LICENSED AND INSURED

CARTER AUTO TRANSPORT & SERVICE LEASING CORP.

1120 McLESTER STREET
ELIZABETH, NEW JERSEY 07201
(201) 527-5333

Port Elizabeth

August 3, 1971.

Department of Environmental Protection
Trenton, New Jersey 08625

Attention: Mr. Richard J. Sullivan
Office of the Commissioner

Dear Mr. Sullivan:

BAD000001

We would like to take this opportunity of complying with your request, regarding the pollution of the waterways in the Port Newark Bay area. We are a service company located in Port Elizabeth, New Jersey, our function is handling, and distribution of import automobiles, along with the removal of cosmoline which brings us to the point of concern.

We have gone to great financial expense to install a waste treatment plant to handle the treatment of our residue, which separates the cosmoline from the water, thus giving a safe P.H. factor range which enables us to discharge the water into the main sewer system, however, with all our concern and effort, we are rather disturbed to see that other companies in this area are being allowed by the Port of New York Authority to perform the same service on import automobiles, and discharge the untreated residue directly through the storm sewers that flow into the Newark Bay.

We have met with the Port of New York technical advisors who have viewed our installation and agreed that our pollution control is a sound and safe system, but have taken no action to terminate this deplorable condition that exists in Port Newark Bay.

Our company would like to extend a cordial welcome to

LICENSED AND INSURED

CARTER AUTO TRANSPORT & SERVICE LEASING CORP.

1120 McLESTER STREET
ELIZABETH, NEW JERSEY 07201
(201) 353-5333

your office to visit our facility, and hope that some action will be taken by your office, against the violators who are polluting our waterways.

Yours very truly,

CARTER AUTO TRANSPORT & SERVICE LEASING CORP.

Alan Husak - Vice President

AH:tlp
c/c Mr. B. J. Zirinsky
Mr. Segesser
Mr. Clark
Mr. Cosman

Mr. Michael Palin, Owner
Portside Industrial Center
102 East 31st Street
New York, New York 10016

Dear Mr. Palin:

Enclosed is a summary of the analysis on a sample taken at Portside Industrial Center, Elizabeth, New Jersey, on May 24, 1971.

Following is a description of the sampling points:

POINT 1 (eff.) - Outfall to Arthur Kill in vicinity of Sam Laffer Associates building.

POINT 2 (eff.) - City outfall at the foot of Trumbull Street. No flow during sampling period.

Please do not hesitate to call me if you have any questions regarding these results.

Very truly yours,

BA0000002

Alan I. Mytelka, Ph.D.
Assistant Chief Engineer

AIM:gig.
Enclosure
cc: New Jersey State Department of
Environmental Protection

SUMMARY OF THE ANALYSES OF SAMPLES TAKEN AT
PORTSIDE INDUSTRIAL CENTER INC.
FOOT OF FIRST STREET
ELIZABETH NEW JERSEY 07206

DATE OF SAMPLING: 5/24/71

SAMPLED BY: INT SANIT COMM
ANALYSES PERFORMED BY: INT SANIT COMM
NUMBER OF POINTS SAMPLED: 1

POINT NUMBER: 1 (EFFLUENT)
TYPE OF SAMPLE: COMPOSITE SAMPLE
FLOW (APPROXIMATE): FLOW NOT ESTIMATED

TEMPERATURE	*****	ORTHO PHOSPHATE-P	0.04
PH	7.1	TOTAL PHOSPHATE-P	******
BIOCHEMICAL OXYGEN DEMAND	16	AMMONIA-N	1.70
CHEMICAL OXYGEN DEMAND	*****	NITRITE-N	0.01
TOTAL CARBON	40	NITRATE-N	1.18
TOTAL ORGANIC CARBON	23	CHLORIDES	312
TOTAL SUSPENDED SOLIDS	41	COPPER	<0.02
TOTAL VOLATILE SUSPENDED SOLIDS	6	ZINC	0.02
SETTLEABLE SOLIDS	27	CHROMIUM	<0.05
VOLATILE SETTLEABLE SOLIDS	1	LEAD	*****
COLIFORM DENSITY	2400	ALUMINUM	*****
CHLORINE RESIDUAL	*****	IRON	*****
ETHER SOLUBLE MATERIAL	1	NICKEL	<0.10
TURBIDITY	28	CADMIUM	<0.02
MANGANESE	0.14	MERCURY	******

ALL UNITS ARE MILLIGRAMS PER LITER EXCEPT PH AND THE FOLLOWING:
TEMPERATURE - DEGREES CENTIGRADE
COLIFORM DENSITY - FECAL COLIFORM ORGANISMS PER 100 MILLILITERS
TURBIDITY - JACKSON TURBIDITY UNITS

MEMO DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO Mr. Hoffman

FROM Mr. Pierce DATE July 7, 1971

SUBJECT Chemical Waste Disposal, 30 S. Front Street, Elizabeth, N.J.

File

On Friday, July 2, 1971, I made an investigation regarding a complaint against Chemical Waste Disposal. The complaintant, Mrs. Dramatses of 5 S. Front Street, stated that the above mentioned plant was discharging chemicals both directly into the Elizabeth River and into sewers on S. Front Street. I did notice chemical "puddles" in the gutter adjacent to the plant. Drums containing methanol, acetic acid, and other chemicals are piled along the roadside.

Although I saw no such discharges, the complaintant and neighbors informed me that dumping occurs late at night or very early in the morning. This fact will apparently necessitate me revisiting the area at a much earlier hour.

Gary Pierce
Student Assistant

BAD000003

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER POLLUTION CONTROL

PHONE CALL
REPORT OF
VISIT

Out

File

Time

Routing

ntacted

Phone No.

lication

Call
of
Visit

Call
of
Visit

4

DEPARTMENT OF ENVIRONMENTAL PRO[illegible]ION
BUREAU OF WATER POLLUTION CONTROL

REPORT OF PHONE CALL / VISIT

In ________ Out ________ File: Elizabeth ✓

Date: 2/27/73 Time: 3:30 PM Routing: ~~Tyrach~~ ~~[illegible]~~ Mirra / [illegible]

Person Contacted: John Kaith Phone No.: 292-6704

Affiliation: Bureau of Air Pollution

Subject of Call/Visit: Discharge of waste chemicals into Elizabeth R.

Summary of Call/Visit: Mrs. Demitreo complained to Air Pollution that Chemical Control Corp., 25 South Front St. [illegible] is discharging waste into the Elizabeth River. [illegible] lives at 5 South Front St. The company [illegible] chemicals from other industries. The [illegible] twice a week.

Mrs. Demitreo phone number is 201-[illegible]

2/28/73 I know of no [illegible] knowledge of this site.

Use [illegible] have no [illegible] of this [illegible]

Action Recommended: Inspection

BAD000005

TIERRA-A-002449

5

MEMORANDUM

June 8, 1967

TO: Mr. George T. Cowherd

FROM: Mr. Fred W. Ulrich

RE: BORNE CHEMICAL CO.,INC.
Elizabeth, New Jersey

On June 7, 1967, I visited the Borne Chemical Company with Ted Kosydar for the purpose of sampling their effluent.

There is one discharge point from this plant to the Kill and the flow is about 5,000 G.P.D.. On inspection, heavy oil was noted in the discharge and this continued throughout the day. Mr. Skok, the plant superintendent, explained that the reason for this was that an oil storage reservoirs had burst and much of the material laid on the ground. When the weather becomes warm (80°F to 90°F) the oil becomes fluid and seeps into the storm drains and into the Kill. At the time of our visit, the oil was being sanded down to prevent its flow. (I would suspect that this condition had gone uncorrected for over a week). Mr. Skok said that he intented to completely close off the sewer leading to the Kill.

The plant grounds are messy and it would seem that much polluting material would find its way to the Kill with the aid of wind and storm runoff.

At 10:35 A.M., we hailed a passing coast guard boat. (boat #CG-40465). The man in charge, Ronald Kier, Oil Pollution Advisor, DC 7 DG, took an effluent sample and charged the company with polluting interstate waters. An analysis will be made of the sample by the Corps of Engineers.

FWU:lk

BAD000006

6

October 11, 1968

Honorable City Council
c/o Mr. John J. Dwyer
City Clerk
50 West Scott Place
Elizabeth, New Jersey 07201

Gentlemen:

There are enclosed permits dated October 7, 1968 issued to you pursuant to Title 58 of the Revised Statutes of New Jersey and in consideration of your application dated August 29, 1968, signed by Herbert L. Kaufman.

The permits are for the construction and operation of a trunk sewer located in the City of Elizabeth, New Jersey, subject to the conditions as shown on aforesaid permits. Your attention is directed to all the conditions of the permits particularly the following:

A. That these permits to construct and operate a trunk sewer herein referred to do not exempt, or shall not be construed to exempt, the applicant, City of Elizabeth, New Jersey, from complying with the rules and regulations and policies or laws lodged in any agency or subdivision in this State having legal jurisdiction.

Very truly yours,

Ernest B. Segesser, Chief Engineer
Water Pollution Control Program

6:13:72
E-9-68-3206
Encls.
c.c. - Clinton Bogert Associates
Consulting Engineers
2083 Center Avenue
Fort Lee, New Jersey 07024
Elizabeth Joint Meeting
Metropolitan State Health District

BAD000007

SP-2
July 60 M-267/1

C-1102
T-D9

State Department of Health of the State of New Jersey

S-9-(3-3286

Certification Approving Application of
City of Elizabeth

for permission to construct a trunk sewer

in the City of Elizabeth , New Jersey

Date October 7, 19 68

An application (*) having been duly made to the State Department of Health of the State of New Jersey, pursuant to the applicable provisions of Title 58 of the Revised Statutes of New Jersey for the approval of conditions under which

City (City, Boro, Town, Twp., or Name of Individual or Corp.) of Elizabeth (Name of Municipality or Applicant's Address)

proposes to construct a trunk sewer consisting of sanitary sewers located on Prince Street - south side from Union Avenue westerly to Manhole 13; on Union Avenue - west side from Siphon Inlet Structure southerly to Manhole 15; on Union Avenue - east side from Siphon Outlet Structure northerly to Manhole 29; on Union Avenue from Diversion Structure No. 1 northerly to Siphon Outlet Structure; on Union Avenue

Jersey, pursuant to the applicable provisions o tle 58 of the Revised Statutes of New Jersey for the approval of conditions under which

City (City, Boro, Town, Twp., or Name of Individual or Corp.) of Elizabeth (Name of Municipality or Applicant's Address)

proposes to construct a trunk sewer consisting of sanitary sewers located on Prince Street - south side from Union Avenue westerly to Manhole 13; on Union Avenue - west side from Siphon Inlet Structure southerly to Manhole 15; on Union Avenue - east side from Siphon Outlet Structure northerly to Manhole 29; on Union Avenue from Diversion Structure No. 1 northerly to Siphon Outlet Structure; on Union Avenue Siphon from Outlet Structure to Inlet Structure; and on Union Avenue from Siphon Inlet Structure north and east to Diversion Structure No. 2, as shown on white prints, seventeen in number, entitled: "City of Elizabeth, New Jersey, Sewerage and Drainage Improvements, District E, Contracts No. 5A & 5B;" two sheets - "Plan and Profile;" "Sanitary Sewer Profiles;" "Diversion Structure No. 1;" "Siphon Outlet Structure;" "Siphon Inlet Structure;" "Diversion Structure No. 2;" "Outlet Structure;" "Modifications to Diversion Structures;" "Transition Structure;" "Junction Chambers No. 1 and No. 2;" "Manhole Details;" three sheets - "Miscellaneous Details;" and "Test Borings for Proposed Sewers - District 'E', Elizabeth, New Jersey;" one dated 1968; fifteen dated August 12, 1968; and one dated January 24, 1967; all received September 3, 1968; and according to specifications entitled: "Sewerage and Drainage Improvements, District E - 1968, Contracts No. 5A and 5B, Contract Documents;" dated September 1968; received September 3, 1968;

in the City of Elizabeth, New Jersey; disposal of sewage into Elizabeth Joint Meeting treatment plant; effluent into Arthur Kill;

and to operate the same; therefore,

Sheet 1 of 3 sheets

SP-9
July 60 M-267/2

This is to certify that the State Department of Health of the State of New Jersey on this 7th day of October 1968 hereby approves the plans and/or other engineering data accompanying said application and hereby grants permission to

City of
(City, Boro, Town, Twp., or Name of Individual or Corp.)

Elizabeth
(Name of Municipality)

to build said works in accordance with said plans and/or other engineering data, subject to the following conditions:

I. That the permit is revocable or subject to modification or change, at any time when in the judgment of the State Department of Health of the State of New Jersey such revocation, modification or change shall be necessary.

II. That the issuance of this permit shall not be deemed to affect in any way action by the State Department of Health of the State of New Jersey on any future application that may be made for permission to discharge additional sewage or industrial wastes into the waters of the State.

III. That the trunk sewer shown by plans and/or other engineering data, which are this day approved subject to conditions herewith established, shall be fully constructed in complete conformity with such plans and/or other engineering data and the aforesaid conditions.

IV. That, in the examination of plans and/or other engineering data the State Department of Health of the State of New Jersey does not examine into the structural features of the design, such as thickness of concrete, adequacy of reinforcing or the efficiency of any of the mechanical equipment or apparatus; and the approval herewith given does not include these features.

V. That no physical connection (s) shall be installed or permitted to exist between any unit or pipe line of any public potable water system and any unit or pipe line into or through which sewage or sewage effluent
(sewage or sewage effluent; industrial wastes or industrial wastes effluent)
discharges or may discharge.

VI. That the approval of plans and/or other engineering data for the above works shall remain in force for a period of only two years from the date of approval unless the said works are constructed or the contract awarded for the construction of such works.

VII. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into features which may involve potential gas hazards, and the approval herewith given does not in-

herewith given does not include these fe es.

V. That no physical connection (s) shall be installed or permitted to exist between any unit or pipe line of any public potable water system and any unit or pipe line into or through which sewage or sewage effluent (sewage or sewage effluent; industrial wastes or industrial wastes effluent) discharges or may discharge.

VI. That the approval of plans and/or other engineering data for the above works shall remain in force for a per.od of only two years from the date of approval unless the said works are constructed or the contract awarded for the constru ion of such works.

VII. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into featu s which may involve potential gas hazards, and the approval herewith given does not include these features.

VIII. That the permit to construct a trunk sewer herein approved does not exempt, or shall not be construed to exempt, the applicant from complying with Section 58:1-26 of the Revised Statutes, which provides that no structure within the natural and ordinary high watermark of any stream shall be made by any public authority or private person or corporation without notice to the State Department of Conservation, Division of ater Policy and Supply, etc.

IX. That this permit to construct a trunk sewer herein referred to does not exempt, or shall not be construed to exempt, the applicant, City of Elizabeth, New Jersey, from complying with the rules and regulations and policies or laws lodged in any agency or subdivision in this State having legal jurisdiction.

STATE DEPARTMENT OF HEALTH OF THE STATE OF NEW JERSEY

Roscoe P. Kandle, M. D.
State Commissioner of Health

SP-10
July 60 M-267/3

This is to certify that the State Department of Health of the State of New Jersey, on this 7th day of October 1968 hereby grants permission to City of
(City, Boro, Town, Twp., or Name of Individual or Corp.)
Elizabeth
(Name of Municipality)
to operate said works when the said works are constructed in accordance with the plans and/or other engineering data and aforesaid conditions, the said permission being subject to the following conditions:

I. That the permit is revocable or subject to modification or change, at any time when in the judgment of the State Department of Health of the State of New Jersey such revocation, modification or change shall be necessary.

II. That the issuance of this permit shall not be deemed to affect in any way action by the State Department of Health of the State of New Jersey on any future application that may be made for permission to discharge additional sewage or industrial wastes into the waters of the State.

III. That no physical connection (s) shall be installed or permitted to exist between any unit or pipe line of any public potable water system and any unit or pipe line into or through which sewage or sewage effluent
(sewage or sewage effluent; industrial wastes or industrial wastes effluent)
discharges or may discharge.

IV. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into features which may involve potential gas hazards, and the approval herewith given does not include these features.

V. That no sewage conveyed by the sewer lines to which
(sewage or industrial wastes)
this permit relates shall be by-passed.

VI. That the permit to operate a trunk sewer herein approved does not exempt, or shall not be construed to exempt, the applicant from complying with Section 58:1-26 of the Revised Statutes, which provides that no structure within the natural and ordinary high watermark of any stream shall be made by any public authority or private person or corporation without notice to the State Department of Conservation, Division of Water Policy and Supply, etc.

VII. That this permit to operate a trunk sewer herein referred to does not exempt, or shall not be construed to exempt, the applicant, City of Elizabeth, New Jersey, from complying with the rules and regulations and

... no physical connection (s) shall ... installed or permitted to exist between any unit or pipe line of any public pota... water system and any unit or pipe line into or through which sewage or sewage effluent (sewage or sewage effluent; industrial wastes or industrial wastes effluent) discharges or may discharge.

IV. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into features which may involve potential gas hazards, and the approval herewith given does not include these features.

V. That no sewage (sewage or industrial wastes) conveyed by the sewer line to which this permit relates shall be by-passed.

VI. That the permit to operate a trunk sewer herein approved does not exempt, or shall not be construed to exempt, the applicant from complying with Section 58:1-26 of the Revised Statutes, which provides that no structure within the natural and ordinary high watermark of any stream shall be made by any public authority or private person or corporation without notice to the State Department of Conservation, Division of Water Policy and Supply, etc.

VII. That this permit to operate a trunk sewer herein referred to does not exempt, or shall not be construed to exempt, the applicant, City of Elizabeth, New Jersey, from complying with the rules and regulations and policies or laws lodged in any agency or subdivision in this State having legal jurisdiction.

(*) - Application dated August 29, 1968, received September 3, 1968, signed by Herbert L. Kaufman. (Authorization to sign application is contained in Engineering Contracts with the City of Elizabeth.)

STATE DEPARTMENT OF HEALTH OF THE STATE OF NEW JERSEY

Roscoe P. Kandle, M. D.
State Commissioner of Health

6E13:32
Sheet 3 of 3 sheets

7

NEW JERSEY STATE DEPARTMENT OF HEALTH
WATER POLLUTION CONTROL PROGRAM
EXAMINING ENGINEER'S REPORT

Project No. S-9-68-3
September 16, 1968

Municipality	City of Elizabeth
County	Union
Organization	Council
Owners and Operators	City of Elizabeth
Location	District E area north of Pennsylvania RR and mainly east of Elizabeth River
Engineer	Herbert L. Kaufman, PE13647 c/o Clinton Bogert Associates Fort Lee, New Jersey
Subject	Trunk sewer
Application	Dated August 29, 1968 and signed by Herbert L. Kaufman, Consulting Engineer
Authorization	Engineering contract with City of Elizabeth
Estimated Cost	$257,000

Sources of Information

1. Application dated August 29, 1968. Received September 3, 1968.
2. Engineer's Report dated August 29, 1968.
3. Specifications for Contract 5B dated September 1968. 2 sets.
4. Plans for Sewerage and Drainage Improvements dated 1968. 17 sheets. 2 sets.

Disposal of Raw Sewage

Elizabeth Joint Meeting treatment plant

Receiving Waters of Treated Waste

BAD000008

Arthur Kill

Basis of Design

It is proposed to construct a sanitary trunk sewer in a portion of Union Avenue together with certain lateral sewers. This is the first stage of a program to elimina combined sewers in the City. The proposed trunk sewer will parallel the existing cc

bined sewer. At its downstream end, the proposed trunk will be tied back into the existing combined sewer. At its upstream end, it will be connected to existing sewers from which a substantial part of storm water flow will be eliminated by the construction of separate storm sewers. Ultimately, it is hoped to eliminate storm sewage from the sanitary lines.

The basis for the design of the sanitary sewer is as follows:

Industrial flow - 5.6 acres@ 5,000 gpd
Commercial flow - 93.7 acres@ 2,000 gpd
Population - 30,000@ 100 gpd
Infiltration - 1,000 gpd per acre
Average flow - 3.2 Mgd
Peak flow - 8.3 Mgd

ALIGNMENT OF SANITARY SEWERS

Location	From	TO
Prince Street - south side	Union Avenue	Westerly to MH 13
Union Avenue - west side	Siphon Inlet Structure	Southerly to MH 15
Union Avenue - east side	Siphon Outlet Structure	Northerly to MH 29
Union Avenue	Diversion Structure No.1	Northerly to Siphon Outlet Structure
Union Avenue Siphon	Outlet Structure	Inlet Structure
Union Avenue	Siphon Inlet Structure	North and East to Diversion Structure No. 2

Footage	Diameter	Type	Minimum Grade
15'	36"	RC	0.10%
1226'	30"	RC	.10%
87'	24"	RC	Siphon
87'	12"	CI	Siphon
430'	12"	VC	0.22%
766'	10"	VC	.30%
363'	8"	VC	.40%

Standard Manholes	Drop Manholes	Maximum Manhole Spacing
33	3	Under 400'

Joints

Manufacturer's Standard

Recommendations

The plans, specifications and allied data relative to this project have been examined and substantial compliance with the rules, regulations and policies of the Department has been noted.

It is recommended that a permit be issued for construction and operation subject to conditions common to all projects.

Respectfully submitted,

mmg

Mortimer M. Gibbons
Principal Public Health Engineer

6E13:G9

8

SP-2
July 60 M-267/1

State Department of Health of the State of New Jersey

S-1[illegible]-68-3316

Certification Approving Application of
City of Elizabeth

for permission to construct a partial sewer system

in the City of Elizabeth (Drainage District E of City Master Plan dated April 19, 1962) New Jersey

Date January 15, 19 69

BAD000009

An application (*) having been duly made to the State Department of Health of the State of New Jersey, pursuant to the applicable provisions of Title 58 of the Revised Statutes of New Jersey for the approval of conditions under which

City of Elizabeth
(City, Boro, Town, Twp., or Name of Individual or Corp.) (Name of Municipality or Applicant's Address)

proposes to construct a partial sewer system consisting of sanitary sewers located

Date _____

An application (*) having been duly made to the State Department of Health of the State of New Jersey, pursuant to the applicable provisions of Title 58 of the Revised Statutes of New Jersey for the approval of conditions under which

City of Elizabeth

(City, Boro, Town, Twp., or Name of Individual or Corp.) (Name of Municipality or Applicant, Address)

proposes to construct a partial sewer system consisting of sanitary sewers located on Easement from Existing Manhole 27 to Manhole 57; on Westminster Avenue from Manhole 53 to Manhole 57; on Pingry Place from Manhole 57 to Manhole 61; on North Broad Street from Manhole 61 to Diversion Structure No. 3; on Westminster Avenue from Manhole 54 to Manhole 56; on Pingry Place from Manhole 57 to Manhole 58; on Westminster Avenue from Manhole 58 to Manhole 60; on North Broad Street from Manhole 63 to Manhole 64; on Salem Avenue from Manhole 61 to Manhole 62; on Fairmount Avenue from Diversion Structure No. 4 to Manhole 71; on Fairmount Avenue North from Manhole 71 to Manhole 72; on Newark Avenue West from Manhole 72 to Diversion Structure No. 5; on Fairmount Avenue South from Diversion Structure No. 4 to Manhole 76; and on Newark Avenue East from Manhole 76 to Manhole 79; as shown on white prints, sixteen in number, entitled: "City of Elizabeth, New Jersey, Sewerage and Drainage Improvements, District E - 1968, Contracts No. 6A & 6B;" seven sheets - "Plan and Profile;" "Sanitary Sewer Profiles;" "Diversion Structure No. 3;" "Diversion Structures No. 4 and No. 5;" "Junction Chambers No. 3 to No. 8;" "Manhole Details;" and three sheets - "Miscellaneous Details;" one undated; fifteen dated September 17, 1968; all received October 21, 1968; and according to specifications entitled: "Sewerage and Drainage Improvements, District E - 1968, Contracts No. 6A and 6B, Information for Bidders, Proposal, Contract Items and Contract Drawings;" dated November 1968; received October 21, 1968; in the City of Elizabeth, New Jersey; disposal of sewage into Elizabeth Joint Meeting treatment plant; effluent into Arthur Kill;

and to operate the same; therefore,

SP-9
July-60 M-267/2

This is to certify that the State Department of Health of the State of New Jersey on this 15th day of January 1969 hereby approves the plans and/or other engineering data accompanying said application and hereby grants permission to

City of

(City, Boro, Town, Twp., or Name of Individual or Corp.)

Elizabeth

(Name of Municipality)

to build said works in accordance with said plans and/or other engineering data, subject to the following conditions:

I. That the permit is revocable or subject to modification or change, at any time when in the judgment of the State Department of Health of the State of New Jersey such revocation, modification or change shall be necessary.

II. That the issuance of this permit shall not be deemed to affect in any way action by the State Department of Health of the State of New Jersey on any future application that may be made for permission to discharge additional sewage or industrial wastes into the waters of the State.

III. That the partial sewer system shown by plans and/or other engineering data, which are this day approved subject to conditions herewith established, shall be fully constructed in complete conformity with such plans and/or other engineering data and the aforesaid conditions.

IV. That, in the examination of plans and/or other engineering data the State Department of Health of the State of New Jersey does not examine into the structural features of the design, such as thickness of concrete, adequacy of reinforcing or the efficiency of any of the mechanical equipment or apparatus; and the approval herewith given does not include these features.

V. That no physical connection (s) shall be installed or permitted to exist between any unit or pipe line of any public potable water system and any unit or pipe line into or through which sewage or sewage effluent discharges or may discharge.

(sewage or sewage effluent; industrial wastes or industrial wastes effluent)

VI. That the approval of plans and/or other engineering data for the above works shall remain in force for a period of only two years from the date of approval unless the said works are constructed or the contract awarded for the construction of such works.

VII. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into features which

IV. That, in the examination of plans and/or other engineering data the State Department of Health of the State of New Jersey does not examine into the structural features of the design, such as thickness of concrete, adequacy of reinforcing or the efficiency of any of the mechanical equipment or apparatus; and the approval herewith given does not include these features.

V. That no physical connection (s) shall be installed or permitted to exist between any unit or pipe line of any public potable water system and any unit or pipe line into or through which sewage or sewage effluent (sewage or sewage effluent; industrial wastes or industrial wastes effluent) discharges or may discharge.

VI. That the approval of plans and/or other engineering data for the above works shall remain in force for a period of only two years from the date of approval unless the said works are constructed or the contract awarded for the construction of such works.

VII. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into features which may involve potential gas hazards, and the approval herewith given does not include these features.

VIII. That the permit to construct a partial sewer system herein approved does not exempt, or shall not be construed to exempt, the applicant from complying with Section 58:1-26 of the Revised Statutes, which provides that no structure within the natural and ordinary high watermark of any stream shall be made by any public authority or private person or corporation without notice to the State Department of Conservation, Division of Water Policy and Supply, etc.

IX. That this permit to construct a partial sewer system herein referred to does not exempt, or shall not be construed to exempt, the applicant, City of Elizabeth, New Jersey, from complying with the rules and regulations and policies or laws lodged in any agency or subdivision in this State having legal jurisdiction.

STATE DEPARTMENT OF HEALTH OF THE STATE OF NEW JERSEY

Roscoe P. Kandle, M. D.
State Commissioner of Health

SP-10
July 60

M-267/3

This is to certify that the State Department of Health of the State of New Jersey, on this 15th day of January 1969 hereby grants permission to City of
(City, Boro, Town, Twp., or Name of Individual or Corp.)

Elizabeth
(Name of Municipality)

to operate said works when the said works are constructed in accordance with the plans and/or other engineering data and aforesaid conditions, the said permission being subject to the following conditions:

I. That the permit is revocable or subject to modification or change, at any time when in the judgment of the State Department of Health of the State of New Jersey such revocation, modification or change shall be necessary.

II. That the issuance of this permit shall not be deemed to affect in any way action by the State Department of Health of the State of New Jersey on any future application that may be made for permission to discharge additional sewage or industrial wastes into the waters of the State.

III That no physical connection (s) shall be installed or permitted to exist between any unit or pipe line of any public potable water system and any unit or pipe line into or through which sewage or sewage effluent
(sewage or sewage effluent; industrial wastes or industrial wastes effluent)
discharges or may discharge.

IV. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into features which may involve potential gas hazards, and the approval herewith given does not include these features.

V. That no sewage conveyed by the sewer lines to which
(sewage or industrial wastes)
this permit relates shall be by-passed.

VI. That the permit to operate a partial sewer system herein approved does not exempt, or shall not be construed to exempt, the applicant from complying with Section 58:1-26 of the Revised Statutes, which provides that no structure within the natural and ordinary high watermark of any stream shall be made by any public authority or private person or corporation without notice to the State Department of Conservation, Division of Water Policy and Supply, etc.

VII. That this permit to operate a partial sewer system herein referred to doe

discharges or may discharge.

IV. That in the examination of plans and/or other engineering data, the State Department of Health of the State of New Jersey does not examine into features which may involve potential gas hazards, and the approval herewith given does not include these features.

V. That no sewage (sewage or industrial wastes) conveyed by the sewer lines to which this permit relates shall be by-passed.

VI. That the permit to operate a partial sewer system herein approved does not exempt, or shall not be construed to exempt, the applicant from complying with Section 58:1-26 of the Revised Statutes, which provides that no structure within the natural and ordinary high watermark of any stream shall be made by any public authority or private person or corporation without notice to the State Department of Conservation, Division of Water Policy and Supply, etc.

VII. That this permit to operate a partial sewer system herein referred to does not exempt, or shall not be construed to exempt, the applicant, City of Elizabeth, New Jersey, from complying with the rules and regulations and policies or laws lodged in any agency or subdivision in this State having legal jurisdiction.

(*) - Application dated October 18, 1968, received October 21, 1968, signed by Herbert L. Kaufman, Engineer. (Authorization to sign application is contained in Engineering Contracts with the City of Elizabeth.)

STATE DEPARTMENT OF HEALTH OF THE STATE OF NEW JERSEY

Roscoe P. Kandle, M. D.
State Commissioner of Health

6E13:G2
Sheet 3 of 3 sheets

9

NEW JERSEY STATE DEPARTMENT OF HEALTH
WATER POLLUTION CONTROL PROGRAM
EXAMINING ENGINEER'S REPORT

S-10-68-3316
December 5, 1968

Municipality ..... City of Elizabeth

County ..... Union

Organization ..... Common Council

Owners and Operators ..... City of Elizabeth

Location ..... Drainage District E of City Master Plan d April 19, 1962

Engineer ..... Herbert L. Kaufmann, P.E. 13647 c/o Clinton Bogert Associates

Subject ..... Partial sewer system - Contract 6B

Application ..... Dated October 18, 1968 and signed by Herbert L. Kaufmann, Consulting Engineer

Authorization ..... Engineering Contract with City of Elizabe

Estimated Cost $258,000

Sources of Information

1. Application dated October 18, 1968. Received October 21, 1968.
2. Engineer's Report dated October 18, 1968.
3. Specifications for Contracts No. 6A and 6B, dated November 1968, two sets.
4. Plans for Contracts No. 6A and 6B dated 1968; sixteen sheets, two sets.

Disposal of Raw Sewage - To Elizabeth Joint Meeting Treatment Plant

Receiving Waters of Treated Waste - Arthur Kill

BAD000010

Basis of Design

The City of Elizabeth is engaged in a long term project to separate storm water an sanitary sewage in its sewerage system. The partial sewer system under review is phase of such project.

Contract 6B comprises the extension of the Union Avenue Trunk Sanitary Sewer and t construction of certain lateral sanitary sewers in Newark Avenue north of Fairmoun

Basis of Design (cont'd)

The basis for design of the Trunk Sanitary Sewer is as follows:

Industrial flow - 5.6 acres @ 5,000 gpd per acre

Commercial flow - 93.7 acres @ 2,000 gpd per acre

Population - 30,000 @ 100 gpd

Infiltration - 1,000 gpd per acre

Average flow = 3.2 MGD Peak flow = 8.2 MGD

Certain diversion structures will be constructed for an interim term. These will p
mit new storm sewers to be constructed. Ultimately the storm water and sanitary se
will be separated. Meanwhile, the large existing combined sewer will be continued
a portion of its course.

Alignment of Sanitary Sewers

Location	From	To
Easement	Existing MH 27	MH 57
Westminster Avenue	MH 53	MH 57
Pingry Place	MH 57	MH 61
North Broad Street	MH 61	Diversion Structure No.
Westminster Avenue	MH 54	MH 56
Pingry Place	MH 57	MH 58
Westminster Avenue	MH 58	MH 60
North Broad Street	MH 63	MH 64
Salem Avenue	MH 61	MH 62
Fairmount Avenue	Diversion Structure No.4	MH 71
Fairmount Avenue North	MH 71	MH 72
Newark Avenue West	MH 72	Diversion Structure No.
Fairmount Avenue South	Diversion Structure No.4	MH 76
Newark Avenue East	MH 76	MH 79

Minimum Grade

Footage	Diameter	Type	Minimum Grade (cont'd)
365'	24"	RC	.30
48'	15"	RC	.40
296'	12"	VC	.30
70'	10"	VC	.40
380'	8"	VC	.40
40'	8"	Steel	0 (highway crossing)

Standard Manholes - 24

Maximum Manhole Spacing - Under 400'

Joints - Manufacturer's Standard

Diversion Structures Nos. 3, 4 and 5

These units comprise reinforced concrete structures into which the existing large brick combined sewer, the new storm and new sanitary sewers are connected. The dry weather sewage flow is ultimately discharged into the Joint Meeting treatment plant. When storm water increases, however, both sanitary and storm flows will be discharged to the combined sewer for a certain period of years until separation is complete. Two of these diversion structures are for temporary use to permit construction of new storm sewers. Bulkheads will be placed in these structures. However, the third diversion structure, be used for some years in the future.

Recommendations

The plans, specifications and allied data relative to this project have been examined and substantial compliance with the rules, regulations and policies of the Department has been noted.

It is recommended that a permit be issued for construction and operation subject to conditions common to all projects.

Respectfully submitted,

mmg

Mortimer M. Gibbons
Principal Public Health Engineer

6E13:G14

10

January 7, 1970

Mr. Behrsin, Plant Manager
Phelps Dodge Copper Products
South Front St. & Bayway
Elizabeth, New Jersey

Dear Mr. Behrsin:

Thank you for the cooperation you and Mr. Williams gave me upon my visit to your plant on December 18, 1969. I was especially pleased with the thoroughness to which Mr. Williams went in showing me installations of interest to me in my investigation of waste discharges from your plant.

The last data in our files concerning your plant are dated 1966 and 1967. The data show that at that time, all your industrial waste went directly into the Arthur-Kill without treatment. They further show that 75 percent of your sanitary wastes went to the Kill.

On my inspection of your plant on the 18th I was shown that all sanitary wastes now go to a sewer leading this waste to the Joint Meeting's sewage treatment plant. I would like you to confirm this for me and would also appreciate your informing me when the sewage going to the Kill was diverted and introduced to the Town sewers.

Turning to the industrial wastes, I was told that none are discharged to the Kill other than cooling water. Furthermore, if I understand correctly, the cooling water is used in closed shell condensers, with no possibility of processing liquids contacting directly and therefore contaminating the cooling water. I would again like your confirmation or correction concerning these facts and the fact that the discharge pipe through which the cooling water exits is not used for any other discharges.

Finally, I would like to know what does happen to your industrial wastes, such as spent solutions, waste from cleaning out vats or other pieces of equipment, waste originating from the rinsing or cleaning of a product, and in general, any liquids which are discharged from your plant.

BAD000011

Your cooperation in answering the questions I have put to you as soon as feasible will be appreciated.

Yours truly,

John Cofman
Chemical Engineer, Trainee

6P15:G7

11

MEMO NEW JERSEY STATE DEPARTMENT OF HEALTH

TO Mr. Hoffman

FROM Mr. Nerlick DATE February 28, 1969

SUBJECT Discharge of Raw Sewage into Elizabeth River

On January 24, 1969, James Panella and I noticed the discharge of raw sewage into the Elizabeth River from a pipe on the property of the John F. Kennedy Arms on Westfield Avenue in the City of Elizabeth.

The assistant township engineer was notified of the discharge. He stated that the discharge was from a syphon that had apparently clogged and that the sewer department would be notified to clean the syphon.

GEIO:ck

BAD000012

M3893

Signed Russell E. Nerlick

12

March 31, 1965

Phelps-Dodge Copper Products Corporation
Bayway and South Front Street
Elizabeth, New Jersey

Gentlemen:

Take Notice that the New Jersey State Department of Health, in cooperation with the Interstate Sanitation Commission, is executing a comprehensive stream pollution control and abatement program in the Arthur Kill area. In this program, it has been determined that you are discharging wastes of a polluting nature into the Arthur Kill, or a tributary thereof. Our information also is to the effect that there are public sewerage facilities available in your immediate vicinity.

You are requested to advise this Department within 30 days of the actions which you will take in order to eliminate the discharge of polluting materials into the Arthur Kill, or a tributary thereof. Please feel at liberty to call upon us for discussion of any details in relation to this problem.

Your cooperation will be appreciated very much.

Very truly yours,

Roscoe P. Kandle, M.D.
State Commissioner of Health

BAD000014

13

March 31, 1965

Copper Pigment & Chemical Works, Inc.
215 Bayway
Elizabeth, New Jersey

Gentlemen:

Take Notice that the New Jersey State Department of Health, in cooperation with the Interstate Sanitation Commission, is executing a comprehensive stream pollution control and abatement program in the Arthur Kill area. In this program, it has been determined that you are discharging wastes of a polluting nature into the Arthur Kill, or a tributary thereof. Our information also is to the effect that there are public sewerage facilities available in your immediate vicinity.

You are requested to advise this Department within 30 days, of the actions which you will take in order to eliminate the discharge of polluting materials into the Arthur Kill, or a tributary thereof. Please feel at liberty to call upon us for discussion of any details in relation to this problem.

Your cooperation will be appreciated very much.

Very truly yours,

Roscoe P. Kandle, M.D.
State Commissioner of Health

BAD 00015

14

March 31, 1965

Archer-Daniels-Midland Company
Chemical Products Division
554 South Front Street
Elizabeth, New Jersey

Gentlemen:

Take Notice that the New Jersey State Department of Health, in cooperation with the Interstate Sanitation Commission, is executing a comprehensive stream pollution control and abatement program in the Arthur Kill area. In this program, it has been determined that you are discharging wastes of a polluting nature into the Arthur Kill, or a tributary thereof. Our information also is to the effect that there are public sewerage facilities available in your immediate vicinity.

You are requested to advise this Department within 30 days, of the actions which you will take in order to eliminate the discharge of polluting materials into the Arthur Kill, or a tributary thereof. Please feel at liberty to call upon us for discussion of any details in relation to this problem.

Your cooperation will be appreciated very much.

Very truly yours,

Roscoe P. Kandle, M.D.
State Commissioner of Health

BAD000016

15

March 31, 1965

Singer Manufacturing Company
321 First Street
Elizabeth, New Jersey

Gentlemen:

Take Notice that the New Jersey State Department of Health, in cooperation with the Interstate Sanitation Commission, is executing a comprehensive stream pollution control and abatement program in the Arthur Kill area. In this program, it has been determined that you are discharging wastes of a polluting nature into the Arthur Kill, or a tributary thereof. Our information also is to the effect that there are public sewerage facilities available in your immediate vicinity.

You are requested to advise this Department within 30 days of the actions which you will take in order to eliminate the discharge of polluting materials into the Arthur Kill, or a tributary thereof. Please feel at liberty to call upon us for discussion of any details in relation to this problem.

Your cooperation will be appreciated very much.

Very truly yours,

Roscoe P. Kandle, M.D.
State Commissioner of Health

BAD000017

16

March 31, 1965

Borne Chemical Company, Inc.
632-650 Front Street
Elizabeth, New Jersey

Gentlemen:

Take Notice that the New Jersey State Department of Health, in cooperation with the Interstate Sanitation Commission, is executing a comprehensive stream pollution control and abatement program in the Arthur Kill area. In this program, it has been determined that you are discharging wastes of a polluting nature into the Arthur Kill, or a tributary thereof. Our information also is to the effect that there are public sewerage facilities available in your immediate vicinity.

You are requested to advise this Department within 30 days, of the actions which you will take in order to eliminate the discharge of polluting materials into the Arthur Kill, or a tributary thereof. Please feel at liberty to call upon us for discussion of any details in relation to this problem.

Your cooperation will be appreciated very much.

Very truly yours,

Roscoe P. Kandle, M.D.
State Commissioner of Health

BAD000018

17

April 19, 1965

Mayor and Council
City Hall
Elizabeth, New Jersey

Gentlemen:

This is to confirm my discussion with Mayor Dunn on April 8, 1965 pertaining to pollution abatement in the Elizabeth, New Jersey area.

The City completed new intercepting sewers and pumping stations in 1957. However, there are two areas that have not been intercepted and the discharges are in violation of a court order obtained on December 1, 1959. One is in the Bayway area which continues to discharge raw wastes into the Arthur Kill at the foot of Bayway Avenue. The other is from the Singer Manufacturing Company area, which discharges untreated sewage at the foot of Trumbull Street.

There has been a series of correspondence between the City of Elizabeth and the Commission since 1960 pertaining to the interception of the Bayway area. We were advised that the plans for the Bayway Interceptor and the Humble Avenue Diversion Sewer were completed in the latter part of 1963, and that applications had been made for federal construction grant funds. We understand that federal funds for this project are not available.

We would therefore appreciate your submitting a proposed time table as promptly as possible indicating when the projects will be advertised for bids, the beginning of construction, and completion of the entire pollution abatement project.

Sincerely yours,

Thomas R. Glenn, Jr.
Director & Chief Engineer

TRG:k

Copy: N.J.S. State Dept. of Health -
Robert S. Shaw

BAD000019

18

NOTICE

WHEREAS, The State Department of Health of the State of New Jersey has found through investigations made by its representatives that the industrial waste or other polluting matter is being discharged into the Arthur Kill, being waters of this State, from the industrial plant operated by the Reichhold Chemicals Incorporated, in the City of Elizabeth, County of Union and State of New Jersey, and that the said discharge is polluting the said waters of this State in such a manner as to cause or threaten injury to the inhabitants of this State either in their health, comfort or property; therefore.

NOTICE IS HEREBY GIVEN, by the State Department of Health of the State of New Jersey pursuant to the applicable provisions of R.S. 58:12.2 to the Reichhold Chemicals Incorporated, in the City of Elizabeth, County of Union and State of New Jersey, requiring that the said Reichhold Chemicals Incorporated must and shall, prior to January 7, 1965 cease such pollution of the Arthur Kill, being waters of this State, and make such disposition of its industrial waste or other polluting matter in a manner as shall be approved by the State Department of Health of the State of New Jersey.

STATE DEPARTMENT OF HEALTH OF THE STATE OF NEW JERSEY

Roscoe P. Kandle, M.D., M.P.H.
State Commissioner of Health

Dated December 23, 1963

BAD000021

James E. McGreevey
Governor

State of New Jersey
Department of Environmental Protection

Bradley M. Campbell
Commissioner

Bureau of Nonpoint Pollution Control
Division of Water Quality
P.O. Box 029
Trenton, N.J. 08625-0029
Tel: 609-633-7021, 292-0407
FAX: 609-984-2147
www.state.nj.us/dep/dwq/nonpoint.htm

March 19, 2004

John Gillespie
City of Elizabeth
50 Winfield Scott Plaza
Elizabeth, New Jersey 07201

Re: R9 -Tier A Municipal Stormwater General Permit
NJPDES: NJG0151530 / PI ID #: 46299
Elizabeth City, Union County

BAE000005

Dear Mr. Gillespie:

Enclosed please find your municipality's Authorization to Discharge (Authorization) under the New Jersey Pollutant Discharge Elimination System (NJPDES) Tier A Municipal Stormwater General Permit NJ0141852 (Tier A Permit), and a copy of the final permit. The "Effective Date" on the enclosed Authorization, 04/01/2004, is your municipality's "Effective Date of Permit Authorization" (EDPA) under this final permit. The implementation schedules contained in the final permit are based on your municipality's EDPA.

A unique NJPDES permit number NJG0151530 has been assigned for your municipality's authorization under the Tier A Permit. In any future correspondence or inquiries, please use or refer to that NJPDES permit number.

The enclosed final permit includes some technical corrections and changes to the advance copy that the Department of Environmental Protection (Department) mailed to your municipality in late January. Please replace the advance copy with the official final permit contained in this mailing. Also enclosed with this mailing is a summary of these technical corrections and changes.

A compact disk (CD) that contains guidance for the Tier A Permit and the informational brochure for the Local Public Education Program will be mailed to you under separate cover. The guidance will have blank and completed example Stormwater Pollution Prevention Plan (SPPP) forms to assist your municipality in preparing its SPPP. The CD will also contain other guidance including courtesy copies of the amended NJPDES Stormwater rules (N.J.A.C. 7:14A) and Stormwater Management rules (N.J.A.C.7:8), model ordinances, the New Jersey Stormwater Best Management Practices Manual, and additional educational materials supplied by the Department's Division of Watershed Management.

If any information about your municipality in this letter or the enclosed Authorization (i.e., mailing address, Municipal Stormwater Program Coordinator, etc.) is incorrect or has changed, or changes in the future, please contact the Bureau of Nonpoint Pollution Control for an Administrative Update Form.

The Department appreciates your efforts toward accomplishing the goal of providing cleaner water for our State and looks forward to working together with you in the future. If you have any questions please contact Julie Zoleta at the Bureau of Nonpoint Pollution Control at (609) 633-7021, or (609) 292-0407.

Sincerely,

Barry Chalofsky, P.P., Chief
Bureau of Nonpoint Pollution Control

Enclosures: (3)
Authorization to Discharge
NJPDES General Permit No. NJ0141852
Summary of technical corrections and changes

C: (w/AUTHORIZATION Form): NJDEP Water Compliance and Enforcement Region Office
Debbie Esposti, BPM

New Jersey Department of Environmental Protection

Bureau of Nonpoint Pollution Control
Division of Water Quality
PO Box 029
Trenton, NJ 08625-0029
Phone: (609) 633-7021
Fax: (609) 984-2147

AUTHORIZATION TO DISCHARGE
R9 -Tier A Municipal Stormwater General Permit

Facility Name:

ELIZABETH CITY

PI ID #: 46299

Facility Address:
50 WINFIELD SCOTT PLAZA
ELIZABETH, NJ 07201-0000

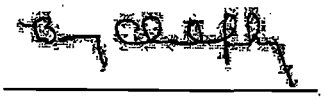
NJPDES #: NJG0151530

Type of Activity: Stormwater Discharge General Permit Authorization New
Owner:
ELIZABETH CITY
50 WINFIELD SCOTT PLAZA
ELIZABETH, NJ 07201

Operating Entity:
ELIZABETH CITY
50 WINFIELD SCOTT PLAZA
ELIZABETH, NJ 07201

Issuance Date:	Effective Date:	Expiration Date:
03/19/2004	04/01/2004	02/28/2009

Your Request for Authorization under NJPDES General Permit No. NJ0141852 has been approved by the New Jersey Department of Environmental Protection.



Date: 03/19/2004

Barry Chalofsky, P.P., Chief
Bureau of Nonpoint Pollution Control
Division of Water Quality
New Jersey Department of Environmental Protection

20

11-0816

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

NOTICE OF VIOLATION

DATE 8-17-92

METRO ENFORCEMENT ELEMENT
BUREAU OF REGIONAL ENFORCEMENT 2 BABCOCK PL, WEST ORANGE, NJ
TELEPHONE NO. 201-669-3900

PCWS # ______ TYPE SUPPLY ______ NJPDES # ______ TYPE DISCH. SW RCRA # ______
NAME OF FACILITY CITY OF ELIZABETH
LOCATION OF FACILITY CITY HALL MUN. ELIZABETH COUNTY UNION
FACILITY REPRESENTATIVE AND TITLE BOB WETZEL SUPERVISING ENG. AIDE

You are hereby NOTIFIED that during an inspection of your facility on the above date, the following violations were noted and remedial actions are required:

(1) DESCRIPTION OF VIOLATION/REMEDIAL ACTION: UNPERMITTED SANITARY SEWER DISCHARGING SEWAGE INTO THE ELIZABETH RIVER AT THE MURRAY STREET BRIDGE, DURING VERY LIGHT RAIN.

(2) CEASE DISCHARGING IMMEDIATELY.
(3) SUBMIT A WRITTEN REPORT WITHIN (30) DAYS TO BUREAU ABOVE

The above noted violations are in violation of the following N.J. Statutes/Regulation, and will be recorded as part of the permanent enforcement history of your facility:

- ☒ New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and appropriate Regulations.
- ☐ New Jersey Safe Drinking Water Act (N.J.S.A. 58:12A-1 et seq.) and appropriate Regulations.
- ☐ New Jersey Water Supply Management Act (N.J.S.A. 58:1A-1 et seq.) and appropriate Regulations.
- ☐ New Jersey Solid Waste Management Act (N.J.S.A. 13:1E-1 et seq.) and appropriate Regulations.
- ☐ New Jersey Underground Storage of Hazardous Substance Act (N.J.S.A. 58:10A-21 et seq.) and appropriate Regulations.

Remedial action to correct the violations must be initiated immediately. Within five (5) calendar days of receipt of this Notice of Violation, you shall telephone the investigator issuing this notice at the above number with the corrective measures you have initiated to attain compliance. The issuance of this document serves as notice to you that the Department has determined that a violation has occurred and does not preclude the State of New Jersey or any of its agencies, from initiation of further administrative or judicial enforcement action, or from assessing penalties, with respect to this or other violations. Violations of these regulations are subject to penalties of up to $25,000 per day.

Further enforcement action, which will require a written response, may be issued on these violation(s) and any additional violations found during the inspection.

[signature]
Investigator, Division of Water Resources, DEP

Violation received by
[signature]

White - Original | Canary - Bureau File | Pink - Criminal Justice | Goldenrod - Central File

New Jersey Is An Equal Opportunity Employer

BAG000065

CITY OF ELIZABETH, NEW JERSEY

DEPARTMENT OF HEALTH, WELFARE AND HOUSING

John J. McGoohan
DIRECTOR

Thomas G. Dunn
MAYOR

December 13, 1965.

Dr. Roscoe P. Kandle,
Commissioner of Health
State Department of Health,
State House,
Trenton, New Jersey.

Dear Dr. Kandle:

Since May, 1965 we have had many communications regarding the problem of the "Big Ditch" located in Newark Airport.

On July 27, 1965 you received a letter from City Council in which they resolved that the State Department of Health take immediate steps to eliminate all health hazards and nuisances generated by the open ditch, and otherwise known as the "Big Ditch" located in the Newark-Elizabeth meadow region. During June or July we received communications that Governor Hughes had expressed interest in this problem and stated he would keep after the problem until it is solved.

I would like to know where this problem rests at the present time. The temperatures are down which will cause the odors to be limited; however, we will soon be approaching warm weather.

Does the health hazard still exist?
Did the dumping of chemicals by the Port Authority have any effect on the ditch?
Is there a legal injunction against the City of Newark concerning dumping in the ditch?

I would appreciate any information which your Department could furnish with regards to this matter. The City of Elizabeth is unaware of the present status of this problem.

Looking forward to hear ng from you in this matter, I remain

Sincerely,

John J. McGoohan
Director
Health, Welfare & Housing.

BAG 000094

INTERSTATE SANITATION COMMISSION

A TRI-STATE ENVIRONMENTAL AGENCY

311 WEST 43rd STREET • NEW YORK, N.Y. 10036

COMMISSIONERS

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Lester H. Grubman	Donna B. Gerstle	Helen Carrozelli
Samuel P. Owen	Thomas C. Jorling	Joseph I. Lieberman

Director - Chief Engineer
Alan I. Mytelka, Ph.D.

COMBINED SEWER OUTFALLS IN THE INTERSTATE SANITATION DISTRICT

Prepared by

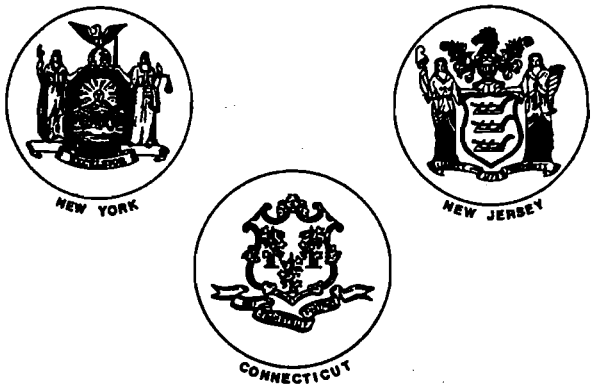
Patricia C. Hick
Staff Attorney

October 1988

BAH000001

INTERSTATE SANITATION COMMISSION

A TRI-STATE ENVIRONMENTAL AGENCY



COMBINED SEWER OUTFALLS IN THE INTERSTATE SANITATION DISTRICT

BAH000001

NEW YORK NEW JERSEY CONNECTICUT

The sewer systems in Bayonne and Jersey City will be undergoing changes in order to connect them to the PVSC POTW in Newark. Because of this construction, those municipalities should take the opportunity to mitigate, and, where possible to eliminate, CSOs in the segment. As mentioned previously, however, no CSO elimination is planned by either community at this time. The Kill Van Kull provides an excellent good opportunity for interstate cooperation because it is a small waterbody into which a relatively large number of CSOs discharge; concentrated effort by the two states could reduce the CSOs in this area and lead to improvement in the degraded water quality.

SECTION 6B: ARTHUR KILL

The Arthur Kill passes between Staten Island and numerous New Jersey municipalities. It is shown on Map 6-3. Separate sanitary sewer systems have been constructed in most municipalities along the Arthur Kill and if they are not entirely separate systems, they are separated along the shoreline. CSOs from several New Jersey communities, including Elizabeth and Perth Amboy, discharge into the Arthur Kill. Outfalls from the Oakwood Beach drainage basin on Staten Island are also included in this section. Tables 6-2 and 6-3 list the CSO outfalls in Section 6B and they are shown on Maps 6-4 and 6-5.

Elizabeth

The City of Elizabeth contributes eleven CSOs to this section of the District: five outfalls to the Arthur Kill and six to the Elizabeth River. The outfalls to the Arthur Kill, shown on Map 6-4, range in size from 36" in diameter to 3' x 5'3". Although the discharge pipes in Elizabeth are generally constructed of cast iron or reinforced concrete, 029 at Elizabeth Avenue is wood. Outfall 032 at Magnolia Avenue is a 3' x 4'6" brick outfall.

Six CSOs from Elizabeth into the Elizabeth River are included here. They range in size from 4' x 3'3" to 60" in diameter. Outfall 040 is a 54" pipe at Pulaski Street and the Elizabeth River. Twenty-four other overflows

from Elizabeth enter the Elizabeth River above outfall 026, but are not shown on Map 6-4. Approximately half of these outfall to saline waters according to the discharge permit. The estimated flow from these CSOs is 1.82 MGD.[10]

The City of Elizabeth is initiating several projects to gain better control over these flows. First, flow meters are being installed at a number of outfalls to monitor flow. Second, the City is constructing a "storage module" at outfall 042, which is above 026 on the Elizabeth River, in an effort to reduce discharges caused by wet weather overflows.[11]

Carteret

Carteret's $9.5 million sewer separation program is approximately 99% complete. Work continues on the remaining regulator interconnections and the cosmetic work of paving the areas that are complete. As part of this work, the Dorothy Street pump station, which discharged to the Rahway River, was renovated and outfall structures and tide gates were replaced or repaired. Construction of the pump station necessary to convey wastewater from Carteret to the Middlesex County Utilities Authority (MCUA) POTW has begun.[12] According to a NJ DEP report, the CSOs from Elizabeth and Carteret "cause severe local water quality problems in the Arthur Kill."[13] With the abatement of CSOs in Carteret, an estimated flow of 1.15 MGD has been eliminated.[14]

Oakwood Beach

The lower section of Staten Island is largely unsewered; reliance is placed on septic systems for individual homes or small package treatment plants for housing developments. Although discharges occur from Staten Island into the Kill, the location or size of outfalls is not always available. The information available from the City lists 33 outfalls from the Oakwood Beach drainage basin into the Arthur Kill including six into Mill Creek and one into Richmond Creek. With the exception of the Richmond Creek outfall (048), which is shown on Map 6-4 and listed on Table 6-2, all of the other outfalls are shown on Map 6-5 and catalogued on Table 6-3. The largest of these outfalls

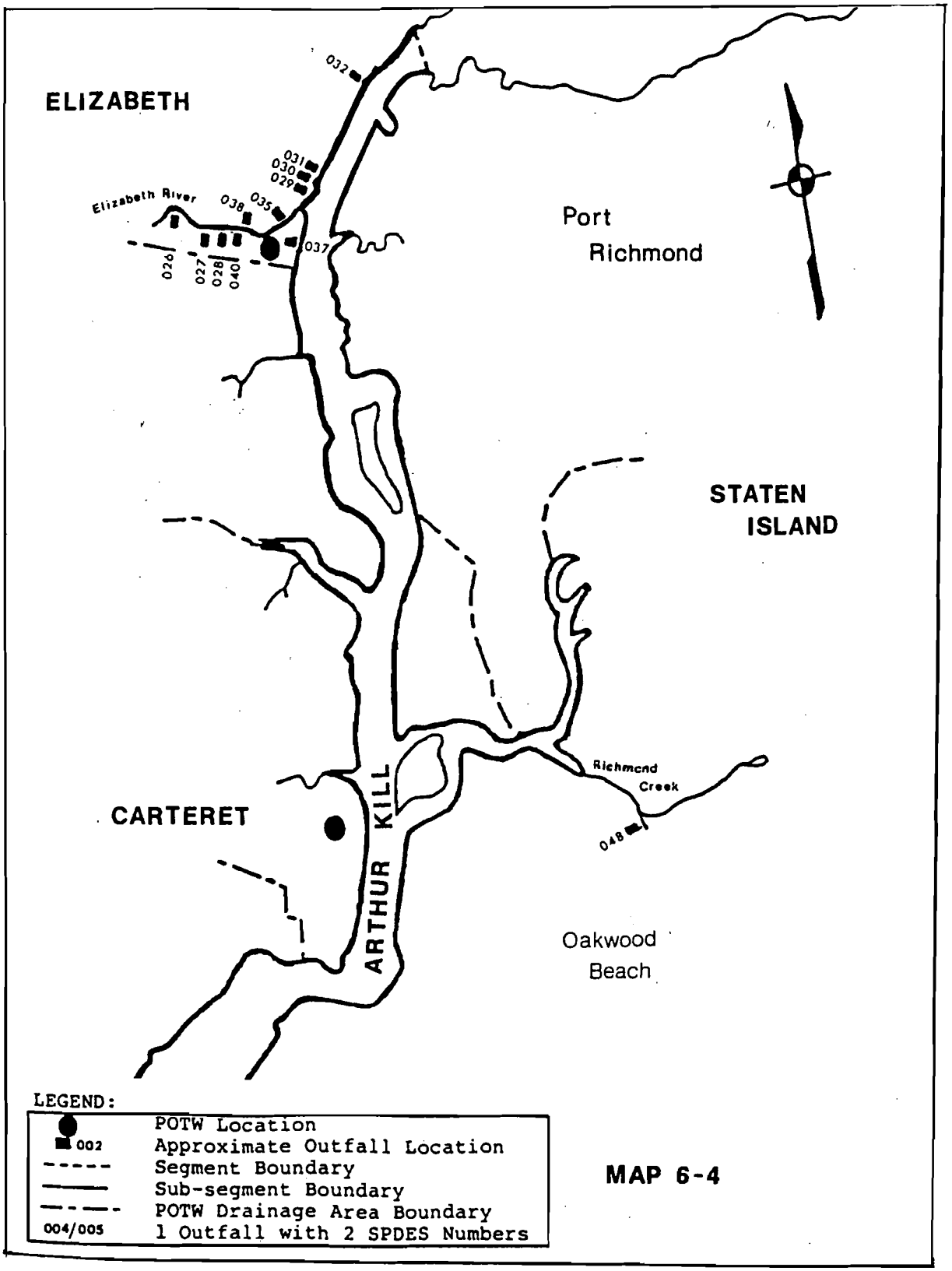

ELIZABETH
032
031
030
029
Elizabeth River
038
035
037
026
027
028
040
Port
Richmond
STATEN
ISLAND
CARTERET
ARTHUR KILL
Richmond
Creek
048
Oakwood
Beach
LEGEND:
POTW Location
002 Approximate Outfall Location
Segment Boundary
Sub-segment Boundary
POTW Drainage Area Boundary
004/005 1 Outfall with 2 SPDES Numbers
MAP 6-4

TABLE 6-1 (continued)

Treatment Plant Drainage Basin: City of Elizabeth, NJ0020648

Outfall Number SPDES	Outfall Number Local	Location of Outfall	Size[7]	Comments/ Notes
001		Ft. of Alina St. Peripheral Ditch	48" dia.	
002		Dowd Avenue Great Ditch	48" dia.	
034		Trumbull Street Newark Bay	60" dia.	
039		Schiller Street Great Ditch	36" dia.	

[7] Information from permit NJ0020648, Table III-A.

TABLE 6-2

COMBINED SEWER OUTFALLS
IN THE UPPER ARTHUR KILL
WATERWAY SEGMENT 6B

Treatment Plant Drainage Basin: City of Elizabeth, NJ0020648

Outfall Number SPDES	Outfall Number Local	Location of Outfall		Size[1]	Comments/ Notes
026*	No.26	John Street	Elizabeth River	4' x 3'3"	
027	No.27	n/o Summer Street	" "	58" dia.	
028	No.28	s/o Summer Street	" "	48" dia.	
029	No.29	Elizabeth Avenue	Arthur Kill	3' x 5'3"	
030	No.30	E. Jersey Street	" "	48" dia.	
031	No.31	Livingston Street	" "	36" dia.	
032	No.32	Magnolia Avenue	" "	3' x 4'6"	
035	No.35	3rd Avenue	Elizabeth River	60" dia.	
037	No.37	Bay Way	Arthur Kill	36" dia.	
038	No.38	Trenton Avenue	Elizabeth River	48" dia.	
040	No.40	Pulaski Street	" "	54" dia.	

[1] All information was obtained from permit NJ0020648, Table III-A.

* There are 24 outfalls discharging to the Elizabeth River in Elizabeth above outfall 026.

NJ0108782 -04LS

CERTIFIED MAIL NO.
P239 234 684

State of New Jersey

Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

FEB 2 8 2000

Honorable Mayor J. Christian Bollwage
Mayor, City of Elizabeth
50 Winfield Scott Plaza
Elizabeth, NJ 07201

SUBJECT: New Jersey Pollutant Discharge Elimination System
General Permit No. NJ0105023
Permit Re-issuance

Dear Mayor Bollwage:

Enclosed is the final reissued NJPDES General Permit NJ0105023 for Combined Sewer Systems with the Response to Comments Document as required by N.J.A.C. 7:14A-15.16. General Permit No. NJ0105023 was issued on February 28, 2000, has an Effective Date February 29, 2000 and will expire on February 28, 2005. The permit has been issued in accordance with the provisions of N.J.A.C. 7:14A.

The general permit has been re-issued with minor modifications as proposed in the draft permit re-issuance that do not impact the substantive provisions of the original permit. The most significant modification to the permit is the incorporation of paragraphs I.E. 3 & 4 that provide for the automatic renewal of existing authorizations as provided by N.J.A.C. 7:14A-6.13 (d) 9.

Within thirty (30) calendar days following your receipt of this permit, under N.J.A.C. 17:14A 17.2 you may submit a request for an adjudicatory hearing to reconsider or contest the conditions of this permit. Regulations regarding the format and requirements for requesting an adjudicatory hearing may by found in N.J.A.C. 7:14A-17.2 (a) through (f). The request should be made to:

Stanley V. Cach, Jr., PE, PP, Chief
Bureau of Engineering North
PO Box 425
Trenton, NJ 08625-0425

BAJ000001

Additionally, the request for an adjudicatory hearing must contain a completed, signed and dated "Administrative Hearing Request Checklist and Tracking Form for Permits" (form attached). The original forms shall be submitted to the Office of Legal Affairs and two copies submitted to the Division of Water Quality at the addresses listed on the attached form.

If you have any questions concerning the revocation and re-issuance of the permit, please contact Stanley V. Cach, PE, PP, Chief, Bureau of Engineering North at (609) 292-6894 or Gautam R. Patel, Chief, Bureau of Engineering South at (609) 984-6840.

Sincerely,

Dennis Hart
Director

ENCLOSURES
General Permit for Combined Sewer Systems and attachments
Request For Authorization and instructions
Notice to Permittees of Final Permit Decision
Administrative Hearing Request Checklist and Tracking Form for Permits

CERTIFIED MAIL NO.
P239 234 478

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

February 28, 2000

Mr. Blaise E. Lapolla
City of Elizabeth
50 Winfield Scott Plaza
Elizabeth, N.J. 07201-2462

SUBJECT: New Jersey Pollutant Discharge Elimination System
General Permit No. NJ0105023
Permit Re-issuance

GENTLEMEN:

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Trenton, NJ 08625-0425

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Sincerely,

Dennis Hart
Director

ENCLOSURES
General Permit for Combined Sewer Systems and attachments
Request For Authorization and instructions
Notice to Permittees of Final Permit Decision
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CERTIFIED MAIL No.
P239 234 684

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection
Bureau of Engineering North
Municipal Finance and Construction Element
PO BOX 425
Trenton, NJ 08625-0425

Robert C. Shinn, Jr.
Commissioner

February 28, 2000

Honorable Mayor J. Christian Bollwage
Mayor, City of Elizabeth
50 Winfield Scott Plaza
Elizabeth, NJ 07201

Dear Mayor Bollwage:

SUBJECT: New Jersey Pollutant Discharge Elimination System
NJPDES Permit No. NJ0105023
General Permit for Combined Sewer Systems
Notice of Automatic Renewal of Authorization
Individual Authorization No. NJ0108782

We are pleased to inform you that your Individual Authorization under the General Permit for Combined Sewer Systems NJPDES No. NJ0105023 was automatically renewed until February 28, 2005 pursuant to NJAC 7:14A-6.13. Enclosed with this letter you will find a copy of your renewed Individual Authorization. Please include a copy of the renewed Individual Authorization in the Combined Sewer Overflow Control Pollution Prevention Plan (CSOPPP).

The General Permit for Combined Sewer Systems NJPDES No. NJ0105023 is issued to control the discharge of pollutants from Combined Sewer Systems through Combined Sewer Overflow Points (CSO Points). The General Permit was re-issued on February 28, 2000, has an Effective Date of February 29, 2000 and will expire on February 28, 2005.

Existing authorizations were renewed automatically when the general permit was issued. The most recently submitted Request for Authorization (RFA) (A copy is enclosed.) was considered a timely and complete request for authorization under the reissued permit. The automatic renewal of an Individual Authorization was applicable for any permittee who had an Individual Authorization under the permit immediately prior to the effective date of the reissued permit.

Enclosed with this notice is a copy of the most recent RFA and the renewed Individual Authorization for your facilities. If any information contained in the Individual Authorization, specifically, any information contained in Table CSO-1, or that

which is contained in the enclosed RFA of record, is no longer valid, accurate, and/or complete, the permittee is required to provide the correct information to the Department within 90-days after the effective date of the permit.

A copy of the general permit and a new RFA package is enclosed with this letter. Please complete the enclosed RFA and FORM A: SCHEDULE OF CSO POINTS and return the completed and signed RFA along with a FORM A to the Department at the address included on the RFA within 90-days after the effective date of the permit.

The Department appreciates your efforts toward accomplishing the goal of providing cleaner water for our State and looks forward to building upon our joint achievements.

Additional information concerning the Re-issued General Permit or the Renewal of the Individual Authorizations may be obtained between the hours of 8:00 AM and 4:00 PM, Monday thorough Friday by contacting Stanley V. Cach, PE, PP, Chief, Bureau of Engineering North at (609) 292-6894.

Sincerely,

Stanley V. Cach, Jr. PE, PP, Chief
Bureau of Engineering North
Municipal Finance & Construction

ENCLOSURES
Individual Authorization
RFA of record
New RFA package

CERTIFIED MAIL No.
P239 234 478

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection
Bureau of Engineering North
Municipal Finance and Construction Element
PO BOX 425
Trenton, NJ 08625-0425

Robert C. Shinn, Jr.
Commissioner

February 28, 2000

Mr. Blaise E. Lapolla
City of Elizabeth
50 Winfield Scott Plaza
Elizabeth, N.J. 07201-2462

Dear Mr. Lapolla:

SUBJECT: New Jersey Pollutant Discharge Elimination System
NJPDES Permit No. NJ0105023
General Permit for Combined Sewer Systems
Notice of Automatic Renewal of Authorization
Individual Authorization No. NJ0108782

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Enclosed with this notice is a copy of the most recent RFA and the renewed Individual Authorization for your facilities. If any information contained in the Individual Authorization, specifically, any information contained in Table CSO-I,

which is contained in the enclosed RFA of record, is no longer valid, accurate, and/or complete, the permittee is required to provide the correct information to the Department within 90-days after the effective date of the permit.

A copy of the general permit and a new RFA package is enclosed with this letter. Please complete the enclosed RFA and FORM A: SCHEDULE OF CSO POINTS and return the completed and signed RFA along with a FORM A to the Department at the address included on the RFA within 90-days after the effective date of the permit.

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Sincerely,

Stanley Cach, Jr., PE, PP, Chief
Bureau of Engineering North
Municipal Finance & Construction

ENCLOSURES
Individual Authorization
RFA of record
New RFA package

NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

The New Jersey Department of Environmental Protection hereby grants you a NJPDES permit for the facility/activity named in this document. This permit is the regulatory mechanism used by the department to ensure your discharge will not harm the environment. By complying with the terms and conditions specified, you are assuming an important role in protecting New Jersey's valuable water resources. Your acceptance of this permit is an agreement to conform with all of its provisions when constructing, installing, modifying, or operating any facility for the collection, treatment, or discharge of pollutants to waters of the state. If you have any questions about this document, please feel free to contact the department representative listed in the permit cover letter. Your cooperation in helping us protect and safeguard our state's environment is anticipated and appreciated.

PERMIT NUMBER NJ0108782

Permittee	Co-Permittee
ELIZABETH CITY OF 50 WINFIELD SCOTT PLAZA ELIZABETH NJ 07201	

Property Owner	Location of Activity
ELIZABETH CITY OF 50 WINFIELD SCOTT PLAZA ELIZABETH NJ 07201	ELIZABETH CITY OF 50 WINFIELD SCOTT PLAZA ELIZABETH NJ 07201

Current Authorization Covered By This Approval And Previous Authorization	Issuance Date	Effective Date	Expiration Date
CSO:COMBINED SEWER OVERFLOW (GP)	02/28/2000	02/29/2000	02/28/2005

By Authority of:

DEP AUTHORIZATION

Stanley V. Cach Jr., PE, PP
Chief, Bureau of Engineering North

(Terms, conditions and provisions attached hereto)

NJPDES/DSW PERMIT NUMBER NJ0108782
INDIVIDUAL AUTHORIZATION PAGE CONTINUED

This individual general permit authorization authorizes the City of Elizabeth to operate a combined sewer system for the collection and conveyance of wastewater and to discharge untreated wastewater in the form of combined sewer overflows from the combined sewer overflow points listed on the Table CSO-I, in accordance with terms and conditions of the General Permit for Combined Sewer Systems NJPDES Permit No. NJ0105023.

Table CSO-I

001	Alina St. No. 1	40°40'49"	74°11'30"	Peripheral Ditch
002	Dowd Ave. No. 2	40°40'19"	74°11'26"	Great Ditch
003	Westfield Ave. No. 3	40°40'04"	74°13'15"	Elizabeth River
005	Westfield Ave. No. 5	40°40'04"	74°13'11"	Elizabeth River
006	Crane St. No. 6	40°40'01"	74°13'09"	Elizabeth River
007	W. Grant, E. Bank	40°39'58"	74°13'09"	Elizabeth River
008	W. Grant St. W. Bank	40°39'58"	74°13'08"	Elizabeth River
009	Murray St. E. Bank	40°39'47"	74°13'09"	Elizabeth River
010	Murray St. W. Bank	40°39'47"	74°13'10"	Elizabeth River
011	Rahway Ave. W. Bank	40°39'41"	74°13'06"	Elizabeth River
012	Rahway Ave. E. Bank	40°39'41"	74°13'04"	Elizabeth River
013	S. of Rahway Ave.	40°39'39"	74°13'04"	Elizabeth River
014	Broad St. E. Bank	40°39'39"	74°12'57"	Elizabeth River
016	Broad St. W. Bank	40°39'38"	74°13'03"	Elizabeth River
017	Broad St. W. Bank	40°39'38"	74°12'56"	Elizabeth River
021	South Spring St. E. Bank	40°39'32"	74°12'53"	Elizabeth River
022	South St. E. Bank	40°39'28"	74°12'39"	Elizabeth River
025	Montgomery St., W. Bank	40°39'22"	74°12'40"	Elizabeth River
026	John St.,E. Bank	40°39'15"	74°12'33"	Elizabeth River
027	Summer St.,W. Bank	40°38'59"	74°12'37"	Elizabeth River
028	Summer St., W. Bank	40°38'59"	74°12'37"	Elizabeth River
029	S.Front St.,E. Bank	40°38'40"	74°11'26"	Elizabeth River
030	East Jersey St. & Front St.	40°38'47"	74°11'12"	Arthur Kill
031	Livingston St.	40°38'48"	74°11'09"	Arthur Kill
032	Magnolia Ave.	40°38'51"	74°10'53"	Arthur Kill
034	Puleo Plaza	40°39'07"	74°10'15"	Newark Bay
035	Third Ave., E. Bank	40°38'33"	74°11'43"	Elizabeth River
036	Irvington Ave. Dod Ct.	40°40'15"	74°13'12"	Elizabeth River
037	Bayway	40°38'06"	74°11'57"	Arthur Kill
038	Trenton Ave., E. Bank	40°38'46"	74°12'52"	Elizabeth River
039	Schiller St.	40°39'46"	74°12'52"	Great Ditch
040	Pulaski St., W. Bank	40°38'47"	74°12'32"	Elizabeth River
041	Morris Ave., W. Bank	40°40'10"	74°13'11"	Elizabeth River
042	Bridge St., E. Bank	40°39'32"	74°12'43"	Elizabeth River

Clinton Bogert Associates

2125 Center Avenue, Fort Lee, N.J. 07024
201-944-1676

PARTNERS
Ivan L. Bogert
Herbert L. Kaufman
PRINCIPALS
Wayne Eakins
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CONSULTING ENGINEERS

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Johannes deWaal
Francis J. Dobrowolski
Daniel S. Greene
Ignaz Rottenbucher
William Wheeler

April 12, 1984

Mr. Robert J. Kotch, P.E., Chief
Technical Services Unit
Construction Grants Administration
NJ DEP
Div. of Water Resources
Box CN 029
Trenton, NJ 08625

Re: City of Elizabeth, NJ
Combined Sewer Overflow (CSO)
Pollution Abatement Program
Volumes I and II, August 1981
Fed. Project No. C-34-0447-01

Dear Mr. Kotch:

Attached hereto are responses to your letter of May 12, 1983. The numbers in the attachment correspond to those in your letter. This attachment is Addendum No. 1 to the Facilities Plan dated August 1981.

The responses contained herein are intended to permit your approval of the Facilities Plan conditioned on completion of the Stage 1B Cultural Resources Survey. We understand the possibility of encountering historic archaeological resources may be most likely during the installation of the underground tanks in the parks, along the Arthur Kill, or along the Elizabeth River. This work would be performed as the grant application is being processed and submitted as a condition of grant approval.

The proposed initial stage includes replacement of (a) the obsolete and undersized Westerly Interceptor from the intersection of Morris and Westfield Avenues to the vicinity of Clarkson and Britton Streets, and (b) obsolete combined sewage overflow diversion structures with modern ones. We are authorizing a professional Stage 1B survey, and will submit it to you upon its completion.

Very truly yours,

CLINTON BOGERT ASSOCIATES

Herbert L. Kaufman

Herbert L. Kaufman

HLK:js
Enclosures
cc: V. Vinegra, Eliz.

BAK000001

CITY OF ELIZABETH, NEW JERSEY
COMBINED SEWER OVERFLOW
POLLUTION ABATEMENT PROGRAM

ADDENDUM NO. 1

Response to General Comments

1. In Attachment A of Supplemental Agreement No. 3, two computer models, SWMM and STORM, were identified for use in the development of the facilities plan. Changes in scope resulting from the necessity of enhancing model capabilities were described. The two models were used to evaluate the existing sewer system and quantify the flow volume and pollutant mass loading to the receiving waters. Subsection 3.c. indicates why the STORM program was modified to do part-year pollutant discharge simulation instead of 12 months as in the original program. Whenever the word "model(s)" is referenced, it means SWMM or STORM, whichever is appropriate. It does not mean a model for receiving water impact evaluation.

The impact of CSO pollutant discharges to the river was demonstrated by one dry weather sampling run on July 20, 1980 and two wet weather sampling runs on July 22 and August 12, 1980, respectively. The results of the analysis of the runs are shown in Tables V-4 through V-7 of the report. The coliform MPN in the river flow increased by an order of magnitude during wet weather at and upstream of West Jersey Avenue but remained about the same between South Street and Trenton Avenue. However, the dry weather coliform MPN was an order of magnitude greater between South Street and Trenton Avenue than at West Jersey Avenue and upstream. The dissolved oxygen in the river was zero between South Street and Trenton Avenue but was at acceptable levels, 5.2 and 5.0 mg/l in the morning, and 8.0 and 11.0 mg/l in the afternoon at West

Jersey and Morris Avenues, respectively. The increase in oxygen in the afternoon could be attributed to the stimulation of sunlight on life forms in the river. The influence of the tide between South Street and Trenton Avenue is indicated by the chloride content.

A run made during dry weather under drought conditions on August 30, 1961 resulted in chloride concentrations at Trenton Avenue equal to about 91 percent and 23 percent of the chloride concentration in the Arthur Kill at high and low tide, respectively. These values are comparable to the corresponding values on July 20, 1981 (Table 1). The measured chloride concentrations indicate no significant flushing of the river during dry weather. The storm of July 22, 1980, with a measured peak flow of about 500 cfs at Ursino Dam, did result in reducing the chloride concentration at Trenton Avenue to near normal, while, after the storm of August 12, 1980 (peak flow at Ursino Dam, 250 cfs), high concentrations of chlorides were still found at Trenton Avenue.

The average velocity in the downstream reaches of the river (exclusive of that imparted by the tidal wedge) as improved by the COE flood control project is about 0.5 feet per second at a flow of 500 cfs. This velocity could be negative (i.e., upstream) and as much as two feet per second with the outgoing tide. Considering the channel length (about 11,500 feet below South Street), this range in velocity should be expected to result in the settling of pollutants in the river below South Street. Comparison of the chloride content in the 1961 and 1980 measurements during dry weather between South Street and Trenton Avenue indicates the effect of enlarging the channel for flood protection. The concentrations at both low and high tides in the 1980 measurements are attributed to the greater volume of estuary water retained which contributes to reducing pollutant flushing. This is further confirmed by the dry weather BOD_5 values between South Street and

Trenton Avenue which were substantially higher at low tide than at high tide. At high tide, the BOD_5 was highest at South Street and lowest at Trenton Avenue which can also be attributed to a benthal deposit resulting from poor flushing. During dry weather, the ratio of DO to BOD_5 has been measured as 4:1 or greater at Morris Avenue. During wet weather, the ratio is reversed and has been measured at 1:4. All the above is consistent with the conclusions that:

(a) The river is normally clean at Morris Avenue and above;

(b) Sewage pollutants enter the river in large quantities in wet weather; and

(c) These pollutants settle in the reaches of the river in the vicinity of and below South Street and that stretch of the tidal estuary is grossly polluted as a result.

The analyses performed for a continuous 12-year record using calibrated models permit an order of magnitude evaluation of the mass of pollutants discharged on the river. The following assumes there were no dry weather flow discharges and an average river flow at Ursino Dam of 6000 Mgal per year.

Construction Stage	BOD Discharged (lbs/year)	River Flow (1) (Mgal/year)	Incremental BOD Concentration (mg/l)
Westerly Interceptor Reconstructed	763,034	6,700	13.5
Stage 1	479,834	6,500	8.9
Stage 2	209,255	6,300	4.0

(1) At mouth.

Table 2 lists the water quality with respect to dissolved oxygen, BOD_5 and fecal coliform MPN in Ursino Lake (obtained from the U.S.G.S.) from October 1978 through September 1982. The Elizabeth River contains substantial oxygen resources before flowing through the City. These are removed apparently by benthos in the tidal estuary of the stream.

Removal of a substantial part of the pollutants now entering the river as a result of combined sewage overflows and urban runoff should result in restoring the water quality in the river.

2. As stated in the Plan of Study dated April 1977, in the last paragraph under "Effluent Limitation," evaluation of alternatives for CSO pollution abatement would be based on the reduction of overflow frequency and the quantity of pollutants discharged relative to the "existing overflow conditions."

Discussions on page VI-4 regarding the Westerly and Easterly Interceptors and regulators indicated the "existing overflow conditions" which serve as the baseline for measuring the effectiveness of abatement alternatives would apply assuming the older sections of the Westerly Interceptor (about 9,120 feet, see Table VI-2), are replaced and inoperable or damaged regulators and tide gates are repaired or replaced and are properly maintained. Stated simply, all dry weather overflows would be eliminated. At the present time, the pollutants discharged to the river are greater due to dry weather overflows and improperly operating regulators. Table X-2 has identified those regulators and tide gates requiring repair or replacement to reduce dry weather overflows to receiving waters. A revised Table X-2 is attached hereto as Table 3.

Under the assumed baseline conditions, overflows from areas tributary to the Westerly Interceptor should occur on average

about 80 times a year and are calculated to discharge about 9,500 lbs of BOD per overflow or an equivalent of daily raw sewage from about 56,000 persons (assuming 0.17 lbs/capita/day). Pollution abatement requires control of CSO.

3. Pollutants discharged with the CSO are not the only cause of stream standard violations. Storm sewer discharges also contribute significant amount of pollutants to the River. After the Westerly Interceptor and regulators are upgraded, storm sewer discharges should account for 30 percent of the total BOD loading that annually discharges from the City and 40 percent of the total suspended solids (SS) loading. Tne plan provides for diverting most of the pollutants in urban runoff to treatment.

The stream classification of the Elizabeth River has been designated by the NJDEP as FW-2 for non-tidal reaches and TW-3 for tidal reaches. FW-2 waters should be suitable for primary contact recreation and industrial and agricultural water supply. TW-3 waters should be suitable for secondary contact recreation and migration of anadromous fish.

Important water quality criteria for FW-2 are:

(a) DO, not less than 4.0 mg/l at any time, 5.0 mg/l (daily average)

(b) BOD, not more than 5.0 mg/l at any time

(c) SS, not more than 40 mg/l at any time

(d) fecal coliform (geometric average), less than 200/100 ml

Important water quality criteria for TW-3 are:

(a) DO, not less than 3.0 mg/l at any time

(b) Fecal coliform, less than 1500/100 ml

Tests indicate the river water quality currently meets FW-2 standards during dry weather at West Jersey and Morris Avenue with respect to DO, BOD and SS. Measurements of fecal coliforms were not made. The effect of CSO and urban runoff pollution is shown in the dry weather water quality in the river's tidal estuary. The proposed plan controls both sources of pollution. The required standard should be achievable if CSO and urban runoff are controlled.

Oxygen is esential to maintain aerobic biochemical processes associated with the decomposition of stream pollutants. The oxygen content of a stream can reflect pollutant loads. The relation of BOD to DO is also critical, since turbulence in part of the river channel can temporarily increase the DO. DO and BOD are the primary water quality parameters that should be measured. Our study uses the amount of BOD loading to the receiving waters to indicate the effectiveness of various alternatives to recover water uses.

4. A CSO study conducted by CBA in 1979 for Hudson County Utilities Authority concluded the street sweeping cost to be approximately $100/curb-mile (ATTACHMENT 1). A study at San Jose indicates a street sweeping cost of $18/curb mile after adjustment based on the ENR indices (ATTACHMENT 2).

The conclusion of the San Jose Study that "improved street cleaning will effectively control total solids and heavy metals in runoff" is not applicable to the humid eastern states. Table 4 indicates the one-hour intensity of a rainfall with a 25-year return interval in San Jose is about one-half that with a return

interval of two years at Sandy Hook, New Jersey. The climate at San Jose is arid compared to Elizabeth. Of importance equal to the relative intensity of rainfalls is their frequency. In Elizabeth, 50 percent of the rainfall events are preceded by only 1.6 days of dry weather, 80 percent, by less that 5.1 days, and 90 percent, by less than 6.7 days. The City presently sweeps the streets once per week when weather permits. To have any significant effect on the pollutants in the runoff, street sweeping would have to be done daily.

In the following, the cost effectiveness of street sweeping is evaluated using data developed in Areas NNW and SE. The amount of BOD loading prevented from directly discharging to the receiving waters is determined using STORM.

Area	Street Sweeping Interval (day)	Additional* BOD Removed (lbs/yr)	Cost of Sweeping ($/curb mile) 100	75	50	25
NNW	1	96,698	13.7**	10.3	6.8	3.4
	2	70,309	10.1	7.6	5.1	2.5
SE	1	68,378	9.7	7.3	4.9	2.4

*in addition to pollutant removed from weekly sweeping
**$/lb of BOD removed from overflow

Comparing cost of street sweeping in $/lb with that of alternatives listed in the last column of Tables VII-4 and VII-5, street sweeping is not cost-effective unless its cost is $25/curb-mile or less.

In our analysis, we have assumed that the efficiency of street sweeping equals 40 percent. This appears to be high for an urban area because of the parked car problem. In addition, all surface pollutants are assumed to have been accumulated on paved

streets and are available to be swept. In fact, substantial amounts of organics and nutrients originate in off-street areas and cannot be controlled by intense sweeping. That means that additional BOD removed by sweeping more frequently than once a week as shown in the table above should be reduced and the cost of sweeping ($/lb) should be increased.

Further, 68 percent of the City is served by combined sewers which contribute about 70 percent of the total pollutants. About 35 percent of the discharged pollutants result from settled dry weather sewer deposits and sewage entering the system during the overflow event. At best, only about 40 percent of the surface pollutants could be removed by the most conscientious street sweeping. Accordingly, the type of facilities proposed in the plan would be required to have any impact on the more than 60 percent of pollutants that would enter the City's sewers. Hence, there is no effective alternative to the proposed program.

Street cleaning may be effective for controlling urban runoff pollution in arid areas such as San Jose with separate sewer systems and an annual rainfall of about 15 inches. In Elizabeth, which is largely servd by a combined system and where it rains frequently with an average annual precipitation of about 45 inches, the effectiveness of street sweeping is greatly reduced. Street cleaning is usually done more for aesthetic reasons than for pollution control.

5. (a) As previously discussed, it was not proposed to evaluate alternatives based on modeling the receiving water impacts. Evaluation was based on the reduction of overflow frequency and the quantity of pollutants discharged relative to the current overflow conditions and the water quality in the river upstream of Elizabeth.

The cost/benefit comparison presented in Plates VII-29 and 30 is derived from an "alternative screening" method developed for the study. The screening method allows identification of the optimal stage of facilities construction. The construction is divided into two stages, initial and subsequent. Facilities included in the initial stage consist of sewer flushing and in-line storage structures that are of relatively low cost. They should divert to treatment about 50 percent of the pollutants that would otherwise enter the Elizabeth River after improvement of the Westerly Interceptor. The improvement of receiving water quality would be monitored as the initial stage construction progresses to determine the needed, more costly, subsequent stage facilities.

(b) Pollution in the receiving waters results from the organic matter and heavy metals which form part of the solids.

Model calibration (Table IV-3) indicates sewer solids deposited contain 40 percent BOD by weight. This is comparable to the field data collected in Boston by Pisano under an EPA grant. Also, solids in the street washoff contain three percent BOD by weight (Table IV-3). Thus, BOD contained in the overflow is directly related to SS. Use of SS or BOD as parameters for evaluation of alernatives is generally immaterial. BOD is used since water quality parameters of concern are DO and BOD.

6. (a) The present worth value of each alternative is based on 6-7/8 percent discount rate and 20-year planning period. The annuity factor value is 10.7.

(b) The capital cost (Tables VII-4 and 5) of the structures and equipment consists of:

(b-1) Construction cost

(b-2) Enginering, legal and miscellaneous cost @ 25% of (b-1)

(b-3) Land cost @ $75,000/acre

(b-4) Salvage value = ([(b-1)+(b-2)] x 0.6 + (b-3)) x 0.2645, where 0.6 is the deterioriating factor and 0.2645 is the present worth factor (6-7/8% for 20 years)

Net capital cost = (b-1)+(b-2)+(b-3)-(b-4)

(c) Remote control system cost (page IX-7) was based on the cost estimate of a similar system for the City of Cleveland. The cost has been adjusted for an ENR index of 3640 (August, 1980).

(d) In Tables VII-4 and VII-5, the present worth of an alternative equals capital cost + (annual O&M cost x 10.7)

(e) The cost of residual disposal (or treatment of additional combined sewage volume and pollutants at the Joint Meeting plant) is given on page IX-25. The treatment costs were the user charge rates to the subscribers of the Bergen County Utilities Authority in 1979

(f) Other bases of cost estimating of alternative schemes are as follows:

(f-1) The capital cost of in-pipe storage modules given on page IX-2 as corrected (Attachment 3) includes the cost of excavation, temporary sheeting, pavement replacement, concrete, metal work, slide gates, sump pump, submersible pumps, controls, piping and electrical work. It also includes a 25-percent increment for engineering, legal and miscellaneous costs and has considered salvage values. Annual O&M cost was esti-

mated as $6,000 per module and includes the cost of remote control devices and manpower requirements.

(f-2) The capital cost of sewer flushing modules given on page IX-3 was updated from that we presented in an EPA report (EPA-600/2-80-118) prepared for Region I (ATTACHMENT 4). Annual O&M costs are obtained from the same source.

(f-3) The capital cost of flow control modules given on corrected page IX-4 (ATTACHMENT 5) was derived inhouse in a manner similar to that for in-pipe storage modules as described in (f-1). Annual O&M cost also was estimated at $6,000 per module.

(f-4) Construction and O&M costs for buried storage tanks shown in Plate IX-5 were developed from actual cost data for the Humboldt Avenue Tank in Milwaukee. Some data are available in the EPA report "Detention Tank for Combined Sewer Overflow" EPA-600/2-75-071, Dec., 1975. Other data were obtained from the City Engineer.

(f-5) Construction costs and O&M costs for swirl separators shown in Plate IX-7 were derived from costs and performance data which appeared in several EPA reports including "The Swirl Concentrator as a Combined Sewer Overflow Regulator Facility," EPA-R2-72-008, Sept. 1972; "Urban Storm Water Management and Technology--Update and Users Guide," EPA-600/8-77-014, Sept. 1977; and "Cost Estimating Manual--Combined Sewer Overflow Storage and Treatment," EPA-600/2-76-206, Dec. 1976.

(f-7) Pipe construction cost data shown in Plate IX-9 was developed from in-house composite data.

(f-8) Cost for jacking concrete pipe shown in Plate IX-10 was developed from in-house data compiled from past projects.

7. The study has recommended installation of ten in-line storage modules in storm sewers. Because of interconnection between combined and storm sewers, four storage modules will be effective in controlling CSO and should be eligible for federal funding. Their locations are:

(a) Area WNW, 1.36 Mgal storage, module at Westfield Avenue and Lowden Street (Junction 161);

(b) Area NNE, 2.05 Mgal storage, module at Irvington Avenue and Prince Street (Junction 353);

(c) Area NCE, 0.46 Mgal storage, module at Elizabeth Avenue and Scott Place (Junction 660); and

(d) Area WW, 0.25 Mgal storage, module at Summer Street and Clarkson Avenue (Junction 760).

The total capital cost of these four modules is $1,828,589. The annual O&M cost is $70,345. The capital cost of the remaining six modules that is not fundable* is $1,722,568, and the annual O&M cost is $87,075.

Table IX-2 will be changed in the Final Report to reflect the funding status of modules in storm sewers, as well as the cost allocation of dual-purpose structures in response to Detailed Comment No. 28.

8. Schedule for Design and Construction in terms of elapsed time is shown in Plate 1. The project is segmented to permit the actual construction sequence to proceed in accordance with the City's fiscal ability.

9. Summary of Public Meetings and Hearings

First Public Meeting

The first informative public meeting was held on January 11, 1978 to advise the public and concerned citizen groups as to the:

(a) environmental reasons, legislative requirements, scope of the work and nature of the facilities planning;

(b) technology being used to plan cost-effective solutions;

(c) possible viable alternatives;

(d) benefits to be derived from their implementation; and

(e) findings to date.

The meeting was publicized in the local news media (newspapers, radio and television stations).

The mailing list of the meeting announcement includes 82 special interest organizations, industries, and local, state and federal agencies.

The meeting was attended by the public, including the mayor, City Council members and representatives from the Rutgers University.

There was no input from the audience that would suggest a change in the Plan of Study.

Second Public Meeting

The second public meeting was held on September 28, 1978 to inform the public of the project progress and solicit public input. The following were discussed:

(a) an evaluation of the existing sewer system;
(b) an update of the project findings; and
(c) highlights of the status of the Project.

The meeting was publicized, like the first, in the local news media and through a mailing list. About 15 people attended the meeting, mostly consisting of the staff from the City and the consulting engineer's office.

Public Hearing

A public hearing was held on September 17, 1981 to allow all interested members of the public to comment and express their opinions of the recommended combined sewer overflow pollution abatement program. The hearing was announced to the public on August 3, 1981 and copies of the draft report, outlining the Program, were available for public review at the City Hall and the Public Library from August 17 until the date of the Hearing. A fact sheet, highlighting the CSO problems and the program to rectify them was also prepared to assist the public in understanding the project. Despite broad distribution of the fact sheet, only one public member attended the Hearing. The remaining attendees were the City staff and the elected officials.

The obvious area of concern was uncertainty as to the status of grant funding and the effect of the absence of such grant funding on the fiscal viability of the City. Improvement of the Westerly Interceptor had received general support as the top priority in abating pollution in the Elizabeth River.

10. Anthony Puniello has determined that the presentation of "Archaeological and Historic Sites" in Chapter VIII of the draft report should be supplemented by a Stage IB Cultural Resources Survey. We understand that this survey can be performed after submission of the grant application.

Response to Detailed Comments

1. An exponent 7 will be added to Table III-5 indicating the magnitude of the coliform samples.

2. The sample year 1979 appearing in the heading of Table III-7 will be changed to 1978.

3. Fourteen dry days prior to May 4, 1978 rainfall, as shown in Table III-7, is correct and the dry days on Page III-11 will be corrected.

Also, on Table III-7, the number of dry days for Data No. 7 should be 10 and that for Data No. 19 should be 14.

4. Sewer sampling for quantity and quality determination is difficult. Its accuracy is affected by sampling site selection, sampling method, equipment used and variability of flow and pollutants contained in the flow. This is particularly true for wet weather flow sampling. It has been reported that errors of greater than 10 percent are common in sewer flow measurement and a 25-percent of error margin is acceptable. The acceptable error range for water quality data would be greater. Thus, in interpreting data and using them for model calibration and verification, the data cannot be considered "exact" but as "probable" and used accordingly.

The most important observation from the data shown in Plate III-40 is that very high SS and BOD concentrations were recorded prior to the occurrence of the peak flow rate. This appears attributable to the so-called "first flush" effect caused by resuspension of sewer deposits and by urban runoff.

Sewage strengths of DWF in Area U during early morning hours were consistently higher than average. The flow also remains relatively high. This is an industrial area and the sewage pattern could be the result of cleaning equipment or other industrial operations. The second peak of BOD concentration in Plate III-40 could be due to DWF. Also, the high SS concentration after sewer flow has returned to about normal appears caused by DWF since this is similar to DWF data collected during the same hours. In Area A (Table III-2), sewer flow during the same hours is about one-half of the average flow and sewer strength is much lower than the average. This is typical of a largely residential area.

5. Inconsistent data presented in Plates III-31, III-38, III-39, III-45 and III-46 are identified and will be corrected.

6. "Table III-4" mentioned near the bottom of Page III-15 will be changed to "Table III-6."

7. The subscripts will be added in the final report.

8. On Table IV-4, May 24, 1978 data are from Area U and the second Vp on Column 1 will be changed to Vm.

9. The ratios near the bottom of Page IV-13 should be 1.23, 1.33 and 1.55, instead of 1.03, 0.76 and 0.845.

10. In the upper ratio on Page IV-14, 1.00 and 1.14 should be interchanged, as well as 1.14 and 0.62 in the lower ratio.

11. Because a number of comments deal directly or indirectly with the calibration and verification of computer model parameters, it appears desirable to describe the overall approach to field data utilization.

Table IV-3 lists the quantity and quality parameters in SWMM to be estimated. Model calibration involves adjusting model parameters to minimize deviation between measured data and model output. Because the available data are limited and relatively large differences are expected in the field data, a subjective method is used to calibrate and verify model parameters.

Calibration and verification of parameters is based on the comparison of the shape of hydrograph and pollutograph; peak runoff rate; total runoff volume; total SS and BOD mass loading, and peak SS and BOD concentrations (ATTACHMENT 6). The numbers are the ratios of predicted values and measured data. The numbers not in the parentheses are the mean and those in the parentheses are the standard deviation. Since of interest in the alternative evaluation is the overflow volume and pollutant mass loading discharged untreated to receiving waters, primary weight was given to runoff volume, and the total SS and BOD mass loading comparison. For data used for calibration, the mean of the predicted values is within 15 percent of the mean of measured values, as compared to 25 percent for data used for verification. The standard deviations of the ratio of the predicted versus measured data of three important parameters are within 30 percent for the calibration data, while those for the verification data are are about 50 percent.

The quality parameters required in STORM were transferred from SWMM because the parameters have the same physical meaning in both SWMM and STORM. Also, both models use the same mathematical formula to describe physical processes such as street washoff. But not all quantity parameters can be directly transferred from SWMM to STORM. This is because STORM computes runoff from an area simply by applying a runoff coefficient to the effective rainfall. The default values of the runoff coefficient in the STORM program are 0.90 for impervious area and 0.15 for pervious area. The hor-

izontal scale of Plate 2 is the runoff volumes of rainfall events used for model calibration and verification computed with the default runoff coefficient in the STORM program. The vertical scale is the measured runoff volume. The straight line indicates a perfect correlation and two curved lines represent the standard error of estimate in the computed volume. The deviation is within 25 percent. The correlation coefficient is 0.98. We consider the comparison is good for quantification of overflow quantity and quality based on long-term simulation.

Because (a) a model can never duplicate exactly the complex nature of rainfall-runoff processes; (b) the accuracy of runoff quantity and quality is usually to be within 25 percent at best; and (c) the point rainfall may not represent areal rainfall even over a small drainage area; the comparison of measured and predicted values of flow and pollutant variations that is presented in the report are within the range that can be achieved.

In light of the above, the model may predict higher flows than the measured values for some rainfall event, while predicting lower flows for others.

12. The number of preceding dry days for rainfall event on July 15, 1978 in Table IV-6 is correct, but that in Table III-7 should be changed from 5 to 10.

13. Models generally do not perform as well for the lower intensity rainfalls as for the higher intensity rainfalls. There was an extended dry period prior to the May 4, 1978 rainfall of 0.15 inches in about 80 minutes. Runoff, as well as pollutant washoff, is highly sensitive to the amount of abstraction and pollutants accumulated in the sewers and streets. Please see Comment No. 11 for the approach adopted in model calibration and verification.

14. As explained on Page III-10, rainfall of May 14, 1978 was not used for calibration and verification purposes because sewers were surcharged in Area A and meters got stuck in Area U. Mention of May 14 rainfall on Page IV-15 will be deleted. On Table IV-5, column under Area U, May 14, 1978, will also be deleted.

We believe that the model parameters presented in the draft report are the best match possible for simulating actual events since they were chosen after over 30 trials and with the assistance of several leading experts in the field.

15. On Pages IV-17 and 18, h), i) and j) will be changed as c), d) and e). The ratio near the bottom of Page IV-17 should be 1.20, 1.11 and 1.42, instead of 1.177, 1.007 and 1.024. May 14 rainfall was not deacribed in text since it was not used for the reasons given in the response to Comment 14.

16. The table will be revised.

17. "Low Tide" and "High Tide" in Tables V-5 and V-7 will be changed to "First Traverse" and "Second Traverse," respectively. Also, mislabeled "AM" and "PM" will be corrected.

18. (a) Table V-6 indicates the coliform count at Morris Avenue and West Jersey Street is about one order of magnitude higher during wet weather than during dry weather. As previously discussed, the tidal reach of the river acts as a settling basin to hold pollutants discharged during wet weather. This failure to flush wet weather pollutants from the river results in the poor condition of the tidal reach at all times including dry weather. Table V-6 serves to point out the importance of wet weather flow on the river coliform level.

(b) The absence of DO in the lower reaches of Elizabeth River during dry weather is believed to be caused by:

(b-1) the effect of benthos; and

(b-2) high water temperature (air temperature reached a maximum of 101°F on the day samples were taken).

Study of the CSO impact on receiving water DO depletion has been observed to include two distinct processes:

(b-1) immediate effect caused by degradation of soluble BOD (about 4 percent of discharged organic matter was degraded this way in river); and

(b-2) delayed effect caused by absorbed soluble colloidal and fine particulate organic matter. Generally, the delayed effect lasted about 12 to 24 hours. Attachment 7 from a CSO study in Milwaukee showed a delay of about 15 hours.

In Chesapeake Bay, as reported by Taft (1980), oxygen depletion is not specifically a response to organic loading resulting from phytoplankton productivity, but may be primarily supported by organic material accumulated during the previous fall and winter.

The wet-weather flow data in the draft report were collected within four hours after the rainfall had ceased. If sampling efforts were continued, a greater DO sag may have been demonstrated.

(c) Although dry-weather overflow at Westfield Avenue occurs frequently, it should not be entirely responsible for poor water quality from South Street to Trenton Avenue. As explained in the response to General Comment No. 2, overflows from the area tribu-

tary to the Westerly Interceptor occur about 80 times a year, discharging an equivalence of daily raw sewage from about 56,000 persons each time. The population in area tributary to the Westfield Avenue overflow is about 20,000. Because only a portion of raw sewage discharges during peak sewage flow period, the amount of pollutants discharged from Westfield Avenue overflow appear less than those in the discharges during wet weather.

(d) There are cross-connections between combined and storm sewers in Areas NNW, NNE, NCE and WW, as explained in the response to General Comment No. 7. There do not appear to be raw sewage discharges from these storm sewers except during wet weather.

(e) Based on the data collected during this study and previous studies, pollutants that enter the Elizabeth River during most rainfalls are trapped in the oscillating movement of water between a point near Arthur Kill and South Street. Sluggish movement of water facilitates deposition of pollutants.

Poor water quality is evident by the bad smell from the river as far north as South Street area in the summertime.

19. (a) If runoff from a rainfall of 0.6 inches is totally contained, it would capture for treatment about 71 percent and 76 percent of BOD now discharged untreated from areas respectively tributary to the Westerly and Easterly Interceptors.

(b) Pollution abatement efficiency of alternative schemes was not evaluated using a so-called "design storm." Rather, operational efficiency of alternatives is compared based on a long-term simulation using 12-year continuous rainfall data. Because of the variable nature of rainfall-runoff processes, and weak flushing action of receiving waters, long-term simulation is more appropriate and reliable than a single storm simulation.

20. (a) Peak dry weather flow in Table VI-2 has included infiltration as discussed on Page VI-2 and shown in Table VI-1.

(b) Base sewage flow of 11.6 mgd and an infiltration flow of 3.5 mgd represents the average sewage flow from the City. To prevent dry weather overflow, the interceptor capacity should at least equal the peak flow. The ratio of the peak to average flow has been recognized as a function of population. Experience shows that higher peak to average ratios are expected from small numbers of people than from large numbers of people. The formula used to estimate the peak flow in Table VI-2 is that suggested by Harmon as described in our EPA Demonstration Grant Report (ATTACHMENT 8). Table VI-2 shows that the capacity of a 9,120-foot long reach of the Westerly Interceptor is less than the peak dry weather flow expected from the tributary area.

(c) Interceptor capacity limitation will exacerbate the flooding problems in the upper reaches of the interceptor system. When a sewer is surcharged, its hydraulic grade line is raised and the backwater effects propagate upstream reducing the capacity of interceptors. This limits the amount of sewage that can enter the interceptors and causes dry weather overflow.

(d) As explained on Page VI-7, the 1930 agreement betwen the City and the Joint Meeting limits the City discharge to the Joint Trunk Sewer to a maximum of four mgd. The Joint Meeting is currently assessing the City $500 per million gallons for flow over its allotted quantity. In addition, all sewage within the City which can be diverted to the Joint Meeting sewers by gravity is.

21. (a) Storage available in the Easterly Interceptor is included in Table VII-5. The storages are 0.05, 0.30, 0.13, 0.24 and 0.15 million gallons respectively for Areas NEN, NES, SE, SSE and SSW.

(b) As explained previously, a "design storm" was not defined or used for development and evaluation of pollution control alternatives. Rather, the alternative evaluation is based on a long-term simulation using continuous hourly precipitation data. In addition to off-line storage, the study also considered sewer flushing and in-line storage. A "design storm" is not an effective tool in modeling to determine pollutional effects since these are sensitive to both pattern and total volume of runoff which no design storm can simulate.

22. (a) The quality of coliform data has been discused in the response to Comment No. 18. Coliform MPN was not modeled since the study did not include modeling of receiving waters.

(b) Appropriate exponents missing in Table VII-8 will be added and are shown in ATTACHMENT 9.

(c) Chlorination to control bacterial contamination is briefly discussed on Pages VII-33 and VII-34 and cost is compared in Table VII-9. This information was derived to determine the feasibility of chlorination facilities. Because the capital and operating costs for chlorination could be substantial, it does not appear justified to include chlorination facilities in the facilities plan. However, if such facilities are later proved to be justified, they can be added in the pollution abatement program.

(d) A dosage of seven mg/l is a reasonably conservative estimate for effective disinfection of stormwater and combined sewage based on the following:

(d-1) In an EPA report on "1978 Needs Survey" (ATTACHMENT 10), formula is given for computing capital and O&M costs for dosages up to seven mg/l. This information was updated from "1976

Needs Survey" report where the efficiency of fecal coliform removal is 99.9 percent. Since formula for dosages greater than seven mg/l are not provided, seven mg/l appear accepted as the practical upper limit for effective disinfection of wet weather flows.

(d-2) The Cottage Farm Storm Detention and Chlorination Facility in Boston has been in operation since 1971. The average chlorine demand of the combined sewage has been reported to vary from 1.3 to 4.6 mg/l (ATTACHMENT 11).

(d-3) A chlorination facility in Philadelphia, using sodium hypochloride as agent, is reported to have achieved a 99.999 percent total coliform removal using a dosage of five mg/l for a contact time of two minutes (ATTACHMENT 12).

(d-4) The operating data at a high-rate screening and disinfection facilities in Syracuse, New York, entitled "Disinfection/ Treatment of Combined Sewer Overflows, Syracuse, New York," by O'Brien and Gere (ATTACHMENT 13), indicate that chlorine dioxide dosages in the order of six to twelve mg/l applied in the initial stage of combined sewer overflows reduced fecal coliform levels to 200 MPN/100 ml. An applied dosage of four mg/l after first-flush loadings had passed would maintain the level of 200 MPN/100 ml. Sequential addition of disinfectants (two mg/l of chlorine dioxide followed by eight mg/l of chlorine gas after fifteen seconds) at a total contact time of one minute, produced three to four log reductions of fecal coliform.

(e) The method of estimating cost for chlorination facilities is essentially as described in the response to General Comment No. 6. The capital costs and annual costs of labor, supplies and power were computed using the formula included in the ATTACHMENT 10. The costs are expressed in terms of the design flow rate. The "50 percent" in Table VII-9 means that a facility is

capable of providing effective chlorination to 50 percent of the overflow volume. The design flow rate for this amount of overflow chlorination was determined from an analysis of hourly overflow rates at each drainage district. The land required for the chlorination facilities is assumed to be one quarter acre.

23. Plate IX-30 is attached.

24. The costs on Page IX-22 will be corrected to agree with Table IX-2.

25. (a) The mislabeled section designations have been corrected as shown in ATTACHMENT 14.

(b) The total estimated cost for future stage work should be $24,733,000.

(c) The upper range of capital cost was correctly stated on Page IX-25 as $4,027,000.

26. (a) The costs for Area NES will be inserted in Table IX-3 as marked in ATTACHMENT 15.

(b) The debt service for Trumbull Street Tank in Table IX-3 is correct but that in Table IX-2 will be corrected.

27. The pipe element No. 247 is in an upstream location of Area CCN. An EPA-sponsored field study in Boston indicates sewer flushing is effective to transport pollutants for a distance of about 1000 feet. Multiple flushings are required to flush deposits to the Westerly Interceptor. Daily solids deposition in Pipe Element No. 247 has been estimated as 70 pounds. Three flushing modules would affect sewer segments with a total of 160 pounds per day of solids deposit.

28. Table 5 shows the cost allocation of dual-purpose and single-purpose facilities for pollution and flood control. Allocation of costs is based on the AJE method as described in the EPA report "Construction Grants 1982," July, 1982. The AJE method is based on the expectation that the sum of the costs of two single-purpose projects is greater than that of a dual-purpose project. The symbols used in the table are identical to those on Page O-2 of the referenced EPA report. E is the cost of single-purpose pollution control facilities as described in Pages VII-25, 26, and 27 of the draft report. For Area NEN, E is the cost of swirl separator at Dowd Avenue and Alina Street. (Text on Page VII-26 will be corrected.) G is the cost of single-purpose flood control facilities. A is the cost of the dual-purpose facilities with B, D and C being the price components of the dual-purpose system divided in facilities for pollution control, flood control and joint purpose, respectively. The joint cost C is the difference between A and the sum of B and D. F is the cost difference between the single-purpose pollution control project and the specific cost for pollution control in the dual-purpose project. Similarly, it is the difference in costs between the single-purpose drainage project and the specific costs for drainage in the dual-purpose project. J and K are the costs allocable to pollution abatement and drainage in the dual-purpose project. The grant eligible fraction is J divided by A.

The cost-effective single-purpose flood control facilities include street inlets and relief sewers to drain flood water to the nearest waterways. The number of inlets required for each flooding area is shown in Plates IX-12, 13, 14, 18, 20, 23, 25, 26, 29 and 30 of the draft report. The drainage route, sewer size and length and estimated capital cost are provided in Table 6. Sewer costs are estimated using Plate IX-9, which relates pipe cost per linear foot to excavation depth. The minimum cover for storm sewers is assumed to be three feet. The locations of flood-

ing area numbers and City streets referred to in Table 6 are shown in Plate IX-2.

In Table 6, the specific cost of pollution control in the dual-purpose facilities, B, includes the cost of flow control modules and the connecting pipes that are used to convey combined sewage only. D includes the cost of street inlets and sewers for diverting stormwater to the storage facilities.

Table 6 shows that it is not cost-effective to provide dual-purpose facilities in Areas NNW and NEN since the sum of costs of two single-purpose projects is less than that of a dual-purpose project. For Areas NCE, CCN, SE and SSW, dual-purpose projects would result in overall savings to the City to provide both pollution abatement and flood relief. The percentages of dual-purpose project costs that are eligible for EPA funding are 84, 47, 45 and 74, respectively, for Areas NCE, CCN, SE and SSW.

TABLE 1

CHLORIDE CONCENTRATION
(in Percent of Arthur Kill Conc.)

	Trenton Avenue		Summer Street		South Street	
	Initial Run	Subsequent Run	Initial Run	Subsequent Run	Initial Run	Subsequent Run
July 20 (1)	34	77	22	65	3	2
July 22 (2)	17	2	1	1	0.3	0.0
Aug 12 (3)	50	27	5	3	0.3	0.3

Notes:

(1) River flow at Ursino Pond 5 cfs ±
Initial Run at low tide; subsequent run at high tide.

(2) River flow at Ursino Pond:

Initial Run Range: 425-511 cfs
Subsequent Run Range: 170-104 cfs

(3) River flow at Ursino Pond:

Initial Run Range: 186-250
Subsequent Run Range: 160-100

TABLE 2

ELIZABETH RIVER BASIN
ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.
WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

Date	Time	Streamflow, Instantaneous (cfs)	Temperature (°C)	Oxygen, Dissolved (mg/l)	Oxygen Demand Biochemical, 5-Day (mg/l)	Coliform, Fecal, EC Broth, (MPN)
Feb 14	1300	14	.5	12.5	1.0	80
Apr 05	1010	19	9.5	10.5	6.0	9400
Jun 06	1205	18	20.5	5.9	6.4	11000
Jul 19	1015	22	-	-	-	7900
Aug 16	1220	9.5	21.0	11.2	3.0	400

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

Oct 02	1230	39	19.0	7.3	-	>2400
Feb 25	1115	7.9	6.5	10.8	3.0	790
Mar 18	0915	135	9.5	10.2	5.7	16000
May 28	1145	11	18.5	17.4	2.8	80
Jul 14	1100	5.9	24.0	12.8	1.9	24000
Aug 26	1045	4.9	24.0	13.2	2.5	500

WATER QUALITY DATA, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

Oct 15	1000	4.0	11.5	10.1	1.5	500
Feb 10	1100	5.8	1.5	13.8	6.5	1600
Apr 13	1045	10	14.0	11.4	4.2	790
Jun 04	1130	11	21.0	7.0	7.1	16000
Jul 21	1045	E70	25.0	7.1	5.7	4900
Aug 20	1100	4.4	22.0	12.1	1.8	800
Sep 29	1130	3.7	16.0	13.5	2.4	3500

WATER QUALITY DATA, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982

Feb 10	1330	E17	5.0	19.8	>25	50
Mar 30	1130	19	10.5	15.1	-	13
Jun 09	1045	11	18.0	7.8	3.6	>2400
Jul 15	1200	8.4	26.0	12.8	6.9	92000
Aug 10	1000	20	23.5	7.0	4.6	16000

TABLE 3

REVISED TABLE X-2

COMBINED SEWER OVERFLOW STRUCTURES

CSO Modeling Number	Location	Structure Description	Discharge Number**	Problems During Field Inspection in 1978
836	Salem Ave., Pingry Place	Combined sewage (CS) relief to storm sewer	036	
838	Union Ave., Parker Road	CS relief to storm sewer	036	
712	Elmora Ave., Linden Ave.	Weir control to 4' x 4' conc. box by 12" C.I. pipe	003,005	
714	Elmora Ave., Jersey Ave.	Weir control to 4' x 6' conc. box by 16" C.I. pipe	003,005	Peak DWF overtops weir
715	Elmora Ave., Pennington St.	Weir control to relief combined sewage flow to 60" RC and 2'-6" x 3'-4" brick	003,005	Peak DWF overtops weir
709	Westfield Ave., Orchard St.	Overflow relief to 90" storm sewer, controlled by low weir	003,005	Peak DWF bypassed for 1 to 3 days after reinfall events
843	Westfield Ave., Union St.	To interceptor via a vertical 18" tile regulated by a float valve	005	Blockage and inadequate interceptor capacity causing bypassing of DWF up to two weeks after rainfall events
896	Crane St., Union St.	12" tile to 30" interceptor	006	
740	West Grant St. near West Bank of River	Sewage diverted by 11" dam through a 6" tile and siphon to East of River	007	Partial blockage in siphon causing frequent DWF bypass
895	West Grant St., Union St.	A vertical 6" tile to interceptor	008	Frequent DWF bypassing caused by blockage of 6" tile
885	South Union St., Caldwell Pl.	2'6" dam to interceptor	009	
750	Murray St., Cherry St.	6" dam to 10" tile then to interceptor	010	
760	Rahway Ave., Cherry St.	7" dam to 10" tile to interceptor	011	Regulator float mechanism clogged with mud
*	Rahway Ave., Penn RR	6" tile to interceptor	011	6" tile clogged
844	Rahway Ave., near South Union St.	8" dam through a 6" vertical tile to interceptor, regulated by a float valve	012	Vertical 6" tile clogged and float valve not working

** NPDES Discharge Serial Number

TABLE 3

continued

COMBINED SEWER OVERFLOW STRUCTURES

CSO Modeling Number	Location	Structure Description	Discharge Number	Problems During Field Inspection in 1978
770	Burnet St. near River	10" tile to 12" interceptor	013	10" tile clogged
880	Broad St., Elizabeth Ave.	A vertical 6" tile to 32" interceptor	014,015	Peak DWF overtops weir
781	Pearl St., Washington Ave.	7" dam through a 10" tile to interceptor	016	
780	Washington Ave. near River	A vertical 6" tile regulated by a float valve to interceptor	016	
*	Broad St. near South Bank of River	5" dam through a 6" tile to interceptor	017	
868	Bridge St. near E. Scott Place	A vertical 10" tile to 34" interceptor	018,020	Tide gate sealed shut by mud.
746	Bridge St., Pearl St.	A vertical 6" tile to 36" interceptor	019	Manhole too deep to inspect
*	Third Ave., bet. Reid and S. Spring Sts.	?	021	
225	South St., Fourth Ave.	15" tile and 2-8" siphon to cross the River	022	
747	South St., Pearl St.	6" vertical tile regulated by a float valve	023	
748	Norwood Terr. at S. Pearl St.	4" tile connection to interceptor	024	
749	Montgomery St., South Pearl St.	4" tile connection to interceptor	025	
980	John St. near East Bank of River	Sewage intercepted by a weir to 15" interceptor	025	
630	Summer St., Clarkson Ave.	Vertical 10" tile, regulated by a float valve	027,028	
634	Clarkson Ave., South of Britton St.	Regulator chamber		
699	Clifton St., Pulaski St.	Chamber to divert to 60" RC interceptor by float control gate	040	Regulator not functional, tide gate silted open
992	Third Ave., Rankin St.	Junction and overflow chambers	038	Cannot be located
990	Third Ave. under N.J.	Oveflow chamber	038	Cannot be located

TABLE 3

continued

COMBINED SEWER OVERFLOW STRUCTURES

CSO Modeling Number	Location	Structure Description	Discharge Number	Problems During Field Inspection in 1978
962	Third Ave., Caspian St.	Opening in bottom of 36" tile to brick sewer	035	
970	Third Ave., South First St.	Regulator chamber	035	Tide gates damaged by barge; temporary bulkhead allows inflow
999	Bayway at South of S. Front St.	Regulator chamber built 1967	037	
960	Elizabeth Ave., S. Front St.	Regulator chamber	029	Tide gate allows inflow
950	East Jersey St., Front St.	?	030	
940	Livingston St., Front St.	Regulator chamber	031	
930	Magnolia Ave., Front St.	Regulator chamber	032	
913	Trumbull St., Second St.	Regulator chamber	034	Explosive atmosphere detected
907	Trumbull St., Fourth St.	CS relief to storm sewer	039	
344	Division St., Fairmount Ave.	Regulator chamber	002	
820	Alina St., entrance ramp to Rt. 1	Regulator chamber	001	

ATTACHMENT 6

CALIBRATION AND VERIFICATION CRITERIA OF PARAMETERS

- Shape of hydrograph and pollutograph

	Calibration	Verification
• Peak runoff Rate	0.96 (0.21)	0.76 (0.42)
• Runoff Volume	1.14 (0.08)	0.96 (0.40)
• Total SS Mass	0.97 (0.29)	1.23 (0.51)
• Total BOD Mass	1.10 (0.27)	1.17 (0.35)
• Peak SS Concentration	0.92 (0.39)	1.60 (0.09)
• Peak BOD Concentration	2.06 (0.98)	1.67 (0.89)

OFFICE OF THE MAYOR

CITY HALL
50 WINFIELD SCOTT PLAZA
ELIZABETH, NEW JERSEY 07201-2462

THOMAS G. DUNN
Mayor

August 10, 1984

Mr. Robert J. Blanco
Director
Facilities Requirements Division (WH-595)
Office of Water
U. S. Environmental Protection Agency
401 M Street, S.W.
Washington, D. C. 20460

SUBJECT: MARINE COMBINED SEWER OVERFLOW (CSO) GRANT APPLICATION... CITY OF ELIZABETH, NEW JERSEY

Dear Mr. Blanco,

In response to your communication of July 11th concerning the subject application, attached please find the requested information which was prepared by our consulting engineers...

We believe this project, the initial step in our City's long-sought objective of cleaning our waterways, is in conformance with the Federal Water Pollution Control Act's statutory basis and legislative history which is stated as:

> "3. The 1984 Appropriations Act (P.L. 98-45) appropriates $30 million '... for projects under Section 201(n)(2), subject to the appropval of the Committees on Appropriations...'. The Conference Report to the 1984 Appropriations Act (Conference Report 98-264), page 11) states that the Committees '... will consider only... project segments which can be fully funded and which will provide significant near-term water quality and public health improvements'."

The tidal reaches of the Elizabeth River are grossly polluted with the dissolved oxygen totally depleted. At times, a foul stench rises from the River due to its pollution. Floating turds can be observed.

The City has expended substantial funds in developing a staged cost effective plan which, when completed, is intended to restore the river waters to a fishable/swimmable state. The City Council, in

BAK000002

response to a "Special Grant Condition" imposed in the grant to construct the Essex/Union Joint Meeting Treatment Plant, agreed by Resolution (dated August 14, 1973) to "authorize the study required by the Special Grant Condition to identify alternative corrective programs (to abate CSO pollution) and the most cost effective solution, and establish an effective schedule for implementing the most desirable alternative".

The City of Elizabeth is sorely in need of aquatic recreational facilities. It currently has in progress the "Old Elizabethport Waterfront Development". This facility, expecting to annually serve 300,000, requires abatement of CSO pollution if its objective is to be fully realized. The need for water contact recreation is acute; our pools are overcrowded, and our children are swimming in the tidal waters of the Elizabeth River and Arthur Kill at a distinct risk to the health and general welfare of our community. Receipt of the grant addressed by our application will be of substantial assistance in expediting our progress toward clean waters.

Sincerely,

Thomas G. Dunn
MAYOR

sae
Attachment
cc: Business Administrator John F. Papetti, Sr.
City Attorney Frank P. Trocino
Community Development Director Neil De Haan
Public Works Director Nicholas Schipani
City Engineer Victor Vinegra
Clinton Bogert Associates (c/o Mr. Herbert L. Kaufman)

Application for Marine CSO Grant

The following is in response to the deficiencies set forth in the July letter relative to the City's subject application signed by Robert J. Blanco, Director, Facility Requirements Division. The response includes local swimming and shellfishing benefits of the project. The regional benefit of the project, such as shellfishing in Raritan Bay and swimming and boating in lower Arthur Kill and Raritan Bay, is included in the NJDEP document entitled "Water Quality Determination--Regionwide Impact of CSO Pollution from the New Jersey-New York Metropolitan Area on the New Jersey Shellfish Waters and Bathing Areas".

1. Swimming

1.1 Standards

Tidal water quality standards for both swimming and shellfishing are shown in Table 1.

1.2 Number of Days Swimming Standards Are Violated

Currently the almost daily discharge of raw sewage to the Elizabeth River results in a DO of 0.0 and very high coliform counts in the tidal reach in dry weather. Accordingly there are no days when swimming standards are not violated. This is supported by available fecal coliform data (see Table 3). Although swimming is discouraged and, in fact, legally banned, children still swim in the lower part of the Elizabeth River and Arthur Kill during hot summer days. This situation is not likely to improve with only the upgrading of the Westerly Interceptor. However, the City as a condition of the Federal Grant awarded for upgrading the sewage treatment plant of the Joint Meeting of Essex and Union Counties, agreed in August 1973 "to study the combined sewer system with the City to identify alternative corrective programs, to select the most cost effective solution in compliance with the requirements of the NJDEP and EPA, and to establish an effective schedule for implementing the most desirable alternative."

In accordance with this committment, the City had prepared a Step 1 Facilities Plan for Sewerage Improvements to abate combined sewer overflow pollution. The draft Plan was essentially completed in 1981 and submitted to the NJDEP for approval. The review of this plan has not as yet been completed, and additional archaeological work appears required. Completion and approval is scheduled for December 31, 1984. Rehabilitation of the Westerly Interceptor is the first step of a staged, cost effective program to permit the City to achieve clean waters over a period of time, determined by its fiscal resources.

The intent of the plan is to restore the tidal reach of the Elizabeth River to swimmable condition and hence contribute to the improvement of water quality in the Arthur Kill.

With the completed plan, CSO's should be experienced only about 14 days per year at times of heavy runoff, and the tidal reach may not violate swimming standards.

1.3 Beach or Swimming Pool Attendance

There are a total of nine swimming pools in the City, including five outdoor pools owned by the City, two indoor pools operated by the Board of Education, and two private indoor pools owned by the YMCA and YMHA. Four of the pools are olympic size, and the remaining pools are relatively small. The total capacity of the City-owned pools is estimated to be about 600.

1.4 Local Swimming Demand Not Satisfied

The need for additional swimming facilities is not satisifed, as indicated by:

a. Pool capacity is often exceeded, resulting in people lining up to wait their turn.

b. children swimming in the lower reaches of the Elizabeth River and in the Arthur Kill at Elizabeth.

1.5 Local Demand for Recreation

The Arthur Kill waterfront has long been considered as the only area in the City with a potential for development of a large water-related recreation facility. With the assistance of the Green Acre Program, the City has begun to develop the waterfront park to provide recreational opportunities to the population in perhaps the most distressed area of the City. The development of the area for public use is considered an important step in the revitalization effort of old Elizabethtown, the first English settlement in New Jersey. When completed in three years, new private, commercial and residential development will be encouraged and supported by the City's recreational facilities. Market analysis has shown a strong economic feasibility to develop a parcel of land of about 8 acres to become a commercial recreation center.

The waterfront development begins at the foot of Elizabeth Avenue, near the mouth of the Elizabeth River. City residents have continued to actively use this area for a good view of the water and the boating traffic in the Arthur Kill. A recreation pier, 35-slip marina, and boat

launching ramp have been constructed. In addition, the waterfront development will include a memorial park, fishing pier, boat landing area, 920-ft. beach, boardwalk, amphitheater, and an additional marina and restaurants. The waterfront park alone is expected to attract 300,000 visitors per year. The development should eventually become a major regional facility. To use its full potential, pollution from CSO and urban runoff should be abated.

2. Shellfishing

2.1 Currently, shellfishing is not permitted in the Arthur Kill or the Elizabeth RIver. Discussions in 3. Water Quality Impacts indicates the freshwater reach of the River can supply the oxygen resources to satisfy the BOD discharged to the river upon completion of the program. Modeling, performed as part of the Facilities Plan, indicated that 77 percent of the BOD now discharged from the City to the River would be diverted to treatment. As indicated in Plates V-3 and V-4 excerpted from the Facilities Plan, this degree of pollution abatement should divert to treatment all rainfall having a total precipitation of 1 to 1.2 inches. Areas NNW and NNE comprise the major tributary areas to the Westerly Interceptor. In 1978, a series bf rainfall events were sampled in sewers tributary to the Westerly and Easterly Interceptor as follows:

Event	Date	Total Rainfall	Interceptor Sewer
1	3/14	0.33	Westerly
2	5/4	0.15	Westerly
	5/4	0.21	Easterly
3	5/14	0.56	Westerly
4	5/24	1.51	Easterly(1)

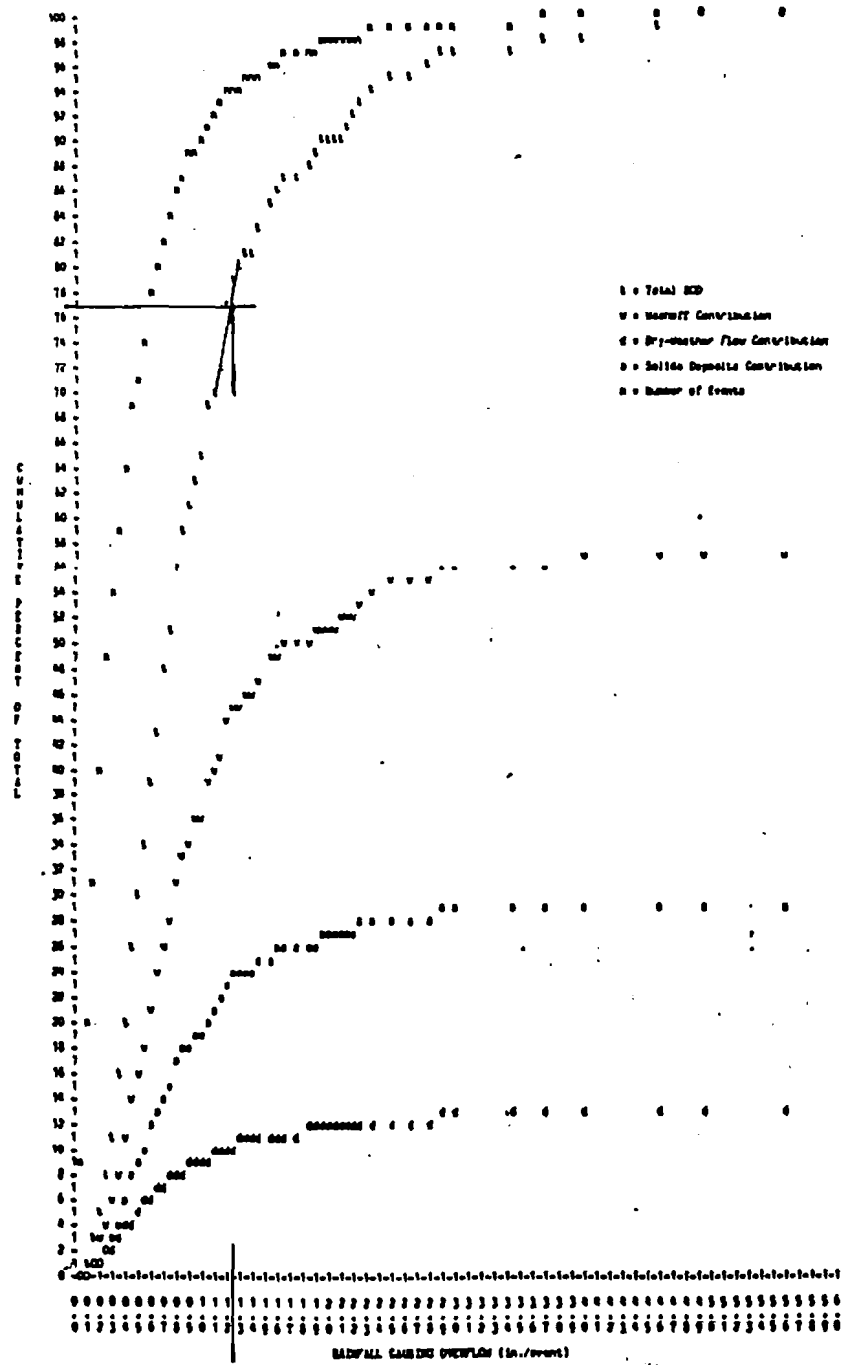
(1) Westerly tributary area aborted due to erratic sampler behavior

Event	Date	Total Rainfall	Interceptor Sewer
5	6/7	0.27	Westerly
	6/7	0.67	Easterly
6	6/21	0.14	Easterly
7	7/14	0.11	Westerly
8	7/17	0.45	Westerly
9	7/27	0.22	Westerly
	7/27	0.18	Easterly
10	10/4	0.53	Westerly
	10/4	0.24	Easterly

All of the above events, except No. 4, would not have resulted in combined sewer overflows, but their total combined sewage and a substantial part of the urban runoff would have been diverted to treatment. Coliforms were measured for events numbered 2, 3, 4, 5, 9 and 10. Wet weather flows flushed the sewers in all events. Plate III-30, excerpted from the Facilities Plan indicates a continuing high coliform level in the wet weather flows that would have been diverted to treatment. This is typical for the smaller rainfalls sampled. The total rainfall of May 24th equalled 1.51 inches, and runoff from between 0.3 and 0.5 inches of rainfall at the end of the storm would have discharged to the River. As shown in Plate III-37, excerpted from the Facilities Plan, the peak coliform concentration occurred early in the runoff period and would have been diverted to treatment. The coliform concentration in the overflows which would have occured at the end of the runoff period had significantly lower coliform populations. This experience should be typical of the larger rainfalls. Accordingly, it appears the coliform discharges to the River should be significantly reduced upon completion of the City's program. It is conceivable that the tidal reaches of the River and the Arthur Kill could be safe for swimming and shellfishing.

CITY OF ELIZABETH, NEW JERSEY

COMBINED SEWAGE POLLUTION ABATEMENT FACILITIES PLAN



ELIZABETH - AREA NNW

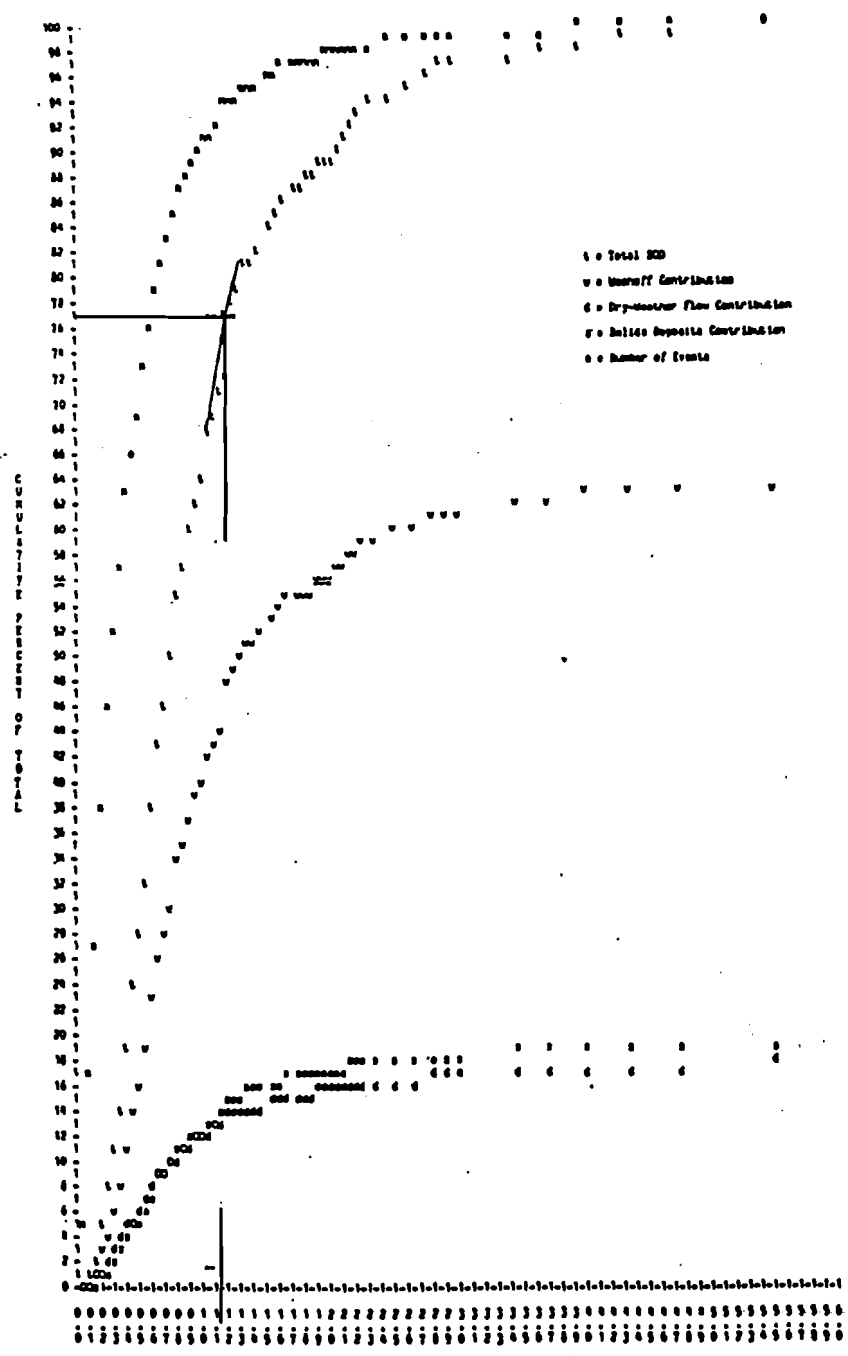
CUMULATIVE BOD OVERFLOW AND NUMBER OF EVENTS AS PERCENT OF TOTAL

CLINTON BOGERT ASSOCIATES

PLATE V-3

CITY OF ELIZABETH, NEW JERSEY

COMBINED SEWAGE POLLUTION ABATEMENT
FACILITIES PLAN

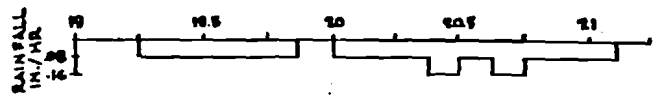


ELIZABETH - AREA NNE

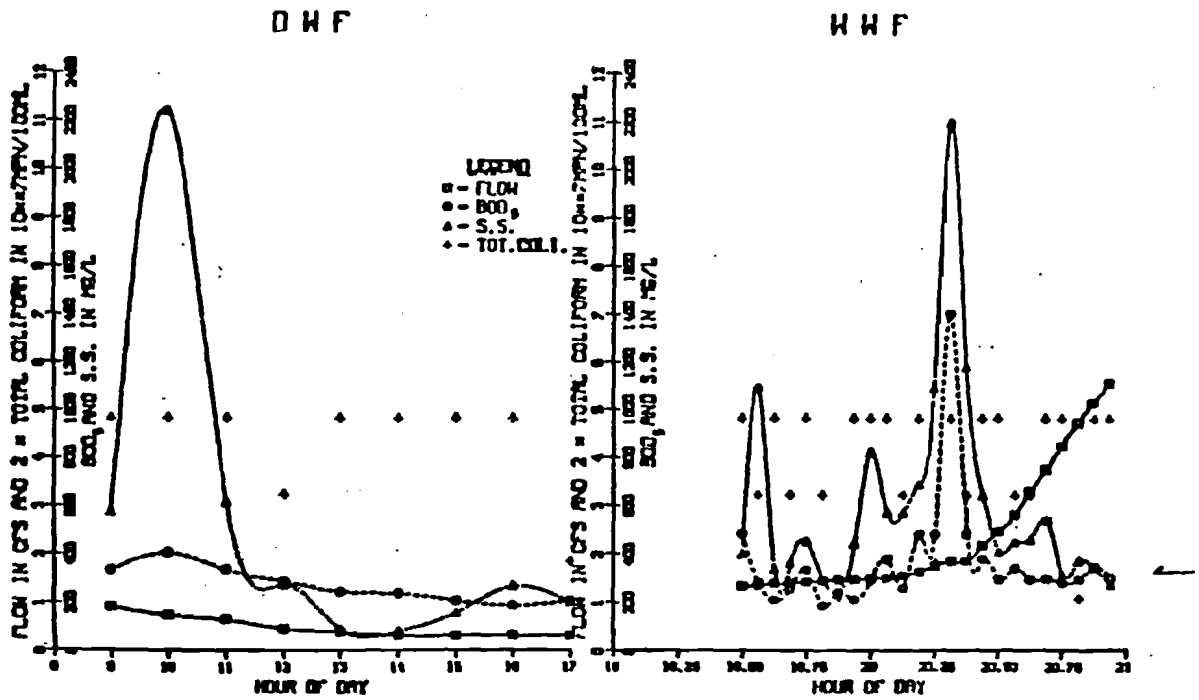
CUMULATIVE BOD OVERFLOW AND NUMBER OF EVENTS AS PERCENT OF TOTAL

CLINTON BOGERT ASSOCIATES

PLATE V-4



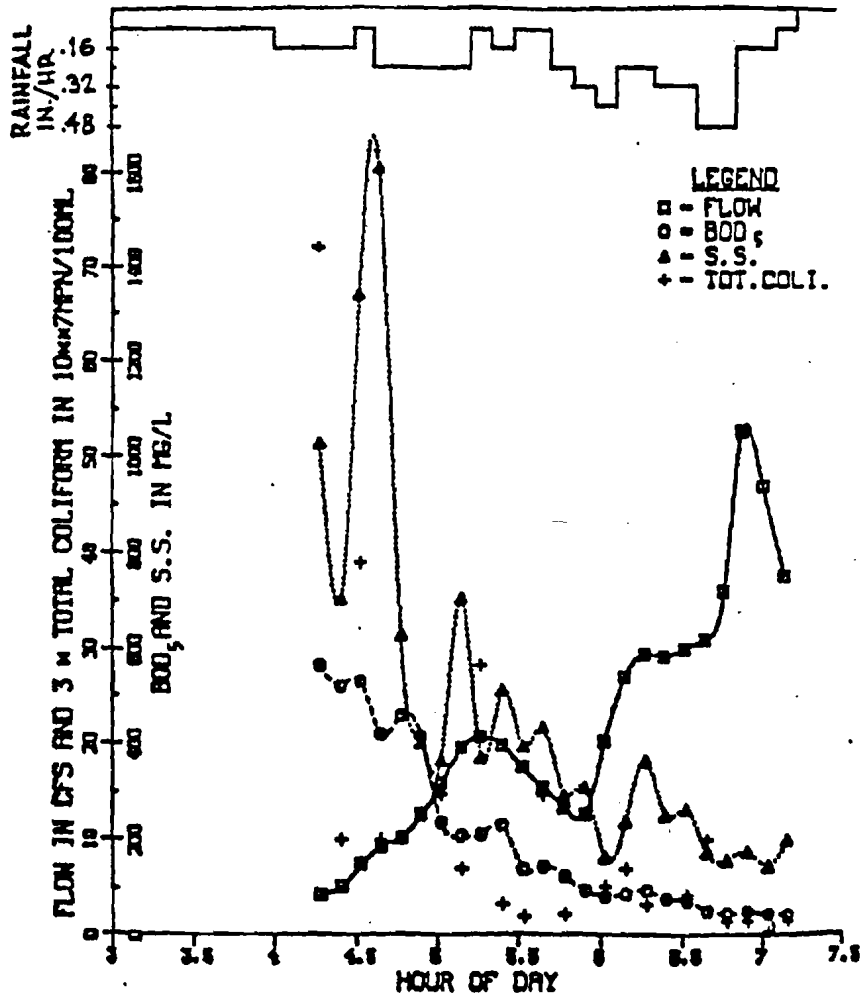
AREA A - MAY 4, 1978



AREA A - WET AND DRY-WEATHER FLOW - QUANTITY AND QUALITY DATA OF MAY 4, 1978

CITY OF ELIZABETH, NEW JERSEY
COMBINED SEWAGE POLLUTION ABATEMENT
FACILITIES PLAN

CITY OF ELIZABETH, NEW JERSEY
COMBINED SEWAGE POLLUTION ABATEMENT
FACILITIES PLAN



AREA U - WET-WEATHER FLOW - QUANTITY AND QUALITY DATA OF MAY 24, 1978

CLINTON BOGERT ASSOCIATES

PLATE III-37

2.2 Existence of Shellfish Beds in the Elizabeth River and Arthur Kill

The existence of shellfish beds in the Elizabeth River and Arthur Kill is indicated by archaeological research and reports published by the Interstate Sanitation Commission (ISC). According to Dr. Kraft, an archaeologist, salt marshes and the freshwater stream combined to make the lower part of the river a haven for shellfish, deer and water fowl. In the ISC 1937 Annual Report, it was reported that:

> "For over a century the shellfish industry in the harbor of New York has been one of the largest in the world. Within the past two decades, health authorities have continually condemned additional portions of the area so that at the present time less than 30% of the waters of the Interstate Sanitation District are now open as shellfish marketing sources. For many years, the greater portion of the area has been a prolific producer of both hard and soft clams.
>
> We now find that the State Health Agencies have condemned as sources of market shellfish, the entire Hudson River from its southern extremity to a point well beyond the northerly limits of the District, the Upper and Lower Bays, the Newark Bay, the greater portion of Raritan and Sandy Hook Bays, and their interconnecting rivers, as well as the East and Harlem Rivers."

A chronological sequence of events of the shellfish resource decline was outlined in a 1939 Federal Works Agency report sponsored by ISC:

"1621-1850: Depletion due to wasteful exploitation

1850-1870: Beginning of pollution by manufacturing wastes discharged into the receiving waters

1870-1930: Pollution by raw sewage for which the accumulated effects resulted in the condemnation of most harvesting areas".

It was also reported in the same report that:

"NEWARK BAY - Here are natural beds extending from a little ways up the Passaic and Hackensack Rivers, down through the Sound and Arthur Kill to near Perth Amboy. Natural oysters are found all the way up the Hudson as far as the state line, but no beds, in the proper sense of the term, exist now. In Newark Bay itself, according to Captain Joseph Ellsworth, only one-fourth of the area, or about 1000 acres, is occupied by natural beds. Here, as elsewhere, the supply has been so persistently drawn on, the oysters being taken away as fast as a "set" is established, to furnish seed to be planted in the Raritan Bay, etc., that the amount of seed obtained depends upon the extent of the set, so great is the demand which always outruns the supply. 7

Some seed from these beds is shipped by J & J W. Ellsworth to California. Only the smallest sized seed is so shipped. In 1886, thirty thousand bushels were shipped. In 1888, only eleven thousand, owing to scarcity of the supply.

The total area of natural oyster ground in the state is about 80,000 acres.

RARITAN BAY - According to Captain Beadle and T.S.R. Brown of Keyport, four-fifths of the ground between Sandy Hook and East Point is used by the clammers. This makes an area of 28 square miles of 18,000 acres (nearly) of clamming grounds. In the Keyport Enterprise of October 23, 1886 is a list of 109 boats operated by about 300 men, including the captains, engaged in taking clams every fair day during a period of about 40 weeks each year.

The frequency for raw sewage discharges to the Elizabeth River are as follows:

Condition	No. of Overflows
Present	Almost Daily**
With upgraded Westerly Int.	80*
After First Stage work	31
Upon completion of all work	14

* Eliminates dry weather flow discharges
** Includes dry weather flow discharges

The City's Facilities Plan used a calibrated continuous simulation model to estimate the mass of pollutants discharged to the River per year. Under existing conditions, dry weather overflows equivalent to the daily discharge of raw sewage from a population of 2200. In addition, the CSO's discharge the raw sewage equivalent to a population of 55,000 per event. The pollutant quantities discharged at various stages in the program are shown in Table 2. This pollution is concentrated in the tidal reaches of the Elizabeth River and reduces the DO to zero. This highly polluted water enters the Arthur Kill with the outgoing tide. Storm sewer discharges currently account for about 27 percent of the BOD loading and 36 percent of suspended solids loading that annually discharges from the City to the River. Interconnections between the combined and storm sewers result in the storm sewers discharging some amount of combined sewage. The City's pollution abatement plan provides for diverting pollutants in the urban runoff to treatment.

Rehabilitation of the Westerly Interceptor and regulator chambers would divert to treatment about 10 and 16 percent respectively, of the SS and BOD loadings that now enter the Elizbeth River. After the initial stage work, 42 and 46 percent respectively, of the SS and BOD loadings would be diverted to treatment. The comprehensive pollution abatement program should divert to treatment about 73 and 77 percent respectively of SS and BOD loads.

The following table illustrates the potential water quality improvement in terms of average reduction of BOD concentration discharged from the City to the River. The river flow at Ursino Dam averages about 6,000 million gallons (Mgal) per year. Because of the complex nature of DO-BOD-benthic demand relationship in the Elizabeth River-Arthur Kill system, BOD concentration is used to indicate the degradation potential of dissolved oxygen in the River.

Construction Stage	BOD Discharged (lbs/year)	River Flow[1] (Mgal/yr)	Incremental BOD Concentration (mg/l)
Existing Conditions	892,920	6,817	15.7
Westerly Interceptor Rehabilitated	752,940	6,722	13.4
Initial Stage	480,040	6,544	8.8
Subsequent Stage	209,280	6,144	4.1

(1) At River mouth

The average DO concentration in the Elizabeth River from June through August is 9.8 mg/l, or more than twice the incremental BOD discharged by the City. The limited number of overflows (14 upon program completion) should only occur during the larger rainfalls when significant dilution should be available. Accordingly the tidal reach water quality should be restored to excellent quality, and a positive impact exerted on the Arthur Kill waters.

3.2 Current Water Quality Conditions in Arthur Kill

The Interstate Sanitation Commission has monitored water quality conditions in Arthur Kill by remote automatic monitoring stations and routine sampling by helicopter. In 1981 the ISC began a coliform survey

as a part of a cooperative disinfection study to determine the effect of relaxation of the disinfection requirement on the Special Restricted Waters in Raritan Bay and Sandy Hook Bay. According to an ISC report, summer dissolved oxygen in Arthur Kill improved measurably in 1980 in comparison with 1975. The 3 mg/l standard for the northern part of the Kill was met only 40 percent of the time in 1975, but increased to 60 percent in 1980, and to 75 percent in 1981. 1980 and 1981 also show a dramatic decrease in coliform densities. This may be attributable to the completion of the Joint Meeting of Essex and Union Counties secondary treatment facilities in 1978 and upgrading of other municipal plants, the diversion or treatment of industrial wastes, and the cessation of some raw sewage dry weather discharges from municipal systems.

The water quality conditions in Arthur Kill may be represented by the data at the ISC sampling station AK-3, located at the center of and on the north side of the Baltimore & Ohio Railroad Bridge, about 2600 ft. south of the Elizabeth River mouth. The DO, BOD and coliform data obtained in June, July and August are shown in Table 1. While the data shows 10 (all prior to 1981) out of 31 data are below 3 ppm standard for DO, only one is below 1 ppm, and none is zero as observed in the lower Elizabeth River. The total coliform densities appear several orders of magnitude less than that observed in the Elizabeth River. The BOD concentrations are also substantially less. The influx of lower BOD concentration of the Arthur Kill waters to the Elizabeth River results in reduction of BOD concentration measured in the lower tidal reaches in high tide period as compared to that in low tide periods. The above comparison shows that the Elizabeth RIver water is of poorer quality than that in the Arthur Kill.

3.3 Elizabeth River Estuary as a "Pollutant Sink"

The present poor water quality in the Elizabeth River tidal reaches is caused by the oscillating tidal flow in the Elizabeth River and Arthur Kill that traps pollutants. Based on a hydraulic study and water quality survey by ISC in 1957, a slug of very poor quality water was found in the middle segment of the Arthur Kill. It oscillated with the tide. During ebb tide, the water flows from the Newark Bay and the Elizabeth River to the Raritan Bay and the polluted water moves southward. During flood tide, the direction of flow is reversed. The Arthur Kill water enters the Elizabeth River. The slug of polluted water is pushed north, and part of it enters the Newark Bay and eventually flows through the Kill Van Kull to the Upper New York Bay and to the open sea. Because of strong dispersion effects in Arthur Kill caused by tidal motion, pollutants discharged from the Elizabeth River will affect the western part of the Raritan Bay in about one tidal cycle. The slug was sustained by new pollutant discharges and was about five miles in length. As the City's program proceeds, the Elizabeth River's contribution to this slug should be largely eliminated.

TABLE I

WATER QUALITY STANDARD FOR SHELLFISHING

Parameters	Standards	Remarks
D.O. (mg/l)	Daily average > 5 At any time > 5	New York State requires > 5 at any time
Total Coliform (100 ml)	(a) Median MPN < 70 No more than 10% > 230	Approved Shellfish Area (Allow direct marketing)
	(b) Median MPN < 700 No more than 10% > 2300	Restricted Shellfish Area (Require purifying or re-laying)
Fecal Coliform (100 ml)	No standard	

WATER QUALITY STANDARD FOR SWIMMING

D.O. (mg/l)	Daily average > 5 At any time > 5	New York State requires > 5 at any time
Total Coliform (100 ml)	No standard	Monthly median not greater than 2400 in NYS
Fecal Coliform (100 ml)	Geometric mean < 200 No more than 10% of monthly samples > 400	

TABLE 2

ANNUAL POLLUTANT DISCHARGES AND THEIR STAGED REDUCTION FROM MARINE CSO PROJECT AREA

(Westerly Interceptor Drainage Basin)

	Combined Sewer Area	Storm Sewer Area	Total
Area (acres)	1,776.3	836.3	2612.6
A. Existing Conditions			
SS (lbs)	3,197,000	1,760,010	4,957,010
BOD (lbs)	650,980	241,940	892,920
Flow (mgal)	507	310	817
B. After Westerly Interceptor Upgraded			
SS (lbs)	2,719,500 (15%)*	1,760,010 (0%)	4,479,510 (10%)
BOD (lbs)	511,000 (22%)	241,940 (0%)	752,940 (16%)
Flow (mgal)	412 (19%)	310 (0%)	722 (12%)
C. After Initial Stage Work			
SS (lbs)	1,893,800 (41%)	967,820 (45%)	2,861,620 (42%)
BOD (lbs)	339,260 (48%)	140,780 (42%)	480,040 (46%)
Flow (mgal)	350 (31%)	194 (37%)	544 (33%)
D. After Subsequent Stage Work			
SS (lbs)	354,960 (89%)	967,820 (45%)	1,322,780 (73%)
BOD (lbs)	68,500 (90%)	140,780 (42%)	209,280 (77%)
Flow (mgal)	107 (79%)	194 (37%)	144 (82%)

*Percent reduction with respect to discharges under the existing conditions.

TABLE 3

WATER QUALITY DATA AT ISC HELICOPTER SAMPLING STATION AK-3

Date	Dissolved Oxygen (mg/l)	BOD (mg/l)	Coliform (MPN/100 ml) Total	Fecal
6/1/77	3.4	>3.4	80000	-
7/6/77	3.6	-	-	5100
7/20/77	1.2	-	-	1200
8/3/77	2.0	-	-	2700
8/17/77	0.6	>0.6	>100000	-
6/21/78	4.0	>4.0	>100000	21000
7/6/78	5.4	-	-	-
7/19/78	2.8	>2.8	-	-
8/2/78	2.5	-	46000	17000
8/16/78	2.5	-	-	-
6/6/79	7.3	-	-	-
6/20/79	4.0	-	7200	1100
7/5/79	4.4	-	-	-
7/23/79	5.0	>5.0	-	-
8/1/79	6.4	3.6	4500	1700
8/22/79	4.0	2.2	-	-
6/4/80	3.5	>3.5	-	-
7/2/80	1.4	-	-	-
7/9/80	2.7	>2.7	>100000	17000
7/16/80	2.6	>2.6	33000	12000
8/6/80	2.0	1.2	21000	2700
8/20/80	3.6	-	-	-
6/3/81	4.1	-	21000	3200
7/1/81	3.1	-	-	-
7/15/81	5.1	-	21000	3200
8/5/81	3.5	2.4	-	-
8/19/81	3.6	-	-	-
6/2/82	4.4	-	>100000	>100000
7/21/82	4.8	-	48000	3800
8/11/82	6.5	-	3500	1300
7/18/83	4.0	-	3500	2400
9/6/83	5.0			