tank disposal systems which will be unable to handle future growth and will, therefore, contribute to contamination of the lake and groundwater as the population increases. As in Plan II an interceptor system is provided for under alternative Plan IB, which is expected to alleviate this potential environmental degradation.

7. Overall Impacts

The overall impacts of alternative Plan IB are similar to the proposed plan.

Provision for sludge disposal is included for both the Ann Arbor and Huron River Treatment Plants under Alternative Plan IB. The sludge handling process would probably include incineration, temporary storage in ash lagoons and ultimate deposit. Ann Arbor would mix the ash with sanitary landfill cover material in its landfill. A definite site for ash disposal from the Huron River Plant has not been selected, although it most likely will also be landfilled. The entire matter remains under study for possible change to another method such as

cropland disposal of sludge or chemical jelling. Incinerators would be designed to meet all air quality standards.

Construction of the interceptor system will entail unavoidable environmental degradation on a temporary basis. The project involves approximately 84 miles of principal interceptor lines. Interceptor construction is expected to result in increased erosion and siltation, and elevated turbidity levels in the area's streams. A certain amount of vegetation would also have to be removed. Depending upon the final location of the interceptor routes, some existing recreational lands may be needed. The above effects resulting from construction activities would also apply to any new collecting sewer systems initiated in conjunction with the interceptor system.

While it is impossible to foresee, implementation of Plan IB could also accelerate current growth rates in portions of the service area. Such growth, while in accordance with the regional land use plans for the area, may result in the need for additional public expenditures for various public services.

Pro and Con of Alternative Plan IB

The advantages of Plan IB are that there would be only a minor decrease in the flow of the Huron River since Ann Arbor would return treated effluent to the river, and the Ann Arbor tertiary treatment plant would remove a substantial amount of pollutants. Water quality standards would be met for the Huron River, as well as Lake Erie.

However, there would be a relatively large concentration of phosphorus discharged to the Huron River during low flows, most of which would eventually reach Lake Erie, anyway.

Treated sewage effluent from an Ann Arbor tertiary treatment plant could reach such volumes by 1990 as to become a substantial portion of the river flow during low flow periods of the Huron River. Any treatment plant malfunction during these times could have serious detrimental effects on the water quality of the river. Although it appears that only Ann Arbor supports Plan IB, it is conceivable that other communities may wish to retain their own treatment plants on the Huron River if Ann Arbor is allowed to do so, rather than finance the interceptors without Ann Arbor's support.

B. Alternative Plan III

This plan proposes the abandonment of the existing plants on the Huron River and the construction of an interceptor extending from a new wastewater treatment plant on the Huron River to Ann Arbor. Also included is an interceptor in Hannan Road from the Huron River north to Canton Township. This system of interceptors would transport the wastewater for treatment to the proposed new Huron River Plant.

The balance of the area would be serviced by the existing Detroit Wastewater Plant through an interceptor extending from the Detroit Plant northwesterly along the Rouge River to Plymouth Road; thence westerly along Plymouth Road to Hannan Road; thence northerly to

White Lake Township in Oakland County. (See Map, Fig. 5)

The service area involving the Detroit Rouge River and Plymouth Road Interceptors encompasses considerable area outside the study area. The proposed Detroit Rouge River Interceptor is planned for early construction to relieve the existing Detroit Rouge Interceptor and provide a more suitable outlet for the Evergreen and Farmington Interceptor districts in Oakland County. Therefore, the timing for providing for the joint service area would coincide.

The 1990 design flow of the Huron River Wastewater Treatment Plant is 91.5 MGD and the secondary treatment process is oxygen activated sludge with phosphate removal. This design flow provides for the estimated 1990 population within the service area. Table 9 shows the cost estimates for this plan.

Table 9

<u>Cost Estimates</u>	<u>Millions of Dollars</u>	
Alternative Plan III		
Huron River Interceptor	32.00	
Hannan Road Interceptor	10.23	
Van Buren Arm	23.66	
Ann Arbor Arm	14.35	
Huron River Plant	26.75	
Ann Arbor Retention Basin	5.00	
Township of Ypsilanti Retention Basin	5.00	
Total to Huron River Plant		116.99
Detroit River Rouge Interceptor	62.36	
Plymouth Road Interceptor	12.02	
North Arm	20.49	
Total to Detroit Plant		94.87
TOTAL PROJECT COST		211.86

Annual operation & maintenance costs in 1990 = \$ 2.69 million

Annual amortization cost*	= \$16.57 million
Total annual cost in 1990	= \$19.26 million

* 25 years at 6%

2. Impact on Lake Erie

The probable impact on Lake Erie would be nearly identical to the impacts already discussed for the proposed plan and for alternative plan IB. The projected flows and waste loadings from this plant would be as follows:

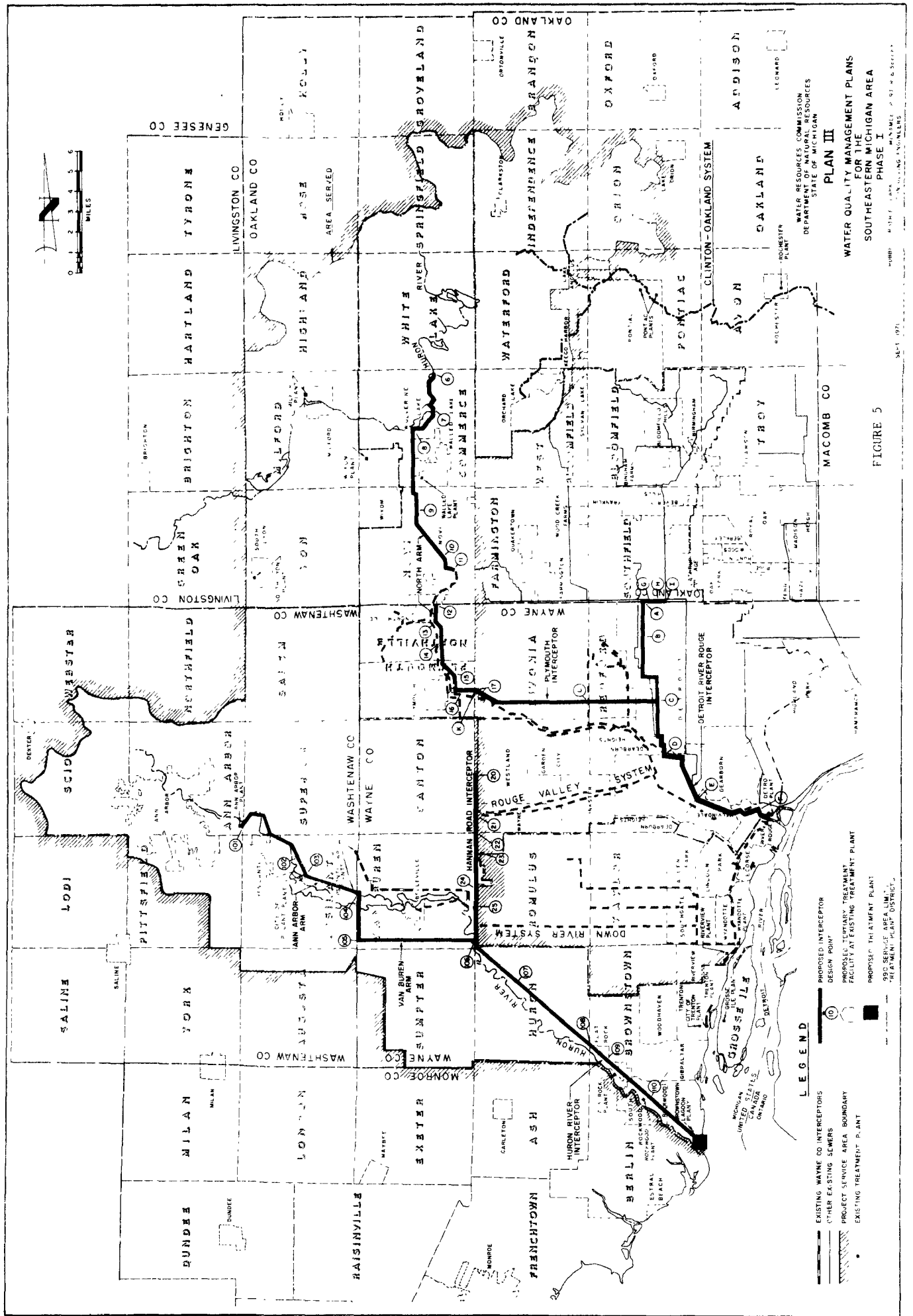
Table 10

Plan III

Waste Loadings to Lake Erie From the Huron River Treatment Plant

Waste Constituents	Effluent Concentration (mg/l)	Pounds per Day	
		1975	1990
BOD 5	20	9,296	15,267
SS	18.5	8,600	14,128
TP	0.67	312	512
NH3-N	6.0	2,790	4,582
TN	14.6	6,788	11,151
<u>Flow=</u>		55.7	91.5

The impact of this discharge would be largely identical to that identified for Plan IB. As there is only a small difference between waste flows and loadings to Lake Erie under Plans IB and III, dissolved oxygen depletion in the receiving waters under Plan III should approximate that calculated for Plan IB, or around 0.7 mg/l.



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All of the other impact considerations previously discussed for Plans IB and II relative to Lake Erie would also apply to Plan III.

3. Impact on the Detroit River

Under Plan III, wastewater from Plymouth and Northville Townships in western Wayne County would be treated at the Detroit Wastewater Plant with discharge to the Detroit River near the mouth of the Rouge River.

The waste loadings to the Detroit River from this wastewater flow would be as shown in Table 11.

Table 11

Plan III

Waste Loadings to the Detroit River

<u>Waste Constituents</u>	Effluent Concentration (mg/l)	Pounds per day	
		<u>1975</u>	<u>1990</u>
BOD 5	20	2,855	4,927
SS	18.5	2,641	4,554
TP	0.67	96	165
NH-N	6.0	856	1,477
TN 3	14.6	2,084	3,595
<u>Flow</u>			
MGD		17.1	29.5

The Detroit Wastewater Plant now serves about three million people in Detroit and surrounding communities. The average flow is presently at the rate of 760 MGD. The present hydraulic capacity of the plant is 1300 MGD. This will be increased to 2600 MGD with completion of the planned additions. Construction now in progress and planned will

provide an effluent quality in accordance with stipulated water quality standards. Facilities will be provided for treating up to 1800 MGD by the activated sludge process with an additional 800 MGD given primary treatment during peak storm flow periods.

The projected flow from the portion of the study service area proposed for treatment at the Detroit facility under Plan III represent only a very minor portion of the total flows being provided for. The projected 1990 flow of 29.5 MGD represents about 1.6 percent of the plant's planned secondary treatment capacity of 1800 MGD. No significant water quality effects are anticipated for the Detroit River as a result of this additional flow.

The Detroit Wastewater Treatment Plant, as with all other treatment facilities in this area, may be required to institute higher levels of treatment in the future due to changes in national policy or other considerations. Also, higher phosphorus removal levels may be necessary in the future.

Future flexibility may also be limited at the Detroit Plant in comparison with other options. Expansion of treatment facilities and interceptors to the plant would likely be costly due to the size of the plant site, the scale of the facilities existing and planned, and the highly developed nature of the area.

4. Impact on the Lower Huron

The impact of Alternative Plan III on the Lower Huron would

be identical to that identified for Plan II. In brief, all existing municipal wastewater discharges would be removed from the Lower Huron; considerable improvement would be expected in water quality, particularly in the impoundments of the Lower Huron; some water quality problems will remain, particularly those due to stormwater runoff; flows would be reduced as a result of wastewater diversions; and present and prospective water uses would be enhanced.

5. Impact on the Middle River Rouge

The impact of Alternative Plan III on the Middle Rouge River would be identical to the impact of Plans IB and II. The Plymouth Interceptor would provide relief to the existing Rouge Valley Interceptor System. This relief would reduce the frequency and magnitude of overflows to the Middle River Rouge.

6. Impact on the Upper Huron Watershed

The impact of Alternative Plan III on the Upper Huron Watershed would also be identical to that of Plans IB and II.

7. Overall Impacts

The Huron River and Detroit Treatment Plants will discharge increasing amounts of wastewater volumes and constituents to Lake Erie and the Detroit River as the population of the service area grows. By 1990, for example, the two plants will be discharging 20,194 pounds/day of oxygen consuming substances, 18,682 pounds/day of suspended solids, and 677 pounds/day of total phosphorus (contributed from the

Huron Basin service area). No significant adverse effects of these loadings are anticipated, however, lower phosphorus loadings may be required in the future.

Construction of the Plan III would likely entail some unavoidable environmental degradation on a temporary basis. The project involves approximately 92 miles of principal interceptor lines, a considerable portion of which will parallel streams. Interceptor construction could result in increased erosion and siltation, and elevated turbidity levels in the area's streams. A certain amount of vegetation would also have to be removed. Depending upon the final location of the interceptor routes, some existing recreational lands may be needed. The above effects resulting from construction activities would also apply to any new collecting sewer systems initiated in conjunction with the interceptor system.

While it is impossible to foresee, implementation of the interceptor system may also accelerate current growth rates in portions of the service area. Such growth while in accordance with the regional land use plans for the area, may result in the need for additional public expenditures for various public services such as schools, stores and power supplies.

Pro and Con of Alternative Plan III

The ecological affects of Plan III would be largely identical to Plan II. Water quality standards in Lake Erie would be met,

maximum protection for the Huron River would be provided, however, flows in the Huron River would be decreased.

The major difference between Alternative Plan III and Proposed Plan II is that wastewater from the Upper Huron River service area would be sent to the Detroit Treatment Plant which is scheduled to be expanded to a capacity of 1,800 MGD. There appears to be no support for Alternative Plan III.

C. Alternative Plan IV

Alternative Plan IV proposes two interceptor systems and two inland tertiary treatment plants within the service area. The Huron River Interceptor would extend from a new plant on Lake Erie along the Huron River to the present Ypsilanti Township Treatment Plant. A North arm would follow Hannan Road from the Huron River to Canton Township. Tertiary treatment plants would be constructed at Ypsilanti and Ann Arbor using nitrification of the sewage with rapid sand filtration and phosphate removal for a 1990 projected average flow of 10 MGD at Ypsilanti. The balance of the service area would be served by the existing Detroit wastewater plant through an interceptor extending from the Detroit Plant westward to Plymouth Township and then northerly to White Lake Township in Oakland County. (See Map, Fig. 6)

The 1990 service area involving the Detroit Rouge River and Plymouth Road Interceptors encompasses considerable areas outside the

study service area. The proposed Detroit Rouge River Interceptor to relieve the existing Detroit Rouge Interceptor and provide a more suitable outlet for the Evergreen and Farmington Interceptor districts in Oakland County is planned for early construction. Therefore, the timing for providing for the joint service areas would coincide.

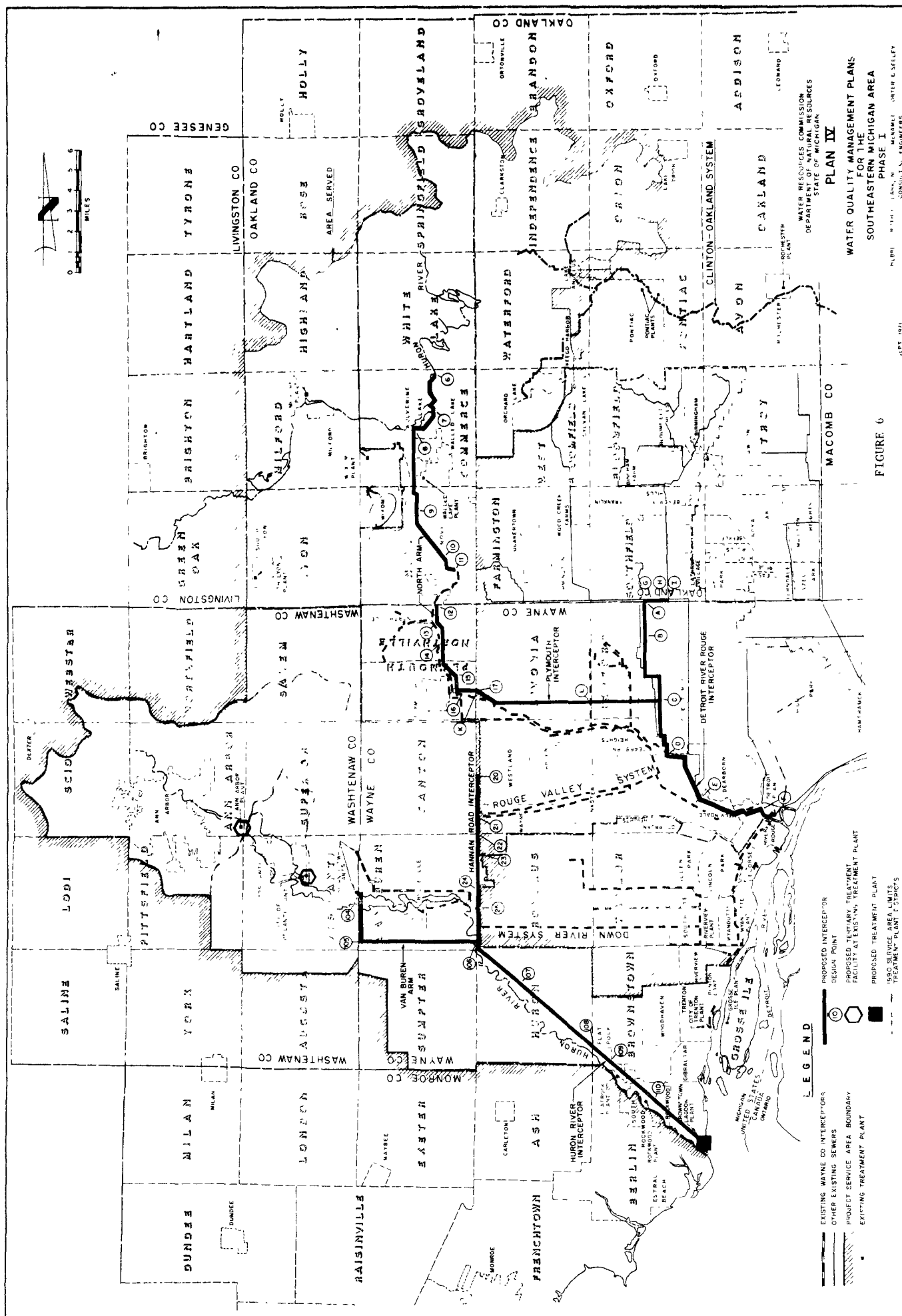
The Huron River Wastewater Treatment Plant's design 1990 average flow is 48.5 MGD and the secondary treatment process is oxygen activated sludge with phosphate removal. This design flow provides for the estimated 1990 population within the service area.

1. Cost Estimates

A summary of the selected project cost and the total 1990 and 2020 project costs are as shown in Table 12.

Table 12

Alternative Plan IV	Millions of Dollars	
Huron River Interceptor	24.58	
Hannan Road Interceptor	10.23	
Van Buren Arm	14.11	
Huron River Plant	17.20	
Township of Ypsilanti Retention Basin	5.00	
Total to Huron River Plant		71.12
Detroit Rouge River Interceptor	62.36	
Plymouth Road Interceptor	12.02	
North Arm	20.49	
Total to Detroit Plant		94.87
City of Ann Arbor Plant	18.34	
Ann Arbor Retention Basin	5.00	
Total to Ann Arbor Plant		23.34
City of Ypsilanti Plant	7.02	
TOTAL PROJECT COST	196.35	
Annual operation and maintenance cost in 1990		3.66



Annual amortization cost* 15.35

Total annual cost in 1990 19.02

* 20 years at 6%

2. Impact on Lake Erie

Under Plan IV, the new treatment plant proposed for Lake Erie adjacent to the mouth of the Huron River would be smaller than that proposed under Plans IB, II, or III. The projected waste loadings to Lake Erie would be as shown in Table 13.

Table 13

Plan IV

Projected Waste Loadings to Lake Erie

From the Huron River Treatment

Plant

<u>Waste Constituents</u>	<u>Effluent Concentration (mg/l)</u>	<u>Pounds per day</u>	
		<u>1975</u>	<u>1990</u>
BOD 5	20	4,274	8,097
SS	18.5	3,953	7,489
TP	0.67	143	272
NH3-N	6.0	1,282	2,429
TN	14.6	3,120	5,910
<u>Flow</u>		<u>1975</u>	<u>1990</u>
(MGD)		25.6	48.5

The impact of this discharge would be largely similar to that identified for the other plans. The same considerations would apply, differing only in degree.

Using the formula and procedure specified in the discussion of Plan II impacts, the calculated ultimate oxygen depletion for the water

of Lake Erie would be 0.39 mg/l in 1990, which would theoretically lower the existing average dissolved oxygen level of the receiving waters of Lake Erie from 7.60 mg/l to 7.21 mg/l.

3. Impact on the Detroit River

The impact of Alternative Plan IV on the Detroit River would be completely identical to the impact of Plan III. There are no differences between Plans III and IV on the population to be served, wastewater flows or waste loadings to the Detroit River.

4. Impact on the Lower Huron

The impact of Plan IV on the Lower Huron will be similar to that of Plan IB although there would be tertiary treatment plants at both Ann Arbor and Ypsilanti. Waste loadings to the river would be reduced by the elimination of four treatment plants from the river and the provision of higher levels of treatment at Ann Arbor and Ypsilanti. Table 14 shows the waste discharges that would be removed from the river and transferred to the Interceptor System.

Table 14

Plan IV

Average Waste Loads Removed from the
Lower Huron from 1970-1971

Reports to the Michigan Department of Public Health

<u>Plant</u>	<u>Flow</u> <u>(MGD)</u>	<u>Pounds per day</u>		
		<u>BOD5</u>	<u>SS</u>	<u>P</u>
Ypsilanti Township #1	2.28	244	314	27
Ypsilanti Township #2	4.67	432	605	26

Average Waste Loads(continued)

Flat Rock	0.74	271	267	16
Rockwood	<u>0.31</u>	<u>309</u>	<u>176</u>	<u>37</u>
TOTAL	8.00	1,256	1,362	106

The following Table 15 compares existing waste loads from the Ann Arbor and Ypsilanti Plants and projected loads for 1975 and 1980.

Table 15.

Waste Loadings from the Ann Arbor and Ypsilanti Treatment Plants in 1970-71 and Projected for 1975 and 1990

<u>ANN ARBOR</u>	<u>1970-71</u>	<u>1975</u>	<u>1990</u>
Average flow (MGD)	14.5	21.6	33.0
BOD 5 (pounds/day)	2,644	721	1,102
SS	2,895	1,803	2,754
 <u>YPSILANTI</u>			
Average flow (MGD)	6.48	8.5	10
BOD 5 (pounds/day)	1,388	284	334
SS	1,533	709	834

As a result of reduced waste loads to the Lower Huron, water quality would be improved. The degree of improvement should closely approximate that expected through implementation of Plan IB. In summary, existing stream concentrations of BOD, suspended and dissolved solids and nutrients would be lowered; higher dissolved oxygen levels would be expected. Particular water quality improvement would be anticipated in the stream impoundments of the Lower Huron. Algal growths should be decreased and diurnal dissolved oxygen variation reduced.

By 1990, stream flow below the Ann Arbor-Ypsilanti area would consist of a significant portion of treated wastewater during drought periods. Nutrients, particularly nitrogen and phosphorus, could

become a serious problem in the plant's effluents. However, the low limit set for BOD 5 and ammonia concentrations should preclude any dissolved oxygen standards violation from occurring downstream; also, suspended solids, bacteria and toxicant limits should prevent any standards violation. Of course, these predictions assume adequate and continually reliable performance of the treatment plants to produce effluents that will fully meet the specified effluent restrictions.

As with all of the plants considered for this service area, these plants may have to provide increased levels of treatment in the future due to changes in national policy or other considerations. Increased phosphorus removal may be required in the future.

Some water quality problems will remain. Stormwater runoff is regarded as a significant water quality problem in this area. This need is not addressed by Plan IV nor by any of the other plans. Previously existing sludge deposits might provide sources of BOD and nutrients for some time. Overall, however, considerable improvement in the water quality of the Lower Huron should be achieved.

While daily waste loads to the Lower Huron would be drastically reduced, the river would still be subject to risks of water quality deterioration resulting from treatment plant breakdowns, accidents or other misfortunes. Some degree of uncertainty must also be attached to the ability of the treatment plants to maintain high performance

levels on a continuous basis so as to conform to the stringent effluent requirements specified. These subjects have been discussed under the impact of Plan IB. They are equally applicable here and, in fact, are more significant as Plan IV proposes two inland tertiary treatment plants. Moreover, the Ypsilanti Plant would discharge its treated effluent directly into Ford Lake, a body of water designated for total body contact recreational use.

One additional positive feature of Plan IV is that treated effluent would be returned to the river at Ann Arbor and Ypsilanti, low flows would not be decreased and, therefore, low flow augmentation need not be considered.

The expected water quality improvement would enhance present and prospective use of the Lower Huron particularly for fishery and recreational uses. The discussion of use enhancement presented under the probable impact of Plans IB and II is applicable to Plan IV.

The present Ypsilanti wastewater treatment plant is located on Ford Lake. There is little available area at this site for expansion. Additional area would likely have to be created through filling of low lying shoreland or lake area. This could create localized adverse environmental effects.

5. Impact on the Middle River Rouge

Under Plan IV, the impact on the Middle River Rouge would be identical to that of Plans IB, II and III.

6. Impact on the Upper Huron

The impact of Plan IV on the Upper Huron would be identical to the impacts previously identified for Plans IB, II and III. The plan would enable the southwestern Oakland County area to meet present and future wastewater management needs.

7. Overall Impacts

Plan IV would provide for the largest removal of wastewater constituents of the four plans considered. In 1990, treatment facilities proposed in Plan IV would discharge substances consuming some 14,456 pounds of oxygen, 15,631 pounds of suspended solids, and 678 pounds of phosphorus. No adverse effects would be anticipated from Plan IV's discharge although higher phosphorus removal levels may be required in the future.

Construction resulting from implementation of Plan IV would likely entail some unavoidable environmental degradation on a temporary basis. The project involves approximately 82 miles of principal interceptor lines, a considerable portion of which will parallel streams. Interceptor construction could result in increased erosion and siltation, and elevated turbidity levels in the area's streams. A certain amount of vegetation would also have to be removed. Depending upon the final location of the interceptor routes, some existing recreational lands may be needed. The above effects resulting from construction activities would also apply to any new collecting sewer systems initiated in conjunction with the interceptor system.

While it is impossible to foresee, implementation of Plan IV may also accelerate current growth rates in portions of the service area. Such growth while in accordance with the regional land use plans for the area, may result in the need for additional public expenditures for various public services such as schools, stores, and power supplies.

Pro and Con of Alternative Plan IV

The advantages of Alternative Plan IV are that it would provide the lowest volume of treated effluent discharged directly to Lake Erie, and there would be no decrease in flow in the Huron River.

This alternative would, however, discharge the greatest volume of effluent to the Huron River. There appears to be no support for Alternative Plan IV.

D. Land Disposal Alternative

Consideration was also given to the following two land disposal alternatives:

1. Land disposal for the entire interceptor service area,
and;
2. Land disposal for the Ann Arbor, Ypsilanti and Ypsilanti Township service area.

These land disposal alternatives, if feasible, could provide a great reduction of waste constituents from reaching the surface waters of the area. The general practice of land disposal involves removing the majority of waste constituents in the sewage by standard treatment methods, followed by land application whereby the effluent filters

through the soil. The water filtering through the soil then enters the groundwater regime or is intercepted by underground drainage systems and sent to surface waters.

The first alternative calls for collecting all the wastewater in the service area for treatment, and rather than discharging to the Huron River or Lake Erie, is discharged to land disposal areas. The second alternative calls for collecting wastewater from the Ann Arbor, Ypsilanti and Ypsilanti Township service areas for ultimate land disposal. The remainder of the service area would send its wastewater for treatment at the Huron River treatment plant with discharge to Lake Erie.

The first alternative would require sufficient land area to spray irrigate a total of 121 MGD by the year 1990. Using the Corps of Engineers recommended application rate of 2 inches per week for 43 weeks per year,* the area of land needed for irrigation would be about 20,000 acres, without considering any land needs for a buffer zone. The Corps of Engineers estimates the cost of purchasing the land at \$2,200/acre; cost of underdrains at \$4,300/acre; and cost of land leveling at \$350/acre for a total of \$6,850/acre. For a total of 20,000 acres, the total land cost is \$137 million. To this cost must be added \$118 million for the interceptors as proposed under Plan II, plus the cost of a 3-stage lagoon treatment plant, plus added pumping and interceptor costs to convey the lagoon effluent to the spray

*"Alternatives for Managing Wastewater for Southeastern Michigan--Report." Prepared by the U. S. Army Corps of Engineers - Detroit District. July 1971.

irrigation area and additional interceptors from the irrigation site to the receiving water courses.

The second alternative, land disposal for wastewater from Ann Arbor, Ypsilanti and Ypsilanti Township, would require sufficient land area to spray irrigate a total of 68 MGD by 1990. Using an application rate of 2 inches per week for 43 weeks per year, the area of land needed for irrigation would be about 11,000 acres for a total land cost of about \$75 million. To this cost must be added the costs of secondary treatment, pumping and piping to the spray irrigation site and from the site to the receiving water course. This total cost would greatly exceed \$63 million, the estimated total cost of providing advanced waste treatment for Ann Arbor and for Ypsilanti City-Township, and would also greatly exceed the total cost of the proposed Plan II.

In addition to being undesirable due to high costs, socio-economic disruption to the area could be substantial. Although specific areas have not been delineated as spray irrigation sites, the minimum land area requirements for the alternatives of 20,000 acres and 11,000 acres (30 square miles and 17 square miles) would probably require the removal of homes and families, and the disruption of transportation and communication facilities. This alternative would lock the area into a long-term solution. Should technological advancements occur which might substantially reduce the cost of conventional

treatment, this alternative would have difficulty adjusting to take advantage of such lower cost treatment.

Pro and Con of Land Disposal Alternative

The advantage of this alternative would be the great decrease of pollutants to surface waters, thereby offering the greatest protection of the surface waters.

The disadvantages are the great increase in costs, miles of interceptors, and amount of land needed and resulting displacement of people and public and private facilities. There is also a problem of management of so extensive a method of pollution control. There appears to be no support for this alternative.

E. No Action Alternative

The alternative of no action is not feasible, since water quality standards for the Huron River Basin Area will not be met.

VI. Comparison of Proposed Plan (Plan II) and Major Alternatives (Plans IB, III and IV)

Table 16 is a comparison of costs and environmental considerations for the proposed plan and the major alternatives. Capital costs and operation and maintenance costs were derived from standardized cost curves. The total annual capital costs were derived by amortizing the total capital costs, assuming a 25-year bond life at 6% interest per year. The O & M costs as presented in the table are based on wastewater flows for the years 1975 and 1990.

Table 16

Comparison of Costs & Other Factors

1. <u>Capital Costs of Selected Projects</u>	<u>Cost in \$ Millions</u>			
	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Total Capital Costs **	\$211.12	\$224.25	\$211.86*	\$196.35*
Total Detroit - Rouge				
Interceptor Costs **	63.42	63.42	63.42	63.42
Total Capital Cost				
Excluding Detroit - Rouge				
Interceptor	147.70	160.83	148.44	132.93
Total Annual Amortization				
Cost (25 years @ 6%)	11.55	12.58	11.61	10.40
Annual Operation and M				
Maintenance Costs				
1975	2.07	1.56	1.90	2.53
1990	2.78	2.14	2.69	3.66
Total Annual Costs				
1975	13.62	14.14	13.51	12.93
1990	14.33	14.72	14.30	14.06

* The total capital costs for Plans III and IV do not include the capital cost of all of the treatment facilities required since that portion of the Detroit Wastewater Treatment Plan required to provide for the service area is not included.

** The Detroit Rouge Interceptor is planned for early construction to relieve the existing Detroit Rouge Interceptor and provide a more suitable outlet for the Evergreen and Farmington Interceptor Districts in Oakland County. This interceptor is a necessary link in Plans III and IV. It was, therefore, included in all four alternative plans so that a total cost comparison could be made.

Table 16 (continued)

2. Design Capacities (1990), MGD *

	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Huron River Plant	88	121	92	49
Ann Arbor Plant	33	-	-	33
Ypsilanti Plant	-	-	-	10
Detroit Plant Portion	-	-	29	29

* Initial (1975 demand on these facilities would be 73 mgd.

3. Level of Treatment

	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Huron River Plant	secondary	secondary	secondary	secondary
Ann Arbor Plant	advanced	-	-	advanced
Ypsilanti Plant	-	-	-	advanced
Detroit Plant	-	-	secondary	secondary

4. Effluent Discharge

a. Discharge to Lower Huron River in pounds/day

	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
BOD 5	1,102	0	0	1,436
SS	2,754	0	0	3,588
TP	185	0	0	
TN	4,022	0	0	

b. Discharge to Lake Erie

	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV*</u>
BOD 5	14,687	20,194	15,267	8,097
SS	13,587	18,682	14,128	7,489
TP	493	678	512	272
TN	10,724	14,762	11,151	5,910

* Does not consider waste discharges to Detroit River from service area.

Table 16 (continued)

c. Reliability of Protection				
	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
i. Huron River	adequate	maximum	maximum	adequate
ii. Lake Erie	adequate	adequate	adequate	adequate
* All alternatives will meet Water Quality Standards.				
5. <u>Stream Flow</u>	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
% reduction in 7-day, 10-year low flow below Ann Arbor				
	10%	36%	36%	0%
6. <u>Land</u>				
a. Regional Growth Patterns Conformance with regional land use plans	Conforms	Conforms	Conforms	Conforms
b. Interceptors				
i. Length (miles)	84	89	92	82
ii. Adverse Impacts*	moderate	moderate	moderate	moderate
*Effects will be most severe during construction.				
7. <u>Pro and Con</u>				
a. Proposed Plan II				
i. Pro				
- Will meet Lake Erie Water Quality Standards				
- Maximum protection for Huron River				
- Single treatment plant provides maximum opportunity for efficient management				
- Isolated plant location, no treatment plants or sludge incinerators in urban areas				

- Temporary treatment plant malfunction will not violate water quality standards
- All service area residents will share costs of interceptors
- Supported by SEMCOG and MWRC

ii. Con

- Decrease flows in Huron River
- Opposed by Ann Arbor

b. Alternative Plan IB

i. Pro

- Will meet Lake Erie water quality standards
- Will meet Huron River water quality standards
- Ann Arbor tertiary plant will increase removal of pollutant materials from surface waters, with exception of phosphorus.
- Only a minor decrease in Huron River flows
- Supported by Ann Arbor

ii. Con

- Discharges relatively large concentrations of phosphorus to Huron River, most of which would reach Lake Erie
- Temporary treatment plant malfunction at Ann Arbor would probably violate water quality standards in Huron River
- Withdraws Ann Arbor's financial support of the interceptors
- Opposed by SEMCOG and MWRC

c. Alternative Plan III

i. Pro

- Will meet Lake Erie water quality standards

Maximum protection for Huron River

ii. Con

- Decrease flows in Huron River
- Future flexibility for expansion or treatment levels at the Detroit plant is decreased due to size and urban location.
- No support

d. Alternative Plan IV

i. Pro

- Will meet Lake Erie water quality standards
- Will meet Huron River water quality standards
- No decrease in flows of Huron River
- Will remove the most pollutant materials, with exception of phosphorus

ii. Con

- Greatest volume of sewage effluent discharged to Huron River
- Temporary treatment plant malfunction at Ann Arbor or Ypsilanti would probably violate water quality standards in Huron River
- No support

e. Alternative Land Disposal Plan

i. Pro

- No direct discharge of pollutants to surface waters.

ii. Con

- High Cost
- Large amount of needed land
- Displacement of people, homes, public facilities, etc.
- Large increase in interceptor length
- Difficulty of managing extensive spray irrigation sites.
- No support

After extensive consideration, the EPA has concluded that Proposed Plan II is the most environmentally compatible and manageable water quality management plan. This plan offers the best alternative of protecting all waters involved enabling water quality standards to be met on a continuous basis. The Huron River and Lake Erie should not be considered as separate entities, for they are both part of the same hydrologic system. The proposal to discharge the total amount of treated effluent into the larger portion of the system is, in this situation, not only more environmentally compatible, but also prudent management.

The environmental cost of this system is decreased flows in the Huron River, possibly up to a 36% decrease in the 7-day 10-year low flow by 1990. It is not known at this time if such a decrease in flow would cause any environmental degradation. Should Ann Arbor and Ypsilanti supply their future increased water demands from sources other than the Huron River, the problem of decreased flows will not arise.

VII. Relationship between short-term beneficial uses vs. long-term environmental consequences for the proposed Plan II.

Upon completion of the wastewater treatment system proposed in Plan II, presently developed areas in southwestern Oakland County, eastern Washtenaw County and western Wayne County will divert their wastewater to the Huron River treatment plant. The lake area of southwestern Oakland County is experiencing sewage disposal problems primarily in the form of numerous nutrient-rich sewage treatment plant effluents which are causing nuisance algae conditions in the lakes. Removal of these effluents will preserve these lakes for recreation use. The proposed system will also remove all treatment plant effluents currently discharged to the Lower Huron River to protect the river for recreational use.

In addition to removing present wastewater discharges from the service area so that water quality standards can be met, the system will be sized to handle future wastewater problems expected to be generated by the predicted rapid population increase in the service area.

The collected wastes from the service area (121 MGD by the year 1990) will be treated at a single plant and discharged to Lake Erie. The degree of treatment will be adequate to meet the current water quality standards for Lake Erie. The proposed system, with one regional treatment plant, will establish a policy of a large regional wastewater treatment system for many years to come. As a result, the

sites used for the Huron River treatment plant and the locations of the interceptors will be committed for waste treatment purposes for the foreseeable future. Further, this system will help to establish the environmentally-sound policy of utilizing the connecting Great Lakes waters in the southeastern Michigan area to assimilate the effluents of wastewater treatment plants, rather than discharging to inland waterways.

The interceptors will be sized to handle future wastewater flows from the predicted growth of population and urbanization. It is understood that urbanization will occur in portions of the service area which are currently rural. If wise land use controls are established and adhered to, the availability of sewer service, after implementation of the proposed plan, should not generate undesirable urban growth patterns.

VIII. Irreversible and Irretrievable Commitment of Resources

Except for the materials of construction for the waste treatment system, there will be no irreversible or irretrievable commitment of resources. It is possible to remove interceptor sewers and treatment plants, and revert the land areas back to their natural state. Realistically, however, the proposed system will commit the interceptor sites and treatment plant site for wastewater treatment purposes for the foreseeable future.

IX. Opportunity & Extent of Public Participation

During 1971, fourteen meetings, conferences and hearings were

held by the State of Michigan concerning the wastewater management needs for the Huron River Basin Area. These meetings were attended by Federal, State and local agencies. The City of Ann Arbor was represented at about eight of the meetings. Other local units within the study area were broadly represented. Based upon information provided by the State of Michigan resulting from these meetings, it appears that Ann Arbor and portions of Washtenaw County support Plan IB. The other municipalities in the study area either support the proposed Plan II or appear neutral.

The Michigan Water Resources Commission prepared an Environmental Assessment on the proposed plan. The assessment also covered the major alternatives considered. The Commission distributed copies of the assessment to interested agencies and individuals. In addition, the Region V Office of EPA distributed copies of the assessment to any interested parties and requested their comments. Appended to this report are copies of representative comments received on the assessment as well as on the plan. All views concerning the proposed plan were considered during the preparation of the draft environmental impact statement.

LIST OF APPENDICIES

Appendix A	Costs
Appendix B	Agreement Between Canada and the United States of America on Great Lakes Water Quality
Appendix C	Fisheries Renovation Project for Huron River
Appendix D	Letters of Comment

APPENDIX A

COSTS

The following is a presentation of costs compiled by the staff of the Michigan Water Resources Commission reflecting the local share of the costs for the proposed Plan II and major alternatives.

This cost comparison was done prior to the new Federal Water Pollution Control Act Amendments of 1972, which raises the Federal share of construction grants from 55% to 75%.

Average Annual Costs of Selected Projects*
(millions of dollars)

	<u>Plan</u>			
	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Average Annual Amortization Cost**	2.89	3.14	2.90	2.60
Annual Operation and Maintenance Costs				
1975	2.07	1.56	1.90	2.53
1990	2.78	2.14	2.69	3.66
Total Annual Costs				
1975	4.96	4.70	4.80	5.13
1990	5.66	5.28	5.59	6.25

* Average annual costs are based only on the local share of capital costs.

** Based on 25 years bond at 6 percent interest.

These average annual costs can be further subdivided into average annual per capita costs for the respective service areas. Thus, while there would be only one treatment plant and one service area under Plan II, Plan IV would have four treatment plants and service areas.

Average Annual Per Capita
Costs of Alternative Selected Projects by Service Areas

Plan and Service Area	Service Area Population		Average Annual Per Capita Cost	
	<u>1975</u>	<u>1990</u>	<u>1975</u>	<u>1990</u>
Plan IB				
Huron River	279,723	489,591	13.30	8.48
Ann Arbor	<u>134,547</u>	<u>205,470</u>	<u>9.21</u>	<u>7.36</u>
TOTAL	414,270	695,061	11.97*	8.16*
Plan II				
TOTAL	414,275	695,061	11.35*	7.60*

Plan III					
Huron River	301,733	498,728	12.06	8.10	
Detroit	<u>112,542</u>	<u>196,333</u>	<u>10.30</u>	<u>7.89</u>	
	414,275	695,061	11.59*	8.04*	
Plan IV					
Ypsilanti	32,138	38,000	15.75	14.77	
Detroit	112,542	196,333	10.40	7.89	
Huron River	135,038	255,258	16.44	10.30	
Ann Arbor	<u>134,547</u>	<u>205,470</u>	<u>9.21</u>	<u>7.36</u>	
	414,275	695,061	12.38*	8.99*	

*Indicates Avg. cost per capita average

From the data presented above, it can be seen that:

- a) The plan with the lowest capital cost is Plan IV; Plan II has the highest capital cost.
- b) Plan II has the lowest average annual cost and average annual per capita cost (for local costs).
- c) While Plan II offers the lowest per capita cost to the region, the Ann Arbor service area would be afforded a significant cost advantage under Plan IB in 1975. A similar cost advantage would exist in 1990 although at a lower magnitude. The cost advantage provided to the Ann Arbor service area under Plan IB, as opposed to Plan II, would be offset by a cost disadvantage to the remainder of the region.
- d) Under Plan IV, the Ypsilanti City service area would incur a significant cost disadvantage relative to the other alternative plans.
- e) Under Plans III and IV, there would be a short-term cost advantage to Oakland County to have its wastewater handled by Detroit, as opposed to the Huron River Treatment Plant under Plan II. This cost advantage would reverse itself by 1990.

f) Finally, it should be noted that these per capita and average annual costs are only valid during the life of the bond issue. After the debt is amortized, operation and maintenance costs of the treatment plants become the principal economic consideration. At that point, the plan with the least number of plants and the least costly treatment processes (which adequately meet water quality standards and other applicable requirements) would be the most economical.

1990 Project Costs

In comparing the costs of the selected project for the four alternative plans, it should be recognized that all of the treatment plans have been designed to meet 1990 needs while portions of the interceptor systems are designed for 2020 needs to avoid costly future relief. Thus, a valid comparison of the costs of the alternative plans can be made by comparing the 1990 design project rather than the selected project. Costs for the 1990 project would be as follows:

Costs of 1990 Project

	<u>Plan</u>			
	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Total Capital Costs	196.39	201.99	190.02	182.04
Total Capital Costs excluding Detroit Rouge Interceptor	139.34	144.94	133.65	125.67

Average Annual Costs of 1990 Project

	<u>Plan</u>			
	<u>IB</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Average Annual Amortization Cost**	2.73	2.84	2.62	2.46
Annual Operation and Maintenance costs				
1975	2.07	1.56	1.90	2.53
1990	2.78	2.14	2.69	3.66
Total Annual Costs				
1975	4.80	4.40	4.52	4.99
1990	5.5.	4.98	5.31	6.12

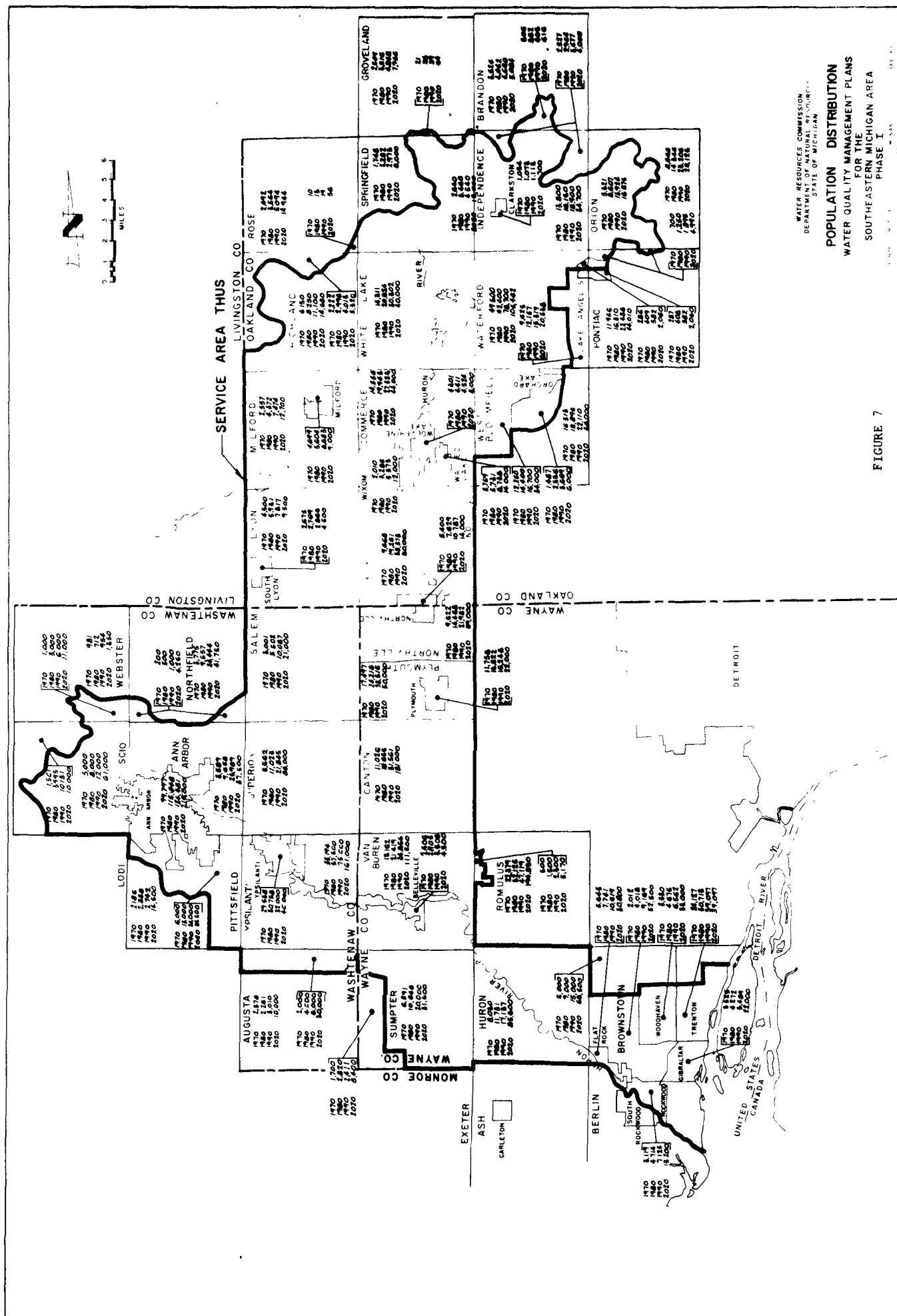
*Based on 25 percent local share only, financial at 6 percent for 25 years.

Average Annual Per Capita Cost of
Alternative 1990 Projects by Service Areas

<u>Plan and Service Area</u>	<u>Average Annual Per Capita Cost</u>	
	<u>1975</u>	<u>1990</u>
Plan IB		
Huron River	12.73	9.14
Ann Arbor	<u>9.21</u>	<u>7.36</u>
TOTAL	<u>11.59*</u>	<u>7.93*</u>
Plan II TOTAL	10.62	7.16
Plan III		
Huron River	11.33	7.65
Detroit	<u>9.77</u>	<u>7.58</u>
TOTAL	<u>10.91*</u>	<u>7.64*</u>
Plan IV		
Ypsilanti	15.75	14.77
Detroit	9.77	7.58
Huron River	15.92	10.02
Ann Arbor	<u>9.21</u>	<u>7.36</u>
TOTAL	<u>12.05*</u>	<u>8.80*</u>

* Indicates Average cost per capita average.

Using the cost data for the 1990 project as opposed to the selected project does not alter any of the conclusions previously stated regarding the four alternatives. It does, however, reinforce a number of such conclusions and increase the spread among certain cost estimates.



APPENDIX B

Agreement Between Canada and the United States of America on
Great Lakes Water Quality. Annex 2

ANNEX 2
CONTROL OF PHOSPHORUS

1. Programs. Programs shall be developed and implemented to reduce inputs of phosphorus to the Great Lakes System. These programs shall include:

- (a) Construction and operation of waste treatment facilities to remove phosphorus from municipal sewage;
- (b) Regulatory measures to require industrial dischargers to remove phosphorus from wastes to discharged into the Great Lakes System;
- (c) Regulatory and advisory measures to control inputs of phosphorus through reduction of waste discharges attributable to animal husbandry operations.

In addition, programs may include regulations limiting or eliminating phosphorus from detergents sold for use within the basin of the Great Lakes System.

2. Effluent Requirements. The phosphorus concentrations in effluent from municipal waste treatment plants discharging in excess of one million gallons per day, and from smaller plants as required by regulatory agencies, shall not exceed a daily average of one milligram per litre in Lake Erie, Lake Ontario and the International section of the St. Lawrence River.

3. Industrial Discharges. Waste treatment or control requirements for all industrial plants discharging wastes into the Great Lakes

System shall be designed to achieve maximum practicable reduction of phosphorus discharges to Lake Erie, Lake Ontario and the International Section of the St. Lawrence River.

4. Reductions for Lower Lakes. These programs are designed to attain reductions in gross inputs of phosphorus to Lake Erie and Lake Ontario of the quantities indicated in the following table for the years indicated.

5. Reservation. The above net discharge figures do not constitute allocations to the two countries, but represent anticipated results of municipal and industrial waste reduction and detergent phosphorus control programs.

6. Refinement of Data. The above net discharge figures are based upon best available data. The parties in cooperation with the State and Provincial Governments and the International Joint Commission, shall continue to refine these estimates to ensure a comparable data base. The estimates are subject to revision upon agreement by the parties to reflect future refinement of the data.

7. Objective of Programs. The objective of the foregoing programs is to minimize eutrophication problems in the Great lakes System. It is anticipated that successful implementation of these programs will accomplish the following results, which are of critical importance to the success of the joint undertaking to preserve and enhance the quality of the waters of the Great Lakes System.

- (a) Restoration of year-round aerobic conditions in the bottom waters of the central basin of Lake Erie.
- (b) Reduction in present levels of algal growth in Lake Erie.
- (c) Reduction in present levels of algal growth in Lake Ontario, including the International Section of the St. Lawrence River.
- (d) Stabilization of Lakes Huron and Superior in their present oligotrophic state.

It is nevertheless recognized that additional measures and programs may be required to minimize eutrophication problems in the future. Available evidence suggests that reductions in phosphorus loadings to achieve a net discharge to Lake Erie in the range of 8,000 to 11,000 tons may be required to bring about mesotrophic conditions in this lake.

9. Commission Recommendations. The Parties will take into account, as soon as available, the recommendations of the International Joint Commission made pursuant to its study of pollution from agricultural, forestry and other land use activities, in order to develop and implement appropriate programs for control of inputs of phosphorus from these sources.

10. Monitoring. The Parties, in cooperation with the International Joint Commission and State and Provincial Governments, shall continue to monitor the extent of eutrophication in the Great Lakes System

and the progress being made in reducing or preventing eutrophication. They will consult periodically to exchange the results of research and to pursue proposals for additional programs to control eutrophication.

11. Submission of Information. The International Joint Commission will be furnished at least annually, in accordance with the Parties, information concerning:

- (a) Total reductions in gross inputs of phosphorus achieved as a result of the programs implemented pursuant to this Annex;
- (b) Anticipated reductions in gross inputs of phosphorus for the succeeding twelve months.

12. Review and Modification. In connection with the first comprehensive joint review of the operation and effectiveness of the Agreement conducted in accordance with Paragraph 3 of Article IX thereof, the effects of phosphorus control programs on the Great Lakes **System** shall be reviewed and further modifications in the programs undertaken pursuant to this Annex shall be considered.

APPENDIX C

Fisheries Renovation Project for the Huron River; and Fish
Species of the Huron River.

NATURAL RESOURCES COMMISSION

HARRY H. WHITELEY
Chairman

CARL T. JOHNSON

E. M. LAITALA

HILARY F. SNELL

CHARLES G. YOUNGLOVE

STATE OF MICHIGAN



WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

RALPH A. MACMULLAN, Director
3335 Lansing Avenue
Jackson, Michigan 49202

October 5, 1972
#175


Mr. Thomas Windau
E. P. A.
1 Northwacker Drive
Chicago, Illinois 60606

Dear Mr. Windau:

Enclosed, copies of the data you requested during our telephone conversation on October 5. As noted, you will receive a copy of our final report when it has been completed.

If you have need for other data relating to this or other similar projects in this portion of southeastern Michigan, please feel free to request copies.

Very truly yours,

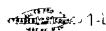

Edward H. Bacon
District Fisheries Biologist

EHB/vrt
Encl:
cc: Tom Doyle/encl.
Dave Weaver/encl.

ENVIRONMENTAL PROTECTION AGENCY
RECEIVED

OCT 6 1972

PLANNING BRANCH
FILE NO. _____



FISHERIES RENOVATION PROJECT PLANNED FOR IMPOUNDMENTS ON HURON RIVER

Ann Arbor's Department of Parks and Recreation has requested the Department of Natural Resources to renovate the fisheries in the Barton, Argo, Geddes and Superior impoundments. The project would be initiated shortly after the Geddes Pond dam is rebuilt -- which is slated for completion in mid-August of this year. The proposal includes plans for treating the above waters with rotenone to remove the present fishery, primarily carp, and restocking with largemouth and smallmouth bass, hybrid sunfish, channel catfish, tiger muskellunge, and walleyes.

The proposal to improve the fishery in the Huron River has been under consideration for several years. The abnormally-high rain fall in June, 1968, caused the Geddes Pond dam to wash out which proved to be the catalyst that precipitated the present plans for this portion of the river.

A meeting on December 16, 1971, at Ann Arbor's City Hall, resulted in conformation of the present plans. In attendance were Messrs. Owers and Harris, Ann Arbor; Mr. David L. Weaver, Regional Fisheries Executive, Lansing; Dr. Carl Latta, In Charge, Institute for Fisheries Research, Ann Arbor; and Messrs. Shepherd and Bacon, District #13, fisheries personnel. It was agreed that the city of Ann Arbor would purchase the necessary rotenone. The Department of Natural Resources would apply the fish toxicant, provide and stock the fish.

It is anticipated that the water will detoxify quickly after treatment because of the river currents as opposed to a lake where the waters tend to be more sedentary.

1-17-72

Ed Bacon

PRELIMINARY REPORT OF FISH MORTALITY PROJECT IN MICHIGAN RIVER
October 5, 1972

Approximately 23 miles of the Huron River in Mackinaw County were treated with rotenone (Pro-nox fish) on October 3, 1972. Area treated includes four impoundments.

Carp were the most numerous (75%) of the fishes removed and constituted approximately 90% of the weight of the fish removed.

A more detailed report will be submitted at a later date.

Dosage - 2 p.p.m.

Fish requested for restocking treated portion of Huron River

	Argo Pond	Barton Pond	Geddes Pond	Superior Pond	Total to Barton Pond
Largemouth bass	9,000	30,000	26,000	9,000	5,000
Smallmouth bass	9,000	30,000	26,000	9,000	5,000
Yard sunfish*	46,000	151,000	130,500	46,500	25,000
Brook stickleback	200	1,000	500	200	100
Walleye	1,000	3,000	2,500	- -	500

* Redeye X Green

Our early request for a stocking of fingerling channel catfish has been withdrawn in favor of plans for stocking 8-10" channel catfish (procured with private funds, in the spring of 1973).

List of Fishes Recorded from the Kuron River
Between Ypsilanti and Dexter, Washtenaw County, Michigan

Reeve M. Bailey and Gerald R. Smith

September 6, 1972

Introduced species are denoted by asterisks.

Locally rare or endangered species are marked †.

PETROMYZONTIDAE - lampreys

Northern brook lamprey - Lethichthys fasciata Reighard and Cummins
†American brook lamprey - Lampetra lamottei (Lesueur)

LEPISOSTEIDAE - gar

Longnose gar - Lepisosteus osseus (Linnaeus)

AMIIDAE - bowfins

Bowfin - Amia calva Linnaeus

UMBERIDAE - mudminnows

Central mudminnow - Umbra limi (Kirtland)

ESOCIDAE - pikes

Grass pickerel - Esox americanus vermiculatus Lesueur
Northern pike - Esox lucius Linnaeus

CYPRINIDAE - minnows and carps

*Carp - Cyprinus carpio Linnaeus
*Goldfish - Carassius auratus (Linnaeus)
Golden shiner - Notemigonus crysoleucas (Mitchill)
Crack chub - Parachanna atrachinoides (Mitchill)
Southern redbelly dace - Phoxinus phoxinoides (Rafinesque)
Blacknose dace - Rhinichthys atraculus melanostomus Agassiz
Stoneroller - Campostoma anomala (Rafinesque)
Hornyhead chub - Moxostoma higinianum (Kirtland)
River chub - Moxostoma microperca (Cope)
†Silver shiner - Notropis phoxinoides (Cope)
Rosyface shiner - Notropis rubellus (Agassiz)
Striped shiner - Notropis chrysocephalus (Rafinesque)

CYPRINIDAE - Continued

- Common shiner - Notropis cornutus (Mitchill)
 Blackchin shiner - Notropis heterodon (Cope)
 Spottail shiner - Notropis bairdii (Clinton)
 Spottfin shiner - Notropis spilopterus (Cope)
 Sand shiner - Notropis atherinoides atherinoides (Cope)
 Milie shiner - Notropis volucellus volucellus (Cope)
 Blacknose shiner - Notropis heterolepis Eigenmann and Eigenmann
 Bluntnose minnow - Pimephales notatus (Rafinesque)
 Fathead minnow - Pimephales promelas Rafinesque

CATOSTOMIDAE - suckers

- Lake chubsucker - Erinnyx lucetta (Lacépède)
 Black redbhorse - Moostoma dugessnei (Lesueur)
 Golden redbhorse - Moostoma erythrum (Rafinesque)
 Northern redbhorse - Moostoma macrolepidotus macrolepidotus (Lesueur)
 Greater redbhorse - Moostoma valenciennesi Jordan
 Northern hog sucker - Hypentelium nigricans (Lesueur)
 White sucker - Catostomus commersoni (Lacépède)
 Spotted sucker - Minytrema melanops (Rafinesque)

ICTALURIDAE - freshwater catfishes

- Black bullhead - Ictalurus melas (Rafinesque)
 Brown bullhead - Ictalurus nebulosus (Lesueur)
 Yellow bullhead - Ictalurus natalis (Lesueur)
 Tadpole madtom - Noturus gyrinus (Mitchill)
 Stonecat - Noturus flavus Rafinesque
 Northern madtom - Noturus stigmosus Taylor
 Brindled madtom - Noturus miurus Jordan

CYPRINODONTIDAE - killifishes

- Blackstripe topminnow - Fundulus notatus (Rafinesque)

ATHERINIDAE - silversides

- Brook silverside - Labidesthes sicculus (Cope)

CASTROSTOMIDAE - sticklebacks

- Brook stickleback - Culaea inconstans (Mitschell)

CENTRARCHIDAE - sunfishes

- Smallmouth bass - Micropterus dolomieu Lacépède

CENTRARCHIDAE - Continued

Largemouth bass - Micropterus salmoides salmoides (Lacépède)
 Warmouth - Lepomis gibbosus (Cuvier)
 Green sunfish - Lepomis cyanellus Rafinesque
 Pumpkinseed - Lepomis gibbosus (Linnaeus)
 Longear sunfish - Lepomis macrochirus palustris Cope
 Bluegill - Lepomis macrochirus Rafinesque
 Rock bass - Ambloplites rupestris rupestris (Rafinesque)
 Black crappie - Pomoxis nigromaculatus (Lesueur)

PERCIDAE - perches

Walleye - Stizostedion vitreum vitreum (Mitchill)
 Yellow perch - Perca flavescens (Mitchill)
 Blackside darter - Percina maculata (Girard)
 Logperch - Percina caprodes semilimpida (Seale)
 Johnny darter - Etheostoma nigrum Rafinesque
 Greenside darter - Etheostoma blennioides Rafinesque
 Rainbow darter - Etheostoma caeruleum Storer
 Barred fantail darter - Etheostoma blennioides blennioides Rafinesque
 Least darter - Etheostoma caeruleum Jordan and Gilbert

COTTIDAE - sculpins

Mottled sculpin - Cottus bairdi Girard

APPENDIX D

The following is a selection of representative comments on the Michigan Water Resources Commission document "Environmental Assessment, Phase I Plans for Water Quality Management, Southeastern Michigan Area," and other general comments on the issue of wastewater management in the Huron River Basin service area.



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
1 NORTH WACKER DRIVE
CHICAGO, ILLINOIS 60606

APRIL 1972

This Regional Office of the U. S. Environmental Protection Agency may soon be preparing a draft environmental impact statement on the proposed Phase I Plans for Water Quality Management, Southeastern Michigan Area.

The report includes information on Plans IB and II involving a large interceptor sewer and a wastewater treatment plant at the mouth of the Huron River at Lake Erie, and also includes information on other plans originally considered by the state.

It is our understanding that you have attended one or more meetings regarding the Phase I Plans. Because we feel that agency and citizen participation in environmental assessment review is important, your review of the Environmental Assessment Report is invited. Your comments, or those of your agency, submitted to us will be carefully considered and will greatly assist us in evaluating the environmental impact of the major proposals included in the Phase I Plans.

If you wish to participate in this environmental assessment review and want a copy of the report, please contact us and we will send you a copy as soon as possible. If you already have a copy and wish to participate, please send your comments to us at your earliest convenience.

We thank you for your interest in this important matter.

Sincerely yours,


R. J. Schneider, Director
Air and Water Programs Division

CITY OF ANN ARBOR MICHIGAN
OFFICE OF THE CITY ADMINISTRATOR
CITY HALL, 100 NORTH FIFTH AVE., 48108

May 30, 1972

Mr. R. J. Schneider, Director
Air and Water Programs Division
Environmental Protection Agency
Region V
1 North Wacker Drive
Chicago, Illinois 60606

Dear Mr. Schneider:

I have delayed answering your letter of April 18 regarding the Michigan Water Resources Commission Environmental Assessment Report because I hoped to have available the findings of a special committee set up by the Southeastern Michigan Council of Governments to analyze the feasibility of financing the Plan II interceptor, single plant solution as endorsed by the Water Resources Commission. Wayne, Oakland and Washtenaw Counties are represented by their engineers on this committee as is the Detroit Water Board. SEMCOG and the City of Ann Arbor are also members. The intent of the committee was to determine whether the proposed 1990-2020 system at a cost of about \$200 million could actually be met within the legal and fiscal constraints on revenue bonding and ad valorem taxing by today's population.

All prior engineering reports and the Water Resources Commission Environmental Assessment Report use a flat per capita basis of cost distribution throughout the proposed Plan II Oakland, Wayne and Washtenaw areas neglecting a) the fact that a uniform charge basis without regard to benefit would be unique in Michigan and b) the fact that the cost to taxpayers in semi-rural areas currently without service would be prohibitive.

A sound and legal basis would be for each area, or county, in the system to pay that portion of the cost of the interceptor and plant that it would be using, thus Ann Arbor and Washtenaw County charged for the Ann Arbor and Van Buren Arms, a portion of the Huron Interceptor and of the plant at the mouth of the Huron. Oakland would pay its share of the plant, Huron Interceptor, Hannan Road and North Arm sewers. This poses extreme problems for Oakland County because a substantial investment required to serve the Oakland area in relation to the present relatively small population. Failure to look at this costing problem in the original Plan studies was unrealistic even if the assumptions regarding the benefits of the total Interceptor single-plant system were valid.

R E S E A R C H C E N T E R O F T H E M I D W E S T

May 30, 1972

We are now reviewing this problem with the bond attorneys through SEMCOG and hopefully will have some legal and fiscal answers which EPA will want for its final analysis and impact statement. Mr. Joseph Price, the Acting Director of the Washtenaw County Department of Public Works, referred to this issue in his comments to you. This whole matter is not touched on at all by the Water Resources Commission Report.

To a considerable degree the Report itself is not an Environmental Assessment as such but a review, repeat and summary of the reports and engineering data previously prepared. The whole question of a new, large single treatment plant at the mouth of the Huron, its relation to the Pt. Mouille natural wildlife area, the filling contemplated by the Corps of Engineers and the ultimate impact on that recreation area is not really examined as an environmental issue and possible contamination and conflicts in use are readily dismissed. Although a number of pages of text relate to the impact on Lake Erie, it is not clear that the standards of the International Joint Commission are being met, that future standards will remain the same and that this plant's impact meets the intent of the President's recent agreement with Canada and has the approval of the Canadian constituencies.

The possibility of plant failure on Lake Erie is minimized; it is maximized for the plants on the Huron River although the record shows such occurrences as rare for the Ann Arbor plant. The value of tertiary treatment is played down although it is clear that final filtration is the answer to the final effluent problems of the Ann Arbor plant as detailed in the Report.

Although there are several pages analyzing Huron River water quality, the data is superficial and inadequate with insufficient samplings. The only extensive analysis was the original Borchardt report mentioned in the Environmental Assessment. The question of low flow periods for the Huron River has received increasing attention and an evaluation has to be made between the quality of the River and amount of flow with all effluent diverted downriver and the quality with the effluent returned. The impact of storm water on River quality is mentioned but not dealt with. The extensive impact of farm run-off and septic dilution in the areas up river from Ann Arbor in both Washtenaw and Livingston counties will be increasingly apparent even if the Ann Arbor plant is discontinued.

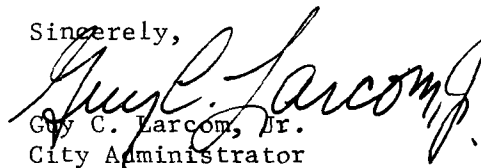
I do not think there is much disagreement over the need for a regional pollution control plan and ultimately a regional authority and most agencies are willing to work in this direction. The Plan II approach of eliminating a number of local plants for a single large plant of Lake Erie has to be appraised in relation to all of the other plants in Southeastern Michigan already draining into Lake St. Clair, the Detroit River and Lake Erie and whether this is the long range approach this country wants to take. The alternative of regional or area plants replacing the multiple small plants with effluent discharging into flowing rivers rather than concentrated at points on Lake Erie and its waters has not been fully explored. The costing

3- Mr. R. J. Schneider

May 30, 1972

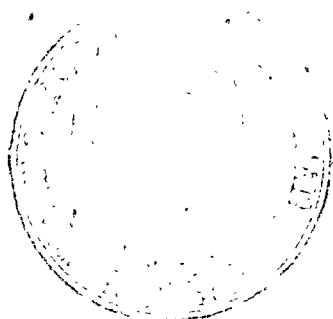
of the partial regional system presented in Plan II and the distribution of capital costs of the large interceptor system we do not believe will stand up in fiscal or legal fact and we believe that interim less costly installations will have to precede any ultimate plan.

Sincerely,

A handwritten signature in cursive script, reading "Guy C. Larcom, Jr.", written over the typed name and title.

Guy C. Larcom, Jr.
City Administrator

GCL/da



CITY OF ANN ARBOR, MICHIGAN
OFFICE OF THE MAYOR

June 20, 1972

Mr. R. J. Schneider, Director
Air and Water Programs Division
United States Environmental Protection
Agency, Region V
1 North Wacker Drive
Chicago, Illinois, 60606

Dear Mr. Schneider:

The Region V office of EPA is in receipt of the Michigan Water Resources Commission's document, "Environmental Assessment, Phase I Plans for Water Quality Management, Southeastern Michigan Area", which pertains to plans for wastewater treatment in the Southeast Michigan area.

You also have the MWRC recommendation of "Plan II" as the best plan for this area. Southeast Michigan Council of Governments, as you know, has concurred in recommending Plan II, subject to further study of the cost-sharing arrangements.

My city has previously expressed to you both (1) our objections to Plan II (as being inferior to Plan IB) and (2) our concern that none of the plans the MWRC studied protect Lake Erie adequately. On the latter point I previously addressed myself to the fact that in all the plans the new plant proposed to be built on Lake Erie provides only secondary treatment, whereas tertiary treatment would seem to be necessary for the protection of Lake Erie.

The present letter concerns itself with a different point: that in all the plans, including Plan II, the phosphorus removal standard is 90% removal, although 90% removal is insufficient to stop rapid eutrophication of Lake Erie. This is particularly true in this instance since the proposed new plant will be large and will be located at one of the most eutrophic, phosphorus-loaded spots on the Lake. I have raised this issue of phosphorus control before the MWRC, but did not make extended remarks on the subject. Even until very recently I did not understand the importance of the issue.

Thanks to your help in bringing to my attention the 1970 Inter-

R E S E A R C H C E N T E R O F T H E M I D W E S T

National Joint Commission Report and the 1969 International Lake Erie Water Pollution Board Report. I feel I am better informed on the issue now. I want to share with you what I learned as I traced the question of the Lake Erie phosphorus control standard through its four phases: (1) the 1969 Report of the Lake Erie Board; (2) the 1970 Report of the IJC; (3) the detergent phosphorus control measures of (a) the US-Canada agreement of April 1972, and (b) the recent Michigan legislation; and (4) the standard currently proposed by the MWRC for the new plant to be built under Plan II.

This matter bears sharply on two decisions presently facing EPA Region V: (1) shall an Environmental Impact Statement be prepared? and if so, what questions shall it explore? (2) shall Plan II be approved and funded by the federal government to the tune of some \$80,000,000?

It is not possible, in my judgment, to approve Plan II while reserving judgment on the question of whether its standard of 90% phosphorus removal should be stiffened at some future date. I attended the meeting of the MWRC when they approved Plan II and voted to forward that recommendation to you. Staff made it very, very clear to the commissioners on the occasion of that vote that the recommendation was contingent on your approval of the standard for treatment contained in Plan II: only secondary treatment and only 90% removal of phosphorus. In private conferences with Ann Arbor officials the IJC staff elaborated its reasoning: a higher standard would add immensely to the operating cost of Plan II; in that event, Plan II would lose its operating cost superiority over Plan IB and other plans, and MWRC probably would prefer some other plan--probably opting for a more decentralized solution, with three or four plants, rather than one big plant.

The crux of what follows can be summarized as follows:

- The Lake Erie Board and the IJC technical people were pointing towards a phosphorus loading standard for Lake Erie of either 0.13 grams per square metre (permissible loading) or 0.28 (dangerous loading);

- The ultimate recommendation of the Board and IJC was a standard of 0.39--which is all that can be achieved by the two control measures they deemed feasible;

- The first control measure recommended was total removal of all phosphorus from detergents, which IJC wanted accomplished by December 31, 1972, and looked to US-Canadian agreement to implement;

- The second control measure was a requirement of 95% phosphorus removal at all industrial and municipal plants on Lake Erie or its tributary streams;

-The first control measure was not adopted, the US-Canadian agreement leaving this matter to the individual states, and the Michigan Legislature having enacted a law that goes only a short way towards eliminating phosphorus from detergents;

-The second control measure will be flouted if EPA approves Plan II, which calls for only 90% phosphorus removal, not 95%;

-Plan II is particularly aggravating because it calls for a new big plant with only 90% phosphorus removal to be located on the western basin of Lake Erie (where eutrophication is much worse than in the rest of the Lake), and to make matters worse, it calls for locating that plant at the mouth of the Detroit River where eutrophication and phosphorus loading is many times worse than in most of the western basin.

The ILEWPB's 1969 Report

The "Report" is part of three volumes. Volume Two is from the ILEWPB, and deals with Lake Erie. Volume Three is from the companion board that concerned itself with Lake Ontario. Volume One is a summary of the two main volumes. All page references in my letter are to Volume Two.

"Eutrophication" is defined thus: "an acceleration in the rate of addition of plant nutrients to natural waters results in increased biological populations and production" (page 65). The Report explains that "lakes are generally classified as oligotrophic, mesotrophic, or eutrophic, depending on their degree of plant nutrient enrichment and biological productivity....If the supply of nutrients to an oligotrophic lake is progressively increased, the lake will become more mesotrophic in character; with further continuing enrichment it will eventually become eutrophic and finally extremely eutrophic." (page 66)

"Sewage effluents, certain industrial wastes and the runoff from agricultural land are all extremely rich in a number of plant nutrients. Of these nutrients, compounds of phosphorus and nitrogen are generally considered to be the most significant and their key role in eutrophication has long been recognized. Experience in many lakes has shown that of these two, phosphorus is most often the easier to control." (page 67)

The Report goes on to define its terms: "In this report all concentrations of phosphorus compounds are expressed in terms of the element phosphorus. Orthophosphate-phosphorus ($\text{PO}_4\text{-P}$) refers to the phosphorus that occurs as orthophosphate ions (such as H_2PO_4 , HPO_4 , PO_4 , NaHPO_4 , CaHPO_4) in a filtered sample of water; total phosphorus (total-P) refers to the phosphorus present as orthophosphate ions after acid digestion of an unfiltered sample

of lake water and includes both the inorganic orthophosphate and the phosphorus present in organic substances. The terms soluble phosphate-P and reactive phosphate-P are treated here as equivalents of orthophosphate-P." (page 68).

With terms defined, the Report can then proceed to discuss the present phosphorus loading of Lake Erie, treating western, central, and eastern basins separately. "With reference to the recent years, 1963 to 1967, all data show that average summer concentrations of both $\text{PO}_4\text{-P}$ and total-P in surface waters are highest in the western basin (17 to 40 $\mu\text{g PO}_4\text{-P/l}$), less in the central (5 to 20 $\mu\text{g PO}_4\text{-P/l}$) and least in the eastern basin (3 to 10 $\mu\text{g PO}_4\text{-P/l}$)." (page 68). This is important to us because the proposed new plant with only 90% phosphate removal is to be located in the western basin.

"In the relatively well-mixed waters of the western basin the concentrations of $\text{PO}_4\text{-P}$ tend to be more uniform with depth than in the central and eastern basins." (page 68) Reference is made to Table 2.3.1. which shows average concentrations of $\text{PO}_4\text{-P}$ at the surface of the western basin ranging from 3.9 (1942) and 4.6 (1951) to between 17 through 65 (1962-1967). The only study of the bottom of the western basin showed 18 in 1967, (at which time the surface registered 17). So, it would appear that both the bottom and the surface of the western basin have orthophosphate-phosphorus average concentrations of at least 17 in the summer time--assuming things have not gotten worse since 1967.

In fact, it is most probable that things have gotten much worse since 1967. "A comparison of early data on Lake Erie with the most recent information available (Table 2.3.1) suggests that the concentration of $\text{PO}_4\text{-P}$ in the western basin of Lake Erie increased approximately four to ten times between the periods 1942-1951 and 1963-1967." (page 71).

The Report also shows that summer time is not the worse season: "The concentrations of both $\text{PO}_4\text{-P}$ and total-P tend to be highest in late winter and early spring (Chandler and Weeks, 1945), conforming to the usual pattern observed in most north temperate lakes. This is the result of reduced biological activity in winter." (page 71). Hence the current loadings in the western basin, particularly in late winter and early spring, will be even higher than the 17 surface and 18 bottom readings recorded in the summer of 1967.

But this, so far, has assumed that the entire western basin is homogenous. In fact, certain parts of the basin are worse than other parts. "It is clear from detailed information in ~~the~~ studies cited in Tables 2.3.1 and 2.3.2 that locally high concentrations of $\text{PO}_4\text{-P}$ and total-P are observed adjacent to major centers of population, industry, and agriculture, or rivers draining such regions (Section 3.2). This is true, for example, of the densely settled area draining into the western basin, and for localized

areas adjacent to Metropolitan Detroit, Toledo, and Cleveland. Measurements by OWPC and the FWPCA show that $\text{PO}_4\text{-P}$ concentrations at the mouth of the Detroit River are higher on the United States side than on the Canadian side." (page 71). This is important because the proposed new plant is precisely at the place where the existing phosphorus loading is the highest--on the United States side of the mouth of the Detroit River, by a densely settled area draining into the western basin, adjacent to a major center of population!

The sources, characteristics and effects of material inputs are discussed starting on page 189. "Municipal wastes may seriously degrade water quality in the vicinity of an effluent discharge... Municipal effluents contain large amounts of the nutrients, nitrogen and phosphorus." (page 189). Table 3.1.1 shows that in the year 1966-7 municipalities discharged a total of 38 short tons of total phosphorus into the western basin of Lake Erie by direct discharge--not into tributaries. Table 3.1.2 shows that industry that year contributed another 10 short tons by direct discharge. The heavy discharge of phosphorus comes not from direct discharge into the Lake but from the tributaries into which municipal plants discharge. This is shown in Table 3.1.4. "As this Table shows, the Detroit River is by far the largest contributor for most constituents." (page 201). In 1966-7 the total phosphorus discharged into the western basin by tributaries was 21,227 short tons per year. (page 202). The Detroit River contributed 17,600 short tons of that western basin total of 21,227. The total Lake received 27,342 short tons from all sources. (page 205).

There may be some difficulty in relating total phosphorus to orthophosphate-phosphorus. The Report indicates "the ratio of total-P to $\text{PO}_4\text{-P}$ has been reported as ranging from 1:1 (Federal Water Pollution Control Administration, 1968b) to 3:1 (Chandler and Weeks, 1945)." (page 71).

So the eutrophication of Lake Erie is closely related to the phosphorus being discharged into the Lake; the eutrophication is worst in the western basin, which gets most of the initial phosphorus discharge (from the Detroit River). There remains the question: how much of the Detroit River's phosphorus load comes from municipal wastes? "63 percent of the phosphorus inputs from all sources comes from municipal wastes." (page 206).

The Report mentions that the average concentration of total phosphorus in the western basin is highest (160 ug/l) at the mouth of the Detroit River (page 223)--precisely where the new plant is to be built with only 90% phosphate removal!

In Table 3.3.1 the Report draws up a materials balance for Lake Erie, showing that of the 30.1 short tons of total phosphorus put into the Lake in 1966-7, 25.4 tons, or 84% of it, was retained. The same table pinpoints the Detroit River municipal contribution of total phosphorus to Lake Erie at 11,510 short tons per year in 1966-7.

On page 236 the Report discusses the state of eutrophication of Lake Erie--getting close now to the ultimate question of what standard of treatment should be required. "As a relatively shallow body of water (mean depth 18 metres as compared to 84 metres for Lake Ontario) Lake Erie is morphometrically predisposed toward eutrophy. This is particularly the case for the western basin (mean depth 6.7 metres) where the waters are isothermal and circulate freely to the bottom during ice-free seasons." (page 237).

"The three interconnected basins of Lake Erie differ in their trophic states. The western basin is clearly eutrophic." (page 237)

"In nearshore environments, particularly in the vicinity of population and industrial centres and at the mouths of rivers draining agricultural regions, there is clearly a greater degree of eutrophication than that of the main body of Lake Erie.... Pronounced eutrophication at nearshore sites in Lake Erie occurs at the mouth of the Detroit...River..." (page 237).

"Vollenweider (1968) has proposed criteria to evaluate the state of eutrophication of lakes based on a knowledge of the loadings of total-P and total-N delivered from both natural and cultural sources. In order to permit a comparison of lakes with different areas and volumes, the annual loadings are expressed as grams of total-P or total-N per square metre of lake surface. Predicted effects are then evaluated as a function of mean depth of the lakes in question, thus bringing all comparisons to a standard volume of lake water.

"Table 3.3.3 lists the admissible and dangerous loading limits proposed by Vollenweider (1968). From data presented in Section 3.1 of this Volume, the annual loadings of total-P and total-N for Lake Erie are 30,000 and 194,000 short tons per year respectively. Converted to a unit area of lake surface these correspond to 1.1 g total-P/m². yr and 6.8 g total-N/m². yr. The admissible and dangerous loading limits for a lake of 20 metres mean depth (versus 18 metres mean depth for Lake Erie) from Fig. 3.3.1 are 0.15 and 0.30 g/m². yr, respectively for total-P." (pages 237-9).

The statement is important and bears repetition: the admissible loading limit for all of Lake Erie is less than 0.15 g/m². yr. The dangerous loading limit is reached before the load reaches 0.30 g/m². yr. We shall have occasion to refer to these standards again later.

"The actual lake loadings for both elements (phosphorus and nitrogen) are thus well above the 'dangerous' limits proposed by Vollenweider." (page 239).

"The loading for total-P in the western basin of Lake Erie (21,000 short tons per year) is 64 times the 'dangerous' limit when expressed on a unit area basis for the western basin." (page 239) (italics mine).

"It must be stressed that these graphic relationships are primarily based upon empirical observations rather than theoretical relationships. For those reasons they provide a solid framework for comparison, largely free of assumptions. They do not, however, fully take into account the varying rates of replacement of water in the lakes shown." (page 239).

"The complete elimination of nutrient loading from municipal and industrial sources will thus never create oligotrophic conditions comparable to those in the upper Great Lakes. At present the combined nutrient loading from municipal and industrial sources accounts for 30 to 40 percent of the total nitrogen and 70 percent of the total phosphorus from all sources. At best there would be a return to conditions existing in the early part of the 20th Century. If, on the other hand, control by nutrient removal is not practiced, and the projected loadings for 1986 are realized, there is every reason to expect further pronounced biological changes that will result in a deterioration of overall water quality." (page 239).

Page 241 contains a striking chart plotting mean depth of lakes along the horizontal dimension and total phosphorus grams per square metre per year along the vertical dimension. A diagonal bar of grey runs from the lower left corner up and to the right. Its top border marks "dangerous limits" and its bottom border marks admissible limits. Lake Tahoe and two other lakes are shown clearly within the area of admissible loadings. Five lakes are shown with loadings between "admissible" and "dangerous". Many lakes are shown in the area where loadings are beyond "dangerous limits", including Lake Erie. But the lake that is shown in the worst shape of all is "W. Erie"--the western basin of Lake Erie--with a loading of about 7 grams per square metre per year; for a lake of that mean depth the "dangerous limit" is reached with a loading, according to this chart, of less than 0.20 grams. The chart is based on Vollenweider's work, as is the table on page 240, which says the same thing in another form.

The Report then goes on to project what is expected to happen by 1986. "The contributions from the forecasted populations are based on an expected phosphorus wastage ratio of 3.5 pounds per capita per year of which 2.5 pounds per person will originate from detergent phosphorus." (page 245) (*italics mine*).

"At present it is estimated that 50 to 70 percent of the total input of phosphorus from all municipal and industrial wastes in the lower Great Lakes basin comes from detergents. The increases in phosphorus sources will account for a doubling of the quantities now supplied to the lake to a level of 45,000 tons per year by 1986.

"Reference to Fig. 5.1.1 illustrates the significance of this total phosphorus loading on Lake Erie. When expressed as an annual loading rate, per unit of surface area, the 1986 input of

phosphorus indicates that a considerable advance in the degree of eutrophication in the lake can be expected." (page 245) Figure 5.1.1 predicts that without controls the total phosphorus loading of Lake Erie will be 44,610 short tons per year by 1986, of which 29,150 tons will be from municipal plants. The Detroit River municipal plant loading, without controls, is predicted at 16,050 short tons per year. (page 260).

On page 257 the Report begins its "Conclusions and Summary." "The most serious water pollution problem in the lower Great Lakes having long term international significance, is the increasing eutrophication of the lakes.... With the present state of knowledge and technology, the only feasible approach to the problem in the lower Great Lakes is the removal of specific nutrients from wastes... The experience in many lakes indicates that phosphorus is most often the controlling material." (page 257) (italics mine)

The Report then goes on to compare its 1986 projections without controls with a new projection for 1986: "if by then all phosphorus is eliminated from detergents and 95 percent of the phosphorus is removed from all municipal and industrial wastes." (italics mine)

It's worth interrupting the narrative to note what happens at this point in the Report. To this point everything was scientific and descriptive. There was no effort to prescribe what the law should or could do. The scientific description was leading to the conclusion that society should seek to retard the process of eutrophication, presumably by reducing phosphorus loadings below what Vollenweider had indicated to be the point of "dangerous loading". For the western basin of Lake Erie that would mean a concentration less than 0.20 grams of total phosphorus per square metre per year, which translates to about 531 short tons per year. (page 204 shows the western basin receiving 21,227 tons per year and page 239 shows the present loading to be 40 times the "dangerous limit"). Since loadings were much more severe at the mouth of the Detroit River, presumably the standards there would be even more restrictive--compelling the 531 tons to the western basin to enter, insofar as possible, at other points.

However, when the authors of the Report reached the "Conclusions" chapter and had to face the implications for government action, they ignored where the prior chapters' logic was leading them and approached the problem from a new direction, asking, What measures are politically feasible? Their answer, obviously, was (1) ban all phosphorus from detergents; and (2) require all industrial and municipal plants to remove 95% of the remaining phosphorus from their influents.

Before going further it is worth noting just how far these two measures would take us in protecting the environment. Table 5.1.1 states that for Lake Erie as a whole the phosphorus loading in 1986 with these two controls would be 11,160 short tons per year, or

4.

0.39 g/m². yr. (page 260). This would still leave Lake Erie as a whole with loadings above the "dangerous limits", albeit the loadings would be lower than they were in 1967.

The most troublesome thing about the "Conclusions" chapter is that it does not discuss the difference between the western basin and the whole of Lake Erie nor does it discuss the difference between the area around the mouth of the Detroit River and the rest of the western basin. It is clear that the two legal steps being recommended would reduce phosphorus loadings to about one fourth of what they otherwise would be, as appears from Table 5.1.1. It is also clear that the total loading for all of Lake Erie otherwise would be about 44,610 short tons per year. If the ratio of loadings western basin to whole Lake stayed the same in 1986 as it was in 1967 (21/27, or 77%), the loading of the western basin, after these two control measures were introduced, would be about 8,600 short tons per year. If 530 short tons per year marks the "dangerous limit", the two control measures would still leave us in a state of affairs in which we put more than 16 times as much phosphorus into the western basin as the Report suggested we should put if we would heed the "dangerous limit." (Of course, if we wanted to heed the "admissible limit", we would need even more strict controls.)

Granted, it is better to exceed the limit by 16 times rather than by 40 times. But the public should know that the measures being proposed are still very far from what it takes to slow down eutrophication--our biggest pollution problem, according to the Report.

This still doesn't come to grips with the fact that the eutrophication around the mouth of the Detroit River is worse than in the rest of the western basin. Presumably, adopting these two measures would leave us with loadings at the mouth of the Detroit River much more than 16 times greater than the danger limit.

To return to the Report itself. At this point it tries to come to grips with the fact that it is about to recommend measures which will not bring loadings below Vollenweider's "dangerous limits". The Report first repeats its earlier praise for Vollenweider's assumption-free criterion, but then goes on thus: "However, as Vollenweider points out, mean depth is the only parameter considered here in relation to phosphorus loading, and other factors (flushing time, geographic location, etc.) must be considered." (page 259-263). The Report does not, unfortunately, discuss either the flushing time or the geographic location of Lake Erie to indicate whether these factors would make one set the "dangerous limits" for Lake Erie higher or lower.

The Report continues: "Also, the added effects of other nutrient substances and growth factors may be involved." However, again unfortunately, the Report does not discuss whether they are involved

or in what direction they cut as regards Lake Erie. (page 263)

The Report, still sniping at Vollenweider, points out that according to Vollenweider's chart, Lake Washington would be expected to be more eutrophic than either Lake Zurichsee or Lake Mendota, whereas in fact it is less eutrophic than either of these lakes. (page 263) We are not told whether the difference in eutrophication between Lake Washington and these other two lakes is great or small. On Vollenweider's chart Lake Washington is only shown to be a trifle more eutrophic than the other two, whereas the western basin of Lake Erie is shown as vastly more eutrophic than any of the three lakes or any others on the chart. Hence, one who is not determined to discredit Vollenweider completely must wonder whether his chart is not subject to minor degrees of error--but still is accurate enough in its basic statement about Lake Erie's western basin: that it cannot tolerate anything approaching the phosphorus loadings that will occur even if phosphates are removed from detergents and the industrial and municipal plants are held to a standard of 95% removal of phosphorus.

The Report, after a discussion of Lake Ontario (which the two proposed legal measures would bring to loadings well within the Vollenweider "admissible limits"), finally comes face to face with the Vollenweider data and proceeds thus: "Lake Erie...it is suggested...would still be well within the eutrophic range after elimination of phosphorus from detergents plus 95 percent of controllable phosphorus in 1986. As was found for Lake Ontario, the earlier examination of various criteria indicated that Lake Erie is considerably less eutrophic than (Vollenweider's chart) suggests." (page 263)

This statement is troublesome because it suggests that Vollenweider, having been "wrong" about Lake Ontario, may well be "wrong" about Lake Erie, too. The data about his being "wrong" on Lake Ontario consists of his data placing Lake Ontario, as of 1967, in the range between admissible and dangerous limits, close to the latter. This location on his chart classifies Lake Ontario as between mesotrophic and eutrophic. Observation places Lake Ontario a little better off--between oligotrophic and mesotrophic. However, only a very small adjustment of his chart is needed to make it correspond to observation. To put it another way, he is a bit pessimistic.

Lake Erie, on the other hand, classifies as eutrophic on his chart and classifies the same way on every count when observed. (page 238) Vollenweider puts Lake Erie so far into the range of eutrophy that even if he made the same pessimistic error about Lake Erie that he made about Lake Ontario, it only means that

Lake Erie, with the two legal measures taken and the pessimism corrected, would be in the range between eutrophy and mesotrophy in 1986.

Vollenweider's error is not great enough to affect the argument that the western basin of Lake Erie will be far into the area of eutrophy--far beyond the dangerous limit--by 1986 even if the two control measures were adopted.

The authors of this chapter of the Report duck the question of the western basin completely. Their statement is: "This assessment of Lake Erie is for the lake as a whole; regardless of phosphorus control the western basin will continue to be more eutrophic than the central and eastern basins." (page 263) But the point is not that the western basin will be more eutrophic than the other two basins; the important point is that even allowing for Vollenweider's pessimism, the two proposed controls will leave phosphorus loadings in the western basin so high that we can guarantee fairly rapid eutrophication.

The Report goes on to touch on a new aspect of the phosphorus problem: "A good deal of concern is expressed about the regeneration of nutrients from the sediments of enriched lakes after the nutrient supply from controllable sources is cut off. Once a lake has become so productive that oxygen is exhausted from deep water during summer, chemical changes at the mud-water interface cause a release of nutrients into the water from the surface sediments. This has been estimated as 8 percent of the total phosphorus load for one small eutrophic lake (Vollenweider, 1968). Large lakes are believed to be proportionately less affected than small lakes, but Lake Erie, which already shows considerable oxygen depletion in the hypolimnion, is approaching this dangerous point in eutrophication. Prevention of this state would serve to delay the regeneration of another source of nutrient enrichment." (page 264). This paragraph is important as regards how fast steps must be taken to remove phosphorus from detergents and to achieve 95% removal of phosphorus at industrial and municipal plants--if those are the only two measures that are going to be taken. It is not clear how important this is for the shallow western basin, which has no hypolimnion

The Report went on to recommend an 80% phosphorus removal standard for municipal plants for now, to be increased to a 95% standard by 1986. (page 266). There was no discussion as to whether the move to the 95% standard would be too late if it was delayed until almost 1986, in view of the earlier expressed concern about phosphorus being released from the mud-water interface once a lake becomes very productive.

The final part of the Report goes on to explain why the recommendation is for both 95% removal at treatment plants and elimination

from detergents: "it will be economically and physically impractical to have full facilities completed for Lake Erie and its tributaries before 1975....If the technology for phosphate removal can be quickly developed, an almost immediate elimination of a substantial proportion of the phosphorus loading to Lake Erie and Lake Ontario could be achieved to prevent further deterioration of these lakes while sewage treatment facilities are being built.

"Secondly, the requirement of phosphorus removal would in many cases impose undue financial burdens on small municipalities, individual homes, and industries in the drainage basins....

"Thirdly, it is estimated that treatment costs for phosphate removal at sewage treatment plants would be reduced by a half to two-thirds by removal of phosphates from detergents. At the present time 70 percent of the phosphorus in municipal sewage in the United States and 50 percent in Canada arises from phosphate-based detergents, the overall basin average lying close to that of the United States.... To achieve the same effluent concentration without replacement of phosphates in detergents would require more than 95 percent removal at the sewage treatment plant with two to three times the overall cost, largely due to the additional chemicals needed and solid wastes produced. Since the solution of the combined sewer overflow problem will take a number of years to accomplish, an early reduction in phosphorus inputs to the lakes from this source could be achieved by detergent reformulation." (page 267) (italics mine)

The IJC Report of 1970

The IJC Report is rather similar to the ILEWPB Report, both in its ultimate recommendations and in its internal inconsistency--disagreement between the early technical chapters and the later normative chapters.

The IJC Report follows the earlier report in stressing eutrophication as a leading pollution problem (pages 35-6); identifying phosphorus as the most feasible place to attack the eutrophication problem (page 37); spotting municipalities as the source of the bulk of total phosphorus contribution to Lake Erie (page 83); attributing 35,000,000 pounds of current total phosphorus input per year to Lake Erie to the Detroit River (page 80); repeating the statement that 70% of the phosphorus in United States sewage comes from detergents (page 82); pointing out that the western basin of Lake Erie was particularly prone to eutrophic conditions because "its mean depth is only 23 feet" (page 85); noting that the mean summer concentration of phosphorus in the western Basin of Lake Erie was 60 micrograms/l (page 85); and concluding "Based on these data the Western Basin is classified as being clearly eutrophic and the rest

of Lake Erie and Lake Ontario as being mesotrophic from the standpoint of nutrient levels." (page 86).

Then came the most interesting part of the Report, quoted in full here:

"The permissible loading of total phosphorus according to the criteria endorsed by the Board is $0.13 \text{ g/m}^2/\text{yr}$. (grams per square metre per year) for Lake Erie and 0.37 for Lake Ontario. Beyond this the loadings are critical and become dangerous at $0.28 \text{ g/m}^2/\text{yr}$. for Lake Erie and 0.75 for Lake Ontario. The actual total phosphorus loading converted to a unit of surface area for Lake Erie was $1.1 \text{ g/m}^2/\text{yr}$. and for Lake Ontario $0.7 \text{ g/m}^2/\text{yr}$. These nutrient loadings produce advanced eutrophic conditions in Lake Erie and serious mesotrophic conditions in Lake Ontario." (page 86)

This is precisely the result one comes to if he adopts Vollenweider's chart and table. At this point in its Report the IJC appeared to be accepting precisely the standards proposed by Vollenweider, with no discount for pessimism.

However, in Chapter XII, beginning on page 112, the IJC Report shifted gears. When it came time to state "Specific Objectives," the one concerning phosphorus was stated thus: "Concentrations limited to the extent necessary to prevent nuisance growth of algae, weeds and slimes which are or may become injurious to any beneficial water use. (Meeting this objective will require that the phosphorus loading to Lake Erie be limited to $0.39 \text{ g/m}^2/\text{yr}$. and the phosphorus loading to Lake Ontario be limited to $0.17 \text{ g/m}^2/\text{yr}$.)" (page 119). (matter in parentheses is in IJC Report text).

At first glance it is impossible to understand why the standard for Lake Erie is set at 0.39 when the prior discussion indicated that the permissible limit is 0.13 and the danger point is 0.28 . Why is a number picked at random-- 0.39 --when the number is too high to satisfy either criteria suggested by the earlier discussion? Not much help comes from the "Discussion of Specific Objectives" (pages 120-122), where the only reference to the phosphorus standard reads: "The objective for phosphorus is based on Chapter VI where it is explained that phosphorus will, under certain conditions stimulate nuisance growths of algae, weeds and slimes. Although a maximum acceptable concentration in the Lakes cannot be specified at all times, it has been found that algal blooms can be expected to follow in years when the concentrations of inorganic phosphorus and inorganic nitrogen exceed 10 and 300 micrograms/l, respectively, at the time of the spring turnover." (pages 121-2).

The real explanation for the 0.39 standard comes on pages 123-4: 0.39 is the standard reached if two legal measures are compelled--elimination of all phosphorus from detergents and 95% removal of the predicted 1986 load of phosphorus at municipal and industrial waste treatment plants.

So in the IJC Report, as in the ILEWBPB Report on which it was based, the ultimate determination of the phosphate loading standard bears no resemblance to the conclusion the earlier discussion was leading towards; the standard--0.39 g/m²/yr.--is too high, but it is the best you can reach if you limit your control efforts to the two measures being endorsed.

The IJC Report was disingenuous in the way it embraced the 0.39 standard, implying that the prior Report had embraced that standard for less pragmatic reasons. The IJC Report reads thus: "The Commission is convinced that the reduction of phosphorus input into Lake Erie, Lake Ontario and the International Section of the St. Lawrence River will significantly delay further eutrophication and will allow the recovery of the Lakes to begin through natural processes. All feasible approaches to the phosphorus removal problem must be implemented. The Boards' report stressed that Lake Erie as a whole might well return to a mesotrophic state if the phosphorus loading were reduced to 0.39 g/m²/yr. and that Lake Ontario might well return to an oligotrophic state if the phosphorus loading were reduced to 0.17 g/m²/yr. This can be achieved if all phosphorus is eliminated from detergents plus a 95% removal of the predicted 1986 load of phosphorus at municipal and industrial waste treatment plants... It must be emphasized that Lake Erie prior to World War II was probably a mesotrophic lake and that even more stringent phosphorus control measures would not result in it becoming oligotrophic." (pages 123-5).

The IJC Report thus travelled the same route as the earlier Report, and like its predecessor, when it came time to draw conclusions, it not only ignored Vollenweider's data, but also ignored (a) the need for different standards for the western basin of Lake Erie and (b) the need for different standards for the mouth of the Detroit River.

The IJC Report did go one step beyond the earlier Report. It proposed a US-Canadian agreement on a three-pronged program of phosphorus control. One prong would be "the reduction of phosphorus discharged to these waters from agricultural activities." (page 150). This would be a new line of attack on the problem. The second prong was the reduction "as a matter of urgency, of the remaining phosphorus in municipal and industrial waste effluents discharging to Lake Erie (etc.), with a view to achieving at least an 80% reduction by 1975 and thereafter additional reduction to the maximum extent possible by economically feasible processes." (page 150). This is the same as in the earlier report--80% removal as an interim target--but now the 95% removal target for 1986 is replaced by the more flexible standard of "maximum extent possible by economically feasible processes", which read alone, could mean more or less than 95% removal. Read together with the Specific Objective of 0.39 g/m²/yr., however, it requires at least 95% removal.

The third prong concerned the big problem of phosphorus in detergents. The US-Canada agreement was to achieve this: "The immediate reduction to a minimum practicable level of the phosphorus content of detergents and the total quantities of phosphorus-based detergents discharged into the Great Lakes System with the aim of complete replacement of all phosphorus in detergents with environmentally less harmful materials by December 31, 1972." (page 150) (*italics mine*)

Summing up, the IJC Report of 1970 reached these conclusions concerning the reduction of phosphorus loading of Lake Erie: (1) it called for adherence to the Commission's General and Specific Objectives--including the one limiting loading to 0.39 g/m²/yr.--"as a matter of urgency" (page 137); (2) it called for this standard to "be recognized as the minimal basis for the establishment of standards for these waters by the States of Michigan, Ohio...(etc.)'..." (page 149); (3) it recommended US-Canadian agreement with the aim of complete replacement of all phosphorus in detergents with environmentally less harmful materials by December 31, 1972 (page 150).

Control of Phosphorus in Detergents Since the IJC Report

Michigan has passed legislation imposing limits on the phosphorus in detergents. But the Michigan legislation is a far cry from the recommended total ban on phosphorus. Michigan now prohibits sale of cleaning agents which contain phosphorus in any form in excess of 8.7% by weight expressed as elemental phosphorus. (Act #226, Public Acts of 1971, approved by the Governor January 3, 1972). According to Professor Daniel Longone of the University of Michigan Chemistry Department, the most widely used phosphate in laundry detergents is sodium tripolyphosphate, STPP. STPP contains 25.26 phosphorus by weight. Thus a standard of 8.7% elemental phosphorus translates into a standard of 34.44% STPP. A 34.44% standard represents a reduction of one third to three fifths for most dishwasher detergents of the standard phosphate sort. For example, in 1970 we saw Tide at 49.8%, Bold at 45.4%, Cold Water All at 45.4%, DUZ at 38.3%, FAB at 38.8%, and Cheer at 36.3%. For only two of the twenty-two high phosphate detergents (Blue Rain Drops, Salvo) would a 34.44% STPP standard represent a reduction of more than one third of the 1970 phosphate level. The information about the detergents was published by the United States Department of the Interior (FWQA) on September 5, 1970, and appeared in the New York Times of the following day.

Since the IJC Report of 1970 the United States and Canada have negotiated an agreement concerning control of phosphorus entering the Great Lakes. But the agreement, signed on April 15, 1972, by President Nixon and Prime Minister Trudeau, does not require a partial or a total ban on phosphorus in detergents--by the end of 1972 or by any other date. Rather, according to the "Great Lakes Water

Quality Agreement Fact Sheet" issued by the Ottawa Office of the White House Press Secretary on April 15, 1972, "the parties agree to take remedial measures to reduce the gross input of phosphorus into Lake Erie and Lake Ontario by agreed amounts over the next five years. (page 3)....The U. S. announced last September a number of conclusions on the health and environmental problems associated with detergents. The announcement noted unresolved questions concerning the possible long-term health effects of NTA, the most promising substitute for phosphorus in detergents and the consumer hazards associated with certain detergent ingredients, such as caustic soda. As a result, EPA announced an increased effort to deal with phosphate-caused eutrophication by removing phosphates at municipal treatment plants. State and municipal governments will continue to make their own decisions on the phosphate removal strategies they believe will best meet their own situations." (page 4) (*italics mine*).

In short, the United States did not agree to compel even reduction of phosphorus in detergents, let alone elimination of phosphorus; the matter was left to the states; Michigan has decided to compel a slight reduction in the amount of phosphorus. Optimists might hope the theory behind the US-Canada agreement is that failure on the detergent front is not too serious since stricter standards than 95% removal can be required at the municipal treatment plants. But if the theory behind the US-Canada agreement is not a shift to standards stiffer than 95% removal at the municipal and industrial treatment plants, then it will be impossible to meet even the $0.39 \text{ g/m}^2/\text{yr.}$ standard IJC set after making its compromise with political expediency.

In assessing how much more than 95% removal will be needed now that detergents are to be allowed to contain almost as much phosphorus as before, one must recall the enormous role detergents play in adding phosphorus to Lake Erie: The 1969 and 1970 Reports indicated that between 50 and 70 percent of the phosphorus from municipal and industrial wastes comes from detergents.

These Reports also stressed how expensive it is to remove more than 95% of phosphorus at the plant. So the failure of the US-Canada talks to achieve a ban on phosphorus in detergents and the failure of the state legislation to reach the IJC goal of total ban by the end of 1972 were momentous twin failures.

The Michigan Water Resources Commission's Standards for removal of Phosphorus at municipal treatment plants

In its Environmental Assessment the MWRC indicates that the Commission requires 80 percent phosphate removal at all city treatment plants in the Lake Erie basin. (page I-41).

It also indicates that in all the plans it compared and considered for the Lower Huron River Basin it required 90 percent phosphorus removal. (page III-4)

Lest there be any misunderstanding of this, the 90 percent phosphorus removal standard is not contemplated as a temporary standard, to be raised later. It is contemplated as the permanent standard. This becomes clear when one notes (1) the MWRC based its decision to approve Plan II in large part on the consulting engineers' study of the estimated 1975 and 1990 costs of operation of the various plans; and (2) that operating costs would be much higher if more phosphorus removal were required than 90%.

In short, MWRC is recommending Plan II to EPA for approval and for federal funding of more than \$80,000,000 on the assumption that One Big Plant will be built on Lake Erie at the mouth of the Detroit River; that all the sewage in this area will be transported to that plant by interceptor; and that the plant will remove only 90% of the phosphorus it receives--when the plant is first built and in operation in 1990.

It is impossible to square this 90% removal standard, (which will run in tandem with the Michigan legislation requiring only limited cleanup of detergents), with the IJC standard of 95% removal, (which was to run tandem with a total ban on phosphorus in detergents).

Nowhere in the MWRC's Environmental Assessment is there any discussion of (1) whether Plan II, which they recommend for federal funding, is consistent with the objective of 0.39 g/m²/yr. phosphorus; (2) whether the standard of 0.39 g/m²/yr. is too lax a standard to protect Lake Erie; (3) whether standards higher than 0.39 should be imposed on plants whose effluent reaches the western basin of Lake Erie; or (4) whether still higher standards should be imposed on plants located at places such as the mouth of the Detroit River, where existing eutrophication is much greater than in most places in the western basin and existing phosphorus loadings are much higher than in most parts of the western basin.

The MWRC's Environmental Assessment avoids all these questions by simply stating its 90% removal standard and assuming it is satisfactory, without attempting to examine, criticize, or justify that standard. The bulk of the Assessment is comparison of various plans--all of which use this same 90% removal standard for all their plants.

Conclusions

#1. If EPA has not already decided to order an Environmental Impact Statement, may I again request, demand, and beseech you to order one?

#2. I think the EPA Environmental Impact Statement should go into the questions MWRC avoided: (1) is an 0.39 phosphorus removal standard adequate for Lake Erie if all phosphorus is removed from detergents? (2) is an 0.39 standard adequate for Lake Erie in view of the twin facts that (a) the US-Canadian agreement does not compel elimination of phosphorus from detergents and (b) Michigan's new law requires only a limited reduction of phosphates in detergents? (3) if an 0.39 standard is adequate for the rest of Lake Erie, is it adequate for the western basin? (4) if an 0.39 standard is adequate for the rest of the western basin, is it adequate for places, such as the mouth of the Detroit River, that already have advanced eutrophication, high levels of phosphorus in the water, and are slated for continuing high loadings from sources other than new treatment plants? (5) will 90% phosphorus removal at the proposed new plant at the mouth of the Detroit River implement the IJC plan to reduce the loading to 0.39?

#3. Whether or not an Environmental Impact Statement is prepared, Plan II should be rejected and EPA should take the position that you want no plant (or the smallest possible plant) at that particular place on Lake Erie. Riverside plants will protect Lake Erie better than lakeside plants. If you are confined to picking among the several plans already reviewed by the MWRC, you should favor one of the plans which creates a smaller plant at that Detroit River-Lake Erie spot--such as Plan IB. If you are free to send MWRC back to the drawing board, you should indicate that the appropriate plan would contemplate three or four decentralized plants, rather than One Big Plant at that Lake Erie location.

#4. In any event, you should require at least 95% phosphorus removal at any plant on Lake Erie or on any tributary flowing into Lake Erie.

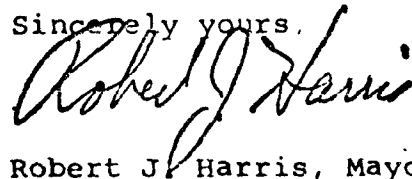
#5. In any event, you should face the question of the phosphorus removal standards at all plants, new or old, on Lake Erie and on Lake Ontario or on tributaries of those Lakes, whether the plants are located in Michigan or in other states. You should assess whether our failures to date on the detergent-control front require you to insist on more than 95% phosphorus removal at all these municipal and industrial treatment plants.

I write this letter realizing full well that if I am successful in my argument, the City of Ann Arbor will wind up being held to standard of at least 95% phosphorus removal at our own plant. We currently remove only 80%; that is a recent development and is

proving expensive to us. We can reach 95% removal, but it will cost us a lot to operate at that level. I realize those increased operating costs will come entirely from local taxpayers, since there is no state or federal assistance for non-capital costs. Nonetheless, I urge this 95% standard. I believe the vast majority of Ann Arborites support me in urging this, because we support real protection of Lake Erie and we are willing to pay our fair share of the cost of providing that protection.

Please give these matters your very serious consideration and show the courage we expect from the nation's chief environment protection agency.

Sincerely yours,

A handwritten signature in cursive script, reading "Robert J. Harris". The signature is written in dark ink and is positioned above the printed name.

Robert J. Harris, Mayor

RJHgc

CITY OF ANN ARBOR MICHIGAN
O F F I C E O F T H E M A Y O R

June 30, 1972

Mr. Francis Mayo
Director, EPA Region V
1 North Wacker Drive
Chicago, Illinois 60606

ENVIRONMENTAL PROTECTION AGENCY
RECEIVED

JUL 11 1972

PLANNING BRANCH - Region V
File No.

Dear Mr. Mayo:

I attach a letter addressed to Congressman Dingell which he shared with the Huron River Watershed Council who shared it with me. When I received the copy from the Council I tried to reach you by phone, but you were busy and Mr. Thomas Windau of your office spoke with me. He indicated that the MWRC proposal for the Huron River Basin was not "disapproved" but rather was neither approved nor disapproved pending an environmental impact statement's preparation. He indicated he would write the City of Ann Arbor confirming this fact and would give us the names of people to whom the MWRC's Environmental Assessment was being sent so that the City could write them our criticisms of the Assessment and other data relevant to environmental impact. He also indicated he would try to let us know the practical deadline we are under for furnishing that information. I hope to receive that communication soon.

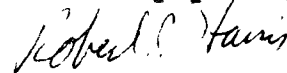
I also wanted to mention to you, for whatever relevance it has on the environmental impact statement or on EPA's general decision concerning sewerage of the Huron River Basin, a recent action of the SEMCOG Executive Committee. At its last meeting the Committee adopted a resolution recognizing that the projections of future population on which SEMCOG (and MWRC) based Plan II are in error. SEMCOG's more recent small area forecasts reveal that the population forecasts undergirding the water, storm, and sewer plan overstate future population. The Executive Committee passed a resolution recognizing this and instructing staff to revise the plan accordingly in time for the 1973 HUD certification. (There is insufficient time to accomplish this revision before the 1972 certification date.) The Executive Committee, by resolution, also instructed staff to do whatever was necessary to see that the small area forecasts are re-

Mr. Mayo

vised on a continuing basis as new data are obtained. These Executive Committee decisions were reported to the SEMCOG General Assembly at its June 23rd meeting with the explanation by the Acting Executive Director that no General Assembly action was needed to carry out these steps.

I am in the process of assembling the data--in addition to that contained in the MWRC's Environmental Assessment--that the City of Ann Arbor wants taken into consideration in EPA's preparation of an environmental impact statement. I am not familiar with the procedure for preparing such a statement and would appreciate hearing from you concerning what opportunities the City will have to present information orally and what substantive or procedural rights the City may have in that process.

Sincerely yours,



Robert J. Harris, Mayor

RJHgc



SOUTHEAST MICHIGAN
COUNCIL OF GOVERNMENTS

July 25, 1972

Mr. Francis Mayo
Director
EPA Region V
1 North Wacker Drive
Chicago, Illinois 60606

ENVIRONMENTAL PROTECTION AGENCY
RECEIVED

AUG 3 1972

PLANNING BRANCH - Region V
FILE NO. _____

Dear Mr. Mayo:

In a letter to you dated June 30, 1972, Mayor Robert Harris of Ann Arbor made several statements regarding recent actions of the SEMCOG Executive Committee. Since these comments are somewhat misleading, I would like to attempt to put them into perspective.

First of all, the discussion pertaining to the small area forecasts and the water, sewer, storm drainage plan was only a small part of a much broader issue. At the time, the Executive Committee was considering the adoption of a Housing needs study. In the resolution adopting the housing study, the following statement is made:

- "(2) that the Executive Committee recognizes that the Water and Sewage Element of the Comprehensive Regional Plan must be evaluated and revised to correspond with the population projections of the Small Area Forecasts, before certification on July 1, 1973, and that sufficient staff and policy review time must be allocated in order to accomplish this task;"

The problem is that, in development of the Water, Sewer, and Storm Drainage plan for Southeast Michigan, prime reliance was placed on County plans. Consolidation of these plans demonstrated the existence of excess planned service area around the periphery of the region.

ROBERT E. FITZPATRICK *Chairman* ROBERT J. HARRIS *1st Vice Chairman* HOMER CASE *2nd Vice Chairman*
JAMES L. TRAINOR *Acting Director*

8th FLOOR, BOOK BLDG.-1249 WASHINGTON BLVD.-DETROIT, MICHIGAN 48226-Tel.(313)961-4266

Mr. Francis Mayo
July 25, 1972
Page 2

Concurrently, SEMCOG revised its estimates of Regional population, based on new census information. It now appears that the regional (7-county) 1990 population will be approximately 6.1 million people as opposed to an earlier estimate of 6.9 million. These regional control totals were then used to estimate population on a small area basis. Again, the tentative results show less population increase around the periphery of the region.

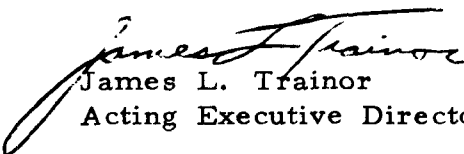
The staff at SEMCOG is now seeking to refine and to shape the urbanized area of Southeast Michigan for 1990. In turn, this effort will more accurately define sanitary sewer service areas. Again, it should be emphasized that these are marginal refinements, along the periphery of the region.

To illustrate this point, a preliminary analysis of the area to be served by the Huron River Interceptor shows a variance of only three percent between the old and new population estimates.

I would hope that this letter will be helpful in EPA's environmental assessment of the Huron River project. Since both the SEMCOG Executive Committee and its General Assembly have both strongly endorsed the regional interceptor, I would hope EPA would see the advantages of an areawide solution to this important wastewater management problem.

If SEMCOG can be of any assistance to EPA in its deliberations, I would like to offer the full cooperation of this office. Also, we would like to offer such information as may be appropriate to your analysis.

Sincerely,


James L. Trainor
Acting Executive Director

JLT/tb



SOUTHEAST MICHIGAN
COUNCIL OF GOVERNMENTS

July 27, 1972

Councilman Mel Ravitz
President
Common Council
City of Detroit
1340 City County Building
Detroit, Michigan 48226

Dear Councilman Ravitz:

I want to thank you for the opportunity, presented in your letter of July 11, to reply to the recent statements of the Mayor of Ann Arbor. In his letter of June 20, 1972, the Mayor alleges that "SEMCOG has been conned into the unhappy position of supporting a water quality control plan that is quite unsound." Further, the Mayor asserts "The Executive Committee was stampeded into endorsing 'Plan II'" These statements are puzzling considering the extended discussions which took place at all levels within SEMCOG last Fall.

First of all, the matter of the Huron River interceptor was the most thoroughly debated issue ever brought before the SEMCOG Executive Committee. The City of Ann Arbor had every opportunity to present its case, and it availed itself of those opportunities over the course of three Executive Committee meetings and one General Assembly meeting. After listening to all of their arguments, most of which are resurrected again in the Mayor's June 20 letter, the Executive Committee voted 19-2 in favor of Plan II --- the Huron River Interceptor.

The General Assembly also adopted this plan, only allowing the City of Ann Arbor the courtesy of a task force to examine any relevant facts that might cause the General Assembly to alter its position. (Significantly, this task force has met nine times over the last six months, and has failed to discover any reason for reversing the Huron River Interceptor decision of SEMCOG. This, in spite of the fact that two members of that task force have raised every possible objection to the Huron River decision.) It would appear from the history of this debate that SEMCOG has been neither "conned" nor "stampeded."

ROBERT E. FITZPATRICK *Chairman* ROBERT J. HARRIS *1st Vice Chairman* HOMER CASE *2nd Vice Chairman*
JAMES L. TRAINOR *Acting Director*

8th FLOOR, BOOK BLDG.-1249 WASHINGTON BLVD.-DETROIT, MICHIGAN 48226-Tel. (313) 961-4266

Councilman Mel Ravitz
July 27, 1972
Page 2

Rather than being "quite unsound", the water quality control plan offers the prospect of almost immediate improvement of the Huron River, and significant improvement in the receiving waters of Lake Erie when this interceptor is considered as part of the total wastewater management system of Southeast Michigan.

To reinforce this point, I would like to quote from the draft Environmental Assessment of the Michigan Water Resources Commission, dated December 29, 1971: "Plan II would improve the quality of the Lower Huron. Existing stream concentrations of BOD, suspended and dissolved solids, and nutrients would be lowered. Higher dissolved oxygen levels would be expected. In particular, water quality improvement is anticipated in the stream impoundments of the Lower Huron. Algae growths should decrease as the nutrient loads are reduced. This will furthermore reduce diurnal dissolved oxygen variation and dissolved oxygen depletion. Current water quality impairments in Ford and Belleville Lakes due to algae blooms and associated fish kills should be reduced to an as yet undetermined extent."

Again addressing the issue of "unsoundness" not only was Plan II recommended by SEMCOG it was also the choice of the Michigan Water Resources Commission. Again, Ann Arbor had every opportunity to present its objections. Further, the elimination of treatment plants on the Huron River in favor of the regional interceptor was recommended by the 1964 National Sanitation Foundation report prepared for the Supervisors Inter-County Committee, the 1968 Lake Erie Report by the Federal Water Pollution Control Administration and the 1971 Water Quality Management study by Hubbell, Roth and Clark and McNammee, Porter and Seeley for the Water Resources Commission. Thus, for almost a decade, the interceptor approach to the Lower Huron River basin has not been considered an "unsound" idea, but rather the converse. The interceptor plan has been viewed as the soundest approach in improving water quality in the lower Huron River.

All of this, of course, was thoroughly discussed before policy bodies of SEMCOG before these officials recommended Plan II overwhelmingly. Again, the City of Ann Arbor was vocal in presenting its arguments.

However, there is a complete mis-statement of fact in the Mayor's letter of June 20. The SEMCOG staff never recommended expansion and continuation of the Ann Arbor plant independent of the regional system.

What we did recommend was that the Ann Arbor plant continue in operation until the regional interceptor came into operation. At the same time we recommended that plant's operation be assumed immediately by a regional agency. At no time did we, as staff, recommend the continuation of the Ann Arbor plant under the control of Ann Arbor or its continuation after the regional interceptor became operational. Ann Arbor has made this argument previously, and is thoroughly familiar with the staff position.

Last Fall, during the debate on "Plan II", the Huron River regional interceptor, there was only passing mention of an important factor in this debate. The Michigan Department of Health analyzed the performance of the Ann Arbor wastewater treatment facilities over the period 1966 to 1971. Its findings are critically important to this debate and were summarized in the WRC environmental assessment. In speaking of the Ann Arbor plant, the report said:

"a) The plant has been loaded during the six year period very closely to design values, both hydraulically and organically.

"b) During the six year period, some 6,959,000 pounds of BOD₅ (five-day biological oxygen demand) were discharged in the plant effluent compared with approximately 2,123,000 pounds which the plant was designed to produce.

"c) Although the daily records indicate that the design effluent objective was achieved on a very small percent of the days during this period, extreme variability of performance, both in terms of BOD and suspended solids removal, was experienced throughout the six years.

"d) At no time was it possible to predict with reasonable confidence the probability of meeting any selected performance level.

"e) Although facilities are considered adequate for disinfection of plant effluent to the normally attainable level of total coliform organisms (MPN of 1,000/100 mls), the coli concentration frequently exceeded these values during summer months when weather conditions are most favorable for intimate body contact in the Huron River."

The environment assessment goes on to say (emphasis is added):
"The reasons underlying the less than expected performance levels at the Ann Arbor plant have not been ascertained. The analysis does raise, however, questions of uncertainty regarding future performance levels." The situation outlined above still existed on July 18, 1972, when it was verified by staff with Lansing.

Finally, "tertiary" is one of the most used words in wastewater management, and is almost always defined to mean what the user intends it to mean. Actually, it has no clear definition, and usually connotes something beyond accepted secondary wastewater treatment. Because it is so imprecise, it is not used at SEMCOG, but rather the more accurately-ambiguous term, "Advanced Wastewater Treatment" is used. This always requires a definition, just as a definition should be demanded of anyone who uses the word "Tertiary."

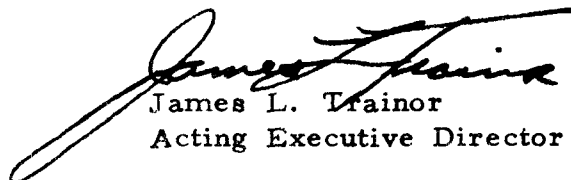
In the Ann Arbor case, "Tertiary" appears to mean 90 percent phosphorus removal with nitrification and sand filtration. Even if an assumption were made that the Ann Arbor plant would perform as designed, a comparison between the Huron River "Secondary" Plant and the Ann Arbor "Tertiary" plant for 1990 shows that the effluent concentration is identical from both plants. Further, the Phosphorus loading to Lake Erie which so concerns the City of Ann Arbor in 1990 is estimated at 1,010 pounds per day as opposed to the average daily loadings to the Huron River in 1971 from the existing six plants of 1602.6 pounds per day. Significantly, Huron River plant would be serving three times as many people in 1990 as do the six plants on the Huron River today.

It should be emphasized, as strongly as possible, that nothing has been discovered to date that should prompt SEMCOG, Water Resources Commission, or the Environmental Protection Agency to reconsider the decision that the most cost/effective solution to the wastewater management problem in the Lower Huron River basin is the regional interceptor with a major treatment plant at the mouth of the river.

To close, the project is technically feasible, financially practical, and immediately needed. It is to the detriment of the Region and particularly to communities on the Lower Huron River (especially Ann Arbor) to continue this argument. The issue has been decided.

To verify, if necessary, the statements in this letter, I would urge every member of SEMCOG's Executive Committee and General Assembly to review the minutes of the Executive Committee meetings for November, December and January, as well as the minutes of the January General Assembly meeting.

Sincerely,



James L. Trainor
Acting Executive Director

JLT/tb

MICHAEL BERRY
Chairman

PHILIP J. NEUDECK
Vice-Chairman

FREDDIE G. BURTON
Commissioner

HENRY J. GALECKI
Secretary & Clerk of the Board

Board of
County Road Commissioners
Wayne County

7TH FLOOR CITY-COUNTY BLDG.
DETROIT, MICHIGAN 48226

JAMES M. DAVEY
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MITCHELL J. ZOLIK
Assistant Managing Director
JOHN P. CUSHMAN
General Counsel
JOSEPH N. HARTMANN
Director of Administration
WALTER P. MEYERS
County Highway Engineer

August 3, 1972

Councilman Mel Ravitz
1340 City-County Building
Detroit, Michigan 48226

Dear Councilman Ravitz:

Your letter of July 11, 1972 requests our analysis and comment of Ann Arbor Mayor Robert Harris' June 20 letters addressed to you and to Mr. R.J. Schneider, Director of Air and Water programs in the Environmental Protection Agency, Region V, in Chicago.

In his letter addressed to you we feel that Mayor Harris, in his "stampede" accusation, discredits the member - representatives of SEMCOG and imputes to the Wayne County Road Commission a power which it does not have and a credit which it does not deserve. His letter recites several reasons for suggesting that the Plan II project might not be built, but he apparently feels that the strongest opposition can be generated by bringing everyone with an interest in Lake Erie into the issues on Ann Arbor's side by presenting a 19-page assessment of the "phosphate problem".

Much of this document is a re-hash of previous comments concerning out-dated reports on the subject. The only relevant material concerns the recent U.S.-Canada treaty conference where it was generally agreed that the total phosphate content of wastewater treatment plant effluent should be limited to 1.0 milligrams per liter (1 p.p.m.), which level can be achieved. Since the average incoming waste to be treated contains about 10 p.p.m., this would call for 90% removal. Also, it was agreed by the U.S. and Canada conferees that a total phosphate loading of Lake Erie amounting to 0.13 grams per square meter per year is a tolerable level and that 0.28 grams per square meter per year is a dangerous loading. The 1970 loading was 1.1 grams, or about four times the dangerous level. Applying the same factors to a situation closer to home, the Ann Arbor plant has a

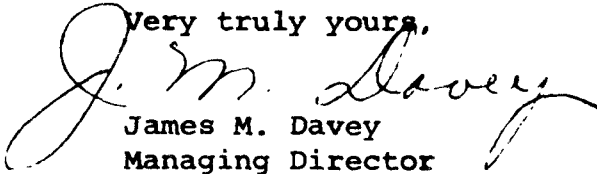
Board of Wayne County Road Commissioners

capacity of approximately 16 million gallons per day and with the 95% phosphate removal proposed by Mayor Harris a loading on Ford Lake, in Washtenaw County downstream from Ann Arbor, of approximately 3 grams per square Meter per year results. This is ten times the dangerous level established for the larger body, Lake Erie, and is the type of situation regarding the operation of the Ann Arbor plant that has caused the concern of all municipalities on the Huron downstream from Ann Arbor. The city wants to continue this type of operation because it is cheaper for Ann Arbor in the short range term and because it prefers local autonomy to the regional solution for these matters.

We feel that regional and particularly watershed solutions must take precedence over local ones, and have proposed the Huron System project because the problems and the needs are critical in Washtenaw County at this moment. We have stated that Wayne and Oakland do not need this project at this particular time, but because the problems in Washtenaw are approaching the crisis stage, we have said that if there is ever going to be a regional system, it has to be agreed to now. We further believe that water quality standards and treatment level requirements should be established by the appropriate federal and state agencies having responsibility and should be determined by ecological and limnological rather than political considerations. Ann Arbor has supported Plan I-B which puts everyone else in the Huron Valley System, but leaves Ann Arbor to continue to degrade the Huron downstream, while hypocritically building parks and recreational facilities along the river within the city, upstream from the city's treatment plant.

Mayor Harris closes his letter with the implication that if E.P.A. supports the project as the Michigan Water Resources Commission and SEMCOG have, their final resort will be to the courts. We feel that Ann Arbor stands alone, and that this is not the position of the rest of Washtenaw County. If such a course is followed, then we feel Wayne County should file counter litigation to stop any further connections to the Ann Arbor sewerage system and treatment plant until the courts have resolved the matter.

Very truly yours,


James M. Davey
Managing Director

cc: Mr. J. Trainer
Mr. G. Remus
Mr. R. Schneider
Mayor R. Harris
Mich Water Resources Comm



Minister
Environment Canada

Ministre
Environnement Canada

Ottawa, Ontario.
K1A 0H3
AUG 17 1972

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HIST. DIV. - GAB

His Worship Mayor Robert J. Harris,
City Hall,
Ann Arbor, Michigan 48108,
U.S.A.

Dear Mayor Harris:

Further to the reply by Mr. Lawless of July 5, 1972, to your letter to Prime Minister Trudeau of June 22, we would advise that we share your deep concern for the eutrophication problems of Lake Erie. In your attached letter to Mr. Schneider, your outline and analysis of the phosphorus control measures in the various reports leading up to and including the Canada-United States Agreement on Great Lakes Water Quality was very ably presented.

With respect to Canada's position, I would refer you to the Canada-United States Agreement and, particularly, those sections dealing with control of eutrophication, Article V, 1(c) and Annex 2. Specifically, the phosphorus content of effluents from sewage treatment plants is to be limited to 1 mg/l which corresponds to approximately 90 per cent removal from sewage where there is no detergent phosphorus control, or 80 per cent removal from sewage where there is detergent regulation to the 5 per cent P_{205} level. This limit was agreed to between the two countries as being based on the best available technology which could be attained consistently in plant operations at this time and was considered more meaningful than a per cent removal criterion. I would point out, further, that within Annex 2 of the Agreement it was recognized that the residual phosphorus loading that would be attained with these control measures may not be adequate to completely eliminate the problem of eutrophication and that additional measures may be required later. The Agreement is a dynamic instrument which calls for a

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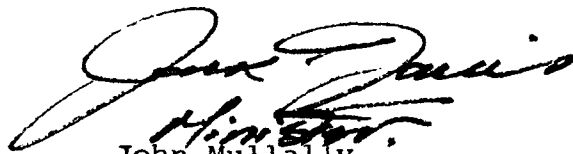
review of phosphorus control programs, lake loadings, and monitoring of the degree of eutrophication, with a view to ensuring that problems are eliminated as soon as practicable. Compliance with the Agreement in its present form would ensure that phosphorus loadings to the lakes are reduced to below those which first began to produce extensive anoxic conditions in the central basin of Lake Erie in 1959-60, and will undoubtedly greatly reduce algal growth (see attached report).

With respect to detergent phosphate control, we would advise that the Minister of the Environment has announced that as of January 1, 1973, the phosphate content of detergents is to be limited to 5 per cent P_{205} in Canada, and we would hope that other concerned jurisdictions on the Great Lakes system would consider following a similar course, as New York State has already indicated it will do.

We are pleased to have drawn to our attention your specific concern about the adequacy of Detroit River sewage treatment plants, and will seek clarification of this matter through the Advisory Boards of the International Joint Commission established to oversee implementation of the Agreement.

Should you require further specific information, from a Canadian point of view, on some of the points which you raised with Mr. Schneider, I would suggest that you contact directly Mr. J.P. Bruce, Director of the Canada Centre for Inland Waters, Burlington, Ontario.

Yours sincerely,


John Mullally,
Executive Assistant.

Enclosure

House of Representatives



LANSING, MICHIGAN 48901

53RD DISTRICT
RAYMOND J. SMIT
BOX 119
LANSING, MICHIGAN 48901
PHONE:
AREA 517-373-1792

MEMBER OF COMMITTEES ON
CONSERVATION AND RECREATION
ROADS AND BRIDGES
TOWNS AND COUNTIES

August 18, 1972

Environmental Protection Agency
Region V
1 N. Wacker Drive
Chicago, Illinois 60606

Attention: R. J. Schneider, Director
Air and Water Programs Division

Dear Sir:

Your invitation to comment on the sewerage problem in Southeast Michigan is appreciated. I am pleased to learn that your agency is undertaking a complete review of environmental considerations.

I regret the delay in my responding to your request for comments, but the press of our legislative schedule has delayed my review of the voluminous background material submitted to you by the Michigan Water Resources Commission and the City of Ann Arbor.

In general Ann Arbor has adequately documented the aspects of cost as affects the city and I will not dwell on these items. However, there are certain other implications to the sewerage problems that I wish to bring to your attention.

Appended to the Michigan Water Resources Commission documents of February, 1972 entitled, "Environmental Assessment, Phase I Plan, for Water Quality Management, Southeast Michigan Area", is my letter of November 10, 1971 expressing my disagreement with the decision of the Water Resources Commission for adopting their Plan II. After careful review of the February, 1972 Water Resources Commission document, I continue to believe that the Commission has made the wrong decision in opting for Plan II. Please refer to my prior letter for the basic arguments as to why Plan II is not sound financially, imposes the most severe pollution load on Lake Erie, robs the Huron River of an important water resource and is inconsistent with wise land use planning policies for the region.

During their preparation of the environmental assessment document, the Water Resources Commission staff extended to me the courtesy of reviewing preliminary drafts. At that time I offered criticism that the environmental assessment seemed more a document to rationalize the decision which their agency

had reached rather than provide an objective assessment of environmental impact and while many of the problems have been removed, many remain in the Environmental Assessment. While such a bias is understandable by the agency which made the original decision, it is assumed that your environmental assessment will correct these comments in the state agency assessment, which reflect bias.

More specifically in response to the conclusions stated in the Water Resources Commission study, I offer these additional comments:

- A. Clarification is needed in the reference on Page II-5 relative to the Flat Rock water supply, for that supply has been planned to be phased out for several years with water being furnished from the Detroit-Metropolitan Water System.
- B. Under conclusions and recommendations (Page V-1) it is stated that there are "no significant differences among the four alternatives in regard to Lake Erie." However, a comparison tabulated on page IV-16 and IV-17 shows significantly less BOD, suspended solids and ammonia nitrogen under plans I-B and IV than under Plans II and III (the difference is on the order of about 25%). Further there is some evidence that biological processes and sedimentation will reduce much of the phosphorus in the Huron River prior to reaching Lake Erie, further improving water quality at Lake Erie and the effect of these nutrients will be more severe in quiescent Lake Erie than in the flowing streams.
- C. Under conclusions (Page V-1) it is stated that there is no significant difference in per capita costs, these being within 10% of each other. The members of the Water Resources Commission have stated that their decision in favor of Plan II was made on the basis of that being least expensive and if further study shows this not to be the case, a re-evaluation of that decision may be in order. I believe a thorough understanding of the cost comparison question should lead to a conclusion that Plan II is not the best proposal for the entire area. There are errors in computing per capita costs which need to be clarified:
 1. Per capita costs include only 25% of capital cost on the assumption that 75% would be state and federal grants and 25% borne locally. All grants are in public money from the taxpayers and must be included in reaching decisions on expenditures of public funds. Plan II is by far the most expensive in capital costs and when all factors are included, the final comparison of total per capita costs for Plan II (Page IV-9) now appears to be more expensive to the local citizen also.
 2. Cost comparisons assume only high rate secondary treatment at Lake Erie. I am told that your agency agrees with me that treatment objectives at Lake Erie must be higher than such treatment will provide. Therefore, the only valid comparison in costs should be that which includes comparable tertiary treatment at Lake Erie.

3. Operating cost comparisons give exaggerated lower costs for Plan II based on the assumption of only secondary treatment costs at Lake Erie and a disproportionate recognition of economies of scale. These operating expenses need further explanation and documentation for these figures do not seem comparable with experience at other plants.
4. Costs of retiring existing plants are incomplete, including only the state grant share and not the local cost of abandoning local plants (See page IV-6 and IV-7).
5. Final cost comparisons are made for the 1990 project. Some sewers are proposed to be built for 2020 needs, while others for 1990. The present population, however, will have to pay for present construction and costs they will have to actually pay should be compared, not costs for a 1990 hypothetical project that is not going to be built.

Furthermore, as I stated in my previous letter, sewers should be designed to serve population growth beyond 15 to 16 years, particularly in view of their high replacement cost. Treatment works, on the other hand, can be more readily expanded and thus can be built for a shorter design period. Design standards and cost comparisons to the taxpayer should be revised to reflect this more appropriate basis for engineering design.

6. Under Plan II a time lag in construction requires building interim treatment improvements at Ann Arbor which later are to be abandoned. These costs have not been included in the cost comparison.
7. In what seems to be a change in position for the Water Resources Commission, that agency now chooses to minimize the importance of flow augmentation for the Huron River while all of their prior studies have emphasized that need. I believe the need for flow augmentation under Plan I-B could be questioned, but under Plan II, with over half of the dry weather flow being taken for water supply at Ann Arbor and Ypsilanti and diverted out of the river through interceptor sewers to Lake Erie, it should be clear that restoration of low stream flows is essential to the implementation of the plan.

Furthermore, legal authorities question if water withdrawals could continue at such a level at Ann Arbor and Ypsilanti without running into conflict with existing Michigan law. This legal issue is summarily dismissed in the Environmental Assessment but has broad implications to the region. If such diversion is curtailed by the courts it would force early abandonment of existing water treatment facilities at these cities.

In comparing costs, the lowest cost alternative for flow augmentation was selected and that project included a reservoir upstream from Ann Arbor. However, more recent studies have shown that adverse effects on water quality in the Huron River would result from the impoundment that had been proposed and practical difficulties and conflicts with other planned land uses mitigate against constructing an augmentation reservoir on the site that had been considered. Truly the only viable alternative,

if the quality of water supplied at Ann Arbor is to be protected, and if diversion from the Huron River is not to be permitted, would be the purchase of water from a Detroit-Lake Huron Supply. Such a purchase and abandonment of existing water treatment facilities would increase costs substantially above those used in the Environmental Assessment study, and further there is no indication as to how such costs are to be apportioned.

- D. The logic used to justify selection of Plan II is very weak. As noted originally, the decision in favor of Plan II was made on the basis of cost advantage, but now, as stated in the Environmental Assessment report, is apparently based almost entirely on risks of accident or malfunction of a plant on the Huron River (Page V-1). The results of such an accident appear very remote and adequate redundancy can be constructed into new facilities to make risk of accidental spill insignificant. It is further suggested that spreading of such risks among several treatment plants will further minimize the possibility of serious damage from such an accident.

However, if accident or malfunction is to be the compelling basis for a decision against construction of a treatment plant on the Huron River, then such risks could be completely eliminated by simply enlarging proposed retention basin capacity and standby pumping to eliminate that problem. Such protection would be possible at a plant the size of Ann Arbor's, but becomes much more difficult at the mammoth plant proposed at Lake Erie. For example, the 33 million gallon per day flow anticipated at Ann Arbor could be stored for the maximum time contemplated in the Environmental Review of five days in a pond twenty feet deep by twenty five acres in area. After the crisis period had passed, flows could then be taken back through the treatment plant.

Such a facility would not just protect to the extent of preventing tolerable damage but would insure against any accidental spill of waste water from Ann Arbor to either the Huron River or Lake Erie.

It must be added parenthetically that the justification given in the Environmental Assessment for accident spill into Lake Erie seems weak and supported only by a conclusion that there would be dilution of 100 to 1 (Page V-1).

While an impoundment to catch accidental spills may not be justified to satisfy the very infrequent potential of such a spill, if experience shows such protection to be necessary it can obviously be provided with added cost below that which would significantly alter the economic advantages of Plan I-B.

- E. Institutional arrangements for financing Plan II do not exist at the present time and the possibility of creating suitable means of financing is in doubt. I am advised that there is disagreement between the units of government as to how the costs for the intercepting sewer project is to be allocated. Oakland County is now seeking to establish a lower population
- 12

potential than that used in the designed study and environmental review. Such an adjustment would have the effect of shifting financial burden from Oakland County to Washtenaw and Western Wayne County and gives aspect to the fears enunciated in my prior letter that Plan II is supported by Oakland County on the assumption that its share of a sewerage system could be financed by others until its population base increases to justify that expense.

A review of the cost figures on Page IV-12 makes it clear that a significant subsidy of Oakland County is already inherent in any of the regional plans studied and the requirement that other areas pick up even greater portions of its share is unconscionable. With 5.4 billion dollars equalized valuation, Oakland County does not qualify for poverty aid from its neighbors.

- F. From a regional planning standpoint, Plan II is destined to promote urban sprawl throughout Eastern Washtenaw, Southwestern Oakland and Western Wayne Counties. Presently Western Wayne County is reported to be only 55% developed, so promotion of instant urbanization throughout Oakland and Washtenaw County would not seem prudent planning. Pressures for out-migration are strong in Wayne County due to economic factors, threat of court ordered school bussing and excellent freeway connections between Detroit and surrounding counties. However, to foster broad expansion and rapid growth in outlying areas has adverse social implications, will result in furthering undesirable land use patterns in the Detroit Metropolitan area and promote unnecessary local tax increases.

You may wish to review the experience of independence of action which has occurred in Ypsilanti Township and which has been independent of planning considerations for the balance of Washtenaw County. Fostered by a federal gift of water and sewerage systems following the Second World War, developments have proceeded rapidly in Ypsilanti Township, promoting sprawl throughout that community. More recently political developments have seen Ypsilanti Township contracting with five or six nearby townships to extend utility services into the presently undeveloped areas and the recent availability of Detroit and Wayne County water and sewer services to that township is being used as a basis for such contracts.

Such a growth syndrome is now seen to be desirable by many local governmental officials in the townships involved, for they expect it will enhance local esteem and reduce property taxes. Experience elsewhere in the metropolitan area has shown that expectations of such benefits are deceiving and short lived and such sprawled communities end up with significantly greater tax burden than those which have carefully planned and confined the pressures of the land developer. There are other townships in the area which are also eyeing the availability of sewer service being provided to them directly through the interceptor to open the door to land development in their area. But most important, once utilities are in population growth must be fostered to pay for the systems.

While I have found that some of the restraints imposed by some core cities against sewer extensions into surrounding townships have caused unnecessary hardships in some cases, I also believe that the possibility of unrestrained development pressures in newly sewerd rural townships will be irresistible locally and result in serious distortion of current plans for controlling urban development of Eastern Washtenaw County.

- G. The Environmental Assessment says that all plans are generally irreversible. While it is true that Plan II might be irreversible, I disagree that Plan I-B is such. At the time of the 1990 expansion of the intercepting sewer system as planned in the Environmental Review, a suitable situation would be present for expansion of any sewer service area that might be desired. However it is very unlikely that reversal of the decisions from adoption of I-B would become necessary, for more probably a reduction in service area, not an expansion, would be desirable in the future if emerging technology is successful.
- H. A final point, the Water Resources Commission Environmental Review discusses waste water disposal in the Upper Huron and the Lower Huron but does not review any implications on the reach of the Huron River between Ann Arbor and the Oakland County line. This portion of the river also includes a number of treatment plants in growing urban centers. The omission is significant for these discharges will also affect downstream water uses.

For example, accidental spill or malfunction at these eight proposed and existing treatment plants in the middle reach of the river would compound the concern for accident significantly. If policy were to be consistent the interceptor would have to be extended to collect sewage from these additional plants and indeed some preliminary decisions have already been made to extend the interceptor farther upstream from Ann Arbor. Several of the plants, however, are to be improved but retained in service to the apparent satisfaction of state agencies.

Cost comparisons in the Environmental Assessment Review include no consideration for interceptor extension above Ann Arbor. Yet once transportation to Lake Erie is the adopted policy, there is very little option available.

- I. There has been political support generated along the lower reach of the Huron for Plan II on the basis that it would better protect the river for swimming. Any illusion of such a benefit should be dispelled for, as pointed out in the Environmental Assessment, waste water effluent should be of quality superior to that of the river.

The public should not be deceived into believing that removal of this well treated effluent from the stream will protect water for body contact uses. Urban run off problems alone from the downstream portions of the basin should mitigate against swimming because of the danger of illegal or accidental waste water cross connections and pollution from storm water run off. And even if known point sources were corrected, swimming in a stream whose waters are largely derived from draining an urban area is of questionable wisdom.

In years past health authorities have ruled against swimming at the Huron even upstream from the Ann Arbor Waste Treatment Works, and very recent tests by the United States Geological Survey of the river above Ann Arbor shows that the water does not normally nor consistently meet bacteriological standards for body contact use. It is therefore deceiving to the public aspiration for more recreational pursuit to proclaim that Ford Lake and Belleville Lake (Page I-18) are protected for body contact recreational use either now or after the interceptor is built. Reduction in low flows in the river proposed under Plan II merely intensify any such problem.

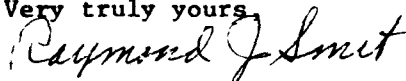
- J. It is noted that the Environmental Review tries to make an issue of performance of treatment by the Ann Arbor plant (Page III-25 and appendix) and we have been told in the past by the state agencies that the Ann Arbor plant has had exemplary performance and only recently have fully loaded conditions caused operational problems.

Obviously this effort to discredit Ann Arbor's plant is inappropriate in the Environmental Review for any newly designed facilities should eliminate the operating difficulty. If, however, plant operation is to be an issue you will wish to review the operating experience at Detroit and other major treatment plants in the area to determine the effects of comparable operating experience and the expected problems of effective operation at the proposed Lake Erie plant.

There are many other points to be made in criticism of the Environmental Review but this letter is already too long. However it is hoped that after you have carefully reviewed these and other issues you will take early action to permit Ann Arbor to construct urgently needed improvements to its waste water treatment facilities.

The need to give complete and adequate protection to the river is pressing and any delay merely compounds the imminent danger to the river.

Very truly yours,



RAYMOND J. SMIT, P.E.
State Representative

RJS/w

CC - Governor William Milliken
Congressman Marvin Esch
Mayor Robert Harris
Washtenaw County Department of Public Works
Michigan Water Resources Commission

THE UNIVERSITY OF MICHIGAN • COLLEGE OF ENGINEERING

ANN ARBOR 48104

DEPARTMENT OF CIVIL ENGINEERING

22 August 1972

Mr. R.J. Schneider, Director
Air and Water Program Division
United States Environmental Protection Agency
Region V
1 North Wacker Drive
Chicago, Illinois 60606

Dear Mr. Schneider:

Please find enclosed herewith my response to your letter of 23 May 1972. Given the nature of the problem under investigation, it is my hope that the Environmental Protection Agency will produce an Environmental Impact Statement regarding the several alternatives which are available for wastewater treatment in Southeastern Michigan.

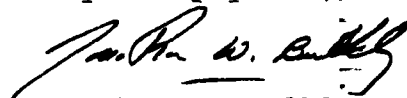
The document which has been prepared -

"Environmental Assessment, Phase I Plans for
Water Quality Management, Southeastern Michigan
Area"

is certainly not satisfactory for the reasons cited in my enclosure. Certain portions of the report are misleading and consequently, the entire report in my view lacks creditability.

If I can be of further assistance, please let me know. Also, I would appreciate being kept informed of EPA's actions in this matter.

Very truly yours,



Jonathan W. Bulkley
Associate Professor

ENVIRONMENTAL PROTECTION AGENCY
RECEIVED

AUG 28 1972

PLANNING BRANCH - Region V
FILE NO. _____

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ENVIRONMENTAL ASSESSMENT
PHASE I PLANS
FOR
WATER QUALITY MANAGEMENT
SOUTHEASTERN MICHIGAN AREA

MICHIGAN WATER RESOURCE COMMISSION

OBSERVATIONS

A. General Observations

1. Population Projections - rather than a single figure as presented, it is more appropriate today to calculate a range of likely projections - i.e., high growth, slight growth, no growth, and negative growth. In this way one can observe what affect - if any - an error in population projections is likely to have upon project evaluation.
2. Costing - The assessment does this upon a per capita basis within a service area. If service area crosses established political boundaries the analysis assumes uniform charges; however, current Michigan legislation may preclude implementation of uniform charges. If the decision is to be based upon economic analysis, it is important to recognize that what appear to be lower costs/capita when taken for an entire service region may in fact be forced subsidization of one area for another.
3. Recreational Developments - Especially Ford Lake/Belleville Lake - more information on public access and alternatives such as swimming pools in the recreations area is needed.

The River and certain man-made lakes can be extremely dangerous for swimming. One must ascertain whether or not it is in the public interest to provide swimming in areas which may be biologically safe but physically hazardous because of swift currents (river) or sharp bottom drop-off (Ford Lake).

4. Lack of Analysis - Impact of storm water runoff on water quality is not considered. This fact limits the usefulness of the report. Dr. R.P. Canale of the University of Michigan has applied mathematical modeling to the Huron River and Ford Lake. His work clearly indicates that storm water runoff is far more serious for water quality than the sewage treatment plants.

B. Specific Observations

1. On pages I-25/I-26 Huron River Water Quality Data - one isolated sample of data for dissolved oxygen (DO) concentration in the Huron River is used. No indication of when it was taken, i.e., 3 am in the middle of summer or 2 pm on the same day. The time of day can have a significant effect upon the DO. The assessment gives emphasis to isolated samples, i.e., 1 sample. The bi-weekly FWPCA data effort provides max-min-average figures for parameters. However, the assessment chooses not to utilize these data but rather the single data value cited above. Note the bi-weekly annual data - minimum never went below 4 mg/l and that the mean value is above 9 mg/l throughout the river.
2. Page I-46 - Given the detailed criticism which is provided

of the operation of the Ann Arbor and Ypsilanti sewage treatment plants - the report should examine the operation of the Detroit Wastewater Treatment Plant - while this can only demonstrate primary treatment plus phosphate removal - it should serve as an indicator of the reliability of that plant. This information coupled with specification of the desired objectives for enhanced operation is necessary for evaluation of alternatives.

3. Page II-5 - Plan IA and IVA were dropped on the recommendation of the Michigan Department of Public Health. These Alternatives proposed a major treatment plant outfall upstream of the City of Flat Rock's municipal water supply intake. Such an outfall was felt to be inconsistent with downstream use of the river for water supply purpose. This statement does disservice to the entire analysis. The fact of the matter is that while the City of Flatrock currently takes .75 mgd from the Huron River, the Detroit Metro Water Service has service mains which deliver water to the contiguous area (Brownstown Township). A new automotive casting plant in Flatrock is on Detroit Metro Water Service - in fact water service by DMWS was a condition for location of this new industrial plant. The primary mains serving Brownstown Township have been designed and built with sufficient capacity to serve Flatrock as well. In fact, the only issue which appears to be delaying provision of DMWS water to Flatrock is a local dispute between Brownstown Township and the City of Flatrock over ownership of water mains in an area of

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the township which has been annexed to Flatrock.

At least two alternatives have been dismissed because of an alleged threat to public water supply. The facts do not support the action by the State Health Department. This misrepresentation causes the entire document to be suspect. Clearly a whole family of alternative solutions have been dismissed which should in fact be considered and evaluated in detail - namely the provision of high order waste water treatment plants located in Western Wayne County as well as in Washtenaw County.

4. Treatment requirements specified in II-3 and III-4 are different for effluents going into Huron River and effluents discharged directly to Great Lakes - Lake Erie. This fact is not well known by the public. Accordingly, it is recommended that cost figures be developed which show the cost per lb of pollutant removal from the waste water. This type of cost figure coupled with the information on treatment levels would assist the evaluation of alternative treatment plants.
5. The dilution assumption based upon 10% of the flow of the Detroit River - see pp. III-17, III-36, III-37 and III-38- is used throughout the report where the Huron River plant is investigated. The analysis neglects to calculate the mixing zone required to achieve the type of dilution assumed. It is of particular importance since the location of the proposed Huron River plant is at the mouth of the Detroit River - in fact the effluent will be discharged

directly into Lake Erie. A very real question is what is the size and shape of this mixing zone under various wind conditions. It is inappropriate - in my judgment - to assume complete mixing without providing information on the nature of and characteristics of the mixing zone required to achieve the assumed dilution of the massive waste load being dumped into Lake Erie.

6. Furthermore, the authors of the assessment have emphasized data which is particularly favorable to the State's position. This fact has already been demonstrated in the dissolved oxygen situation in the Huron River. The Public Health Service Report cited by the State as the source for the 10% flow of the Detroit River (above) also has the following information:

"A second area of relatively low DO (dissolved oxygen) was found immediately below the mouth of the Detroit River in a finger extending southward for a distance of 4 to 6 miles. Average values here were under 85% saturation; the minimum value was 4.8 mg/l, just off Pointe Mouille", (emphasis added). There is no reason to assume that the DO levels have become more favorable since publication of these findings. Given the scanty reference provided on III-17 and III-18 to water quality data collected in 1970, it is impossible to evaluate the figure of 7.6 mg/l for DO as chosed by the Water Resources Commission. However, in view of the Flatrock case and the selection of the DO of 2.0 mg/l as an example, it would appear that this figure of 7.6 mg/l is certainly questionable -

especially in light of the USPHS findings.*

7. A major shortcoming of this entire analysis is its lack of attention to stormwater runoff (page III-23). A decision which if taken today - will direct subsequent sewage treatment activities for the next 50 years should not and indeed must not be made without consideration of this important contribution to surface water quality. As an example, on page III-26, it is stated that a complete treatment plant breakdown on the Huron River would constitute a significant threat to recreation uses near and downstream of the outfall. In reality, stormwater runoff constitutes a greater source of coliform than even complete failure of the sewage treatment plant in the River, yet, this whole dimension of the problem is ignored.
8. On page III-33, the report makes the following statement:
"While it is impossible to foresee, implementation of Plan IB may also accelerate current growth rates in portion of the service area. Such accelerated growth may bring about adverse environmental side effects and the generation of accelerated needs for additional public expenditures for various public services". This statement has been added to balance a similar statement which appears on pages III-50/III-51 related to Plan II. Clearly, any solution which utilizes the "Super Sewer" concept is going to generate strip development along the pipe. This adverse situation may be lessened by location of a number of

*U.S. Public Health Report, "Report on Pollution of the Detroit River, Michigan Waters of Lake Erie and their Tributaries", p. 281

very high order treatment plants located within the interior of the region. Unfortunately as pointed out in paragraph 3, this type of solution has been ruled out by the State Health Department for reasons which are not supported by fact.

9. The waste loadings to Lake Erie from the Huron River Treatment Plant are shown on page III-35. It is understood that no sewage treatment plant operates at constant efficiency of removal. Indeed the output of a sewage treatment plant is a random variable. Also, since secondary treatment plants of the size proposed for the Huron River Plant have not yet become operational in Michigan, it may be more desirable to carefully monitor the performance, i.e., operational characteristics in comparison with design parameters - of the existing Detroit Sewage Treatment Plants which are currently being upgraded from primary to secondary treatment facilities. If these existing plants perform at consistently lower levels of treatment than the design levels, adjustments should be made in the anticipated operating characteristics of the Huron River plant.
10. On pages III-36 and III-38, the assessment attempts to justify the discharge of massive amounts of partially treated sewage into Lake Erie. This effort is misleading since it is based upon the following assumptions:
 - A. Complete and instant mixing since no mixing zone is indicated.

B. A very optimistic value of 7.6 mg/l DO for Lake Erie. Any average value chosen may be extremely misleading since two or three days of calm days may cause the DO to go to zero in the western basin.

Accordingly, the dissolved oxygen analysis presented in the assessment should be considered as one more attempt of environmental "justification" instead of environmental assessment.

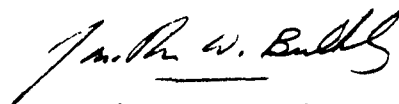
11. On page III-40, the assessment includes an estimate of the cost of tertiary filtering facilities. In order to assist the public in comparing the performance of such facilities, the assessment should specify the anticipated effluent to be produced from such a facility. For example, the requirement for the Ann Arbor Treatment Plant is to produce an effluent of 4 mg/l BOD. For the massive Huron River Plant, the tertiary filtering facilities appear to be capable of 95% removal which from previous data would indicate an effluent of 10 mg/l BOD which is 2-1/2 times the effluent from the Ann Arbor Plant. These factors need to be clarified for a complete understanding of the alternatives.
12. On pages III-44 and III-45, the assessment addresses the question of flow augmentation. The findings by the Water Resources Commission - namely that the need for low flow augmentation in the lower Huron under Plan II has not been established - is simply not correct. The engineering consultants the Water Resources

Commission recommended that flow augmentation be considered. The assessment itself speculates in the following fashion: "... the alternative of purchasing Detroit water assumes that Ann Arbor and Ypsilanti's total supply would be purchased from Detroit. It might be more economical to purchase only a portion of the total supply needed and to retain the Huron source as well as ground water sources. There is also the possibility that further ground water sources can be developed." All of this information uncovers aspects of the problem of waste water management that certainly need exploration prior to any final decision on the Super Sewer. What is suggested is some sort of optimization problem using three sources for water - namely the Huron River, Ground water, and Detroit Metropolitan Water. Until this issue of flow augmentation has been examined and data provided regarding cost and environmental impacts associated with the alternatives, any decision would reflect partial analysis.

13. Chapter IV contains 21 pages of economic cost comparisons based on per capita costs of the several alternatives. As previously stated, these cost comparisons are misleading since uniform charges are not possible under current law. Secondly, the cost analysis should be placed on an effectiveness basis - namely pounds of BOD (etc) removed per \$ invested. Finally, the cost data indicates that at present one cannot choose on the basis of cost. What is needed is an additional study to demonstrate the sensitivity

of the analysis to changes in projected population.

14. In my opinion, there is a significant difference among the alternatives investigated. The Water Resources Commission is anxious to transfer the risk of malfunction to Lake Erie. As one aggregates wastes into a single facility, the probability of failure increases. The size of Lake Erie is no justification for transferring such a risk of failure. By locating smaller plants on interior rivers, the incentives will exist to implement systems and techniques that truly minimize the likelihood of plant failure.



Jonathan W. Bulkley
Associate Professor
The University of Michigan
Ann Arbor, Michigan

STATE OF MICHIGAN

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RALPH A. MAC MULLAN, Director

August 24, 1972

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ENVIRONMENTAL PROTECTION AGENCY
RECEIVED

AUG 28 1972

PLANNING BRANCH - Region V
FILE NO. _____

Mr. Robert J. Harris, Mayor
City of Ann Arbor
100 N. 5th Avenue
Ann Arbor, Michigan 48108

Dear Mayor Harris:

Your June 20, 1972, letter relative to Plan I and Plan II for the Lower Huron River Basin was discussed at the August 17-18, 1972, meeting of the Water Resources Commission. It was the decision of the members that I would transmit our comments to you concerning this letter on behalf of the Commission.

At the onset let me correct your misapprehension that our staff may not have kept us properly informed on communications relating to this matter. It is our position that staff are scrupulously conscientious and objective in apprising the members of all germane information and views on the subjects requiring our attention and that there was no departure from that policy in this case.

As to the substance of your extremely long letter; in essence, you argued that none of the alternative wastewater management plans studied by the Water Resources Commission for portions of western Wayne, eastern Washtenaw and southwestern Oakland Counties would adequately protect Lake Erie.

Your position was based on the premise that 90 percent phosphate removal is insufficient to stop rapid eutrophication in Lake Erie, particularly under Plan II since the proposed new treatment plant near the mouth of the Huron River will be large and will be situated at one of the most eutrophic, phosphorus-laden spots on the lake.

Your letter concluded with the requests that the EPA:

1. prepare an Environmental Impact Statement which would re-examine the matter of phosphorus loadings to Lake Erie;
2. reject Plan II and endorse the concept of "Riverside" plants rather than "Lakeside" plants;
3. require at least 95 percent phosphorus removal at any plant regardless of location.



We believe there are several basic deficiencies and omissions in your arguments.

1. You erroneously consider technical recommendations of outdated reports dealing with Lake Erie as being valid today. New data are available which presents a more optimistic picture regarding enhancement of water quality in Lake Erie through phosphorus control programs.

The latest guideline for Federal agencies, states and provinces is, of course, the new International Agreement between the United States and Canada. The Agreement establishes target phosphorus reductions for the next six years from both countries and specifies an effluent restriction not to exceed a daily discharge of 1 mg/l for municipal waste treatment plants discharging more than 1 million gallons per day into Lake Erie, Lake Ontario and the international section of the St. Lawrence River.

2. You do not recognize the basic assumption that phosphorus is transported by the tributaries to the Great Lakes System in essentially undiminished quantity. While reason and speculation would indicate that some reduction in phosphorus loading might take place in river impoundments, data are not available to substantiate this speculation nor to quantify such reduction. Therefore, it must be assumed that the phosphorus does reach the Great Lakes system from inland sources. Consequently, we fail to see any significant difference in phosphorus loadings to Lake Erie under any of the alternative plans studied.
3. You fail to give any consideration to protecting the Huron River lakes and impoundments from eutrophication by nutrient discharges from inland treatment plants. Downstream from the Ann Arbor wastewater treatment plant, both Ford and Belleville Lakes have been the subject of extreme concern by residents and users in regard to their eutrophic state. These water resources must also be protected, along with Lake Erie. You cite a number of loading values from various study reports on Lake Erie. Three of those values taken from the 1970 IJC report dealing with Lake Erie, Lake Ontario and the international section of the St. Lawrence River are as follows:

Permissible loading to Lake Erie. . .	0.13 gm/m ² /yr
Dangerous loading to Lake Erie. . . .	0.28 gm/m ² /yr
1970 loading to Lake Erie	1.10 gm/m ² /yr

If one were to assume that: (a) Plan IB was adopted, leaving only Ann Arbor discharging to the Huron River with its present discharge of 15.4 million gallons per day, and (b) 95 percent phosphorus removal was achieved by the Ann Arbor plant, the discharge to Ford Lake in terms of phosphorus loadings would be 2.8 gm/m²/yr.

August 24, 1972

4. Your letter underscored the fact that the Water Resources Commission's approval of Plan II was contingent upon EPA's approval of the proposed treatment levels at the Lake Erie wastewater treatment plant. The proposed treatment level is secondary treatment and 90 percent phosphorus removal. You noted that the underlying reasoning was that if higher treatment levels were required, the operating costs of Plan II would increase greatly and that Plan might not, therefore, be the best alternative.

It should be made perfectly clear that the Commission's concern about higher treatment levels was not related to phosphorus removal but specifically to levels of BOD removal.

If, as may well be, higher levels of phosphorus removal are to be required, they will be required at all of the treatment plants considered in the alternative plans. Correspondingly, the operating costs of all the alternative plans will increase and there is no reason to expect any change in the cost ranking of the alternative plans. Actually, some economy could possibly be achieved at large plants in comparison with smaller plants.

It is the conclusion of the Commission that correspondence on this matter has fully examined all valid representations as to the respective merits of the several plans.

Very truly yours,

WATER RESOURCES COMMISSION

John P. Woodford
Chairman

cc: Environmental Protection Agency

Mr. Ralph W. Purdy, Executive Secretary
Michigan Water Resources Commission
Department of Natural Resources
Stevens T. Mason Building
Lansing, Michigan 48926

Dear Mr. Purdy:

As you are aware, this region of the Environmental Protection Agency is currently making a study of the Environmental Impacts of the various Wastewater Management Alternatives considered in the Phase I Plans for Water Quality Management, Southeastern Michigan Area. We are anxious to complete our study which is prerequisite to our making a decision regarding which alternative is the least damaging to the environment and the most cost effective.

Accordingly, we are in need of additional information as follows:

1. What are the methods and costs involved in sludge disposal under Plans IB and II? Where will disposal facilities be located? If incineration is used, where will ash be deposited?
2. It appears that flow augmentation below the city of Ann Arbor may become necessary, under Plan II. If augmentation is needed, how will it be accomplished, what will the costs be, and what will be the effect on the cost effectiveness of Plan II?
3. How will Plans IB or II affect the proposed recreation complex at Pte. Mouillee, especially in regard to possible contamination of the water adjacent to the park due to effluent discharge? Under what conditions could contamination occur, and how often would contamination be expected to occur?
4. What, if anything, could be done in either the design of the treatment plant outfall or the recreation complex to prevent contamination of recreation waters?

5. What effects would the interceptor and its construction have on the natural environment, residential areas, transportation routes, parks, and other existing and planned land uses? Is detailed data available on the route locations of the interceptors described in Plans IB and II?

We anticipate that we may find it necessary to request additional information from you as our study progresses, and we appreciate any assistance you may provide.

Sincerely yours,

R.J. Schneider, Director
Air and Water Programs Division

J-ETStenson:cb
8-24-72

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION

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DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926

RALPH A. MAC MULLAN, Director

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JOHN E. VOGT
STANLEY QUACKENBUSH
THOMAS F. JAMES
JOHN H. KITCHEL, M.D.

August 31, 1972

Mr. R. J. Schneider, Director
Air and Water Programs Division
Environmental Protection Agency
1 North Wacker Drive
Chicago, IL 60606

Dear Mr. Schneider:

I have received your letter of August 28, 1972 in which you request additional information about the wastewater management alternatives considered in the Phase I Plans for Water Quality Management, Southeastern Michigan Area.

No one is more interested in arriving at a decision on this matter and getting on with the implementation of an effective water quality management plan than the Michigan Water Resources Commission. In responding to your letter, however, I must point out that your inquiries fail to indicate an understanding of the nature and effort that has been undertaken in the Southeast Michigan Area. In our study of engineering alternatives, our consultants examined seven alternative regional wastewater management plans in considerable detail. As requested by your agency, our environmental assessment addressed four of these alternatives with significant depth.

It was never contemplated, however, that detailed engineering plans and detailed cost calculations would be developed for all of the alternative plans. Further, it does not seem prudent to require such costly engineering studies until there is at least a likelihood that the proposed plan will be approved. I find it impossible to satisfactorily answer your inquiries without such detailed information.

With these thoughts in mind, we have attempted to offer some comments on your inquiries using the information available to us.

Question 1

In the engineering study of the alternative plans, the Commission's consultants employed standardized cost curves to determine capital and operation and maintenance costs for treatment plants. No cost breakdown for sludge handling is available.



Identical sludge handling processes will be used at all of the treatment plants included in Plans IB and II. This will include incineration, followed by drying and temporary storage in ash lagoons, and ultimate deposit. Ann Arbor will mix the ash with sanitary landfill cover material in its landfill. A definitive site for ash disposal from the proposed Huron River Plant has not been selected, although it most likely will also be landfilled.

This entire matter remains under study for possible change to a better method such as cropland disposal of sludge or chemical jelling. Considerable latitude remains available until the final engineering is completed.

Question 2

The matter of flows in the Huron River below Ann Arbor under Plan II is discussed in the Environmental Assessment. It was pointed out that there is some existing capability to supplement low flows through the use of the Barton, Argo, and Geddes Impoundments. The Environmental Assessment concluded that the need for further flow augmentation in the Lower Huron under Plan II has not been established. The Water Resources Commission is unaware of any further information which would warrant a change in this position. For your information, we are attaching a recently received opinion from the Michigan Attorney General's Office which lends support to this position.

Questions 3 and 4

It is our opinion that the discharge from the proposed Huron River Treatment Plant under both Plans IB and II will have negligible, if any, effect upon the proposed Pointe Mouillee Recreation Complex. The only exception to this is in the event of serious treatment plant malfunction or failure. The probability of such a serious malfunction or failure is unknown, but is considered to be remote.

It should be clearly understood that detailed engineering of the location and design of the outfall has not been done. Moreover, until a plan for the area is finally selected and firm commitments secure, such detailed engineering cannot prudently be undertaken. At this point in time, there is considerable latitude regarding the location, length, design, and other characteristics of the outfall. It is anticipated that comprehensive studies will be undertaken with due examination of flows, currents, etc., to locate and design an outfall structure which will have absolute minimum environmental impact.

Question 5

General effects of constructing the interceptor system under both Plans IB and II were outlined in the Environmental Assessment. The regional planning agency, the Southeastern Michigan Council of Governments, made the determination that both Plans IB and II conform to its comprehensive planning program and have subsequently endorsed Plan II as the preferred alternative.

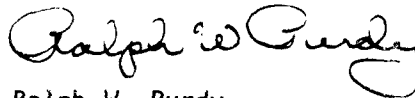
August 31, 1972

In regard to detail route locations for the interceptor, we have asked the Wayne County Board of County Road Commissioners to forward directly to you such reports as are available on detailed route locations. Again in this instance, completion of detailed plans are awaiting final action in the adoption of a regional plan. It is anticipated that considerable effort will be directed at coordinating final route determinations with interested park and other local officials so as to minimize any environmental or other disturbances.

I hope these responses will assist you in your efforts.

Very truly yours,

WATER RESOURCES COMMISSION

A handwritten signature in cursive script, reading "Ralph W. Purdy".

Ralph W. Purdy
Executive Secretary

RWP:JPD/jeh
Enclosure

December 27, 1971

Mr. Jerome Maslowski
Assistant Attorney General
Seven Story Office Building
Lansing, Michigan 48926

Dear Mr. Maslowski:

Growing out of questions recently raised before the Water Resources Commission relative to the discharge of wastewater effluent into another watercourse than the water's source, the Commission has directed me to seek your advice on just what the Commission's legal position is in such matters.

As you know, in the current consideration of Official Plans for Southeastern Michigan, required by the Federal EPA as a basis for Federal water pollution control construction grants, the Commission has favored a plan that would take Ann Arbor's wastewater into an interceptor sewer outletting in Lake Erie, thus reducing the flow of the Huron River, from Ann Arbor to its mouth, by the volume that the city takes from the river for its municipal supply.

Also, in another example, Packaging Corporation of America takes some 10 million gallons per day from the upper end of Manistee Lake and discharges its wastewater effluent by pipeline directly to Lake Michigan, thus reducing flow-through in Manistee Lake and the Lower Manistee River by that much. This diversion is proceeding under Stipulation with the Commission.

In the Ann Arbor case, opponents of the Commission's favored plan charge that the reduction in Huron River flow will seriously affect the river's downstream usefulness. In the Manistee Lake case, no possible detriment to the lake or lower river can be seen.

These two cases illustrate situations where discharge of properly treated effluent to another watercourse can be desirable from the standpoint of effective water pollution control. Although these situations are not numerous they still are not uncommon.

I have considered developing a set of specific questions to pose to you, but am inclined to think you can conceive of the legal issues raised by these situations much better than I can as a technician, if you are willing to approach it on that basis. What the Commission needs to know is where it stands in issuing orders that either specify another watercourse for discharge, or simply agree to it as an alternative selected by the waste discharger in the face of a Commission Order that drastically limits discharge to the source watercourse.

Mr. Maslowski

-2-

December 27, 1971

If this request is too general, I shall try to develop a set of precise questions.

Very truly yours,

WATER RESOURCES COMMISSION

Ralph W. Purdy
Executive Secretary

RWP/NB:clp

STATE OF MICHIGAN
DEPARTMENT OF ATTORNEY GENERAL



LEON S. COHAN
Deputy Attorney General

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AUG 7 1972

WATER MANAGEMENT

FRANK J. KELLEY
ATTORNEY GENERAL

LANSING
48913

August 1, 1972

Ralph W. Purdy, Executive Secretary
Water Resources Commission
Stevens T. Mason Building, 8th Floor
Lansing, Michigan 48926

Dear Mr. Purdy:

By letter dated December 27, 1971, you have requested advice from the Attorney General concerning orders of the Water Resources Commission which limit discharges to a source watercourse. Specifically, you mention opposition to a Proposed Order of the Commission requiring discharge to Lake Erie of water from Huron River which will affect the downstream usefulness of that river and also you speak to ongoing diversions of water by the Packaging Corporation of America which reduces flow through Manistee Lake and the lower Manistee River and which water will flow to Lake Michigan.

Initially it may be pointed out that the Michigan Supreme Court has held that public or private riparian owners may, by virtue of ownership of part of the shoreline, take and divert water supplies as long as the withdrawal is reasonable and does not injure other riparian owners. City of Battle Creek v. Goguac Resort Association (1914) 181 Mich 241. Thus in considering diversionary uses from a stream and the resulting effect on the source watercourse, the crucial test in determining lawfulness is whether the diversion constitutes a "reasonable use."

In determining reasonableness of use, the courts, while looking to the need for the purpose of the diversion, have, nevertheless, up to this point in time placed the greater emphasis on the affect of the diversion on downstream riparians and the gree of damage sustained. In construing the reasonableness of a taking, the Michigan Supreme Court has, however, held that a taking may be reasonable even though the quantity of water remaining in the watercourse is somewhat diminished. Kennedy v. Niles Water Supply Company (1913) 173 Mich 474.

Ralph W. Purdy
August 1, 1972
Page 2

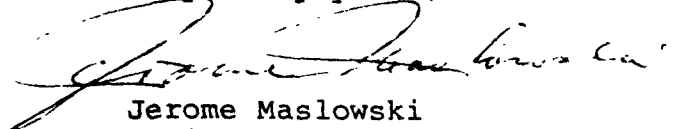
In a related recent Pennsylvania case, Belin v. Department of Environmental Resources, 4 ERC 1238, the Court considered the effect of a State permit to discharge waters drawn from a source watercourse as respects riparians on the receiving watercourse. The Court concluded the State permit to be lawful in the absence of convincing evidence that the riparians on the receiving watercourse would be injured thereby. In its opinion, the Pennsylvania Court stated as follows:

"In summary, we hold that the Department is empowered to issue permits allowing for the discharge of waste waters in instances where such discharge results from a diversion of waters from one watershed to another. This right is strictly qualified by the requirement that all conditions and criteria of the statutes and regulations be satisfied. The Department did not abuse its discretion, nor did it commit an error of law. The Adjudication and Order of the Department is hereby affirmed."

The foregoing case is consistent with Michigan case law insofar as the need to show damaging affect. In this regard the Commission, however, should be aware of the possible application of Act 127, PA 1970 (Michigan Environmental Protection Act) which does not require allegations or proof of personal damage or injury.

In summary, you are advised that diversions by a riparian owner under Commission order from a source watercourse may be considered lawful in the absence of unreasonable diminution of downstream flow which demonstrably injures lower riparians. It would appear that in entering orders providing for diversions from source watercourses and for discharge into other waters that it is in the interest of the Commission to consider and insure that such orders will not cause unreasonable downstream riparian injury and will not give rise to adverse environmental affects.

Very truly yours,


Jerome Maslowski
Assistant Attorney General

JM/jp

MICHAEL J. DUFFY
President
THOMAS J. NEWMAN
Vice President
FREDDIE G. BURTON
Secretary
WAYNE G. RICE
Deputy Secretary

BOARD OF PUBLIC WORKS
Wayne County

7TH FLOOR CITY-COUNTY BLDG.
DETROIT, MICHIGAN 48226

September 5, 1972

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JOHN P. CUSHMAN
General Counsel
JOSEPH N. HARTMANN
Director of Administration
WALTER P. MEYERS
County Highway Engineer
GEORGE R. BINGHAM
Director, DPW

Mr. R.J. Schneider, Director
Air and Water Programs Division
U.S. Environmental Protection
Agency, Region V
1 North Wacker Drive
Chicago, Illinois 60606

ENVIRONMENTAL PROTECTION AGENCY
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SEP 8 1972

PLANNING BRANCH - Region V

FILE NO. _____

Dear Mr. Schneider:

Re: Huron Valley Wastewater
Control System

In response to the request of Mr. James Dooley of the Michigan Water Resources Commission we have transmitted the following described documents to you under separate cover.

1. "Hannan Road Arm of the Huron River Sanitary Interceptor System", November, 1967.
2. "Huron Valley Wastewater Control System, Report on Regional Plan vs. Local Plan," February, 1971.
3. "Huron Valley Wastewater Control System, Report on Costs and Cost Allocation", April, 1971.
4. "Report on Ann Arbor's Case Against SEMCOG Endorsement of Plan II, Huron Valley Wastewater Control System", January, 1972.

Document No. 1 contains plans and profiles of the Hannan Road Arm (Main Arm) and the North Arm (East Arm) referred to in the "Water Quality Management Phase I" report prepared for the Water Resources Commission in September, 1971. Document No. 3 contains plans and profiles of the Huron River Interceptor (Huron River Trunk), the Van Buren Arm (Van Buren Arm), and the Ann Arbor Arm (Ypsilanti Arm), referred to in the Phase I report.

Documents 2 and 3 set forth Wayne County's position of full support of and commitment to the regional wastewater management system proposed by the office, which system is the model after which Plan II of the Phase I report was patterned.

9-5-72
Re: Huron Valley Wastewater
Control System

Mr. R.J. Schneider, Director
Air & Water Programs Div.
U.S. Environmental Protection
Agency, Region V

Document No. 4 was prepared in rebuttal to the City of Ann Arbor's criticism of Plan II. It contains Wayne County's estimates of the cost of adding tertiary treatment to the Huron River Treatment Plant, of the cost of including flow augmentation facilities on the project, and of the cost of including existing debt retirement in the project, concluding that such costs would not be significant factors in a project of this size and scope.

Regarding sludge disposal, this Department and the City of Detroit presently incinerate sludge and dispose of the ash on land. Since this is the current practice in the area, it was used as the basis of estimating the cost of the Huron Plant.

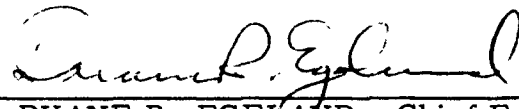
However, this office is very actively investigating alternate means of sludge disposal including land disposal of liquid sludge, heat treatment, chemical treatment and processing for disposal as a dry soil conditioner. Any one of these methods or a combination of them may be employed at the Huron Plant.

The design of the proposed plant outfall is of prime concern to this office. Our investigations indicate that an outfall could be designed which would not only eliminate shoreline degradation, but could also conceivably disperse the plant effluent into lake currents so that the residual nutrient resources in the effluent would be utilized to promote the growth of controlled and harvestable crops of desirable species of fish.

If we can be of further service to you in your deliberations on this subject, please do not hesitate to call on us.

Very truly yours,

DEPARTMENT OF PUBLIC WORKS
COUNTY OF WAYNE



DUANE R. EGELAND, Chief Engineer

DRE:rh
cc: Michigan Water Resources Comm.
Attn: James Dooley

Report on
Ann Arbor's Case Against SEMCOG Endorsing "Plan II"
Huron Valley Wastewater Control System

1. Background

The SEMCOG has been deluged with correspondence, reports, "expert opinions" etc., ostensibly supporting the City of Ann Arbor's position that SEMCOG should not concur in its staff's recommendation that Plan II of the Michigan Water Resources Commission's report on Water Quality Management, be adopted as the official plan for the Huron Valley area.

The documentation presented by Ann Arbor, while voluminous is largely repetitive. Nine specific arguments have been identified and responded to in the summary at the end of this report, but Ann Arbor's basic position can be capulized in the following three statements:

Statement I

Ann Arbor contends that the cost of Plan II will be 39 million dollars more than the cost of Plan 1B (preferred by Ann Arbor).

Statement II

Ann Arbor contends that the quality of the Huron River will not be improved by implementing Plan II.

Statement III

Ann Arbor contends that implementation of Plan II would, in effect, close future options of local treatment if and when there are technological breakthroughs.

2. Discussion of Statement I

Ann Arbor claims that the Water Resources Commission did not take into consideration the costs of certain items in arriving at its decision to adopt Plan II as the official plan for the Huron River area. A discussion of each of these items follows:

A. Tertiary Treatment

Ann Arbor contends that tertiary treatment is necessary at the Huron River Plant. In support of this contention Ann Arbor submits the personal opinion of a planner employed by the Great Lakes Basin Commission, whose comments are typical of the other expert opinions solicited by Ann Arbor. In his letter to Mayor Harris, this planner correctly identifies the problem

of Lake Erie as excessive phosphates, but recommends tertiary treatment because "the plant design does not appear to include a high level of phosphate removal". The fact of the matter is that the total phosphate removal will be exactly the same whether Plan II or Plan 1B is implemented.

For comparison purposes, however, let us include tertiary treatment facilities at the Huron Plant in the form of a mixed media filtering system.

According to recent bids received at the Warren Michigan Plant, the cost of such facilities for a 121 MGD plant (Plan II) would be 6.2 million dollars and the cost for a 88 MGD plant (Plan 1B) would be 4.8 million dollars. According to figure 8 of the Water Resources Commission report, it will cost approximately 10% more for operation and maintenance of a tertiary plant. These costs are included in tables B and C.

B. Flow Augmentation

Ann Arbor contends that taking the Ann Arbor Plant off the river may create nuisance or hazardous conditions during periods of low flow in the river, and that provisions must be made to augment flow during these periods. While it is difficult to understand why the entire area should subsidize the presumably already profitable Ann Arbor Water Supply System, again for comparison purposes, let us include the cost of flow augmentation in the project.

City Manager Guy C. Larcom, Jr., has stated that all the city's attempts to store water upstream from Ann Arbor have been unsuccessful and has stated that it is impossible for a single city to secure such storage rights. Since the city was motivated by economic gain we can understand the reluctance of upstream communities to assist the city in this matter.

We are optimistic that an authority representing the entire area and motivated by environmental concerns would have more success than the City of Ann Arbor in making storage arrangements, but for the purpose of establishing costs, let us assume that a new storage area must be constructed as described in the appendix of the Water Resources Commission report. The cost of the alternate is estimated at 4.6 million dollars and is included in Table B.

C. Retirement of Existing Treatment Facilities

While there is a question as to whether the new system should be responsible for the payment of unretired debt on existing plants, it is recognized that such debts represent an unusual burden on the communities whose plants must be abandoned. Accordingly, this debt has been included in the overall capital costs of the project shown on Table B.

Prior to finalization of the Water Resources Commission report, the Wayne County DPW advised the Water Resources Commission and its consultants that the cost estimates contained certain discrepancies and request that these errors be corrected.

The Water Resources Commission and the consultants acknowledged that these discrepancies did occur in the report, but that due to tight time requirements, the report could not be corrected. The Water Resources Commission argued that while the changes were fairly large, they affected all plans and would not significantly change the cost differences between plans. It was also noted that the cost of flow augmentation and existing debt retirement had not been included in the cost tabulations and these costs would offset the errors.

The DPW accepted the Water Resources Commission's explanation and did not dispute the cost figures contained in the report. However, since Ann Arbor is now contesting the cost figures, the basic costs should be revised to reflect an accurate estimate. The changes are detailed in the DPW letter to the Water Resources Commission dated September 16, 1971 (copy attached) and are tabulated in Table A.

3. Conclusions Concerning Statement I

Conclusion 1A. Tertiary Treatment

The need for tertiary treatment at plants discharging directly into Great Lakes waters has never been substantiated, and it is evidently the position of state and federal pollution control officials that such treatment is not necessary at this point in time.

The City of Ann Arbor's "experts" on Lake Erie correctly identify the problem of Lake Erie as phosphate enrichment but then seem to make the erroneous assumption that tertiary treatment is required to remove the phosphates. The fact is, that the same degree of phosphate removal is required under either Plan 1B or Plan II and that tertiary treatment would be of no value in reducing the phosphate content of Lake Erie.

It should be obvious to anyone that tertiary treatment is better than secondary treatment, and, for that matter, that quarternery treatment would be better than tertiary treatment. The question is, will the benefits derived from tertiary treatment warrant its extra cost or might that extra cost be better utilized by implementing other programs such as physical removal of accumulated bottom deposits or research in marine husbandry to develop aquatic food chains which would productively assimilate the nutrients which are now unbalancing the natural marine ecosystems. We submit that organizations such as the Wayne County Road Commission, the City of Ann Arbor or SEMCOG are in no way qualified to make such judgements and should not attempt to do so.

of Lake Erie as excessive phosphates, but recommends tertiary treatment because "the plant design does not appear to include a high level of phosphate removal". The fact of the matter is that the total phosphate removal will be exactly the same whether Plan II or Plan 1B is implemented.

For comparison purposes, however, let us include tertiary treatment facilities at the Huron Plant in the form of a mixed media filtering system.

According to recent bids received at the Warren Michigan Plant, the cost of such facilities for a 121 MGD plant (Plan II) would be 6.2 million dollars and the cost for a 88 MGD plant (Plan 1B) would be 4.8 million dollars. According to figure 8 of the Water Resources Commission report, it will cost approximately 10% more for operation and maintenance of a tertiary plant. These costs are included in tables B and C.

B. Flow Augmentation

Ann Arbor contends that taking the Ann Arbor Plant off the river may create nuisance or hazardous conditions during periods of low flow in the river, and that provisions must be made to augment flow during these periods. While it is difficult to understand why the entire area should subsidize the presumably already profitable Ann Arbor Water Supply System, again for comparison purposes, let us include the cost of flow augmentation in the project.

City Manager Guy C. Larcom, Jr., has stated that all the city's attempts to store water upstream from Ann Arbor have been unsuccessful and has stated that it is impossible for a single city to secure such storage rights. Since the city was motivated by economic gain we can understand the reluctance of upstream communities to assist the city in this matter.

We are optimistic that an authority representing the entire area and motivated by environmental concerns would have more success than the City of Ann Arbor in making storage arrangements, but for the purpose of establishing costs, let us assume that a new storage area must be constructed as described in the appendix of the Water Resources Commission report. The cost of the alternate is estimated at 4.6 million dollars and is included in Table B.

C. Retirement of Existing Treatment Facilities

While there is a question as to whether the new system should be responsible for the payment of unretired debt on existing plants, it is recognized that such debts represent an unusual burden on the communities whose plants must be abandoned. Accordingly, this debt has been included in the overall capital costs of the project shown on Table B.

Prior to finalization of the Water Resources Commission report, the Wayne County DPW advised the Water Resources Commission and its consultants that the cost estimates contained certain discrepancies and request that these errors be corrected.

The Water Resources Commission and the consultants acknowledged that these discrepancies did occur in the report, but that due to tight time requirements, the report could not be corrected. The Water Resources Commission argued that while the changes were fairly large, they affected all plans and would not significantly change the cost differences between plans. It was also noted that the cost of flow augmentation and existing debt retirement had not been included in the cost tabulations and these costs would offset the errors.

The DPW accepted the Water Resources Commission's explanation and did not dispute the cost figures contained in the report. However, since Ann Arbor is now contesting the cost figures, the basic costs should be revised to reflect an accurate estimate. The changes are detailed in the DPW letter to the Water Resources Commission dated September 16, 1971 (copy attached) and are tabulated in Table A.

3. Conclusions Concerning Statement I

Conclusion 1A. Tertiary Treatment

The need for tertiary treatment at plants discharging directly into Great Lakes waters has never been substantiated, and it is evidently the position of state and federal pollution control officials that such treatment is not necessary at this point in time.

The City of Ann Arbor's "experts" on Lake Erie correctly identify the problem of Lake Erie as phosphate enrichment but then seem to make the erroneous assumption that tertiary treatment is required to remove the phosphates. The fact is, that the same degree of phosphate removal is required under either Plan 1B or Plan II and that tertiary treatment would be of no value in reducing the phosphate content of Lake Erie.

It should be obvious to anyone that tertiary treatment is better than secondary treatment, and, for that matter, that quaternary treatment would be better than tertiary treatment. The question is, will the benefits derived from tertiary treatment warrant its extra cost or might that extra cost be better utilized by implementing other programs such as physical removal of accumulated bottom deposits or research in marine husbandry to develop aquatic food chains which would productively assimilate the nutrients which are now unbalancing the natural marine ecosystems. We submit that organizations such as the Wayne County Road Commission, the City of Ann Arbor or SEMCOG are in no way qualified to make such judgements and should not attempt to do so.

Table A

Adjustments to Water Resources Commission Basic Capital Costs of Huron Valley
Wastewater Control System
(Figures in Millions of Dollars)

	WRC Basic Cost	<u>1</u>	<u>2</u>	<u>3</u>	Adjusted Basic Cost
Plan IB					
Huron River	124.36	-10.58	-8.36	-5.0	100.42
Ann Arbor	23.34	0	0	0	23.34
Total	147.70	-10.58	-8.36	-5.0	123.76
Plan II					
Huron River	160.83	-12.93	-15.89	-10.00	122.01

1. Adjustment changing Huron River Interceptor from tunnel to open cut construction.
2. Adjustment changing all interceptors to 1990 design size.
3. Adjustment eliminating retention basins from interceptor cost.

Table B

Additional Costs of Huron Valley Wastewater Control System as Suggested by
Ann Arbor
(Figures in Millions of Dollars)

	Adjusted Basic Cost	Tertiary Treatment	Flow Aug.	Debt Retirement	Total Cost
Plan IB					
Huron River	100.42	+4.8	0	+0.75	105.97
Ann Arbor	23.34		0		23.34
Total	123.76	+4.8	0	+0.75	129.31
Plan II					
Huron River	122.01	+6.2	+4.6	+2.22	135.03

Table C

Revised Annual Amortized Debt Retirement Cost of
Huron Valley Wastewater Control System
(Figures in Millions of Dollars)

	Adj. Basic Cost & Tert. Treat.	Local Share (25%)	Flow Aug. & Debt Ret.	* Total Local Share	Annual Avg. Cost of Amortization 25 yr. / 6% Bonds
Plan IB					
Huron River	105.22 ~	26.30	0.75	27.05	2.12
Ann Arbor	23.34	5.84	0	5.84	0.46
Total	128.56	32.14	0.75	32.89	2.58
Plan II					
Huron River	128.21	32.05	6.82	38.87	3.04

*It is assumed that these costs will not be eligible for government grants

Table D

Revised Total Annual Per Capita Cost of Huron
Valley Wastewater Control System

	Annual O & M Costs (\$M)		Annual Amort. Cost (\$M)		Annual O & M & Amort. Costs (\$M)		Population Service Area		Tot. Annual Cost per Capita (\$)	
	1975	1990	1975	1990	1975	1990	1975	1990	1975	1990
Plan IB										
Huron River	1.42**	1.89**	2.12	4.01	3.54	4.01	279,723	489,591	12.66	8.19
Ann Arbor	0.78	1.06	0.46	1.52	1.24	1.52	134,547	205,470	9.22	7.40
Total	2.20	2.95	2.58	5.53	4.78	5.53	414,270	695,061	11.54	7.96
Plan II										
Huron River	1.72**	2.35**	3.04	5.39	4.76	5.39	414,275	695,061	11.49	7.75

**Includes cost of tertiary treatment

Conclusion 1B. Cost Differences Between Plan II and 1B

The difference in annual per capita costs between Plan 1B and Plan II, (including tertiary treatment, flow augmentation and debt retirement costs) favors Plan II and became increasingly more favorable as time goes on. The difference in capital costs between Plan 1B and Plan II is so small that it is questionable as to which plan will actually be more expensive. Accordingly, we can only reaffirm our position that, "-the final decision to approve - Plan 1B or Plan II - be based solely on the long range ecological and environmental effect of that decision."*

4. Discussion Concerning Statement No. 2

Ann Arbor's contention that the water quality of the Huron River will not be improved by implementing Plan II is apparently based on a pilot plant study which indicated "that water reaching Ann Arbor from upstream is more polluted than water being discharged into the river by Ann Arbor's pilot tertiary treatment plant".

Such a statement has little meaning unless qualified. Pollution can not be defined in relative terms such as "more," "equally" or "less" polluted, but rather must be measured in terms of a growing list of parameters which make up the overall pollution profile. Thus, even though water may not be "polluted" in terms of biological oxygen demand or suspended solids, it could be grossly polluted in terms of PCB, chromium or mercury.

5. Conclusion Concerning Statement No. 2

There is, of course, little likelihood that the apparently very good performance of the tightly controlled and skillfully operated pilot plant will be duplicated on full scale day to day operating conditions. An examination of any treatment plant operation records will bear this out.

However, even if the full scale operation did produce a consistently high quality effluent, there is the ever present danger of inadvertent plant bypassing. Wayne County's position on this matter is summarized in the following two paragraphs taken from the Road Commission's Resume' of Reports on Regional Plan vs. Local Plan "and Costs and Cost Allocation" (copy attached).

"It is pointed out that since there are no one hundred percent effective fail safe means of guarding against factors such as human error, mechanical failure, power disruption or natural phenomenon, all plants occasionally discharge raw or partially treated wastes to the receiving stream, and that even though such accidental discharges may be of infrequent occurrence or short duration, they could result in long range or possibly irreparable damage to the ecology of the watershed."

*Report on Regional Plan vs. Local Plan, 2-71.

"Projects involving river flow management, erosion control, chloride control and improved storm sewer and street cleaning operations will be important steps in the overall pollution abatement program, but it is emphasized that the most urgent need at this time is implementation of the proposed "Huron Valley Wastewater Control System". This system, designed to accommodate the domestic, commercial and industrial sanitary wastewater disposal requirements of a residential population of 1,827,000 persons, would export all "sanitary" and other "hard" wastes from the watershed to one plant at the mouth of the river where treatment operations can be economically performed and effectively controlled."

6. Discussion Concerning Statement No. 3

Ann Arbor contends that if Plan II is implemented, the option of constructing advanced treatment plants along the river in the future will no longer be available.

Future options will be effected regardless of which plan is implemented because of the large financial commitments which are involved, but the implementation of Plan II will actually enhance the option of constructing local plants along the river in the future, whereas implementation of Plan 1B would probably forever close out the option of constructing an interceptor system to serve the area.

In the preceding section, it was pointed out that the principal objection to local plants is that accidental discharges could result in long range and possibly irreparable ecological damage to the watershed. If, however, an interceptor were available into which wastewater could be diverted in emergencies, it would become entirely feasible to expand the system by constructing local treatment facilities as improved treatment methods become available. On the other hand, if Ann Arbor is permitted to continue to operate a plant on the Huron River, because of financial expediency, it is logical to assume that Oakland County and Wayne County will request permission to build two new major plants on the Huron River. When there are three major plants on the Huron River the total capital investment in plant facilities will probably preclude any possibility of implementing an interceptor system for the Huron Valley.

With the breakdown of the interceptor system plan, many more plants will be constructed along the river. As more and more plants are constructed, accidental discharges will increase and the river will deteriorate accordingly.

7. Conclusions Concerning Statement No. 3

We are at a point in time at which the future course of wastewater management in the Huron Valley must be decided.

If Plan II is adopted all interceptor system and local treatment options will be held open. If Plan II is not adopted it is unlikely that an interceptor system will ever be installed, and local treatment plants will be constructed along the entire

length of the river. Such a development would result in the accelerated deterioration of the Huron River, ultimately destroying it as a recreational facility.

8. Summary

The City of Ann Arbor has criticized Plan II which has been approved and/or endorsed by the Michigan Water Resources Commission, the Wayne County Board of Commissioners, the Oakland County Department of Public Works and the staff of the SEMCOG, to name only a few.

A. Ann Arbor's Position

Ann Arbor's criticism of Plan II is based on numerous contentions which are listed as follows:

1. Plan II does not require tertiary treatment at the Huron River Plant. In support of the contention, Ann Arbor presents the testimony of "experts".
2. Plan II does not provide for flow augmentation of the Huron River to make up for the water currently being discharged to the river from the Ann Arbor Plant.
3. Plan II does not provide for full reimbursement of outstanding debts on treatment facilities which must be abandoned under Plan II.
4. If the cost of the provisions of items 1, 2 & 3 (above) were included in the cost estimates, the capital cost of Plan II (one plant plan) would be \$39,000,000 higher than for Plan 1B (two plant plan) and the annual per capita costs \$3.63 (1975) to \$2.28 (1990) more for Plan II than for Plan 1B.
5. There would be no environmental improvement experienced by abandoning the Ann Arbor Treatment Plant because the river water reaching Ann Arbor from upstream is more polluted than the water being discharged into the river from Ann Arbor's pilot treatment plant. Ann Arbor contends that its full scale plant will produce an effluent of equal quality as that of the pilot plant.
6. One-plant systems are obsolete as is proven by the fact that Los Angeles and San Antonio have gone to decentralized plant schemes.
7. Since the Wayne County Road Commission supports Plan II, Wayne County must be planning to set rates which will discriminate against Oakland and Washtenaw Counties.
8. A decision to implement Plan II would have the effect of irrevocably closing out the option of constructing local plants if and when technological breakthroughs make the perfect fail safe plant possible.
9. Ann Arbor contends that it is important that the SEMCOG staff's recommendation be supported so that the staff's ability to influence environmental decisions will not be undercut and so that the staff's reputation among the smaller members, for seeking to have SEMCOG's power exercised fairly will not be diminished.

B. Wayne County's Response

The following are the responses of Wayne County to the positions taken by Ann Arbor:

1. Wayne County does not consider itself, Ann Arbor, or SEMCOG qualified to determine whether or not tertiary treatment should be required at plants discharging directly to the Great Lakes Waters. A close review of the "expert" opinions presented by Ann Arbor indicate that these so-called experts have correctly identified the Lake Erie problem as phosphate enrichment but seem to feel that tertiary treatment will reduce the phosphates in plant effluents. This is an erroneous assumption, the fact of the matter being that the exact same degree of phosphate removal is required at all plants.
2. Flow augmentation was not included in the proposed project because it was felt that flow augmentation was properly a function of the water supply operation which was causing the flow depletion. A properly managed water supply system should be obligated to provide sufficient storage to conduct its operations without interfering with critical flows in the source of supply.

It would appear that the cost of flow augmentation has been somewhat exaggerated by Ann Arbor, since the cost of providing additional storage facilities was estimated in the Water Resources Commission report at only \$4,600,000.

3. Ann Arbor's contention that unretired debt on existing treatment facilities which would be abandoned, should be paid for by the system has some merit and would undoubtedly be given consideration by the proposed authority.
4. If costs are to be challenged, the basic costs contained in the Water Resources Commission report should be corrected to reflect the errors and inconsistencies noted by the Wayne County Road Commission prior to the release of the report.

If the basic costs are so corrected and the costs of tertiary treatment, flow augmentation and debt retirement included in Plan II, the capital cost of Plan II would be \$5,720,000 more than for Plan 1B, but the annual per capita costs of Plan II would be \$0.05 (1975) and \$0.21 (1990) less than for Plan 1B.

Since estimates could vary by 10% or more either way, costs should not be a factor in the decision to implement Plan II or Plan 1B, particularly since normal controlled inflation is raising the cost of the project at a rate of approximately 1.5 million dollars per month.

5. Ann Arbor's claim that the day to day operations of a full scale plant will produce an effluent equal to that of the pilot plant, and its contention that tertiary treated wastewater will be less polluted than the natural river water, must be seriously contested.

A cursory review of any treatment plant operating records will quickly disclose the logical fact that average annual removal efficiencies are well below the maximum efficiencies attained during the year, and that pilot plant performance is usually substantially better than that of the prototype counterpart.

The claim that pilot plant effluents are less polluted than the natural river water is based on comparisons of relatively few pollution parameters, and (to paraphrase the Ann Arbor paper) is apparently -"bottomed on a deep pessimism about-" the effectiveness of surface runoff control programs such as erosion control and chloride control ordinances, and improved storm sewer and street cleaning operations, " in improving the quality of the natural river water.

Pollution cannot be defined in terms of suspended solids, biochemical oxygen demand, bacteriological counts, and phosphate removal, but should be considered in relation to all of the numerous parameters which make up the pollution profile.

A pollution profile has not been universally established, but the Corps of Engineers has identified 65 such parameters and the proposed Wayne County Sewer Use Regulation specifies over 30 parameters which should be considered in defining pollution with the list growing as the environmental effects of various elements and compounds are more fully understood.

Of the pollution parameters currently identified in the proposed Wayne County Regulations, over one-half will pass through the tertiary treatment process unaffected. The potentially hazardous effect of these parameters, which include mercury chromium and lead, can be countered only by dilution in the sewage itself or in the receiving waters. It should be apparent that Plan II, which would treat 121,000,000 gallons of wastewater a day and discharge the treated effluent into a body of water flowing at a minimum rate of 100,000,000,000 gallons per day (1:830 dilution) will be infinitely better able to cope with these problems than could Plan 1B, under which the Ann Arbor Plant would treat 33,000,000 gallons of wastewater per day and discharge into a body of water flowing at a minimum rate of 50,000,000 gallons per day (1:1.5 dilution).

Wayne County's basic concern, however, is for the fate of the river after those inevitable periods when due to human error, mechanical failure, power disruptions or natural phenomenon, the plant inadvertently or by necessity discharges raw or partially treated wastes to the river. Such discharges will probably be of infrequent occurrence and short duration but because of the low dilution factor, their effect

on the ecology of the river could be extremely long range and possibly irreparable.

The question that must be asked is why should such chances be taken if a reasonable alternate solution is available?

6. To compare the wastewater disposal problems of Los Angeles with its normally dry riverbeds and where ocean disposal, with the complication of reversing tides is involved, or of San Antonio which is not located on a major watercourse and where there is a critical water shortage, with the wastewater disposal problems of Southeast Michigan is unrealistic and any meaningful conclusions could not possibly be drawn from such comparisons.
7. The apparent fear that Ann Arbor will be discriminated against by Wayne County in the establishment of rates can have no rational basis. The Board of Wayne County Commissioners has gone on record that it supports a Regional System managed by a board composed of representatives of Wayne, Oakland and Washtenaw Counties. It seems highly improbable that such a board would establish discriminatory rates. It should also be recognized that since the State and Federal Governments will be providing 75 to 80% of the capital cost of the project they could have a strong influence on how the balance of the cost will be distributed.
8. Contrary to Ann Arbor's contention that implementation of Plan II would close out future options of treating wastewater at diversified local facilities, implementation of Plan II will, in fact, keep that option open. An interceptor connecting local treatment facilities would provide the fail safe mechanism which is necessary if such a system of wastewater management is ever to be feasible.

Failure to adopt Plan II, on the other hand, would result in the construction of two new major plants on the Huron River, one in Oakland County and one in Wayne County. This would be the financially expedient solution to Oakland and Wayne Counties' sewerage problems, because the construction of the plants could be deferred until existing treatment capacities are fully utilized and until populations have increased so as to provide a better financing base. The additional capital investments and compounded problems of reorganization and relocation of personnel would then provide the reasons to further delay, or more likely, to completely abandon any interceptor plan.

It can be predicted, therefore, that the practical effect of failure to adopt Plan II as the official area plan at this time will be a proliferation of treatment plants along the Huron River and the rapid deterioration of the river as a recreational facility.

9. We quite agree that the SEMCOG staff's recommendation to adopt Plan II should be supported. As stated in item 2, however, we must seriously question the technical qualification of the staff to make judgements regarding the specific degrees of treatment necessary at the Huron Plant or at any other plant.

September 16 1971

Michigan Water Resources Commission
Stevens T. Mason Building
Lansing Michigan

Attention: Mr. William Marks, Planning Division

Gentlemen:

We have reviewed the draft of the report of the consultants to the Commission, and based upon the report and discussions at recent meetings have the following comment:

1. It is recognized that the assignment to the consultants was to submit data and analyses which would make it possible to compare an interceptor scheme with a plan previously submitted by the City of Ann Arbor for treatment plant expansion to the year 1990. Consequently, the interceptors are designed for that population and flow, except for some tunnel designed for 2020. As a practical matter would not be designed for a 15 year load and financed over a 25 year period. We have revised some of the data to reflect the interceptors as all being sized for 1990, for purposes of comparison only.

<u>Plan</u>		<u>Project</u>			<u>1975 Cost</u>	<u>1990 Cost</u>
		<u>Cost</u>	<u>75%</u>	<u>25%</u>	<u>Per Capita</u>	<u>Per Capita</u>
<u>I B</u>	Huron River					
	System	116.00	87.00	29.0	12.69	8.13
	Ann Arbor	23.34	17.50	5.84	9.21	7.36
	Total	139.34	104.50	34.84	11.56	7.91
<u>Plan</u>						
<u>II</u>	Huron River					
	System	144.94	103.70	36.24	10.60	7.15

2. We understand that in order to submit an acceptable treatment plant design it was necessary to provide retention basin facilities at both Ypsilanti and Ann Arbor Treatment Plants, estimated to cost 5 Million Dollars each. This cost was reflected and charged to the interceptor project which we feel is not realistic in that this would either be a part of the local system expense or could be provided for in the interceptor capacity allocation.

We have therefore computed an allocation of cost for the interceptor system without retention basins.

<u>Plan</u>		<u>Project</u>	<u>1975 Cost</u>		<u>1990 Cost</u>	
		<u>Cost</u>	<u>75%</u>	<u>25%</u>	<u>Per Cap.</u>	<u>Per Capita</u>
B	Huron River w/o Ret. Basins	134.94	102.20	33.74	19.14	6.88

3. We feel that the interceptor costs between French Landing and the mouth of the river are high. The estimate includes extensive amounts of tunnel construction which we feel may not be necessary and which would represent extra cost of well over 10 Million Dollars.

The information set forth above is not intended to suggest that the estimates included in the report be changed but are only mentioned to indicate that differences in construction costs of this magnitude have very little effect on the overall per capita cost, and that the operation and maintenance cost which will continue into the future at a declining rate have a more significant effect on the per capita cost.

As soon as the official plan has received all necessary approvals construction should be scheduled for the earliest possible date, because of the continuing rise in the construction costs. The Engineering News Record Index shows a startling 56% jump from March of 1970 to June of 1971 for the Detroit Area.

We look forward to the Commission meeting set for September 23rd and 24th and toward the solution to these difficult, perplexing and expensive considerations.

Very truly yours,

DEPARTMENT OF PUBLIC WORKS
COUNTY OF WAYNE

GEORGE R. BINGHAM, Director

GRB:jlj

cc: Mr. Purdy, Water Resources Comm.
Mr. Zolik, Wayne County Rd. Comm.
Mac Names Porter and Seeley
Hubbel Roth and Clark

HURON VALLEY WASTEWATER CONTROL SYSTEM

Resume' of Reports on "Regional Plan vs. Local Plan" and "Costs and Cost Allocation"

Because of concern over the increasing pollution of the Huron River, the Board of Commissioners of Wayne County has vigorously opposed expansion of treatment plants at Ann Arbor and Ypsilanti in Washtenaw County.

These reports, composed of 145 pages of text, charts, graphs and plans, were prepared by the Waste Control Division of the Wayne County Road Commission to support the Commissioners' position and to set forth a feasible plan for the immediate implementation of a Regional System which is generally acknowledged to be the ultimate solution to the problem.

The reports express doubt as to the ability of the proposed Ann Arbor and Ypsilanti treatment facilities to render effluents of high enough quality to permit swimming downstream from the plants, which is the official goal established by the State Water Resources Commission.

It is pointed out that since there are no one hundred percent effective fail safe means of guarding against factors such as human error, mechanical failure, power disruption or natural phenomenon, all plants occasionally discharge raw or untreated wastes to the receiving stream, and that even though such accidental discharges may be of infrequent occurrence or short duration, they could result in long range or possibly irreparable damage to the ecology of the watershed.

Projects involving river flow management, erosion control, chloride control and improved storm sewer and street cleaning operations will be important steps in the overall pollution abatement program, but it is emphasized that the most urgent need at this time is implementation of the proposed "Huron Valley Wastewater Control System". This system, designed to accommodate the domestic, commercial and industrial sanitary wastewater disposal requirements of a residential population of 1,827,000 persons, would export all "sanitary" and other "hard" wastes from the watershed to one plant at the mouth of the river where treatment operations can be economically performed and effectively controlled.

The effluent from the plant would be carefully dispersed into Lake Erie at selected points where normal fluctuations in effluent quality will not have the critical ecological effects that such fluctuation would have on the relatively low flow of the river.

The facilities of the proposed System include a 130 million gallons per day treatment plant and 100 miles of sanitary sewers ranging in size from 11 feet six inches to 10 inches in diameter.

Huron Valley Wastewater Control System
Resume' of Reports (continued)

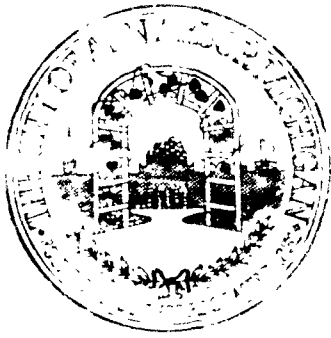
The capital cost of the project is estimated at \$134,000,000 and the initial cost of operation is estimated at \$65.40 per million gallons of wastewater treated. Assuming that Federal and State grants will finance 80% of the capital cost and that the balance will be paid off in equal annual payment at a 5.5% interest rate, the monthly cost to an average family would be as follows:

Cost per Family per Month

County Year	Oakland		Washtenaw		Wayne	
	1972	2022	1972	2022	1972	2022
Capital Cost	\$0.45	\$0.16	\$0.53	\$0.15	\$1.75	\$0.18
Op. Cost	0.60	0.38	0.60	0.38	0.60	0.38
Total Cost	1.05	0.54	1.13	0.53	2.35	0.56

The total capital cost of the Regional System will be considerably less than the total capital cost of several sub-systems providing equivalent capacity, although in certain instances the capital cost of the Regional System could be higher than the capital cost of a sub-system. In all cases, however, the lower operating costs of the larger Regional System will offset any capital cost difference so that the total cost over a period of years will always be less for the Regional System.

The reports conclude with recommendation that: 1., Federal and State pollution control funds should be used in such a way as to discourage local plant expansions and encourage a Regional Plan System; 2., The Regional System should be managed by a Regional Board composed of representative of Wayne, Oakland and Macomb Counties; 3., The Boards of Public Works of the three counties should be authorized to proceed with negotiations for capacities and allocations in the system; and 4., The Board of Public Works of Wayne County should be designated as the coordinating agency for the overall project.



CITY OF ANN ARBOR MICHIGAN

O F F I C E O F T H E M A Y O R

October 31, 1972

Mr. R. J. Schneider, Director
Air and Water Division
Environmental Protection Agency
Region V
1 Wacker Drive
Chicago, Illinois 60606

Dear Mr. Schneider:

In recent correspondence with the Michigan Water Resources Commission concerning the proposed plan for treatment of sewage in the Huron River Basin in southeast Michigan, the statement was made that there is new data "which present a more optimistic picture regarding enhancement of water quality in Lake Erie through phosphorus control programs." I wrote Chairman Woodford of the Michigan Water Resources Commission to learn what that new data might be and received a response from Assistant Division Chief Turney dated September 28, which I attach. I have asked Professor Bulkley at the University of Michigan School of Natural Resources to comment on the letter of September 28, and I attach his letter of October 16.

I forward both pieces of information to you to be taken into account in the preparation of the Environmental Impact Statement concerning this project.

Sincerely yours,

Robert J. Harris, Mayor

RJHmp
Enclosures

STATE OF MI

NATURAL RESOURCES COMMISSION

HARRY H. WHITELEY
Chairman
CARL T. JOHNSON
E. M. LAITALA
HILARY F. SNELL
CHARLES G. YOUNGLOVE



WILLIAM G. MILLIKEN, Governor
DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926
RALPH A. MAC MULLAN, Director

WATER RESOURCES COMMISSION

JOHN P. WOODFORD
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ALVIN R. BALDEN
Vice Chairman
CHARLES D. HARRIS
JOHN E. VOGT
STANLEY QUACKENBUSH
THOMAS F. JAMES
JOHN H. KITCHEL, M.D.

September 28, 1972

Mayor Robert J. Harris
City of Ann Arbor
100 N. 5th Street
Ann Arbor, Michigan 48108

Dear Mayor Harris:

Chairman John Woodford has asked that we respond to your August 29, 1972 letter requesting clarification on new data "which present a more optimistic picture regarding enhancement of water quality in Lake Erie through phosphorus control programs".

The new data to which Mr. Woodford's letter refers consists of studies conducted primarily by the Canadian Centre for Inland Waters and which form the basis for the new international agreement. Scientists and officials concerned with water pollution control in the Great Lakes area now believe that phosphorus control programs presently in effect will result in Lake Erie input reductions, from point sources, below the 12,000 tons/year level during 1972 and a further decline to about 3,000 tons/year by 1975. The studies indicate that when point sources are below 12,000 tons/year the lake will be relieved of the threat of anoxic conditions and the recycling of nutrients from the sediment bank.

There will still remain a non-point source input to Lake Erie of some 12,000 tons/year, 60% of which will be from land drainage sources. The non-point source discharges would then be about 4 times the municipal loading. Control over this comparatively much larger source will be of greater import to Lake Erie than striving for a 95% removal rate rather than a 90% rate at sewage treatment plants. It is the recognition of the non-point source loading and a general interest in developing programs to attack this problem that makes us and others optimistic that something can and will be done in this area to the relief of point source dischargers.




Mr. Robert J. Harris
September 28, 1972
Page 2

Legislation such as Michigan's proposed House Bill 4709 authorizing land use control has been enacted or is under consideration in most of the Lake Erie states and should aid in reducing the total discharge below the 11,000 tons/year, still considered to be the level at which nuisance growths of algae and weeds are expected to subside.

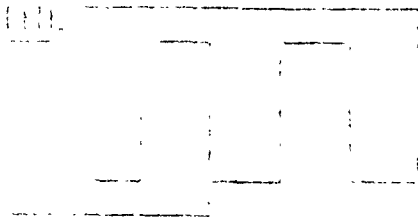
Very truly yours,

WATER RESOURCES COMMISSION


William G. Turney
Assistant Division Chief

WGT:bb

cc: Chairman Woodford
Mr. Vogt
Mr. Purdy
Mr. Frost



SCHOOL OF NATURAL RESOURCES

1046 Natural Resources Building
Ann Arbor, Michigan 48104
313 764-1404

UNIVERSITY OF MICHIGAN

October 16, 1972

Mayor Robert J. Harris
City of Ann Arbor
100 North 5th Street
Ann Arbor, MI 48108

Dear Mayor Harris:

Thank you very much for forwarding a copy of the recent letter which you received from the Water Resources Commission. I gather that the WRC is attempting to justify a 90% phosphate removal at certain point sources in place of the more strigent 95% removal level.

The following conclusion is useful to this issue:

Phosphorus input to Lake Erie must be reduced immediately; if this is done, a quick improvement in the condition of the lake can be expected; if it is not done, the rate of deterioration of the lake will be much greater than it has been in recent years.¹

In order to achieve the objective of immediate reduction of phosphate input into Lake Erie, one may envision several alternatives. One is to ban phosphate detergents; another is to provide for high order phosphate removal at points where such removal is feasible - i.e. at point source locations. There is general agreement that the increase in point service discharges of phosphate is the primary factor which has contributed algae blows and subsequent severe oxygen depletion in Lake Erie during the critical summer months.

The Project Hypo Report indicates that while the percentage of phosphate loadings from non-point sources has probably increased over time, the pattern of this percentage increase and the pattern of increase of non-municipal sources is not yet absolutely known.² Given

1. "Project Hypo - An Intensive Study of the Lake Erie Central Basin. Hypolimnion and Related Surface Water Phenomena," Canada Center for Inland Waters, Paper #6, U.S. Environmental Protection Agency, TR TS-05-71-208-24, February 1972.
2. Project Hypo Report (Previous Citation), p. 144.

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the lack of data upon these non-point contributions, it is commendable that the state is taking action to reduce these loadings. However, in my view, the uncertainties which exist regarding these sources do not justify the policy of 90% removal of phosphates from municipal sources. Rather, the critical condition of Lake Erie as documented in the joint U.S.-Canada Project Hypo demonstrates the necessity for removal of phosphates at the 95% level. If future research clearly establishes that lesser removal rates for point sources can be tolerated, then the 95% removal policy could be relaxed. This action would result in a reduction in operating costs in the future. For the present, it is my view that the immediate objective is to implement decisive removal processes at point sources at the 95% level in order to minimize the probability of Lake Erie reaching complete anoxic conditions during the critical months of August and September.

If I can provide further information, please let me know.

Very truly yours,



Jonathan W. Bulkley
Associate Professor

JWB:jg

*ps - Pls. find enclosed herewith a
paper by one of my colleagues - Ray Canale -
It indicates the importance of storm
water runoff for water quality in Fard Lake -*