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ENGINEERING REPORT
on
Pollution of Waters
of
Interstate Sanitation District
by
LOWER WESTCHESTER COUNTY

INTERSTATE SANITATION COMMISSION

New York • New Jersey • Connecticut

POLLUTION
of the
INTERSTATE SANITATION DISTRICT

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AUGUST, 1952
INTERSTATE SANITATION COMMISSION

TABLE OF CONTENTS

	Page
General Information	1
Sewage- Amounts and Sources	4
Sewage Treatment Plants	7
Appendix A-Summary of Analyses	11
Appendix B-South Yonkers Project	15
Appendix C-North Yonkers Project	16
Appendix D-Mamaroneck Project	17
Appendix E-Blind Brook Project	18
Appendix F-New Rochelle Plant	19
Appendix G-Sources of Information	20
Map-Location of Westchester County	2
Map-Sewage Treatment Plants and Tributary Areas- Lower Westchester County	8

GENERAL INFORMATION

Westchester County is located to the North of New York City, extending some 30 miles from its southerly border line with Bronx County to the Putnam-County-Westchester County line. It is bounded on the east by Connecticut and Long Island Sound and on the west by the Hudson River.

Included among its 435 square miles are landscaped highways, rolling hills, fine beaches, country estates, and residential developments which give to this area its unique character. Although these characteristics tend to attract a residential suburban population, more than half of the county's 625,816 inhabitants reside in four large cities, Yonkers, Mount Vernon, New Rochelle, and White Plains, all in the southern portion of the County. Within the perimeter of these cities are included most of the 927 manufacturing plants of the County. The product lists of these plants include nationally known brands of rugs, automobiles, copper wire, elevators, and hearing aids.

Although the importance of these manufacturers is not to be slighted, the relative preponderance of wholesale and retail trade establishments attest to the primary residential nature of the County. 8,396 retail establishments, 642 wholesale establishments, and 3,089 selected service trade establishments have annual receipts of \$643,195,000., \$329,525,000., and \$48,881,000., respectively, comprising a total sales volume of over \$1,000,000,000. This can be compared with the annual total of \$134,172,000. in salaries and wages and \$268,308,000 in value added by manufacturing.

manufacture attributable to the manufacturing establishments.

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SEWAGE - Amounts and Sources

In an area of this character it is to be expected that the water-borne wastes are essentially of a sanitary nature, with but few exceptions. It is estimated that the total sanitary flow from the county's 625,816 inhabitants is 79.0 million gallons per day with dry weather average flows. Of this total some 62.6 million gallons per day amounting to 79% of the total derived from the southerly part of Westchester County is collected by the sewer network of the Westchester County Sanitary Sewer Commission, and by the New Rochelle Sanitary District.

Since all of the treatment plants of the Westchester County Sanitary Sewer Commission are located adjacent either to the Hudson River or Long Island Sound some of the trunk lines from the inland districts are of considerable length. The South Yonkers Plant collects sewage from areas 12 miles distant, the North Yonkers plant some 12-15 miles, the Mamaroneck Plant from 8 miles, and the Blind Brook plant from 3.5 miles.

Most of the trunk lines of the Westchester County Sanitary Sewer Commission are of fairly recent construction. The commission was formed in 1926 and the majority of the existing lines were placed in operation during the period 1931-1932. The one large section of trunk lines not completed in this period is the Bronx Valley line tributary to the South Yonkers Plant completed in about 1911.

The following table gives an indication of the volume of sanitary and industrial wastes tributary to each plant,

<u>Plant</u>	<u>Area Served sq.mi.</u>	<u>Population Served</u>	<u>Sanitary Wastes M.G.D.</u>	<u>INDUSTRIAL WASTES (1)</u>		<u>Total Wastes M.G.D.</u>	<u>Nature of Industrial Waste</u>
				<u>Direct(2) Discharge</u>	<u>Indirect (3) Discharge</u>		
1. North Yonkers	31.9	86,400.	9.53	2.69	1.43 1.04 Clean	11.00	B.O.D., S.S. Nitrate Salts, Grease, Toxic materials, acids.
2. South Yonkers	52.1	259,600.	28.53	.32	1.21 .26 Clean	30.00	B.O.D., S.S., Acids, Toxic materials, Grease.
3. Mamaroneck	30.0	64,100.	8.13	-	0.30 .07 Clean	8.50	B.O.D., S.S., Toxic materials, Grease.
4. New Rochelle (4)	9.1	81,000.	10.92	-	0.04 .04 Clean	11.00	B.O.D., Toxic materials, acids, grease.
5. Blind Brook	1.1	9,500.	1.1	-	-	1.10	-
	124.2	500,800.	58.21	3.01	2.98 1.41 Clean	62.6	B.O.D., S.S. Acids, Grease nitrate and toxic materials.

1. The total volume of industrial wastes noted is derived from the general area served by the treatment plant and is not meant to imply that the industrial wastes are necessarily tributary to the treatment plant. The total includes only indirect discharges.
2. Direct discharges via private sewers to either the Hudson River or Long Island Sound.
3. Indirect discharges via public sewers to treatment plant, includes clean discharges.
4. New plant now under construction.

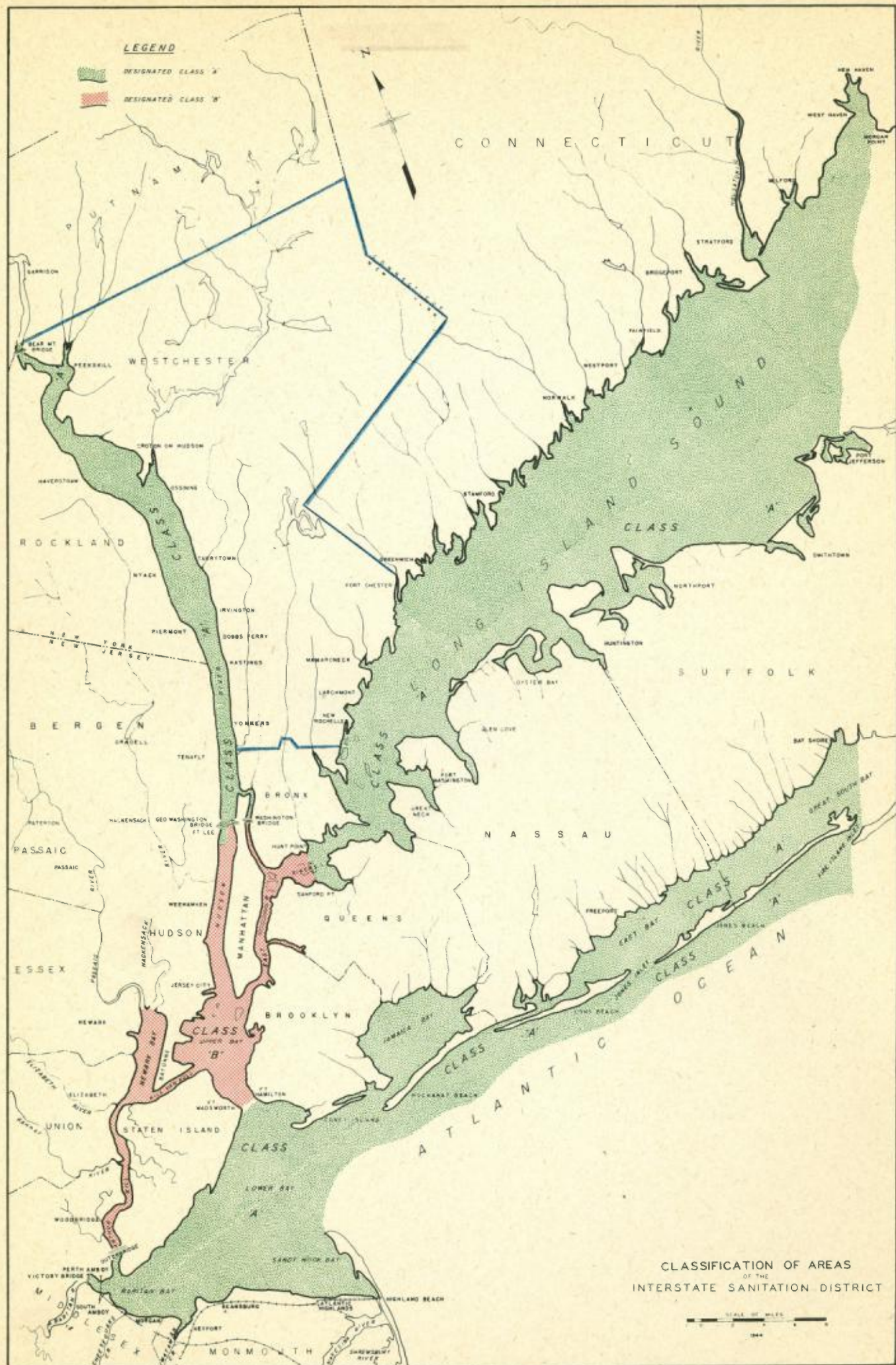
and the approximate population served. A total of about 62.6 million gallons per day is treated at these plants of which about 3.39 million gallons (the total of the indirect discharges) or 5.4 percent constitutes the industrial contribution. (The New Rochelle plant is included in this total, although it is not under the jurisdiction of the Westchester County Sanitary Sewer Commission, to indicate the sources and amounts of wastes in all of lower Westchester County)

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SEWAGE TREATMENT PLANTS
OF THE WESTCHESTER COUNTY SANITARY
SEWER COMMISSION

In conjunction with the construction of the vast trunk line network completed in the early 1930's by the Westchester County Sanitary Sewer Commission, four sewage treatment plants were built. The total cost of these plants, including the trunk sewer lines, was about \$23,670,000. The approximate location and the areas served by the North and South Yonkers Plants, the Mamaroneck and the Blind Brook Plants are shown on the accompanying map. All of these plants discharge to Class "A" waters. Other pertinent data concerning these plants are contained in Appendix A.

At the time of the creation of the Westchester County Sanitary Sewer Commission the City of New Rochelle did not see fit to enter into the County System. Recently, with the City of New Rochelle as a nucleus, a sanitary sewer district, which will also serve some of the adjoining areas outside of the New Rochelle City limits, has been formed. The sewage treatment plant now being constructed in conjunction with the sewer district will provide for effective sedimentation and chlorination. The total cost of the plant, including interceptors and the outfall sewer is estimated at about \$4,900,000; it will replace the old City of New Rochelle screening plant. The City of New Rochelle was under an order of the Interstate Sanitation Commission dated February 1st, 1950, to construct facilities that would enable compliance with the terms of



Tri-State Compact.

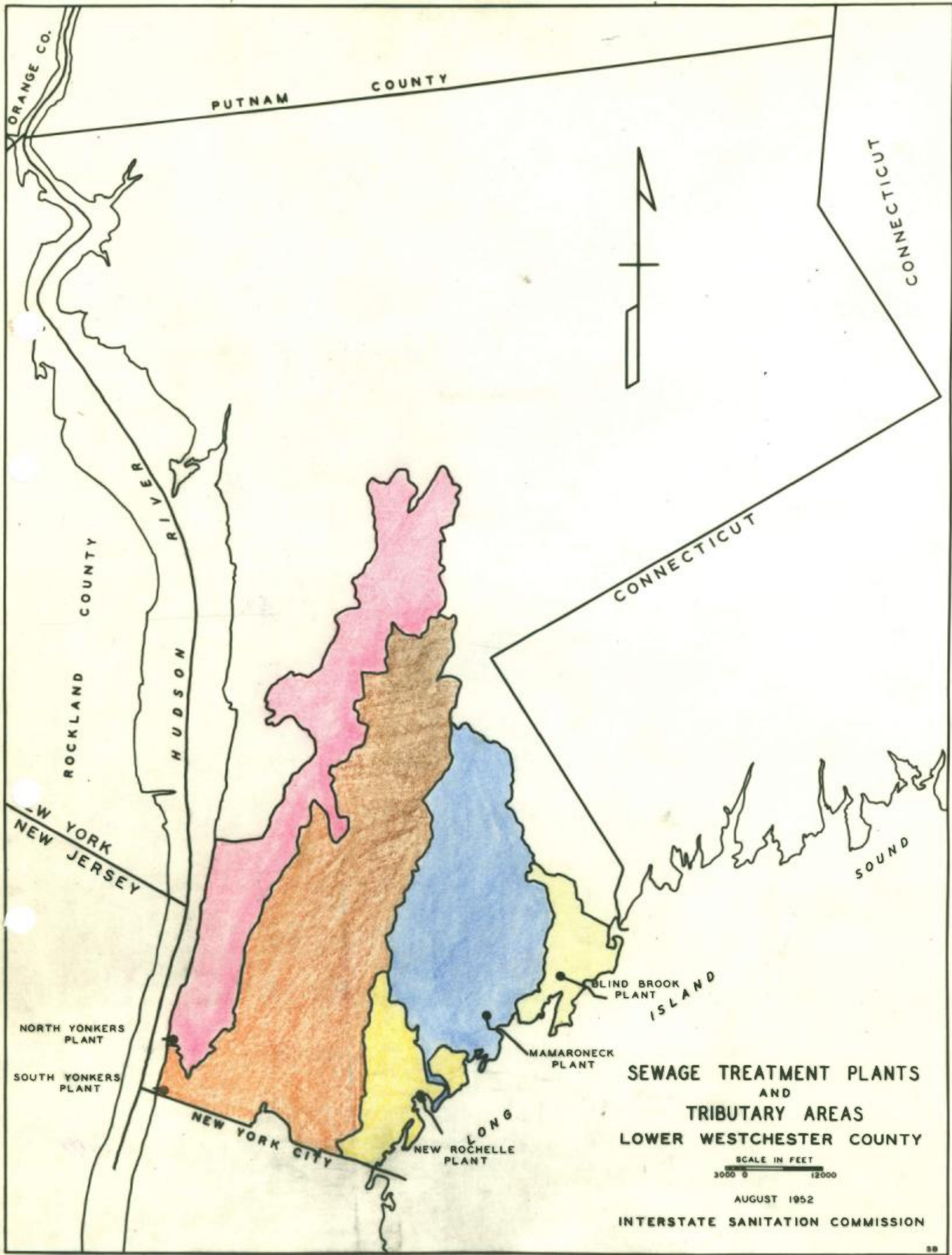
The four plants of the Westchester County provide little more than fine screens and chlorination for the treatment of their influent sewage, and have no immediate plans underway to supplement their treatment facilities.

"As a rule such screens are expected to collect sewage matter down to $1/16$ in. in size, and fine screens have been in irregular operation with openings as small as $1/32$ in. in their smallest or controlling dimension. The efficiency of screens, nevertheless, is low: normally about one-fifth that of sedimentation tanks. The small space required by screening plants is in their favor; the nature of the screenings collected is against them. The solids removed include uncomminuted fecal matter and spread objectionable odors, unless they are disposed of immediately and in a suitable manner." ----- "In general, the efficiency of independent screening plants is not commensurate with their cost. Settling tanks with short detention periods are preferable."*

Samples taken at the North and South Yonkers, Mamaroneck, and Blink Brook plants by the Interstate Sanitation Commission show that on the date of the inspection, the highest percentage of suspended solids removal was 33 percent.

This highest percentage removal of suspended solids is little more than one half of the removal efficiency of 60 percent stipulated by the Tri-State

* Imhoff and Fair - Sewage Treatment - pages 47-48
John Wiley and Sons (1940)



Compact prior to discharge into Class "A" waters. Inasmuch as suspended solids removal efficiencies were always below the prescribed minimum, and on occasion indicated an apparent negative percentage removal, systematic sampling of the suspended solids by the Interstate Sanitation Commission Staff has been discontinued since 1944. (The summary of analyses for the Westchester County Sanitary Sewer Commission plants are given in Appendix B.)

Discharge to Class "A" waters further requires that the effluent sewage shall not have a most probable number of coliform organisms greater than one per cubic centimeter in more than fifty percent of the samples obtained. The summary of analyses demonstrate that this requirement has been violated on 16.7 percent of the sampling days by the Mamaroneck plant, 41.2 percent by the North Yonkers plant, 21.1 percent by the Blind Brook plant, and 47.1 percent by the South Yonkers plant.

The aggregate of these results indicate that on continued occasions the treatment plants of the Westchester County Sanitary Sewer Commission are in violation of the Tri-State Compact.

APPENDIX

Summary of Analyses
South Yonkers S. T. W.

<u>Date of Inspection</u>	<u>Percent Removal Suspended Solids</u>	<u>Percent Removal 5 Day 20°C.B.O.D.</u>	<u>Coliform M.P.N./ml.</u>	<u>Organisms % over 1/ml.</u>
6-14-38	8	7	71,600	75
10-2-39	7	6		
10-2-40	18	7	30	0
6-5-41	15			
6-25-41		4		
6-3-42	8	5	850	50
7-29-43	33	3	600	100
7-13-44		Neg.	1,200	50
5-21-45			30-	0
7-24-46			17,500	100
7-2-47			36	0
6-9-48			36	0
8-19-48			30-	0
5-25-49			230	100
8-18-49			24,000+	100
5-11-50			30-	0
9-21-50			390	100
6-7-51			2,400	100
5-21-52			240,000	100

- Less than

Summary of Analyses

North Yonkers S. T. W.

<u>Date of Inspection</u>	<u>Percent Removal Suspended Solids</u>	<u>Percent Removal 5 Day 20°C B.O.D.</u>	<u>C o l i f o r m M.P.M. / ml</u>	<u>O r g a n i s m s % over 1/ml</u>
6-16-38	20	7	71,600	75
10-3-39	18	12		
6-6-40	12	7	56,500	100
6-25-41	6	2	240	25
5-14-42	9	3	240,000*	100
7-29-43	25	4	800	50
7-13-44		20	260	50
5-21-45			93	50
7-24-46			1,420	100
6-24-47	19	15	970	50
6-9-48			11,000	100
8-19-48			24,000+	100
5-25-49			73	0
8-18-49			30-	0
5-11-50			30-	0
9-21-50			30-	0
6-751			43	-
5-21-52			24,000	100

* less than

Summary of Analyses

Mamoronock S. T. W.

<u>Date of Inspection</u>	<u>Percent Removal Suspended Solids</u>	<u>Percent Removal 5 Day 20°C B.O.D.</u>	<u>C o l i f o r m M.P.N./100 ml</u>	<u>O r g a n i s m s % Over 1/ml.</u>
6-13-38	17	27	2,660	50
10-11-39	17	18		
6-11-40	21	5	30-	0
7-23-41	14	15	30-	0
6-2-42	6	3	880	100
8-26-43	5		30-	0
6-15-44			30-	0
6-11-45			36	0
7-29-46			110	50
6-19-47			1,200	50
6-9-48			36	0
8-17-48			30-	0
5-18-49			30-	0
8-24-49			30-	0
5-23-50			30-	0
9-21-50			91	0
5-3-51			3	0
8-2-51			120	100
5-12-52			46,000	100

- Less Than

Appendix "A"

Summary of Analysis

Blind Brook S. T. W.

<u>Date of Inspection</u>	<u>Percent Removal Suspended Solids</u>	<u>Percent Removal 5 Day 20°C B.O.D.</u>	<u>C o l i f o r m M.P.N./100 ml</u>	<u>O r g a n i s m s % Over 1/ml.</u>
6-13-38	25	27	1,690	50
6-28-38			9,300	100
10-16-39	10			
6-10-40	7	2	280	50
7-21-41		9	40	0
10-1-41	6	11		
6-1-42	7	6	220	75
9-2-43	15		88	25
6-15-44			30-	0
6-11-45			46	0
7-29-46			110	50
6-19-47			30-	0
6-9-48			30-	0
8-17-48			30-	0
5-18-49			30	0
8-24-49			24,000+	100
5-23-50			30-	0
9-21-50			4,600	100
5-3-51			3-	0
8-2-51			15	0
5-12-52			39	0

- Less Than

APPENDIX

SOUTH YONKERS PROJECT

WESTCHESTER COUNTY SEWER COMMISSION

Community	Population Served
Bronxville	7,000.
Eastchester District	20,000.
Greenburg Town	40,000.
MT. Pleasant (Valhalla Dist.)	2,000.
Mt. Vernon	67,000.
North Castle District 1	700.
North Pelham (Village)	5,000.
Pelham (Village)	2,000.
Pelham Manor	1,400.
Scarsdale (Village)	12,000.
Tuckahoe (Village)	6,500.
White Plains City (Part)	18,000.
Yonkers	75,000.
New Rochelle	3,000.
<u>TOTAL POPULATION SERVED</u>	<u>259,600.</u>

TREATMENT

Bar rack, (mechanically cleaned)
 Fine Screens (less than 1/8 inch
 opening grit chamber without continuous
 removal mechanism Chlorination by chlorine
 gas no flow meters pre & post chlorination
 in summer months.

DATE OF CONSTRUCTION

1931

Cost

COST OF CONSTRUCTION

\$ 8,558,847.- total including interceptors
 and outfall

DESIGN FLOW

84.0 mgd

AVERAGE DAILY FLOW

30. mgd (estimated)

AREA SERVED

52.09 SM

TYPE OF SEWERS

Separate

OUTFALL

Hudson River off South end of Yonkers to
 Class "A" waters of the Interstate
 Sanitation District.

APPENDIX

NORTH YONKERS PROJECT

WESTCHESTER COUNTY SEWER COMMISSION

Community	Population Served
Ardsley (Village)	1,400.
Dobbs Ferry	6,000.
Elms Ford (Village)	3,000.
Hastings-on-Hudson	7,000.
New Castle (Chappaqua Dist.)	200.
Pleasantville	2,000.
Yonkers	<u>67,000.</u>
<u>TOTAL POPULATION SERVED</u>	86,600.

TREATMENT Barrack (mechanically cleaned)
Fine screens (less than 1/8" opening)
Grit Chamber (without continuous removal)
Chlorination (pre and post) during summer months,
no flow meters.

DATE OF CONSTRUCTION 1933

COST OF CONSTRUCTION \$8,900,000. including interceptors
and outfall.

DESIGN FLOW 50.0 mgd

AVERAGE FLOW 11.0 (estimated)

AREA SERVED 31.87 Sm

TYPE OF SEWERS Separate

OUTFALL Hudson River, off Main Street, Yonkers to Class "A"
waters of Interstate Sanitation District.

APPENDIX

MAMARONECK PROJECT

WESTCHESTER COUNTY SEWER COMMISSION

Community	Population Served
White Plains City (Part)	25,000.
Harrison	8,600.
Mamaroneck Town	22,300.
Mamaroneck Village	5,200,
New Rochelle	<u>3,000.</u>
<u>TOTAL POPULATION SERVED</u>	64,100.
<u>TREATMENT</u>	Bar rock, grit, chamber, fine screens (less than 1/8 inch opening) chlorination.
<u>DATE OF CONSTRUCTION</u>	1931
<u>COST OF CONSTRUCTION</u>	\$ 5,839,546. including interceptors and outfall
<u>DESIGN FLOW</u>	42.0 mgd
<u>AVERAGE FLOW</u>	8.5 mgd
<u>AREA SERVED</u>	30.0 SM
<u>TYPE OF SEWERS</u>	Separate
<u>OUTFALL</u>	54 inch outfall, 11,527, feet long extending about 1 1/2 miles off shore into Long Island Sound (Class "A" waters).

APPENDIX

BLIND BROOK PROJECT

WESTCHESTER COUNTY SEWER COMMISSION

Community	Population Served
Rye City	6,400.
Portions of Towns & Villages on Trunk Sewer	<u>3,100.</u>
<u>TOTAL POPULATION SERVED</u>	9,500.
<u>TREATMENT</u>	Bar screen, grit chamber, fine screens (less than 1/8 inch opening), chlorination by chlorine gas.
<u>DATE OF CONSTRUCTION</u>	1928
<u>COST OF CONSTRUCTION</u>	\$1.430,000.- Including interceptors and outfall
<u>DESIGN FLOW</u>	12 mgd
<u>AVERAGE FLOW</u>	1.05 mgd
<u>AREA SERVED</u>	5.9 S M
<u>TYPE OF SEWERS-</u>	Separate
<u>OUTFALL</u>	36 inch line extending 1½ miles into Long Island Sound (Class "A" waters) off Rye Beach Avenue.

APPENDIX

NEW ROCHELLE PLANT

NEW ROCHELLE SEWER DISTRICT

TOTAL POPULATION SERVED 81,000.

TREATMENT Grit removal, maceration of floating solids, effective sedimentation and chlorination of dry weather flow, treatment of sludge and separate digestions dewatering of sludge by vacuum filtrations and either complete incineration or drying of sludge to permit use as fertilizer as desired.

DATE OF CONSTRUCTION Now under construction, expected date of completion 1953.

COST OF CONSTRUCTION \$4,900.000. including interceptors and outfall.

DESIGN FLOW 15 mgd

AREA SERVED 9.1 S M

TYPE OF SEWER separate

OUTFALL 54 inch reinforced concrete line 9,300 feet long extending into Long Island Sound (Class "A" waters)

SOURCES OF INFORMATION

General Information

- 1.- Department of Commerce, State of New York Pamphlet entitled "New York State Business Facts Westchester-Rockland District" (1950) for statistics on Manufacture, retail business etc.

Sewage - Amounts and Sources

- 1.- Statistical Report- 1930-1940, Westchester County Department of Health some of information on sewage flows and population
- 2.- Operation reports on Westchester County plants filed under Westchester County for Sewage flows
- 3.- U.S.P.H.S. Form 1156 for information on population (population Tributary to Mamaroneck is incorrect as it does not include part of White Plains)
- 4.- Industrial Waste Inventory for industrial flows

Sewage Treatment Plants

- 1.- Reports of the Westchester County Sanitary Sewer Commission, 1930 and 1931

Appendix - North Yonkers Plant, South Yonkers Plant, Mamaroneck, and Blind Brook

- 1.- Treatment
U.S.P.H.S. Form 1156
- 2.- Cost, Date of Construction, outfall, and type of sewers from files for plants
- 3.- Area Served obtained by parimeter from map "County Sewers Districts, Trunk Sewers, Westchester County, Department of Planning 1943" from Book of Maps- Westchester County Department of Planning 1944

Appendix - Summary of Analyses

- 1.- From laboratory records of Interstate Sanitation Commission

Appendix - NEW ROCHELLE PLANT

1.- Treatment

Page 17, Report on New Rochelle Sanitary
Sewer District, Westchester County Department
of Public Works (1950)

2.- Completion Date

Amended order of Interstate Sanitation Commission
re New Rochelle dated February 26, 1951

3.- Cost, Design Flow

Memo December 27, 1951, filed under New
Rochelle

4.- Outfall

Map, Proposed Outfall Sewer
March 17, 1952- filed under
New Rochelle