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VOL. IV

A P P E N D I X

to

P U B L I C H E A R I N G S

before

COMMISSION TO STUDY ADVISABILITY AND PRACTICABILITY
OF FORMULATING AND IMPLEMENTING A COMPREHENSIVE
WATER SUPPLY POLICY AND PROGRAM, CREATED UNDER ACR 31.

Held:
October 8, 1968
October 9, 1968
October 10, 1968
Assembly Chamber
State House
Trenton, New Jersey

Assemblyman Herbert M. Rinaldi [Chairman]

* * * *

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STATE OF NEW JERSEY
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
CAPITAL IMPROVEMENTS PROGRAM
STATEMENT SUBMITTED TO THE
GOVERNOR'S COMMISSION TO EVALUATE THE CAPITAL NEEDS OF NEW JERSEY
SUBCOMMITTEE ON CONSERVATION AND PUBLIC SAFETY
HENRY C. LANG, CHAIRMAN
DONALD C. BORG
MARY LOUISE NUELSEN
GEORGE C. CONNETT, EXECUTIVE DIRECTOR
DONALD P. MARIONE, STAFF ASSISTANT

PRESENTED BY

ROBERT A. ROE
COMMISSIONER OF CONSERVATION AND
ECONOMIC DEVELOPMENT

PRUDENTIAL PLAZA
NEWARK, NEW JERSEY

MARCH 15, 1968

It is the fundamental responsibility of the Department of Conservation and Economic Development to conserve and protect the estate of our people including our public lands and natural resources and to promote the effective use and economic development of these resources for the overall health, welfare and best interest of all of our citizens.

In carrying out this mandate, the conservation and economic development of our natural resources truly establishes the environmental posture and characteristics of our State and of our people. Total environmental resource conservation and economic development has now become one of the greatest challenges facing both public and private agencies.

In view of the fact that New Jersey is now the most urban State in the nation, with a population in excess of seven million people, estimated at over 900 persons per square mile, we are the most densely populated State in the nation. The greatest concentration of our population is in the northeastern quadrant of the State and roughly 80% live in the eleven counties which form a rather narrow strip running between New York and Philadelphia.

The ever-increasing exodus of people and industry from the urban centers into the suburban and rural areas is creating an ever-mounting pressure on our natural resources along with the enormous competition for the use of our land which clearly brings into sharp focus the delicate balance between conservation and economic development and indeed the vital necessity of the interrelationship of the two objectives.

We must once and for all firmly establish and understand the basic difference between the day-by-day cost of providing the current essential needs of our people and at the same time understand the vital necessity of investing in our future growth and development. We can no longer afford the luxury of continued procrastination and attempt to survive on the productivity of past capital investments when for all intent and purposes they have long since been totally

committed and in a large measure used up. In face of the desperate capital needs of the people of this State, expediency in the interest of partisan politics or vested interests can simply just not be tolerated.

In attempting to establish priorities, it is fully recognized that the order of magnitude of our capital investment requirements literally covers the widest possible elements of the "re-birth" of our State.

Of all of these priorities, no matter how we equate or measure our future investment -- by whatever standard applied -- short of the air we breathe, there is no element more basic or critically essential to the sustenance and life of our people and the economic vitality of this State than the quantity and quality of our water supply.

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT

CAPITAL INVESTMENT PRIORITY NO. ONE

"Blue Acres" State Water Resources Development Program

The constant long term critical water shortage in New Jersey reached the disaster stage in the Spring of 1965 when it became abundantly clear that unless uniform mandatory conservation measures were invoked, which in effect would "ration and conserve the remaining water supply," we would definitely run out of water in many areas of the northeastern part of the State not only affecting the basic needs of three million people of that region but literally bringing to a halt the economic productivity in the heart of the industrial complex of New Jersey.

The severity of the situation was fully recognized and in order to avoid economic chaos the Governor declared a state of emergency by invoking his authority established under "archaic" World War II statutes still on the books and placing the operation of the public and private water supplies of the State under the direction and jurisdiction of the State Department of Conservation and Economic Development.

water supplies.

It must further be understood that as a general economic trend, which has accelerated over the last five years, New Jersey's industry, out of competitive necessity, is converting from vertical to horizontal manufacturing facilities and automating wherever possible. In view of the lack of land areas in the urban centers, they are forced to move laterally from the urban centers to the suburban and rural areas of the State. In addition, ever-increasing strangling traffic congestion with the resultant increased cost of moving inventory and people coupled with the ever-spiralling increased cost of city taxation are further aggravating and stimulating this trend. Under the present circumstances, these factors creating this situation are in the main outside the control of city administrations, particularly as it relates to their source of revenues and fiscal ability to cope with the situation.

As we finally recognize and accept the mandate that we must rebuild our cities from the ground up and we begin to energetically and "sanely" apply the concepts of "urban renewal" and "model cities," in the absence of adequate land area, we must focus on the last natural resource -- the use of the air space. We simply cannot achieve this goal with dependence on antiquated inadequate internal municipal water distribution systems which in many instances have not been renovated or improved in over fifty years and do not have the capability to serve high-rise structures.

In view of the weight of the evidence, any further deferment or procrastination short of an immediate action program for the State's water resources development would indeed not only be jeopardizing the health and safety of New Jersey's citizens but would be courting economic disaster in the strongest sense of the word.

The present status of the water supply situation in the State of New Jersey is as follows:

Essentially, the source of our water supply is from surface water or groundwater, or a combination of both. The major regional river basins of the State are the Hackensack, the Passaic, the Raritan and the Delaware. The balance of the southern part of the State from Trenton south is primarily served by groundwater supplies.

Hackensack River Basin

The safe dependable water supply yield of the Hackensack River Basin servicing, in the main, Bergen County, one of our most populous Counties, has for all intent and purposes been totally allocated and committed.

Further sources of water supply to meet the growth needs of this river basin service area during the 1970's and beyond will have to either come from the Hudson River, a new reservoir at the confluence of the Passaic and Ramapo at Twin Bridges, Fairfield Township, or through additional diversion pipeline system from Round Valley-Spruce Run.

It must be noted that the extent of the water supply demand need to service the potential development of the Bergen-Hudson meadowlands area cannot be fully evaluated nor applied to the equation until the development program relating thereto is more crystallized.

Passaic River Basin

The safe dependable water supply yield of the Passaic River Basin servicing primarily the Counties of Passaic, Essex, Morris and Hudson has in the main been essentially allocated and committed with the exception of the potential yield of a new reservoir at the confluence of the Pequannock and Passaic Rivers at Twin Bridges, Fairfield Township which would be an intricate part of the water supply-flood control program of the Passaic River.

The improvements that have been, and are being made to the Passaic Valley Water Supply Commission system for increased diversion from the Passaic River at Little Falls, the construction program of Jersey City's Longwood Valley Reservoir, some planned improvements to the Newark reservoir reserves, acquisition of reservoir sites by the Morris County Municipal Utilities Authority to help provide the storage reserves for Morris County and the major diversion from the Spruce Run-Round Valley reservoir system into the metropolitan area of Newark planned by the North Jersey Water Supply Commission and presently under litigation will help to temporarily ameliorate until the mid-1970's the critical situation in this basin service area.

Part of the longer range program of the State is to divert additional water from the Delaware Basin to further supplement the yield of the Passaic Basin.

Raritan River Basin

The safe dependable water supply yield of the Raritan River Basin servicing the Counties of Hunterdon, Mercer, Middlesex, Monmouth, Morris, Somerset and Union has not as yet been completely developed, allocated or committed. There is substantial additional yield development potential in this basin area that would not only provide for the needs of the counties involved but would provide additional water for export to other basin service areas.

The construction of the Round Valley-Spruce Run reservoir system authorized under the 1958 Water Supply Bond Act has been completed with the exception of some modifications to the Round Valley reservoir outfall line. This reservoir system will provide a safe dependable yield in the basin of approximately 190 million gallons per day at the optimum point of diversion at Bound Brook. Seventy million gallons per day of this supply has already been allocated and committed to the Elizabethtown Water Company. An application

is pending before the State Water Policy and Supply Council for 70 million gallons per day with an additional 20 million gallons per day option to the North Jersey District Water Supply Commission which would be the water that would be diverted -- exported -- from the Raritan Basin through their proposed new pipeline to the metropolitan Newark area. In effect, with these allocations and commitments, the remaining reserve potential yield of the Round Valley-Spruce Run system would only amount to 30 million gallons per day.

In view of the inordinate growth potential of the communities in this basin service area, in the early 1970's considerable additional water supply will be needed. To meet these needs it is essential that we immediately take steps to acquire the Six-Mile Run Reservoir Site, the Confluence Reservoir Site and the South River Tidal Dam Reservoir Site. These reservoirs should also be constructed immediately in view of the fact that they will increase the yield of Round Valley-Spruce Run by 50 million gallons per day, increase the yield of the Delaware-Raritan Canal, located within the basin and having its source of water supply from the Delaware River, by an additional 38 million gallons per day and the construction of the South River Tidal Dam is essential to protect the groundwater supply of that area from impending salt water intrusion. When these projects are completed, in effect, the yield of the Raritan Basin will have been committed.

Delaware River Basin

New Jersey is vigorously pursuing a minimum allocation of 300 million gallons per day from the developable yield of the Delaware River Basin water supply system.

The detailed engineering data relating to New Jersey's diversion from the Delaware and the modus operandi of providing this supply to New Jersey has not as yet been completed nor finalized by the Delaware River Basin Commission and

the State of New Jersey. The water supply from the Delaware, however, will in effect service all three of New Jersey's river basins, namely, the Raritan, the Passaic and the Hackensack. To accomplish this goal a system of direct feed supply and "exchange waters" within all three basins will be established.

In view of the fact that 1975 has been estimated as the approximate date when the Delaware River Basin system will be capable of providing water supply to the State of New Jersey and the point of diversion is planned in the vicinity of Frenchtown on the Delaware, in order to be able to effectively utilize this water supply and meet our needs and demands of late 1970 and early 1980, we must immediately begin to acquire the three reservoir sites of Hardscrabble, Stony Brook and Twin Bridges including the diversion pipeline right-of-way from Frenchtown to these three reservoir storage sites.

Monmouth County

To effectively service the rapidly increasing growth of Monmouth County, we must immediately acquire the Lower and Upper Manasquan Reservoir Sites.

Groundwater Development -- Southern New Jersey

A number of engineering studies in many areas of the southern part of the State have already been concluded. Additional engineering studies are underway to ascertain the full potential yield of the groundwater and surface waters of this area of our State.

Serious salt water intrusion has been encountered, particularly in the Cape May area as it relates to the water supply of Wildwood and Cape May City.

Solutions to these problems are being studied, particularly as they relate to development of groundwater supplies further inland, recharge reservoirs or possibly water desalination facilities along the coastal area.

This summary graphically illustrates the status of New Jersey's water supply system and the exigencies of the projected development program.

To implement our State Water Resources Development Program, we recommend the following:

1. The immediate acquisition and preservation of our remaining reservoir sites in a water resources "land bank."

This is essentially important in view of the fact that reservoir sites are severely limited because of their natural geographic structure and critical locations. Once a reservoir site is lost for other uses, it cannot be replaced.

The fierce competition for the use of our land, as previously mentioned, and the constant intrusion of commercial and residential developments in these reservoir site areas will ultimately make it economically unfeasible to acquire them at a later date. The rapid escalation of land values in New Jersey could easily double the cost of the estimated acquisition program within five to ten years.

This acquisition program should provide for an "in lieu payment of taxes" to compensate those communities and counties where reservoir sites would be acquired and preserved for future use and development.

The precedence for this recommendation and a formula to accommodate same has already been implemented in the Round Valley-Spruce Run reservoir development program.

The estimated cost to acquire the necessary reservoir sites as outlined, but not including a reserve fund for in lieu payment of taxes is \$49,350,000

Note: For detailed data relating thereto see attached Exhibit I, Summary, Page 3.

2. The State should program to build the reservoirs in advance of immediate need and provide the lead time to have adequate water available to guide our growth and development.
3. The State must be responsible for building the major water aqueducts and distribution trunklines. These should be built as major arteries interconnecting existing water systems and new systems to be developed providing the optimum flexibility of serving any area of the State, and of such design and capacity to have the capability of transferring huge quantities of water where needed providing a positive insurance policy against further drought crises.

The detailed construction time schedule of the forementioned river basins water supply capital improvements including estimated construction costs is attached.

The estimated cost of this immediate phase of construction is \$275,900,000

Note: For detailed data relating thereto see attached Exhibit I, Pages 1-2 and Summary on Page 3.

4. The State should provide grants-in-aid to make available matching funds to municipalities on a 50-50 State-Municipal formula for the improvement of the municipality's internal water distribution systems to insure the health and safety of the residents by providing an adequate supply in quantity and pressure.

Estimated cost \$ 25,000,000

5. In evaluating the forementioned Water Resources Development Capital Improvements Schedule, I call to your attention that

- a. The estimated dollar value of construction does not include Phase II of the Water Resources Development Program which, in effect, would require an additional investment of \$150 million to construct additional reservoirs in the northwest quadrant of the State -- covering Sussex and Warren Counties -- and also to provide for additional reservoir construction in the southern part of the State. Some of these reservoirs may ultimately be constructed by local or private interest.
- b. Additional funding will also ultimately be necessary to accommodate the construction

- of additional interconnecting
trunklines. The cost estimate
of these facilities is not as
yet available.
- c. The cost estimates under Phase I
do not include the construction
cost of the diversion line by the
North Jersey District Water Supply
Commission from Bound Brook to
the City of Newark estimated with
contingencies at\$67,725,000
- d. The cost estimate of Phase I does
not include New Jersey's contributory
share of the construction of the
Delaware River Basin water
supply system in view of the
fact that these figures are not
available as yet.
- e. The cost estimate of Phase I does
not include New Jersey's
contributory share of the Passaic
Valley Water Supply-Flood
Control Program
estimated at \$73,500,000
- f. The cost estimate of Phase I does
not include the cost of
construction of New Jersey's
contributory share of the Crab
Island Tidal Dam estimated
to cost \$36,000,000

Note: Other data relating to the above items under No. 5 is provided in more detail on the capital development summary sheet, Page 3, Exhibit I.

6. Initial water desalination studies have already been conducted in the northeastern part of the State which resulted in a realization that the cost of desalting at this time is considerably more expensive than developing our present water resources. It is recognized, however, that by 1990 or the year 2000 some method of renovating water or desalting water will be necessary to provide New Jersey with additional water supply.

We are presently conducting a pilot study with the Office of Saline Water, U.S. Department of the Interior in a coordinated effort with Public Service Electric and Gas Company, the Federal Government and this department at the fossil-fuel Marion plant of Public Service on the Hackensack River.

7. In recognition that total water management in our State evolves around water quality, water supply, flood control and flood plain zoning, it is important to note that major water supply-flood control studies are intensively being carried out on the Passaic River Basin and the Delaware River Basin. A substantive flood plain delineation program has recently been committed and is underway for the Raritan Basin. Additional flood control studies are being carried out on some of

our southern New Jersey rivers.

8. The Water Policy and Supply Council of the State of New Jersey and the Commissioner of the Department of Conservation and Economic Development should have standby statutory power extended to them by the Legislature with the authority to act in any emergent or impending emergency where water resources problems are involved.
9. There should be established by legislation a permanent standing WATER BOARD OF ARBITRATION having sufficient authority so that their decisions would be binding upon the parties of interest in water disputes without having to burden the courts in long, lengthy judicial proceedings.
10. In view of the fact that the rivers of New Jersey have become the conduits of our water supply, they can no longer be used as garbage pails for untreated refuse.

As the most urban State in the nation, with perhaps the most complex situation relating to water supply, water allocation and water quality, all within a highly complicated industrial complex, we must seriously consider the establishment and implementation of restrictive and selective zoning on the headwaters of our rivers, in effect, prohibiting these basic water source areas to be utilized by complex

manufacturing processes emitting deleterious quantities of organic or inorganic wastes.

11. There are basically two alternative methods of financing this Water Resources Development Capital Improvements Program:

- a. A general State bond issue approved by referendum wherein the full faith and credit of the State would be pledged and the cost of which would be ultimately amortized by revenues derived from the sale of the water.

Although this method would no doubt achieve the lowest bond interest rate, it would also reduce the borrowing capacity of the State, thus possibly affecting the bonding capacity for other capital improvements.

In this method of financing usually the bond amortization period is shortened which results in initially higher water rates as is the case of the 28-year bond amortization schedule of the Round Valley-Spruce Run reservoir system.

- b. By an act of the Legislature, we could establish a Water Resources Development Authority within the State Department of Conservation and Economic Development which would have the

authority to issue revenue bonds.

These bonds would be amortized by the revenues derived from the sale of the water and would not reduce the State's general borrowing capacity. Although the interest rate may be slightly higher, a longer amortization period is usually available under this method of financing which, in effect would result in initially lower water rates.

It is possible to float a 40-year bond issue with a deferred amortization payment for the first ten years so that only interest payments would be required during the initial phases of the construction program.

In view of the fact that construction costs are increasing yearly at an estimated rate of 5% to 7%, any slightly higher interest rate would be more than offset by accelerating the construction programming during the first ten-year period. In order to effectively carry out this type of program, however, in our judgment, it would be necessary to initially provide the funding by general revenue bond issue for the acquisition

of the reservoir sites. The proceeds from the sale of these land acquisition bonds could be loaned to the authority to be repaid over a period of time by the revenues derived from the sale of the water.

Exhibit II of this presentation is a detailed breakdown of the cost estimate of the Delaware diversion, including pipeline right-of-way acquisition, reservoir site acquisitions, pumping stations and capital reservoir construction.

Exhibit III of this presentation is a comprehensive graph projecting the water demand needs in Region I to the year 2,000 and interrelating this data with the water development and construction schedule outlined in this report.

This data has been compiled and developed from the studies and information already available under this department's Water Development Master Plan for New Jersey.

CAPITAL IMPROVEMENTS SCHEDULE

FY 1968-69

South River Tide Dam	Acquisition	\$ 5,000,000
Raritan Confluence	"	1,500,000
Manasquan - Upper and Lower	"	2,000,000
Six Mile Run	"	4,600,000
Hardscrabble	"	8,000,000
Two Bridges	"	5,000,000
Stony Brook (So. Br. Raritan)	"	1,250,000
Hackettstown	"	5,000,000
Delaware River P.L.R.O.W.	"	2,000,000
Reservoir Sites (S & NW N.J.)	"	<u>15,000,000</u>
	TOTAL	\$49,350,000

FY 1969-70

South River Tide Dam	Construction	\$ 4,000,000
Round Valley Outlet Pipeline	"	4,000,000
Raritan Confluence	"	2,500,000
Manasquan - Lower	"	<u>1,500,000</u>
	TOTAL	\$12,000,000

FY 1970-71

Raritan Confluence	Construction	\$10,000,000
Manasquan - Upper	"	<u>4,000,000</u>
	TOTAL	\$14,000,000

FY 1971-72

Raritan Confluence	Construction	\$10,000,000
Manasquan - Upper	"	4,500,000
Hardscrabble	"	<u>1,500,000</u>
	TOTAL	\$16,000,000

FY 1972-73

Hardscrabble	Construction	\$12,000,000
Six Mile Run	"	3,000,000
Two Bridges	"	<u>7,000,000</u>
	TOTAL	\$22,000,000

FY 1973-74

Hardscrabble	Construction	\$ 4,900,000
Six Mile Run	"	3,000,000
Two Bridges	"	<u>27,000,000</u>
	TOTAL	\$34,900,000

FY 1974-75

Two Bridges	Construction	\$ 6,000,000
Delaware River Pipe Line	"	<u>34,000,000</u>
	TOTAL	\$40,000,000

FY 1975-76

Stony Brook (So. Br. Raritan)	Construction	\$10,000,000
Delaware River Pipe Line	"	60,000,000
Hackettstown	"	<u>6,000,000</u>
	TOTAL	\$76,000,000

FY 1976-77

Stony Brook (So. Br. Raritan)	Construction	\$15,000,000
Delaware River Pipe Line	"	36,000,000
Hackettstown	"	<u>10,000,000</u>
	TOTAL	\$61,000,000

WATER DEVELOPMENT COSTS

FY 1968-69	\$49,350,000
FY 1969-70	12,000,000
FY 1970-71	14,000,000
FY 1971-72	16,000,000
FY 1972-73	22,000,000
FY 1973-74	34,900,000
FY 1974-75	40,000,000
FY 1975-76	76,000,000
FY 1976-77	<u>61,000,000</u>
TOTAL	\$325,250,000

DELAWARE DIVERSION
TRANSMISSION LINE

COST ESTIMATE

<u>Pipe Line Section</u>	<u>Miles</u>	<u>Cost in Millions</u>	
		<u>Uniform Flow</u>	<u>Flood Skin</u>
(1) Frenchtown - So. Br. Raritan River	10.6	10.6	31.8
(2) So. Br. Raritan - Lamington River	10.4	10.4	31.2
(3) Lamington to Ralston	12.4	12.4	37.2
(4) Spur: Ralston to Stony Brook Res.	6.9	7.0	10.5
(5) Ralston to Hardscrabble Res.	3.6	3.6	10.8
(6) Hardscrabble to Route 10	8.7	8.7	13.0
(7) Route 10 to Two Bridges	7.7	7.7	11.0
(8) <u>Pumping Stations</u>			
Frenchtown (1-3)		4.0	12.0
South Branch (1-3)		4.0	12.0
Lamington (1-3)		4.0	12.0
Ralston (1-2)		4.0	8.0
Route 10 (1-2)		4.0	8.0
(9) <u>Terminal Reservoirs</u>			
Stony Brook		20.0	20.0
Hardscrabble		26.4	26.4
Two Bridges		40.0	40.0

Cost Breakdown

Pipeline	60.4	135.5
Pumping Stations	20.0	44.0
Terminal Reservoirs	86.4	86.4
TOTAL	166.8	265.9

NOTES

Pipeline: Size, 108" Diam.
Capacity, 300 mgd; cost \$ 1million/mile

Pumping Station: Capacity, 300 mgd; cost \$ 4 million/unit

Pipeline Length: Frenchtown to Two Bridges 60.3 miles
Ralston to Stony Brook 6.9 miles

STATE WATER RESOURCES DEVELOPMENT

CAPITAL IMPROVEMENTS SCHEDULE

SUMMARY

<u>PROJECT</u>	<u>ACQUISITION</u>		<u>CONSTRUCTION</u>	
	<u>FY</u>	<u>Cost</u>	<u>FY</u>	<u>Cost</u>
South River Tide Dam	69	5,000,000	70	4,000,000
Round Valley Outlet Pipeline			70	4,000,000
Raritan Confluence	69	1,500,000	70, 71, 72	22,500,000
Manasquan - Lower & Upper	69	2,000,000		
Lower			70	1,500,000
Upper			71, 72	8,500,000
Six Mile Run	69	4,600,000	73, 74	6,000,000
Hardscrabble	69	8,000,000	72, 73, 74	18,400,000
Two Bridges	69	5,000,000	73, 74, 75	40,000,000
Stony Brook (So. Br. Raritan)	69	1,250,000	76, 77	25,000,000
Hackettstown	69	5,000,000	76, 77	16,000,000
* Delaware River Pipe Line	69	2,000,000	75, 76, 77	130,000,000
Reservoir Sites (S & NW N.J.)	69	15,000,000	-----	-----
		SUB TOTALS	\$49,350,000	\$275,900,000
		TOTAL	\$325,250,000	

Other Projects

1. Reservoir Sites (S & NW N.J.)	\$150,000,000
2. Raritan Basin Diversion	67,725,000
3. Tocks Island (D.R.B.C.)	xxxxxxxxxxxx
4. Passaic Valley Program (U.S.C.E.)	73,500,000
5. Crab Island Program (U.S.C.E.)	36,000,000

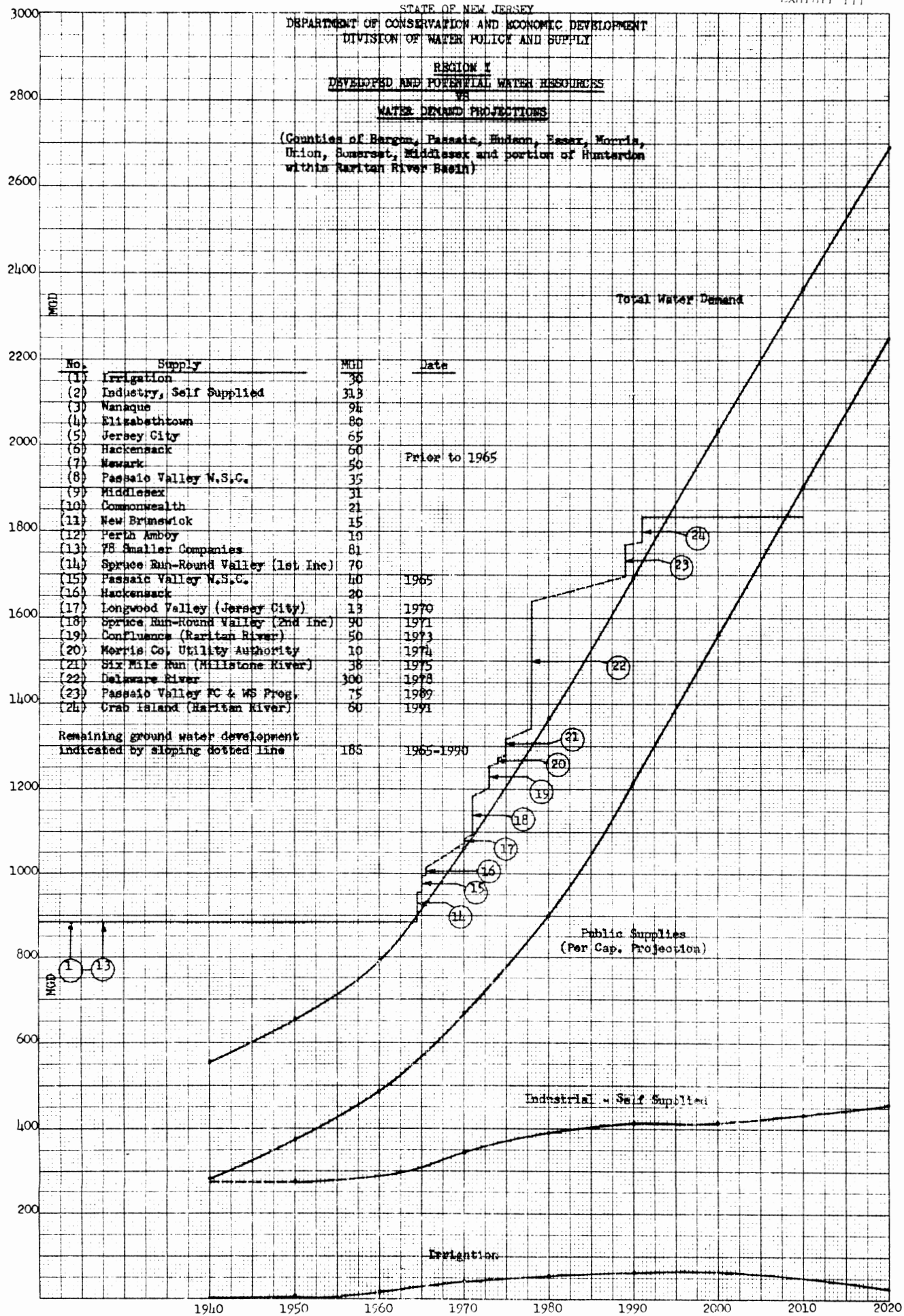
Notes:

1. Pending determination of State responsibility. Estimate based on \$1 million per 1 billion gallons of storage capacity.
 2. Pending determination of N.J.D.W.S.C. negotiations
 3. 4. & 5. Federal programs, long term revenue financing possibility. Preliminary value of State responsibility where shown.
- * Delaware River pipeline may cost an additional \$50 million if total flood-skimming diversion is required.

STATE OF NEW JERSEY

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLYREGION I
DEVELOPED AND POTENTIAL WATER RESOURCES
VS

WATER DEMAND PROJECTIONS

(Counties of Bergen, Passaic, Hudson, Essex, Morris,
Union, Somerset, Middlesex and portion of Hunterdon
within Raritan River Basin)

STATE WATER RESOURCES DEVELOPMENT
CAPITAL IMPROVEMENTS SCHEDULE

PRIORITY NO. ONE

FY1969-71 -- Acquisition

South River Tide Dam	\$5,000,000
Raritan Confluence	1,500,000
Manasquan - Upper and Lower	2,000,000
Six Mile Run	4,600,000
Hardscrabble	8,000,000
Two Bridges	5,000,000
Schooley Mountain Reservoir (formerly referred to as Stony Brook, So. Br. Raritan)	1,250,000
Hackettstown	5,000,000
Delaware River P.L.R.O.W.	2,000,000
Reservoir Sites (S & NW N.J.)	<u>15,000,000</u>
SUB TOTAL (Acquisition)	<u>\$49,350,000</u>

FY1969-78 -- Construction

Round Valley Outlet Works	\$4,000,000
South River Tide Dam	4,000,000
Raritan Confluence Reservoir	22,500,000
Manasquan - Lower	1,500,000
Six Mile Run	6,000,000
Manasquan - Upper	<u>8,500,000</u>
SUB TOTAL (Construction)	<u>\$46,500,000</u>
TOTAL	\$95,850,000

For advanced preparation of Engineering designs and specifications	<u>10,000,000*</u>
TOTAL	\$105,850,000

*It is extremely important to note that in order to prepare the detailed plans and specifications for the construction of the balance of the water system needs of the State, a minimum of \$10 million should be made available for the advanced preparation of engineering designs and specifications.

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY
WATER DEVELOPMENT FUND AS OF 10/5/68

EXHIBIT V

26

	TOTAL AVAILABLE	ENCUMBERED	EXPENDED	UNENCUMBERED BALANCE	
430-900	4,631,721.14	266.70(A)	4,625,438.74	6,015.70	(A) S & M Electric Comp 266.70
430-905 Reimbursement Treasury	4,684,451.00	----	4,684,451.00	----	(B) Twp. of Union & Lebanon 7,882.61 Twp. of Union & Lebanon 30,000.
430-910 Const. Spruce Run	9,730,238.06	37,882.61(B)	9,692,355.45	----	(C) Bohren, Bogart, VanCleef 6,656.90
430-920 Const. Round Valley	10,123,393.48	6,656.90(C)	10,116,736.58	----	(D) Special Report #26 4,985. Special Report #28 2,200 Special Report #23 3,850
430-930 Acquisition Land	787,453.63	----	787,453.63	----	(E) Blanket Order 286.05 Charles J. Kupper 9,310.84 Harvey W. Sarvon 4,800. American Air Surveys 24,240. Anderson & Nichols Co. 633,519.93 Blanket Order (Pipe) 1,086.90 Water Quality Monitoring(DA) 276,501.75
430-940 Const. Pumping Station	9,353,225.33	----	9,353,225.33	----	(F) Blanket Order 297.20 U.S.G.S. (Input-Output) 13,900. Public Service 25,700. (Disalinization)(DA) 255,000. Gilbert Associates
430-950 Const. Admin. Building	531,539.51	----	531,539.51	----	
Sub - Total	39,842,022.15	44,806.21	39,791,200.24	6,015.70	
431-900 Ground Water Invest.	1,250,000.00	11,035.	1,115,946.11	123,018.89	
432-900 Pennsauken Studies	100,000.00	----	4,913.21	95,086.79	
433-900 Surface Water Raritan - Millstone	3,000,000.00	950,645.47(E)	288,423.32	1,760,931.21*	
434-900 Surface Water	2,000,000.00	294,897.20(F)	158,383.74	1,546,719.06	
TOTAL	46,192,022.15	1,301,383.88	41,358,866.62	3,531,771.65	
LESS: 431-900 and 432-900	1,350,000.00	- 11,035.	- 1,120,859.32	- 218,105.68	
60% pro-rata share of state-wide Water Resource Program		+ 351,000.00		- 351,000.00**	** State-Wide Water Resources 595,000.00 Development Program
40% pro-rata share of state-wide Water Resource Program		+ 234,000.00		- 234,000.00**	* Includes 79,487.26 Refund from Comprehensive Water & Related Resources Planning
Balance of Operating		+ 6,015.70		- 6,015.70	
TOTAL RESIDUE AVAILABLE	44,842,022.15	1,881,364.58	40,239,007.30	2,722,650.27	

EXHIBIT V

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY
WATER DEVELOPMENT FUND AS OF 10/5/68

	TOTAL AVAILABLE	ENCUMBERED	EXPENDED	UNENCUMBERED BALANCE		
430-900	4,631,721.14	266.70(A)	4,625,438.74	6,015.70	(A) S & M Electric Comp	266.70
430-905 Reimbursement Treasury	4,684,451.00	----	4,684,451.00	----	(B) Twp. of Union & Lebanon	7,882.61
430-910 Const. Spruce Run	9,730,238.06	37,882.61(B)	9,692,355.45	----	Twp. of Union & Lebanon	30,000.
430-920 Const. Round Valley	10,123,393.48	6,656.90(C)	10,116,736.58	----	(C) Bohren, Bogart, VanCleef	6,656.90
430-930 Acquisition Land	787,453.63	----	787,453.63	----	(D) Special Report #26	4,985.
430-940 Const. Pumping Station	9,353,225.33	----	9,353,225.33	----	Special Report #28	2,200
430-950 Const. Admin. Building	531,539.51	----	531,539.51	----	Special Report #23	3,850
Sub - Total	39,842,022.15	44,806.21	39,791,200.24	6,015.70	(E) Blanket Order	286.05
431-900 Ground Water Invest.	1,250,000.00	11,035.	1,115,946.11	123,018.89	Charles J. Kupper	9,310.84
432-900 Pennsauken Studies	100,000.00	----	4,913.21	95,086.79	Harvey W. Sarvon	4,800.
433-900 Surface Water Raritan - Millstone	3,000,000.00	950,645.47(E)	288,423.32	1,760,931.21*	American Air Surveys	24,240.
434-900 Surface Water	2,000,000.00	294,897.20(F)	158,383.74	1,546,719.06	Anderson & Nichols Co.	633,519.93
TOTAL	46,192,022.15	1,301,383.88	41,358,866.62	3,531,771.65	Blanket Order (Pipe)	1,086.90
LESS: 431-900 and 432-900	1,350,000.00	- 11,035.	- 1,120,859.32	- 218,105.68	Water Quality Monitoring(M)	276,501.75
60% pro-rata share of state-wide Water Resource Program		+ 351,000.00		- 351,000.00**	(F) Blanket Order	297.20
40% pro-rata share of state-wide Water Resource Program		+ 234,000.00		- 234,000.00**	U.S.G.S. (Input-Output)	13,900.
Balance of Operating		+ 6,015.70		- 6,015.70	Public Service	25,700.
TOTAL RESIDUE AVAILABLE	44,842,022.15	1,881,364.58	40,238,007.30	2,722,650.27	(Disalinization)(DA)	
					Gilbert Associates	255,000.

** State-Wide Water Resources Development Program 595,000.00

* Includes 79,487.26 Refund from Comprehensive Water & Related Resources Planning

WATER RESOURCES RESEARCH INSTITUTE

EXHIBIT VI

<u>CODE NO.</u>	<u>TITLE</u>	<u>FISCAL YEARS</u>				<u>DURATION</u>
		<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	
M-1	Changing Technology & Industrial Water Requirements	\$ 5,394	\$ 5,672	\$ ---	\$ ---	1968
M-2	Urbanization and its Effect on Water Resources	10,070	9,630	9,703	---	1969
M-3	Artificial Mixing of Density Stratified Fluids (Conducted at Princeton University)	8,860	8,740	---	---	1968
M-4	Use of water y Lowland Vegetation	2,318	3,216	2,465	2,000	1971
M-5	Flood Hazard Perception in the Paulins Kill Valley	1,182	---	---	---	1967
M-6	Bentnal Decomposition of Oil Pollutants	4,750	3,070	---	---	1968
M-7	Quality Aspects of Water Resources as Related to Urbanization	2,600	2,600	---	---	1968
M-8	Testing for Phenols in Water	4,826	5,300	---	---	1968
3-009-NJ	Engineering Economics Study of the Growth Potential for Industrial Users of the Passaic River Water - Stevens Institute	---	10,310	10,605	---	Extended thru 1969
B-010-NJ M-10	Photosynthetic Reaeration in the Upper Passaic River	---	3,373	3,372	---	1969
B-011-NJ M-11	Process Control for Oxygen Regeneration of Polluted Rivers	---	10,975	2,474	---	1969

WATER RESOURCES RESEARCH INSTITUTE (cont'd)

<u>CODE NO.</u>	<u>TITLE</u>	<u>1967</u>	<u>FISCAL YEARS</u>		<u>1969</u>	<u>1970</u>	<u>DURATION</u>
			<u>1968</u>				
FWPCA DEMONSTRATION PROJECT-WPDL31-01 (RI)-67	Oxygen Regeneration of Polluted Rivers	\$ ---	\$20,000		\$12,000	\$12,000	1970
M-14	Surface and Groundwater Potentialities of the Mullica River Basin	---	1,800		9,827	---	1969
M-15	Economics of River Water Sampling (Stevens Instit.)	---	---		---	10,000	1971
M-16	Economic Value of Water Quality to Man's Environment	---	---		---	4,000	1971
M-17	Relationship of Agricultural Fertilizer Use to Water Pollution	---	---		---	5,000	1972
M-18	Economics of Water Based Recreation in New Jersey	---	---		---	7,000	1971
M-19	Clay Mineral Composition in New Jersey Rivers and the Chemistry of its Precipitation	---	---		---	4,000	1973
M-20	Oxygen Demand of Benthic Depos- its in Streams	---	---		---	6,000	1971

PUBLIC WATER SUPPLY PROJECTIONS

Raritan River Basin

<u>Year</u>	<u>Middlesex County</u>	<u>Somerset County</u>	<u>Hunterdon County*</u>	<u>Total</u>
1960	51.6 MGD	17.1 MGD	3.4 MGD	72.1 MGD
1970	86.5 "	30.5 "	5.9 "	122.9 "
1980	137.7 "	51.2 "	9.8 "	198.7 "
1990	199.2 "	80.0 "	15.7 "	294.9 "

Portions of Delaware River Basin

<u>Year</u>	<u>Warren County</u>	<u>Hunterdon County**</u>	<u>Total</u>
1960	8.0 MGD	3.3 MGD	11.3 MGD
1970	10.3 "	3.9 "	14.2 "
1980	15.0 "	6.1 "	21.1 "
1990	21.1 "	8.7 "	29.8 "

*Within Raritan River Basin.

**Within Delaware River Basin.

PUBLIC WATER CONSUMPTION PROJECTIONS

PORTION OF DELAWARE RIVER BASIN

Hunterdon County*

<u>Year</u>	<u>Population</u>	<u>Public Supply Amount Per Capita**</u>	<u>Total</u>
1960	25,900	126 GPD	3.3 MGD
1970	29,100	134 "	3.9 "
1980	42,200	144 "	6.1 "
1990	58,000	150 "	8.7 "

Warren County

1960	63,200	126 GPD	8.0 MGD
1970	76,700	134 "	10.3 "
1980	104,100	144 "	15.0 "
1990	140,600	150 "	21.1 "

*Approximate population within Delaware River Basin.

**Source: "Water Resources Management in New Jersey" -
State of New Jersey - Nov. 1967.

PUBLIC WATER CONSUMPTION PROJECTIONS

RARITAN RIVER BASIN

Middlesex County

<u>Year</u>	<u>Population</u>	<u>Public Supply Amount Per Capita*</u>	<u>Total</u>
1960	433,856	119 GPD	51.6 MGD
1970	636,000	136 "	86.5 "
1980	860,900	160 "	137.7 "
1990	1,076,900	185 "	199.2 "

Somerset County

1960	143,913	119 GPD	17.1 MGD
1970	224,000	136 "	30.5 "
1980	319,800	160 "	51.2 "
1990	432,200	185 "	80.0 "

Hunterdon County**

1960	28,200	119 GPD	3.4 MGD
1970	43,200	136 "	5.9 "
1980	61,500	160 "	9.8 "
1990	85,100	185 "	15.7 "

*Source: "A Capital Program" - Governor's Committee -
April 1968.

**Approximate population within Raritan River Basin.

State of New Jersey
County of Hunterdon

RESOLUTION

WHEREAS, the Board of Freeholders of Hunterdon County has a deep and abiding interest in the water resources of this County; and

WHEREAS, the State of New Jersey has located the Round Valley-Spruce Run Reservoir System within Hunterdon County; and

WHEREAS, the State of New Jersey represented to the people of Hunterdon County that these reservoirs would make available to them, at a reasonable cost, bountiful water supplies; and

WHEREAS, the County of Hunterdon is rapidly growing, both industrially and residentially; and

WHEREAS, the need for sizeable quantities of pure potable waters will be greatly increased in Hunterdon County as a result of this growth; and

WHEREAS, it has become evident through the announced plans of the State of New Jersey, and through newspaper releases, that a plan is under way to transport all of the remaining safe yield of water from the Round Valley-Spruce Run System to areas outside of this County; and

WHEREAS, it appears to the Board of Freeholders of Hunterdon County, and to many of its citizens, that such action would be detrimental to the best interests of the people, and to the growth of Hunterdon County;

NOW, THEREFORE, BE IT RESOLVED

1. That the State of New Jersey be requested to furnish the Board of Freeholders of Hunterdon County with a complete and documented plan of their intentions with regard to the disposition of Hunterdon County waters, with particular reference to the yields of Round Valley and Spruce Run; and if alternate plans exist for the supplying of waters to Hunterdon County, it is requested by the Board of Freeholders that these be presented, complete with the cost factors involved, and the proposed method of financing; and
2. That the State of New Jersey be requested to defer any such action until such time as the plans of the State for the disposition of Round Valley-Spruce Run waters can be thoroughly studied by this Board, and adequate safeguards arranged for the people of Hunterdon County and their best interests.

Offered by Kenneth V. Myers

Adopted August 20, 1968

I HEREBY CERTIFY THIS TO BE A TRUE
COPY OF THE ORIGINAL

Regnier V. Jones
HUNTERDON COUNTY BOARD OF FREEHOLDERS

Regnier V. Jones
Regnier V. Jones, Clerk

Freeholders Want Answers From State

Demand Its Intentions Regarding Water From County Reservoirs

Will Hunterdon get any of that Spruce Run-Round Valley water which the cities and the North Jersey District Water Supply Commission are battling about?

Hunterdon County freeholders want to know and they are asking the Conservation Department and state legislators for answers.

In a unanimously approved resolution, the freeholder board Tuesday asked the state for "a complete and documented plan of its intentions with regard to the disposition of Hunterdon County waters," especially yields of Round Valley and Spruce Run.

The freeholders also ask if "plans exist for supplying waters to Hunterdon County," and what the cost will be.

All Going Elsewhere

According to the freeholders, it appears "that a plan is under way to transport all of the remaining safe yield of water from the Round Valley-Spruce Run system to areas outside of this county."

"The county stands to suffer if the present squabble continues as it is," Free-

holder Kenneth Myers remarked.

He referred to the dispute between Newark and the North Jersey Commission on a pipeline the commission intends to build from the Raritan River near Bound Brook to Newark and neighboring communities.

Newark and some of those neighbors are fighting the pipeline project in court and at meetings of the commission, asserting water from the Round Valley-Spruce Run-Raritan River complex will cost well over \$200 per million gallons, far more than originally estimated.

Too Expensive

And Round Valley-Spruce Run-Raritan River water could become "too expensive for local use in Hunterdon or maybe can't be gotten at all," said Freeholder Director William Winter.

Elizabethtown Water Company already is buying up to 70 million gallons of water a day from the state, taking the water from the mainstream of the Raritan.

The Hunterdon freeholder resolution,

says that Hunterdon was promised and is entitled to "bountiful water supplies at reasonable cost" from the reservoirs and rivers in its boundaries.

Back when Spruce Run and Round Valley were authorized through public bond issues, the North Jersey Water District Commission was empowered to get water from the reservoirs to the Newark area so the state could start getting fees to pay off the bonds.

Start On Pipeline

Last week, the commission voted to spend \$4.5 million as a start on the Bound Brook-to-Newark \$51 million pipeline.

No one has yet decided—although the Conservation Department has begun studies—how to route the water from Round Valley to the North Branch of the Raritan. Spruce Run feeds the South Branch, and the South Branch in turn feeds water via pumping into Round Valley.

Both the South and North Branches flow into the mainstream of the Raritan.

PORTION OF THE STATEMENT BY JAMES F. WRIGHT, EXECUTIVE
DIRECTOR, DELAWARE RIVER BASIN COMMISSION, NOT READ
AT THE TIME OF THE HEARING.

Chairman Rinaldi and Members of the Commission:

I appreciate the opportunity to testify before this Commission today, in my capacity as Executive Director of the Delaware River Basin Commission, a federal-interstate water resources agency created in 1961. Our Commission is an agency of the United States Government and of the States of New York, New Jersey, Pennsylvania and Delaware. Its geographic jurisdiction covers the entire 12,500-square-mile land area drained by the Delaware River and its tributaries. The river originates in the Catskill Mountain region of New York State and flows approximately 350 miles to the ocean at Cape May. The basin drains all of Warren County, western portions of Sussex, Hunterdon and Mercer, and all or most of the lower Counties of Burlington, Camden, Gloucester, Salem, Cumberland and Cape May. The Commission's area of jurisdiction is confined to the limits of the Delaware River Basin. However, it may, under certain circumstances, act outside the basin subject to the permission of the states in which it proposes to act.

Supreme Court Decree

In the 1920s New York City first contemplated going to the headwaters of the Delaware River for additional municipal water supply. Negotiations between the states of New York and New Jersey and the Commonwealth of Pennsylvania at that time failed to provide any acceptable solution to their mutual water supply problems.

In 1931 the United States Supreme Court granted the City of New York the right to a diversion of 440 million gallons per day and required that New York City release from its Delaware Basin reservoirs a limited quantity of water to maintain minimum flows.

Actually, the decree did not take effect until the City's first Delaware reservoir, Neversink, went into operation in 1953. Meanwhile, New York's plan to expand the Delaware system reopened the case, and in 1954 the high court authorized additional graduated diversions to the City. The amended decree initially raised the City's diversion rights from 440 million gallons to 490 million, timed to the 1955 completion of the City's next Delaware reservoir, Pepacton. When Cannonsville, the third reservoir, went into operation in March 1967, New York City's diversion rights jumped to 800 million gallons. From the beginning, the terms of the Supreme Court decree required New York City to release water from its storage reservoirs to maintain a minimum basic rate of flow at the Montague, New Jersey, gauging station of 1525 cubic feet per second, of benefit to downstream states, including New Jersey. Upon completion of the Cannonsville project, this minimum flow rate increased to 1750 cubic feet per second. In addition, the decree granted to the State of New Jersey the right to divert 100 million gallons a day from the Delaware Basin without obligation to provide compensating releases. New Jersey exercises this diversion right through waters taken from the Delaware and Raritan Canal. This diversion currently runs somewhat in excess of an average of 70 million gallons per day, thus leaving unused rights of something less than 30 million gallons per day under the present decree. I emphasize that the Supreme Court decree does not prevent New Jersey from making additional diversions from the Delaware River system. However, it does clearly provide that any such diversions in excess of 100 million gallons per day must be associated with some form of additional storage and compensating releases to downstream states.

The Delaware River Basin Compact of 1961, which created this Commission, was very careful to delineate a clear line to protect the terms

of the Supreme Court decree. However, the Compact did convey to the Commission certain authority to change the decree subject to the unanimous consent of the parties to the decree. Also, in times of emergency such as a drought or other catastrophe, the Commission may temporarily change the terms of the decree under unanimous consent of its members. We have invoked this special authority once in response to the emergency conditions associated with the 1961-67 drought.

MORRIS COUNTY MUNICIPAL UTILITIES AUTHORITY

COURTHOUSE

MORRISTOWN, NEW JERSEY



October 10, 1968

STATEMENT PREPARED
for
JOINT LEGISLATIVE COMMISSION HEARING
on
THE FUTURE WATER NEEDS OF NEW JERSEY

The Morris County Municipal Utilities Authority is pleased to contribute to this hearing and to set forth the position of the Board of Freeholders and the Morris County Municipal Utilities Authority with respect to the development of water supply in New Jersey.

In the past and, unfortunately, even at the present, it appears that the development of a water supply is predicated upon "first-come, first-served" with little, if any, planning geared to serve all of the people of New Jersey on an equitable basis.

It is not necessary to elaborate upon this fact, but one will recognize that the North Jersey District Water Supply Commission is interested only in serving its own member municipalities, and that the Round Valley pipe line is intended to serve only those communities who have subscribed for "capacity rights". Likewise, when Jersey City speaks of a new reservoir in Longwood Valley to supplement its basic supply which is stored in the Boonton Reservoir, Jersey City is interested only in serving its own needs or interests. The Passaic Valley Water Commission endeavors to protect

October 10, 1968

its own rights and derives its supply from the Passaic River but has little concern for equity in the sharing of this water, as is evidenced by its recent request to renege on an agreement with both the Morris County Municipal Utilities Authority and the Township of Wayne, to provide a small portion of the supply which was developed by the construction of the Point View Reservoir System. Meanwhile, the City of Newark would like to preempt the rights from the Delaware River by building its own pipe line and a storage reservoir at Dunker's Pond, again solely to serve the interests of Newark. The degree of cooperation is perhaps matched by the degree of interconnections--which are few and far between--and each agency appears to protect its own rights and the welfare of its own consumers, without due concern of the entire area needs. Perhaps this is as it should be, but the Morris County Municipal Utilities Authority feels that an overall State master plan should be developed which would integrate Round Valley, future Delaware River Water Supply sources, the Boonton supply of Jersey City, the Pequannock supply of the City of Newark, the Passaic Valley Water Commission supply from the Passaic River, and even the major private utilities, such as Elizabethtown Water Company, the Hackensack Water Company and other water purveyors in the Northeast section of the State, into one major network with a proper interchange and an equitable sharing of these water supplies.

Morris County has been most unfortunate in the past, in that major water purveyors have come in and have practically preempted the sources of supply in the County, such as the Rockaway River and the Pequannock River, with the result that these fine large major supply sources which could readily be distributed in this area are piped long distances to the heavily developed cities in the northeastern part of the State. The Morris County Municipal

October 10, 1968

Utilities Authority recognizes that the needs for water in Morris County are far in excess of the available sub-surface supplies, and they have endeavored to protect the water rights of the county by planning for the development of surface sources of supply which are admittedly small and which may serve the County over an interim period until such time as the Delaware might be developed or a State directed and coordinated plan can provide water throughout the State on an equitable basis.

Before undertaking any of this planning, the County Authority presented their plans of developing these relatively small supply sources to the State Department of Conservation and Economic Development, Division of Water Policy and Supply, so that these proposed plans would conform to the long-range objectives of this state. These plans have been endorsed by the State and, accordingly, the Authority has proceeded to acquire these sites for possible surface and sub-surface supply sources at four locations in the County--the Tourne, Washington Valley, Succasunna and Pulaski. Approximately three million dollars has been authorized to date for the acquisition of land alone at these potential water supply sources. Preliminary plans are also being developed for transmission mains to convey this water to the various municipalities in the county who may have need for supplemental supply sources. In addition, it is hoped that these proposed facilities can be reinforced with additional water supplies deemed to be required in the future to meet the greater needs of the County, and we would expect these supplies to come from the Delaware River. We fully endorse the State's objectives and planning of acquiring vast reservoir sites for the storage of Delaware River water, and we would hope that these supply sources

October 10, 1968

will be available to the County to supplement those projects which we have planned and hope to complete prior to development of the major supply sources set forth by the State and by the Corps of Engineers.

We will be glad to elaborate upon the details of our planning and objectives to date, and we have our Consulting Engineer here who is prepared to describe the four water supply sources that we hope to develop.

In addition, we hope to recharge our declining well fields and are now developing a plan for ground water recharge which we will be pleased to discuss with representatives of the State Water Supply Council. These plans require the complete cooperation between existing water facilities, State agencies and our Authority, and we are prepared to cooperate with all agencies involved in developing an integrated supply system throughout the State.

We agree that additional storage sites are required in New Jersey. We agree with Commissioner Roe that considerable water is going down the drain, but for eight years, our Authority has been developing plans to utilize such surplus water. However, unless a central agency is established to integrate the existing supplies with the new supplies, we are fearful that New Jersey's future in the field of water supply will continue to be in a state of conflict, confusion and controversy, and we would endorse any program which would lead to the elimination of the several conflicts which now prevail.

We are enclosing a copy of our January 10, 1966 Report Upon the Long-Range Plan for the Development and Utilization of Water Supply Sources by the Morris County Municipal Utilities Authority, as well as our statements of policy, dated April 5, 1966, and October 9, 1967.

MORRIS COUNTY MUNICIPAL UTILITIES AUTHORITY
COURTHOUSE
MORRISTOWN, NEW JERSEY



RECEIVED

OCT 6 - 1967

ELSON T. KILLAM ASSOCIATES, INC.
HYDRAULIC & SANITARY ENGINEERS

STATEMENT OF POLICY

October 9, 1967

The Morris County Municipal Utilities Authority was formed in 1958 for the express purpose of endeavoring to protect and develop, wherever possible, the water resources of the County, particularly when these water resources could best be developed on an area-wide, regional, or County basis which could not readily be undertaken by individual municipalities.

The need for this action was evident based upon the past history of surface water diversion from the County by other water purveyors. At the time of the formation of the Authority, Jersey City had made application for further diversion of water from the Rockaway River drainage area, and the Authority opposed this application unless water could be made available to the County municipalities.

Since the formation of the Authority, the following

Refer To.....	Refer Back To.....
Date Seen.....	To Be Filed.....
Date Answered.....	
By.....	

major steps have been taken:

(1) Authority action has resulted in approval by the State Department of Conservation, Division of Water Policy and Supply, for Authority to develop all excess water from the Rockaway River Basin.

(2) Authority has acquired rights to water from the Pointview Reservoir supply of the Passaic Valley Water Commission. These rights are currently limited to 2.0 MGD and might be increased to 6.0 MGD.

(3) Authority has obtained endorsement and approval of four of the more advantageous sites selected for water supply development, namely, Tourne at Mountain Lakes, Washington Valley in Morris Township, Succasunna in Roxbury Township, and Pulaski in Mount Olive Township.

(4) In addition, the Authority has developed a Master Plan for development and wholesale transmission of supplies, which plan is currently being reviewed by the State.

It is the objective of the Authority to develop basic water supply sources and not to undertake construction of facilities within each municipality. Each municipality will be expected to continue to expand its own internal system, including storage and supply wherever possible such as from local wells.

It is the objective and intention of the Authority to make water available on a wholesale basis to those communities which cannot develop their own supplies and to those communities which need additional supplies to supplement their own facilities or sources.

The Authority intends to develop means of water conservation through storage and ultimate utilization of excess wet weather stream flows, particularly by the development of recharge basins and recharge wells, so as to obtain maximum use of our limited remaining water resources. In this connection, studies of regional methods of water pollution control will be considered, and in addition thereto, serious study will be given to the possibility of stream flow regulation in conjunction with the development of surface reservoirs.

In addition to the above, the objective of this Authority is to develop a Master Plan for the entire County which can be integrated with State or Federal programs including, but not limited to, a possible limited connection with a Tocks Island development contemplated in the future; integration with existing water supplies in the area including Jersey City, Passaic Valley, possibly City of Newark.

The Authority feels that the integration of all water

supplies in Morris County is as important to the County as the integration of all major water systems in the northern part of the State is important to the economy of New Jersey. It is, therefore, the objective of the County's studies and plan to effect a complete integration of water supplies so that ultimately those communities having excess supplies could make available to other communities excess waters in periods of drought or under other adverse conditions where such interchange is found to be necessary or advantageous.

It is recognized that the above objectives are long range and cannot be accomplished in a short period of time. The development of major water supplies often requires a period of 10 to 15 years, and the County's objective is to develop these programs on a stage basis as required and where needed with the objective of ultimately providing water throughout the entire County from a series of reservoirs which would be tied together by interconnecting pipelines.

The Morris County Municipal Utilities Authority is presently undertaking a program for the development of basic sources of water supply throughout Morris County.

Following several years of studies and investigations, the Morris County Municipal Utilities Authority requested

endorsement of potential reservoir sites which had been selected throughout the County for possible development. On June 8, 1965, the Division of Water Policy and Supply endorsed four of the proposed sites, namely, the Tourne at Mountain Lakes, Washington Valley in Morris Township, Pulaski in Mount Olive Township and Succasunna or Alamatong in Roxbury and Randolph Townships. Subsequently, on May 31, 1966, the Water Policy and Supply Council extended its endorsement to include the Weldon Brook reservoir site located in Jefferson Township. Other sites are also being considered by the Authority which is now actively planning the development of the first four sites which were endorsed.

The Morris County Municipal Utilities Authority membership is comprised of the Freeholders. The Authority is cognizant of the need for conserving and developing the water supply resources in the County as I have just stated. The basic objective of the Authority is the development of resources on an area-wide or regional basis where the development of such resources cannot readily be undertaken by individual municipalities.

It is not the objective of the County Authority to develop, enlarge, expand or otherwise improve local water supply

systems. It is the objective of the County Authority to develop regional water supply resources and to distribute same to those municipalities which have need for such water to augment their own independent water supply resources and to provide water to those municipalities who cannot develop surface or subsurface supplies of adequate capacity within their municipal boundaries to meet their requirements.

The Morris County Municipal Utilities Authority is cognizant of the fact that ground-water tables have been declining in many areas of the County due to over-pumpage and because of the drought. The Authority hopes to develop both surface sources of supply and subsurface sources of supply with recharge facilities as a primary consideration. The Authority also hopes to develop plans for the recharge of the vast well field areas in the eastern part of the County utilizing surplus waters which may be available during so-called wet periods to increase storage of the County ground-water areas.

The Authority has appropriated \$1,500,000 to initiate the program for the development of the four reservoir sites. Property is presently being acquired for both the Tourne and Washington Valley sites. Appraisers are at work on all four of the reservoir sites and preliminary boring work has been completed at both the Tourne and the Washington Valley site.

Borings are underway currently in other areas.

It is the objective of the Authority to proceed expeditiously with the development of both the Tourne reservoir site and the Washington Valley reservoir site. With the completion of these reservoir sites, it is proposed to construct the necessary treatment facilities and pipelines to distribute water to the areas in need.

Municipalities have approached the Authority and have made informal requests for urgent action in connection with the development of these water supply sources.

It is the objective of the Authority to undertake the development of both Tourne and Washington Valley as soon as possible. To date the Authority has acquired approximately 300 acres of a total of 800 acres necessary for the Washington Valley Reservoir. All the property necessary for the Tourne Reservoir has been acquired except a tract owned by the Borough of Mountain Lakes. It is anticipated that the acquisition of the total acreage will be accomplished by March of 1968. This initial program will be followed by the development of both the Succasunna or Alamatong site and the Pulaski site with an inter-connecting pipeline plan which will provide means of distribution of the water supply sources throughout the County. The Authority has urged those municipalities who are not members to apply for

membership in the Authority. This would not only expedite the completion of the programs which are now underway but would also encourage the Authority to rapidly complete the water supply program which was conceived almost ten years ago by the Board of Chosen Freeholders of Morris County.

Norman J. Griffiths
Executive Director.

MORRIS COUNTY MUNICIPAL UTILITIES AUTHORITY
COURTHOUSE
MORRISTOWN, NEW JERSEY



STATEMENT OF POLICY

April 5, 1966

The Morris County Municipal Utilities Authority was formed in 1958 for the express purpose of endeavoring to protect and develop, wherever possible, the water resources of the County, particularly when these water resources could best be developed on an area-wide, regional, or County basis which could not readily be undertaken by individual municipalities.

The need for this action was evident based upon the past history of surface water diversion from the County by other water purveyors. At the time of the formation of the Authority, Jersey City had made application for further diversion of water from the Rockaway River drainage area, and the Authority opposed this application unless water could be made available to the County municipalities. Since the formation of the Authority, the following major steps have been taken:

(1) Authority action has resulted in approval by the State Department of Conservation, Division of Water Policy and Supply, for County to develop all excess water from the Rockaway River Basin.

(2) County has acquired rights to water from the Pointview Reservoir supply of the Passaic Valley Water Commission. These rights are currently limited to 2.0 MGD and might be increased to 6.0 MGD.

(3) County has obtained endorsement and approval of four of the more advantageous sites selected for water supply development, namely, Tourne at Mountain Lakes, Washington Valley in Morris Township, Succasunna in Roxbury Township, and Pulaski in Mount Olive Township.

(4) In addition, the County has developed a Master Plan for development and wholesale transmission of supplies, which plan is currently being reviewed by the State.

It is the objective of the Authority to develop basic water supply sources and not to undertake construction of facilities within each municipality. Each municipality will be expected to continue to expand its own internal system, including storage and supply wherever possible such as from local wells. It is the objective and intention of the Authority to basically make water available on a wholesale basis to those communities which

cannot develop their own supplies and to those communities which need additional supplies to supplement their own facilities or sources.

The Authority intends to develop means of water conservation through storage and ultimate utilization of excess wet weather stream flows, particularly by the development of recharge basins and recharge wells, and to effect a total water management program throughout the entire County consistent with Federal and State objectives so as to obtain maximum use of our limited remaining water resources. In this connection, studies of regional methods of water pollution control will be considered, and in addition thereto, serious study will be given to the possibility of stream flow regulation in conjunction with the development of surface reservoirs.

In addition to the above, the objective of this Authority is to develop a Master Plan for the entire County which can be integrated with State or Federal programs including, but not limited to, a possible limited connection with a Tocks Island development contemplated in the future; possible tie-in and utilization of Round Valley water; integration with existing water supplies in the area including Jersey City, Passaic Valley, possibly City of Newark.

The Authority feels that the integration of all water supplies in Morris County is as important to the County as the integration of all major water systems in the northern part of the State is important to the economy of New Jersey. It is, therefore, the objective of the County's studies and plan to effect a complete integration of water supplies so that ultimately those communities having excess supplies could make available to other communities excess waters in periods of drought or under other adverse conditions where such interchange is found to be necessary or advantageous.

It is recognized that the above objectives are long range and cannot be accomplished in a short period of time. The development of major water supplies often requires a period of 10 to 15 years, and the County's objective is to develop these programs on a stage basis as required and where needed with the objective of ultimately providing water throughout the entire County from a series of reservoirs which would be tied together by interconnecting pipelines.

No program can be successful without establishing a basis of charges which are reasonable and equitable. While no definitive plans have been set forth for financing the proposed works, it is expected that the ultimate cost for these facilities will be paid for only by those communities and industries which

actually require or withdraw water from the proposed system. In the initial stages while sites are acquired, easements obtained for future pipelines, and preliminary studies are under way with regard to engineering and the development of supplies such as boring work, drilling of exploratory wells, and other required preliminary investigations, these will be financed by the County as a whole. As each system is developed, however, the total cost will be assessed against each individual supply source. Once the system has been completed, rates will be established for water so as to retire the bonds that are eventually sold for the improvements from revenues with the backing of the County provided so as to establish minimum interest rates and over-all cost to the participants.

In summary, the County will for many years act as the backstop and financing agency for the early studies and even during the early years of site acquisition and preliminary studies and investigations. However, once given facilities are completed and water is available for sale, rates will be established of a sufficient magnitude to reimburse the County to cover all costs involved in the initial studies as well as to cover the costs of the construction of the facilities and the operations of the systems once they are completed.

Norman J. Griffiths
Executive Director

REPORT UPON LONG-RANGE PLAN
FOR THE
DEVELOPMENT AND UTILIZATION
OF
WATER SUPPLY SOURCES
BY THE
MORRIS COUNTY MUNICIPAL UTILITIES AUTHORITY

January 10, 1966

MORRIS COUNTY MUNICIPAL UTILITIES AUTHORITY

COURTHOUSE

MORRISTOWN, NEW JERSEY



REPORT UPON LONG-RANGE PLAN
FOR THE
DEVELOPMENT AND UTILIZATION OF WATER SUPPLY SOURCES
BY THE
MORRIS COUNTY MUNICIPAL UTILITIES AUTHORITY

January 10, 1966

When the Morris County Municipal Utilities Authority was first formed in 1958, the purpose and objective of forming the Authority was to protect the interests of the County from the continued development and subsequent diversion of water supplies from within the County to areas outside the County. Specifically, the City of Jersey City which had in the past developed the Boonton Reservoir supply in the Rockaway River Basin and which had obtained rights to withdraw some 70 million gallons of water per day from the County--which is taken from the County and used primarily in Jersey City--proposed to develop another reservoir in the Rockaway Basin, the Longwood Valley Reservoir, and thereby increasing the diversion of waters from the County from 70 million gallons per day to about 84 million gallons per day.

It was recognized that the needs of the County in the future were far in excess of the limited remaining supplies available within the County borders and the Utilities Authority endeavored to protect the interests of all of the municipalities in the County by opposing the Jersey City request for additional diversion rights--without some consideration being given to making available to the municipalities in the County of at least a portion of these water supplies which would be developed in the Rockaway River Basin at Longwood Valley (either from Boonton Reservoir, Split Rock Reservoir, and/or the proposed Longwood Valley Reservoir).

Jersey City refused to consider the request of the Morris County Municipal Utilities Authority and argued that they required all of the water being developed for their own use. They refused to consider any allotment or sale of any portion of the additional water being developed in the Rockaway River Basin to any municipality in the County.

Accordingly, the Utilities Authority then formally opposed the request by Jersey City for the further development of the Rockaway River Basin unless some of this supply could be made available to the County. Hearings were held in Trenton which lasted over a period of several years and resulted in a decision by the Water Policy Commission which permitted Jersey City to develop

the Longwood Valley Reservoir and to withdraw 84 MGD from the Rockaway River Basin. This decision was appealed by the Utilities Authority and was reviewed by the Supreme Court. The Supreme Court's decision and final order provided that Morris County would have the right to develop and utilize the excess water runoff from the Rockaway River so long as such diversion would not encroach upon the development of the Boonton, Split Rock, or Longwood Valley Reservoirs. In effect, the decision stated that whenever excess water flowed over the dam at Boonton, the County would have the right to the diversion of such excess waters for the development and use as water supply.

When the Authority was first established and created by the Board of Chosen Freeholders, it was the stated intention that the purpose and objective would be to protect and develop water supplies that might logically and properly be developed on a County basis and that there would be no interference with any municipality owning or operating its water system or with any municipality which hoped in the future to develop its own water system and that, furthermore, the Authority would not consider developing local municipal facilities other than to make available a basic source or sources of supply, whenever possible, which individual municipalities might wish to utilize.

However, in 1958 immediately following the establishment of the Authority and without any detailed discussion as to the activities and purposes of the Authority, the following municipalities submitted resolutions to the Board of Chosen Freeholders withdrawing from the Authority: Hanover, Florham Park, Riverdale, Parsippany-Troy Hills, and Wharton. These municipalities had their own water systems or were served by adjoining systems and felt that they had no need of the future protection which would be afforded through membership in the Authority or that they would have no need for the additional water supplies which might be made available by the Authority's action.

In early 1959, the following municipalities which had independent systems also withdrew from the Authority: Boonton, Morristown, Madison, Chatham, Denville, and Morris Plains.

More recently, in June of 1964, Montville withdrew from the Authority despite the fact that without the action of the Morris County Municipal Utilities Authority, Jersey City would not have made water available to the Township of Montville. Jersey City proposed to sell water to the municipalities of Caldwell, Fairfield, and North Caldwell. These municipalities had previously received their supply from Essex Fells who no longer could provide the supply required. The Utilities Authority opposed the application, effected

a substantial reduction in the amount of sale, and at the same time obtained an agreement from Jersey City with the assistance of the Water Policy Commission, to the effect that Montville would be entitled to obtain water from the supply line from Boonton Reservoir which supplies Jersey City.

Most of the municipalities which have withdrawn from the Authority did so shortly after the formation of the Authority and during a period when water supplies appeared to be amply available to most of these municipalities.

During the past five years, the Authority has undertaken extensive studies and investigations which, it was felt, would lead to the development, possibly by stage construction, of relatively economical supply sources which would be available to those municipalities which needed additional supplies to supplement their present ground water sources of supply.

During the past five years, the northeastern section of the country, and particularly northern New Jersey, has experienced a drought of unprecedented severity. During this time, ground water tables and most subsurface aquifers which had been declining at a fairly constant rate through the years declined at an even greater rate causing some concern and fear that these valuable subsurface supplies had been severely overpumped and might no

longer suffice to serve the growing municipalities which were dependent upon them for their very existence (Parsippany-Troy Hills, Morristown--as well as Hanover and Morris Township which are served by Morristown, Madison, Chatham, and Florham Park).

In addition to the Jersey City plan for further development of the Rockaway River watershed, the Passaic Valley Water Commission proposed a diversion on the Pompton River at Pequannock and the construction of a reservoir in Wayne formerly known as Pancake Hollow and more recently as Point View Reservoir. This proposed system would increase the availability of water for the Passaic Valley Water Commission through the construction of the proposed offstream reservoir which would store excess river flows which would be pumped into this basin during periods of peak runoff. The Morris County Municipal Utilities Authority opposed this application for diversion and requested that water "rights" be made available to the County, with the recognition of the fact that the municipalities bordering the Pompton River, namely, Lincoln Park, Pequannock, Riverdale, and possibly Kinnelon, might find this source of supply necessary for their long-range water requirements.

As a result of many months of conferences and negotiations, the Morris County Municipal Utilities Authority was granted "rights" to 2.0 MGD and possibly rights of 6.0 MGD in the event that Wayne

did not accept the 4.0 MGD allocated to them as a result of the permission to construct this system. The County was allowed seven years to develop and utilize this supply.

In the meantime, the County proceeded with studies to develop other possible sources of supplies throughout the County which might be eventually tied together and integrated into a common system which would readily provide distribution to various sectors and areas of the County. The basic concept of water supply development was to endeavor to protect the existing invaluable subsurface supplies by providing means of recharge or well field "resting" and to provide subsurface or surface "bank storage" during periods of heavy rainfall. This plan of operation would permit heavier withdrawal from underground sources in periods of drought than otherwise possible with well field "resting" or aquifer recharge when surface supplies were brim full during wet weather months. The proposed plan for the development of a long-range comprehensive water plan for the County has been discussed with engineers from the Water Policy Commission, and four of the basic water supply sources proposed have been approved, together with a suggested additional development utilizing Split Rock Reservoir for storage of excess water. In addition, other plans are being considered which would fully integrate these proposed sources of supply so as to make water available to practically

any area of the County and to draw upon one or more of the proposed sources of supply to supplement any individual supply source which might be temporarily overdrawn. In effect, a "bank" arrangement for the storage, distribution, and utilization of water would be developed similar to the State and Federal Government plan of utilizing the Boonton Reservoir as a "bank" to store excess water from which point it is distributed by existing pipeline interconnections to Wanaque, Passaic Valley, and other major areas of demand in northern New Jersey.

Briefly, the proposed developments in the County may be summarized as follows:

(1) The development of the Tourne Reservoir in Mountain Lakes Borough.

(2) The development of the Washington Valley Reservoir in Morris Township.

(3) The development of a recharge basin and subsurface supply on Black River in Succasunna.

(4) The development of the Pulaski Reservoir in Mount Olive Township.

(5) The utilization of Split Rock Reservoir (Jersey City) for "bank" storage of excess water to be used by Kinnelon, Rockaway Township, and other municipalities in the vicinity of this reservoir.

(6) The development of a water supply storage and distribution system from the Point View (Pancake Hollow) Reservoir utilizing capacity rights obtained by the Authority from the Passaic Valley Water Commission.

(7) Consideration of a supplemental source of supply utilizing excess wet weather flows only for the withdrawal of water from the upper Musconetcong River (Lake Hopatcong).

(8) Consideration of future storage in the Jefferson Township area of the County utilizing "excess" flows from the proposed Longwood Valley Reservoir.

(9) Interconnecting pipelines between some of the major surface supplies developed in (1) through (8) to provide facilities for recharging well fields and for making direct sources of supply available to municipalities and for the transfer of excess waters between various reservoirs so as to effect a "bank" plan for storage, transfer, and utilization of the developed water supplies.

The proposal for utilization of the various sources of supply being considered and which could eventually result in a comprehensive interconnected water plan available to the entire County is shown on Plate A accompanying this report and is further described in greater detail.

(1) Tourne Reservoir (Off-stream pumped storage)

This reservoir would be an off-river storage reservoir. Water would be pumped from the Rockaway River during periods of excess river flow when water is passing over the dam at Boonton. It is recognized that the past five years have been extremely critical and that supplemental supplies would have to be provided during such critical years in order to most effectively utilize this proposed supply. It is planned to construct a pipeline from the reservoir which would serve municipalities in the general vicinity of the reservoir and which would also convey the water to the municipalities of Morristown, Hanover, Florham Park, Madison, and Chatham so as to provide a means of recharge of existing well fields and possibly the development of an area underground "bank" storage plan which would enable more water to be pumped from wells than might ordinarily be obtained from this ground water aquifer during dry weather periods, provided that underground storage is increased during wet weather flows.

(2) Washington Valley (On-stream storage development)

Washington Valley would comprise an on-river reservoir. The reservoir would be located in Morris Township and the supply would be made available to the municipalities in the general vicinity of the reservoir. However, a pipeline could eventually

be constructed which would convey the water easterly and possibly provide an interconnection with the proposed pipeline from the Tourne Reservoir. Thus, an interconnection would be made available so that communities between the two reservoirs would have the benefit of either source of supply during periods of extreme drought or as required. This interconnection would also provide another possible source for "bank" storage or the recharge of existing well fields.

(3) Black River-Ironia-Succasunna Development
(Wet weather diversion and ground water development)

The Black River development would comprise basically a subsurface source of supply which would be highly developed by the recharge of pervious sands in this general area. A small dam would be constructed to provide a vast recharge area for the subsurface aquifers. Water would be pumped from this possible major source of water supply primarily to communities in this general vicinity, but excess surface waters could also be made available to the other storage reservoirs proposed, namely, Tourne and/or Washington Valley.

(4) Pulaski Reservoir (Off-stream pumped storage)

The Pulaski Reservoir would be an off-river storage basin which would be filled by pumping from the Musconetcong River during periods of high runoff. This proposed reservoir would be integrated

with the State's long-range plan for the development of a State-owned reservoir at Saxton's Falls. The State's reservoir would provide the basic source of supply for the proposed Pulaski storage basin in the future. The proposed Pulaski Reservoir could supply by gravity a major portion of Mount Olive Township as well as the contiguous municipalities of Netcong and Roxbury.

(5) Split Rock (Tributary area supplemented by pumped storage)

Under this plan, facilities would be provided for pumping excess waters from the Rockaway River into the Split Rock Reservoir. At the present time, the watershed for this reservoir is entirely inadequate for the very large volume of storage available. In addition, it appears feasible to provide increased storage by raising the height of the dam at Split Rock. The State has suggested consideration of the utilization of this storage in cooperation with Jersey City under a "bank" storage plan. The County is in full agreement and hopes to develop a plan which will be approved by the State and will be mutually advantageous to Jersey City and the County. Under this plan, water could be withdrawn from the Split Rock Reservoir and made available to Kinnelon, Rockaway Township, and other municipalities in this general area.

(6) Point View Reservoir (Passaic Valley Water Commission)

The municipalities of Lincoln Park, Kinnelon, and Pequannock might require additional waters in the relatively near

future and an excellent source of supply is available from this recently constructed reservoir system from which the County has "rights" to at least 2.0 MGD. The County is investigating the feasibility of constructing a pipeline and a storage basin in this general area so as to make a gravity supply available to interested communities and to thus utilize at an early date the capacity rights granted to the Authority.

(7) Musconetcong River (Pumping to Rockaway during high flow periods)

Several years ago in conjunction with Authority activities in the Jersey City matter, preliminary studies were made involving low head pumping and diversion into the Rockaway River of water discharged from the Musconetcong River or Lake Hopatcong during high flow periods.

This flow would augment the surplus flows in the Rockaway River.

It is pertinent to note that during the past few months under a Federal Emergency Act water was pumped from Lake Hopatcong into the Rockaway River Basin and eventually into the Boonton Reservoir which serves as a "bank" for the storage of water to be served to the drought stricken northern areas of New Jersey. Consideration should be given to the development of a permanent pumping station and pipeline whereby some portion of the "excess" waters flowing over the dam at Lake Hopatcong might be pumped

during wet weather periods. These "excess" waters would then be transferred into the Rockaway River Basin and conveyed to the Tourne and/or Split Rock Reservoirs during wet weather periods to be used for distribution in those municipalities in the northern and eastern parts of the County as required during dry weather periods.

(8) Jefferson Township Area

In addition to the four basic water supply sources which have been approved by the State, consideration is being given to the development of still another off-river reservoir site in Jefferson Township. Water to fill the basin might be obtained from the Musconetcong River and/or the Upper Rockaway River and would be limited to such "excess" flows as could be pumped during periods of rainfall which otherwise would not be captured downstream and would go to waste in the Ocean. Under this plan, the waters would be used to serve the rapidly growing northwestern portion of the County.

(9) Interconnection of Proposed Facilities

In general, in the construction of the proposed facilities, pumping stations and/or interconnecting pipelines would be provided so as to distribute the water stored in the reservoirs to those communities which would require additional water to supplement their independent or normal supply sources and to those communities which

require water so as to enable them to develop their own municipal facilities. The pipelines would also be used as a source of supply to provide waters for recharge of subsurface aquifers and would also be used to convey waters from one reservoir to another during periods of extreme drought. Such transfer of water has been required in the drought stricken northern New Jersey area this past summer, namely, by providing water from the Jersey City-Boonton system and from the Elizabethtown system to the City of Newark and to others thus relieving the drain on the Wanaque and Pequannock Reservoir facilities.

In summary, while several municipalities originally withdrew from the Morris County Municipal Utilities Authority, it is felt that once the proposed plans can be developed to a point where full and complete approval is obtained from the State and at such time as a definitive plan for stage construction can be programmed along with definitive estimates of cost, most if not all of the communities who have withdrawn may wish to reinstate their membership in the Authority. Recognizing the fact that the needs for water in the County will soon be far in excess of those available from present sources of supply, the County proposes to proceed with the acquisition of land for those reservoir sites

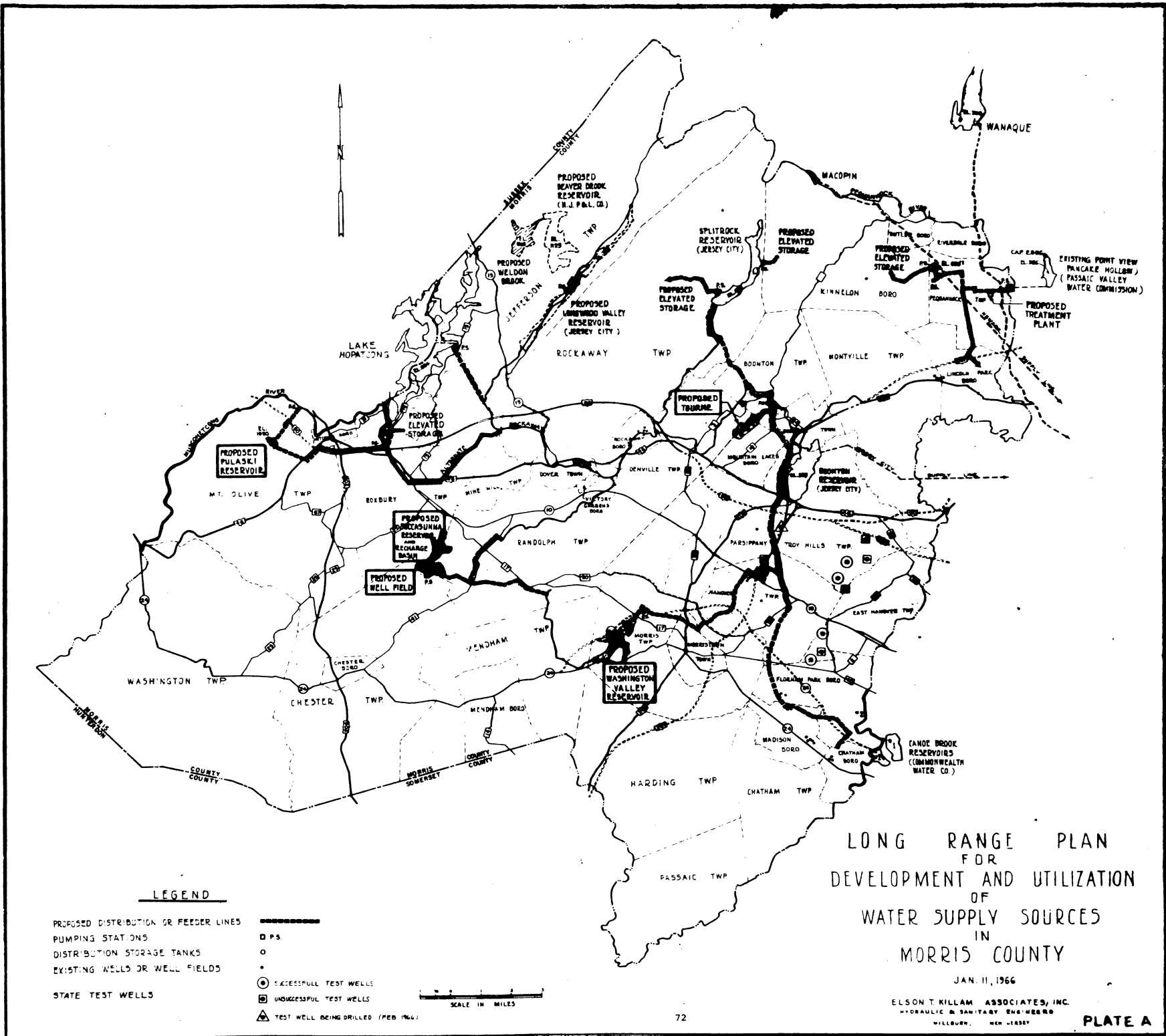
which have already been endorsed by the State and which will actually comprise the basis of a water supply system for the entire County. It is the objective of the Authority to provide basic sources of supply for the benefit of all of the municipalities in the County. It is still the objective of the Authority to consider only basic sources of supply and to encourage each municipality to continue to develop its own water distribution and storage facilities.

The Authority hopes to soon present a comprehensive plan of action, generally as described above, to the State for approval. Since the State has endorsed the over-all program proposed by the Morris County Municipal Utilities Authority, it is proposed to present this plan to each municipality and to demonstrate how they will benefit from the long-range program which will eventually supply a majority of the municipalities in the County with water.

Respectfully submitted,

MORRIS COUNTY MUNICIPAL UTILITIES AUTHORITY

Norman J. Griffiths,
Executive Director



STATEMENT SUBMITTED BY JOHN R. GIDEONSE

COMMISSION HEARING ON FORMULATING AND IMPLEMENTING

A COMPREHENSIVE WATER SUPPLY POLICY

FOR THE STATE OF NEW JERSEY

October 10, 1968

Submitted by: Atlantic County Planning Board

Introduction:

Almost all potable water supply in Atlantic County is derived from ground water sources. Of the 23 municipalities in the county, 16 are supplied either entirely or partially by public and private water companies. The remaining 7 municipalities not served by a central water supply distribution system use individual domestic wells. The 16 municipalities that are served by a central water supply distribution system had a 1960 combined population of about 144,000 persons.

Plate 1 lists these municipalities, the name of the water company or department serving the area, the 1967 water consumption and the geologic formation from which the ground water is drawn. It should be noted that the high rates of water consumption in the resort municipalities on Atlantic County's barrier beaches is attributable to increased consumption during the summer months.

Plate 1 clearly shows the importance of the Kirkwood strata to the county's overall ground water supply picture, because this aquifer is used by island and mainland communities as far inland as the Town of Hammonton.

PLATE 1, ATLANTIC COUNTY WATER CONSUMPTION, 1967

MUNICIPALITY	WATER COMPANY	1967 WATER CON. IN MILLION GALLONS	GEOLOGIC STRATA
Absecon	Atlantic Co. Water Co.	100	Cohansey
Egg Harbor Twp.	" " " "		
Linwood	" " " "		
Northfield	" " " "		
Pleasantville	" " " "		
Somers Point	" " " "		
Atlantic City	Atlantic City Water Dept.	5000	Cohansey & Kirkwood
Egg Harbor Twp.	" " " "		
Galloway Twp.	" " " "		
Hamilton Twp.	" " " "		
Pleasantville	" " " "		
Brigantine	Brigantine Water Dept.	288	Kirkwood
Egg Harbor City	E.H.C. Water Dept.	140	Kirkwood
Galloway Twp.	" " " "		
Hamilton Twp.	Hamilton Water Dept.	110	Raritan & Cohansey
Weymouth	" " " "		
Hammonton Town	Hammonton Water Dept.	319	Kirkwood
Longport	Longport Water Dept.	102	Kirkwood
Margate	Margate Water Dept.	631	Kirkwood
Ventnor	Ventnor Water Dept.	N.A.	N.A.
ATLANTIC COUNTY TOTAL		6,690	

Data compiled by the Atlantic County Planning Staff

Kirkwood Outcrop Area:

The 1910-1912 Geologic Map of New Jersey indicates that the Kirkwood outcrop area parallels the Delaware River at about a 10 to 15 mile distance from this river beginning at Kellys Point to Trenton and eventually terminating at the Lakewood-Neptune area on the Atlantic Ocean. The underlying formations of the Kirkwood is listed as being of Cretaceous and Tertiary age by the 1916 Geological Survey of New Jersey, Volume 8.

The Kirkwood formation slopes in a southeasterly direction, and is overlain by the Cohansey. Thus, precipitation on the Kirkwood outcrop area near Camden eventually finds its way to Atlantic County in the form of ground water. Because of this hydrologic fact the Atlantic County Planning Board finds that what happens in the way of urban development to the Kirkwood outcrop area near Camden is of particular interest to this board.

According to the best engineering estimates available percolation is reduced by about 90% when urban development takes place. Atlantic County is, thus, faced with the prospect of having its ground water supply in the Kirkwood formation drastically reduced when the Kirkwood outcrop is fully covered by urban development some time in the not too distant future.

Can Atlantic County Use the Cohansey Formation?

Plate 1 clearly shows that water is currently being drawn from the Cohansey formation. The Atlantic County Water Company, the Atlantic City Water Department and the Hamilton Water Department currently pump water from the Cohansey aquifer.

It is noteworthy that both the Atlantic County and Atlantic City central water supply systems are located along the coastal area where the Cohansey formation is about 250 feet thick.⁽¹⁾

Engineering opinion indicates that the depth of the Cohansey formation along the coast is of sufficient thickness to prevent pollution from surface waters, and for this reason the Cohansey aquifer can be effectively used in the area.

Further inland, however, the Cohansey formation tapers off and has a thickness of about 125 feet⁽²⁾ at the Town of Hammonton in Atlantic County and only about 50 feet⁽³⁾ at Berlin in Camden County. Due to the sloping nature and diminishing thickness of this formation it is probable that half of Atlantic County will not be able to safely use ground water from the Cohansey for fear of surface pollutants.

This in turn would increase the county's reliance upon the Kirkwood formation as its principal source of ground water.

(1) Cross section figure 30, GEOLOGICAL SURVEY OF NEW JERSEY, Volume 8, 1917.

(2) ibid

(3) ibid

How Much Land Will Be Needed For Urban Development In The
Camden Class III Region By 1987?

The Camden Class III Region as defined by the N. J. Division of State and Regional Planning in its 1961 publication THE SETTING FOR REGIONAL PLANNING IN NEW JERSEY, defines this region as covering about 1,023 square miles of territory.

From land use measurements made in 1967 approximately 302⁽⁴⁾ square miles are currently covered by urban development. The remaining gross land area available for urban development is estimated at 721 square miles⁽⁵⁾ of which an estimated 84 square miles⁽⁶⁾ are believed to be unuseable due to poor drainage and high water tables. This unuseable land lies principally along the banks of streams and river.

Thus, the remaining usable land for future urban development is estimated at about 637 square miles. Plate 2 lists this information in tabular form.

(4) Unpublished data: N.J. Division of State and Regional Planning, Bureau of Statewide Planning

(5) ibid

(6) ibid

PLATE 2, CAMDEN CLASS III ESTIMATED LAND
AVAILABLE FOR FUTURE URBAN DEVELOPMENT, 1967

TOTAL LAND AREA -	1,023 square miles
1967 DEVELOPED LAND -	<u>302</u> " "
REMAINING GROSS AVAILABLE LAND	721 square miles
ESTIMATED UNUSEABLE LAND	<u>84</u> " "
REMAINING NET AVAILABLE LAND	637 square miles

Source: Preliminary unpublished data - N.J. Division of
State And Regional Planning, Bureau of Statewide
Planning.

Population Projections For Camden Class III Region:

Plate 3 lists the estimated 1967 population of the
Camden Class III Region, its projected 1987 population and
the number of persons expected to be located on the REMAIN-
ING NET AVAILABLE LAND for future urban development shown
in Plate 2.

PLATE 3, CAMDEN CLASS III ESTIMATED EXISTING
AND PROJECTED POPULATION, 1967-1987

	ESTIMATED 1967 POPULATION	PROJECTED 1987 POPULATION	1967- 1987 INCREASE
CAMDEN CLASS III	838,350	1,337,000	498,650

Source: Preliminary unpublished data - N.J. Division of State
And Regional Planning, Bureau of Statewide Planning

In other words the Camden Class III Region can expect to house an additional half million persons in the next 20 years.

How Much Land Is The 1967-'87 Camden Class III Population Likely to Require For Urban Development?

The preliminary estimated land consumption per household for the 1967-'87 time period in the Camden Class III Region is 0.48 acres.⁽⁷⁾

The preliminary estimated household size for the 1967-'87 time period is 3.20 persons⁽⁸⁾ per household. With this information the estimated land consumption for the additional 1967-'87 population in the Camden Class III Region can be calculated as shown in Plate 4.

PLATE 4, 1967-'87 LAND CONSUMPTION CALCULATIONS
FOR THE CAMDEN CLASS III REGION

Estimated 1967-'87 Population Increase: 498,650 persons

Estimated 1967-'87 Persons per household: 3.20 persons

Estimated 1967-'87 Household Increase:

$$\frac{498,650}{3.20} = 155,828 \text{ households}$$

Estimated 1967-'87 Land Consumption Per Household: 0.48 Acres

Estimated 1967-'87 Total Land Consumption For 155,828 Households:

$$155,828 \times 0.48 \text{ Acres} = 74,797 \text{ Acres}$$

$$= 117 \text{ Square Miles}$$

Source: Calculation by Atlantic County Planning Staff

(7) Preliminary unpublished data: N.J. Division of State & Regional Planning, Bureau of Statewide Planning

(8) Preliminary unpublished data: N.J. Division of State & Regional Planning, Bureau of Statewide Planning

Thus it is evident that urban area within the Camden Class III Region will expand by 117 square miles within the next 20 years.

Where Is The Urban Growth Likely To Take Place In The Camden Class III Region?

Urban growth in the Camden area has historically followed two directions namely the southwest-northeast axis along the Delaware River and the southeast-northwest axis along routes 30, 40 and 42 to Atlantic County. There is no evidence at this time to suspect that these growth trends will materially change direction within the next 20 years.

Since the current urban development radiating outwards from the City of Camden along routes 30, 40 and 42 have already crossed the Kirkwood outcrop area there is sufficient reason to suspect that by 1987 most of the outcrop area will be solidly developed between Routes 30 and 40.

Possible Solutions For Protecting The Kirkwood Outcrop Area:

Several methods come to mind for diverting urban development from the outcrop area as follows:

1. Since much of the outcrop area is currently in agricultural uses, incentives may be provided to insure that agriculture will remain a viable use, strong enough to withstand urban development pressures. By 1987 the Camden Class III Region is expected to house about 1.3 million persons. Certainly the need for

open space will increase proportionately. Keeping agriculture in the outcrop area would be one way of meeting open space needs and breaking up the congestion of the urban landscape.

2. Those parcels in the outcrop area that are currently wooded would lend themselves for active recreational uses. The daily life of the Camden metro dweller of 1987 would be greatly enriched if a green belt of an interlocking park system were provided.
3. In the event urban development must be accommodated on the Kirkwood outcrop area a system of shallow impoundments might be established to collect storm water and allow to gradually percolate into the ground.

Properly managed, this approach could also result in added recreation space during the summer months when precipitation is minimal.

No doubt the Commission's technical staff can add dozens of similar engineering and recreational solutions. Perhaps the most important facet of the Kirkwood outcrop area is that it presents an opportunity to provide a superior physical environment to the Camden Metropolitan population both present and future.

To miss the opportunity to solve two problems simultan-

iously would seem most unfortunate not only to Atlantic County's future population but to the urban populations of Camden, Gloucester and Burlington County as well.

Atlantic County Planning Board Request To The Commission
on Comprehensive Water Supply Policy:

The outline of our probable future, 20 years hence, indicates that Atlantic County's ground water supply is likely to be threatened by expanding urban development across the Kirkwood outcrop area as a direct result of the expanding Camden metropolitan population. It is requested that the Commission study in depth the possibility of urban encroachment upon the Kirkwood outcrop area within the foreseeable future. In the event the Commission reaches similar conclusions as those presented in this preliminary brief, a program be devised to modify future urban development in such a way as to preclude the need for loading urban development on the Kirkwood outcrop area.

On behalf of the Atlantic County Board of Chosen Freeholders and its County Planning Board, we thank the members of the Commission for graciously inviting us to appear at this public hearing.

Statement of Phillip Alampi, Secretary of
Agriculture, New Jersey Department of
Agriculture, on behalf of the Agricultural
Conservation and Marketing Complex in New
Jersey to the Legislation Study Commission
on Long Range Water Needs and Policy,
October 9, 1968.

Mr. Chairman and Members of the Commission:

My name is Phillip Alampi. I am a resident of
Pennington, New Jersey, and am Secretary of the
State Board of Agriculture. As such, I am in
charge of the Department of Agriculture, a
sector of the executive branch of civil govern-
ment in New Jersey. The Department, in general,
is involved with regulatory, development and
service programs in the realm of agricultural
production, marketing, conservation and rural
resources.

Our specific interest in water and water supply is
historic, basic, and primary in its application.
In this presentation we desire to stress conserva-
tion and prudent use -- not mere preservation of
water. We are a Department with specific interests,
as charged by the Legislature under Title 4,
Chapter 24, of the Revised Statutes which provides for
the conservation of New Jersey soil and water
resources, and the creation of Soil Conservation

Districts. The fifteen Soil Conservation Districts are special subdivisions of State government within our Department. These districts are interlocked in their trusteeship of soil and water conservation and use.

Probably the first concern of the Department of Agriculture is an adequate agricultural water supply for livestock purposes; for crops and irrigation; and for processing and preparation of all our farm products for market.

The State Soil Conservation Committee, of which I am Chairman, and the fifteen Conservation Districts are charged with the prevention and control of soil erosion, primarily caused by run-off water. Small watershed flood control through the Federal P.L. 566 is carried out at the local level under the sponsorship and assistance of the Soil Conservation Districts.

Such conservation of soil and water is achieved through adequate conservation practices on the lands and by construction of impounding and retention dams wherever feasible. In a general sense, the Districts as now constituted are stewards of nearly 100 per cent of the land mass area of our State. This embraces all our productive soils, all our woodlands and the conservation of every drop of rain that falls thereon.

Water is a critical and vital rural resource on which agriculture is wholly dependent. Long before we dreamed of an urban sophisticated society with all its benefits as we now enjoy in New Jersey, farmers and land owners appreciated the worth of water and its conservation. The greatest and most useful portion of our water arises in our rural watersheds. Any comprehensive and long range water plan must recognize proper land treatment, upstream flood control, impoundments, nonpollution use practices, cropland irrigation and livestock needs, plus processing, packing and recreational water requirements. Already we have certain public laws to attain these goals. Presumably a broader look is contemplated by your competent Committee. We will be eager to assist in the consummation of a full spectrum program.

Agriculture, while expressing historic, traditional and priority use of water in New Jersey is not provincial in this concept. We do recognize, in an urban society that nonfarm, industrial, personal and recreational demands exist for water by all people. And rightfully so!

Our economic, social and population growth as a State ^{as} and/people is irrevocably tied in with our total water supply and its use.

We are mindful that such factors are a part of public policy for everyone concerned.

New Jersey has seemingly operated on the traditional principle that our water supplies are limitless. If this assumption be true, our current reappraisals, at least, agriculturally, are alarming. The nonagricultural sectors in the State, with a few notable exceptions, have not matched agriculture in proper conservation and in nonpollution practices. Waste of water resources is evident on many sites. Truly, agriculture believes, despite recurrent drought periods, that our abundant annual rainfall, occurring on properly established conservation media, with adequate flood control installations on our landscape, and the ability of our ponds and soils to retain water provide us the rare ability to store adequate water for our needs for a long time to come. Such existing water storage and control practices now in effect will require expansion and more appreciation by the educators and nonfarm users among our citizenry. The role our present conservation program plays in the ecology of the State is a priceless asset and is worthy of both praise and expansion.

I should now digress a moment and dispel the all too frequent assumption that agriculture will be non-existent in the foreseeable future in New Jersey.

Nothing could be further from the truth. And it's up to all leaders in the State, not just agricultural leaders, to see that this never occurs. The role of farming in water conservation and our ecology is in itself a basic argument. Equally important is the economic impact and diversity of mercantile trade that agriculture generates in our business life. The free agricultural contributions of total conservation, of open space, of a lack of pollution of water and air in our complex society, when matched with business values, make agriculture a most acceptable partner in our State. We have decreased from 26,000 farms in 1946 to approximately 9,000 at the present time. But a count of farm numbers is no/^{precise} criterion of viable agriculture or its ability to feed, clothe and shelter our citizens -- not to mention our added free contribution in conservation. Our farms are bigger, better equipped and more properly managed. Their f.o.b. farm production is still approximately 300 million dollars annually. Moreover, our farmers are adjusting to meet a changing pattern of life in the Garden State. Livestock enterprises are declining. Processing crops; gourmet crops; ornamental, flower seed and sod crops; and special prepared food items are expanding. High acre-value crops are the rule of the day. The input businesses in agriculture

along with our research and development groups are beaming "know how", even using computers, to find ways to extend profit per acre. All such crops need water to grow and water to process them for market. But none of these are pollutant crops, i.e., neither of the air nor, of especial concern to you/ ^{of water} They contribute to an aesthetic landscape, open space, recreation and conservation. Surveys being completed on the impact of agriculture in New Jersey business in 1966, while not yet officially released, indicate the actual monetary turnover in our trade of this business is over 2 billion dollars. It seems to us in agriculture the challenge of the late 20th Century in the residue of landmass left in the three northwest and the seven southern New Jersey counties is to superimpose the best of two worlds on the residual landscape. Keep enough agriculture to have it viable with all its added benefits of free services to our entire society. Unfortunately, we haven't always done this in eleven counties of the State. A sound water program will help to accomplish this.

A word should be said about the so-called Pine Barrens and their relation to agriculture and water. This natural reservoir exceeds man's best ideas for conservation because it stores water underground,

with natural biological filters, yet it is available for use. Here again agriculture has participated for the best of the plant breeder's skill; the soil scientists knowledge and the farmer's know-how and incentives, together have given us the blueberry and cranberry crops and wood products crops with no pollution and the ecology of the region has been preserved. We know that this cannot go on forever, but the opening of this area to exploitation and use without some prior considerations of basic agriculture and the ecology of the area would be in agriculture's opinion, a mistake of the greatest magnitude. This Commission should be guided here by two rules. Conservation and anti-pollution of this splendid water reserve.

In summary, the New Jersey Department of Agriculture along with our contemporaries in the Soil Conservation Service (U. S. Department of Agriculture) and New Jersey farmers compliment the Legislature and your Committee for examining this vital topic. We hope you will call on us for any help we can provide. We believe that the private land owner, still a major force in the control of our landscape, has a great stake in your deliberations. This group will also contribute to the success of your efforts

if enlisted to this end. We are presently working with the Department of Community Affairs in its implementation of A 385, which creates the Open Space Commission to study the future of open space and its proper preservation in New Jersey. This topic should be carefully tied in with your analogous deliberations and aims. There are fruitful signs everywhere that our great State is rising to prudently meet the confrontations of all its people for a well-rounded life in a densely populated environment.

END

Phillip Alampi
New Jersey Department
of Agriculture
Trenton, New Jersey

October 8, 1968



MIDDLESEX WATER COMPANY

SUPPLYING TOWNSHIPS OF WOODBRIDGE AND
EDISON, AND BOROUGHES OF SOUTH PLAINFIELD
METUCHEN AND CARTERET

TELEPHONE 634-1500

WOODBIDGE, N. J. 07095

October 8, 1968

The Honorable Herbert M. Rinaldi, Chairman
Joint Legislative Commission to Study the
Feasibility of Formulating and Implementing
a Comprehensive Water Supply Policy and
Program (ACR-31, 1968)
State House
Trenton, New Jersey 08601

Dear Mr. Rinaldi:

The Middlesex Water Company, operating as an investor-owned public water utility since 1897, provides water service to Woodbridge, Carteret, Metuchen, Edison and South Plainfield in Middlesex County. We appreciate this opportunity to present for the Commission's consideration the points of view which follow.

The Middlesex Water Company believes that water-shortage crises during the recent severe drought would not be averted in the future by the creation of some new state regulatory agency. Historically, the broad field of public water supply in New Jersey has been administered by the Department of Conservation and Economic Development (Division of Water Policy and Supply), the Department of Health and by the Department of Public Utilities. These three agencies have a wealth of experience going back over many years in their respective jurisdictions covering the broad spectrum of water resources and supply. A new agency would not have the benefit of such broad experience. These three agencies have experienced staffs of well-trained, competent professional personnel. A new agency would require many years to acquire and develop a staff of comparable competency.

It is our opinion that the greatest need in New Jersey is for the Legislature to provide adequate appropriations and enabling legislation to implement the programs of these existing agencies which are directed toward improving, enlarging and extending the water resources of our State. In the past, sound, feasible and needed water supply projects such as Chimney Rock, Bunnvale and the Delaware-Raritan Canal Projects were not carried out, not for any lack of good foresight and planning, but rather because timely legislative action was not forthcoming. It is our hope that the work of this Commission will result in effective legislative action to implement present and future State water supply projects.

We point to the need for such projects. No substantial water supply projects have been authorized by the Legislature since the Spruce-Run-Round Valley projects in 1958.

Middlesex Water Company urges that legislation be enacted to permit the Department of Conservation and Economic Development to acquire reservoir sites for future projects before they are lost forever as happened in the case of the Chimney Rock and Bunnvale projects of the 1930's.

We urge that this Commission study and implement plans of the Department of Conservation and Economic Development to restore the capacity of the Delaware-Raritan Canal so that it can be used to divert the full legal limit of 100 million gallons daily established by the U.S. Supreme Court Decision of 1954. Probably no other water supply project in the State would be as economical.

The Honorable Herbert M. Rinaldi, Chairman

October 8, 1968

Toward this end we recommend that:

- a. The Feeder Canal between Raven Rock and Trenton be cleared of existing obstructions to restore its full hydraulic capacity.
- b. The Six-Mile Run Reservoir Project in Franklin Township be constructed to provide storage for increasing the average delivery capacity of the Delaware-Raritan Canal.
- c. Consideration be given to construction of a pumping station on the Delaware at Trenton, with a pipeline to the Delaware-Raritan Canal, to overcome any flow deficiency of the Feeder Canal which may exist, thus increasing the over-all carrying capacity of the main canal.

Respectfully submitted,

MIDDLESEX WATER COMPANY

A handwritten signature in dark ink, appearing to read "Edward D. Bastian", with a large, stylized initial "E" at the beginning.

By: Edward D. Bastian
Chief Engineer

Consulting Engineer
to the
Board of Chosen Freeholders
of the
County of Monmouth

CLAUDE W. BIRDSALL
1700 "F" STREET
BELMAR, NEW JERSEY

October 3, 1968

New Jersey Legislative Study Commission,
Relating to Water Supply

Honorable Sirs:

The County of Monmouth is engaged in making a comprehensive plan of water supply for the County. We know now that by 1975, additional sources of water supply must be developed in this County or the people will suffer from an insufficient supply of water.


Large areas of land must be acquired now for storage reservoirs to meet future needs before development of the reservoir site takes place.

The State of New Jersey made a survey and outlined the area of land needed and arranged for the area to be purchased under the Green Acres Program, however, the money was used up and the land was not purchased.

We are informed that similar problems exist in other areas of the State and we are convinced that in a few years the private water utilities and the municipal and regional water utilities will all be fighting for water unless the State makes a comprehensive and overall water supply study, allocates the water on a fair and equitable basis, and appropriates the money to purchase the needed land and to implement the comprehensive program.

We believe that the State of New Jersey should formulate and implement a comprehensive plan for the long range water needs of the State.

Very truly yours,



Claude W. Birdsall

CWB/js

Water Policy Statement

by

Dr. Samuel D. Faust
Department of Environmental Sciences
College of Agriculture and Environmental Science
Rutgers, the State University
New Brunswick, New Jersey

Many faculty members of the College of Agriculture and Environmental Science, Rutgers, The State University, have expressed concern about the water resources problems of New Jersey within the past few years. This concern has been distributed in public policy forums, in speeches, in research, and in publications. Copies of some of these speeches and publications are enclosed.

It is recognized generally that the water resources of New Jersey are used for domestic (i.e., potable) water supplies, industry, agricultural irrigation, recreation, waste water disposal, and navigation. It is the competition for these uses that places quantity and quality demands upon the water resources. Furthermore, this competition leads to "temporary shortages" of water. In other words, one of the aforementioned uses may demand more water which leads to less water available for the other uses. Whereupon, the public cries "water shortage." This was especially evident in the recent drought.

In recent years, several studies and reports have appeared outside of the College of Agriculture and Environmental Science. These are:

1. "Surface Water Control in New Jersey. Part I.
(1) Framework for Water Policy. (2) New Jersey Water Control Laws. (3) Administration of Water Resources" by S. A. Decter.
2. "Surface Water Control in New Jersey. Part II.
(1) Organization Structure. (2) Substantive Programs,"
by S. A. Decter.

3. "Proceedings of the Public Policy Forum on Surface Water Control in New Jersey." Sponsored by Bureau Government Research, Rutgers, The State University, November 2, 1967.
4. "Water Resources Management in New Jersey," State of New Jersey, Commission on Efficiency and Economy in State Government, November, 1967.

These reports are concerned mainly with the governmental aspects of water resources. Moreover, these reports dwell upon the quantities of water needed to meet future domestic and industrial demands. There is, however, a serious oversight in these reports, namely, the quantity requirements for water quality management in the future for New Jersey.

The Department of Environmental Sciences in the College of Agriculture and Environmental Science has been concerned with water quality management problems in New Jersey for nearly 50 years. These efforts are summarized in the following reports:

1. "Water Resources of the Future for the United States and New Jersey." Presented before the North Jersey Chapter of the American Association of University Women, September 26, 1962.

This report reviews the water quantity and quality problems in New Jersey: "as the demand for water lies in the northern half of the state, whereas the abundant supply lies in the southern half of the state." and "New Jersey's surface waters are and will be used for pollution abatement. This, I feel, will be the major problem facing our state since the stream flows, hence dilution cannot be increased proportionally with the expected increase in population. This will mean extensive and more complete treatment of our domestic and industrial waste waters than at present." This report examined the present and potential development of ground and surface water supplies in detail for the four water resource regions of New Jersey.

2. "Chemical and Biological Problems of the Water Resources of New Jersey" - A Report to the Provost, Dr. Richard Schlatter, Rutgers, The State University, January 15, 1965.

This report was compiled by a committee of seven faculty members of Rutgers, The State University of which five were selected from the College of Agriculture and Environmental Science. An abstract follows:

The primary water resource problems of New Jersey that demand immediate attention are: (1) the need for more adequate surface water storage facilities in Northern New Jersey to meet present and future demands. Better water quality management and stream flow regulation will be possible with their development, and (2) the proper protection of New Jersey's ground-water resources. New Jersey receives, on the average, 45 inches of annual precipitation which is equivalent to 16-17 billion gallons of water per day. All of this water is not, of course, available nor retained for immediate use. There are alternating periods of abundance and drought since rainfall patterns vary from year to year. As this report was prepared, the State was experiencing a three year drought that dangerously lowered surface water supplies in north-eastern New Jersey and increased water pollution.

Population projections for New Jersey range from a low of 8.1 to a high of 15.4 million people in the year 2000. Corresponding projections for municipal and industrial water supplies range from 1.058 to 1.542 billion gallons. Irrigation requirements will reach 43.5 billion gallons annually in the year 2000. Pollution loads have been projected to range from 0.38 to 0.62 million pounds per day that will require 5.12 to 8.24 billions of gallons of water per day for adequate dilution in the year 2000.

Some chemical and biological data have been collected and published concurrently with development of New Jersey's waters since the late 1800's. The State Department of Conservation and Economic Development, usually in cooperation with the U. S. Geological Survey, has collected and published most of the currently available data. These include information on: (1) limnological data on 108 lakes and ponds, (2) fisheries research and management activities, (3) chemical water

quality the principal ground-water aquifers, (4) salt-water intrusion into ground waters adjacent to the Raritan and Delaware Bays and the Atlantic Coastal region, and (5) a few surface-water chemical quality data. Rutgers - The State University has collected and published some research information as follows: (1) algae, plankton, and productivity studies, (2) aquatic vegetation in New Jersey, (3) ecological studies of selected fresh waters, (4) fresh and marine fishes, (5) ecological studies of the Raritan and Delaware Bays, (6) chemical and bacteriological quality of selected geological formations, and (7) pollution surveys of the Raritan River.

Current chemical and biological water resource investigations by cooperative State-Federal programs are concerned mostly with a collection of ground and surface water quality data. Research programs at Rutgers - The State University include: (1) physico-chemical and biological effects of stream impoundments, (2) aquatic microbiological studies, (3) the persistence of organic contaminants in surface waters, (4) fresh and salt water fishes studies, and (5) ecological studies in the Raritan and Delaware Bays.

Development of ground and surface water supplies of New Jersey to meet the above projections will require the study of associated chemical and biological water resources problems. This committee urgently recommends that the following studies be initiated: (1) a study of factors leading to plankton blooms and their productivity and control in large reservoirs, (2) a study of the ecology and physiology of aquatic flowering plants with emphasis on their influence and control, (3) continuation of the Pine Barren Hydrologic Research Project, (4) consideration of the effects of silting and aging of reservoirs upon streams, (5) studies into the reduction of evaporation from the surfaces of large bodies of water, (6) investigations on the effect of heavy drawdown on the biota and productivity of reservoirs and downstream waters, (7) study of thermal

pollution in Barnegat Bay, (8) the discovery of management techniques for the practical and effective control of fish population structures, (9) investigations on the chemical-biological interrelationships of impounded waters, (10) long-term patterns in water quality of New Jersey surface waters, (11) life cycle studies of any of our coastal species, with particular emphasis on salinity dependence and whether or not the species has obvious commercial value, (12) studies of other effects of dissolved and suspended materials on the growth, feeding, reproduction, etc. of our coastal species, whether in the laboratory or in the field, (13) critical evaluation of standards for discharge of wastes into receiving waters with a view toward protection of our estuarine resources, (14) formation of a water quality data retrieval center, (15) comprehensive stream surveys, (16) trunk sewer studies, and (17) advanced waste water treatment studies.

3. "Future Quantity and Quality Demand Upon the Water Resources of New Jersey." Presented at the Rutgers Public Policy Forum, January 11, 1966.

This forum was entitled, "New Jersey's Water Resources" and was held on the Rutgers Campus of the College of Agriculture and Environmental Science. A copy of the proceedings of this conference is enclosed. One of the six papers cited above dealt with the question of water pollution in New Jersey. A summary appears below:

Summary

New Jersey has an ample, if not abundant, supply of water for drinking, for waste water disposal, for recreation, for irrigation, and for industrial process waters. Furthermore, this supply should be enough to last us until the year 2000 and beyond without external supplements. The challenge before us today is simply - are we prepared to meet the demands of quantity and quality upon our water resources?

Any demands on water resources must be based upon population projections. The U. S. Census Bureau projects a doubling of our population by the year 2000. Our population was 4.84 million in 1950. It is predicted that 13.61 million people will reside in

New Jersey in 2000 of which 67% or 9.12 million will be crowded into the eight northeastern counties. As the population increases, so will the demands upon our water resources.

The conjecture that New Jersey has an ample supply of water is based upon an average annual rainfall of 45-46 inches. This is equivalent to 16-17 billion gallons of water per day. About half of this water is lost through evaporation and transpiration which leaves approximately 8.0 B.G.D. for surface runoff, and ground water recharge. This 8.0 B.G.D. (or 2920 B.G.Y.) is our theoretical or maximum water supply.

A very serious limitation to the theoretical water supply is variability. There are periods of excess rainfall intermixed with periods of drought. Since our water is not evenly supplied, it must be captured and stored in reservoirs. The 15 reservoirs in the Hackensack, Passaic, and Raritan River Basins can store approximately 20% of the average annual supply (645 B.G.Y.) or a total of 129 billion gallons of water. Herein is another problem. These reservoirs are subject to variations in their total contents and are rarely, if ever, full.

Projections are offered for consumption of water for domestic and industrial purposes and for dilution of pollution to the year 2000. These projections for the whole State are as follows (year 2000): (a) domestic and industrial consumption (supplied through municipal systems), = 1.8 B.G.D. and (b) industrial consumption (self-supplied) = 1.3 B.G.D. This gives a grand total of 3.1 B.G.D. (1132 B.G.Y.). More extensive projections were made for the eight northeastern counties because this area will become even more critical in terms of supply and demand. These projections are: (a) domestic and industrial consumption = 1.2 B.G.D., (b) industrial (self-supplied) consumption = .400 B.G.D., and (c) dilution for waste water treated effluents, urban and rural runoff = 2.4 B.G.D. This gives a grand total of 4.0 B.G.D. (1460 B.G.Y.). This total figure can be compared with the average annual combined flow in the Hackensack, Passaic, Raritan, Elizabeth, Rahway, and Saddle Rivers of 1.8 B.G.D. (657 B.G.Y.)!

The current surface water quality situation in New Jersey indicates that the critical river basins are the Hackensack, Passaic, and Raritan. Furthermore, the water quality data suggest that pollution of these rivers will double by the year 2000! Very definite trends toward deterioration of water quality are indicated over the years 1947-1964.

Domestic pollution projections were made for the 8 northeastern counties. It is indicated that the 9.1 million people will be contributing the equivalent of 910 tons of pollution per day. Waste water treatment will reduce this figure to 180 tons per day that will be discharged into surface waters. This residual pollution will, in turn, require 1.2 B.G.D. of water for dilution in order to maintain 4.0 ppm of oxygen in the surface waters.

One very significant implication stems from the above projections. Every drop of water that runs off the 8 northeastern counties will have to be captured and stored in order to meet the domestic consumption requirements plus dilution for pollution requirements by the year 2000! This implication does not include industrial water and waste water requirements. Another important implication is that New Jersey will need an average of 2.5 gallons of dilution water for every gallon consumed over the next 35 years!

4. "Long-Term Analyses of Water Quality -- A Model Study of the Passaic River Basin." Presented at the First Annual Colonial Educational Conference, Rutgers, The State University, May 1, 1968.

This paper is concerned with the long-term trends of water quality in the Passaic River Basin as indicated by parameters of sewage pollution: dissolved oxygen, biochemical oxygen demand, and coliform bacteria. Two statistical techniques were employed; moving average and linear regression analyses, to establish trends over a period of twenty years, toward either water quality deterioration, improvement, or continuation of the status quo. These analyses of the water-quality data in this report suggest that sewage pollution has been on the increase since 1948. Extrapolation of present conditions into the future suggest that the Passaic River will become "completely" polluted by the year 1980. That is, if additional or better waste water treatment facilities are not constructed, or if more dilution is not provided from releases of water from reservoirs.

Recommendations

1. Indeed, it is unfortunate that political boundaries do not coincide with river basin boundaries. That is to say, the uses of a river basin should be managed in total rather than in part where political units dissect the watersheds of New Jersey. The State government of New Jersey should give serious consideration to the establishment of a Department of Water Resources that will administer our waters in total rather than in part as currently practiced in the Departments of Health, Agriculture, Conservation and Economic Development, etc. One cannot divorce the various uses of water. Water supply, waste water disposal, recreation, irrigation, and navigation are interrelated. One cannot, for example, withhold water in a reservoir for supply without affecting downstream water quality. The State of New Jersey must adopt the concept of "total management" in order to make most efficient uses of our water resources.

2. In the course of developing a water quality management program several soul-searching questions must be answered, some of which may be:

- a. What are the actual water quality requirements for the various uses of water in New Jersey?
- b. To what extent should New Jersey's streams function as waste water carriers? What are the actual assimilation capacities of our streams?
- c. What are the economic factors in managing water quality?
- d. Is 4.0 ppm a reasonable level of oxygen to maintain in our surface waters? Or, shall we aim for a higher level? Or, could we tolerate a lower level? How much will it cost to maintain various levels of oxygen? In summary, what is the most economic use of our surface waters relative to water quality?
- e. What water quality priorities are needed to resolve differences between conflicting and competing water uses? How shall they be established?
- f. Are the river basins of New Jersey being administered in the best interests of all concerned? Do we need Commissions or Authorities such as the one established on the Delaware River to manage all aspects of water resources?

- g. If we accept the single, and consumptive use of water for dilution of pollution, from where will it come? Can we provide more surface storage space? Shall we divert large quantities from one river basin to another? Shall we supplement our surface waters with ground waters?
- h. How much treatment should we give to our waste waters? Primary? Secondary? Tertiary? Shall the waste waters be treated individually or collectively in a given river basin?

These are only a few of the many questions that must be answered. They can be summarized in one overall question -- What shall be the best use or uses for our water resources in New Jersey? Our waters will be used for domestic and industrial supplies. Our waters will be used for waste water disposal. Our waters will be used for recreation. Can we expect to maintain water quality in all reaches of a stream to meet all requirements of these three major uses? Or, shall we separate these uses and assign them to selected portions of a stream?

STATEMENT SUBMITTED TO THE
JOINT LEGISLATIVE STUDY COMMITTEE
ON
A COMPREHENSIVE WATER SUPPLY POLICY AND PROGRAM
TO MEET THE LONG RANGE NEEDS
OF THE
STATE OF NEW JERSEY
PRESENTED BY
ELIZABETHTOWN WATER COMPANY
ROBERT W. KEAN, JR.
PRESIDENT

OCTOBER 31, 1968



We appreciate the Commission's thoughtfulness in holding its record open until November 1st for those who were unable to testify at the public hearings of October 8th - 10th. We have taken advantage of the extra weeks to examine testimony already introduced with the thought of avoiding repetitious historical data and documentation. What follows is, therefore, a collection of rather random impressions and convictions based upon our experience and expertise.

Elizabethtown is the major water supplier in Middlesex, Union and Somerset Counties. We also supply smaller areas in Mercer and Hunterdon Counties, and transmit sizable gallonages to Essex County municipalities through inter-connections. All in all we serve over 100 million gallons daily to a population of approximately 750,000. Our sources are deep wells, the Delaware River (transported through the Delaware and Raritan Canal), and the Raritan River supplemented by the Round Valley and Spruce Run reservoirs. In size we are among the first ten investor-owned water companies in the country. We are a public utility, regulated by the State Board of Health, the Water Policy and Supply Council, and the Board of Public Utility Commissioners.

The first controversial issue seems to be whether the present public structure that concerns itself with water supply development and allocation, namely the Division of Water Policy and Supply under jurisdiction of the Commissioner of Conservation and Economic Development, is working properly or whether some super-agency with additional powers and responsibilities is necessary.

In the areas of New Jersey for which we are responsible, the existing structure has worked well for the most part, and has responded to the public interest. Our dealings with them have included:

1. The filing and processing of numerous applications for water diversions from surface and underground sources to meet our customers' needs.
2. The delineation of various areas as "protected" for safety against excessive well water withdrawals by industrial and commercial establishments not otherwise under the jurisdiction of the Water Policy and Supply Council.
3. The seeking of advice and exchange of information on available sources and water requirements as necessary to implement long term planning.
4. The development and maintenance of the Delaware and Raritan Canal as a water supply conduit.
5. The inception and implementation of the Water Supply Law of 1958 and the construction of the Round Valley and Spruce Run balancing reservoirs.
6. The setting of rates for the State-operated projects to which we are currently paying approximately \$1,000,000 annually.

Long term planning is the ingredient most essential for successful water supply management. Our long term planning for five, ten, twenty or more years into the future is supplemented by annual summer load studies to pinpoint areas of fastest growth where our pumping, storage, or transmission facilities should be enlarged for the ensuing year. Our success in avoiding drought-born restrictions on water usage has been due to this policy, and to close communication with and intimate knowledge of those communities dependent upon our services.

We do feel that the Division of Water Policy and Supply is handicapped by an inadequate budget and is understaffed and underpaid when compared to private industry especially in view of its tremendous responsibilities. We also think the question should be raised as to whether the Department of Conservation and Economic Development does not cover too wide a field. It might better be divided into two Departments, each headed by a Commissioner of cabinet rank. One could be the Department of Natural Resources, and could include the Water Supply functions. Its Commissioner could be given a direct mandate of "continuous surveillance" by the legislature, so that situations such as the 1965 emergency in parts of Essex County could not surprise an unaware public. Appropriate emergency powers to act during drought periods could also be delegated to this office.

We do not believe in the concept of a super-agency for water development such as might be necessary in the arid southwest or in many less sophisticated parts of the world. Admittedly mistakes have been made in New Jersey. In our opinion they were largely due to pilot error, rather than faulty air foil or cockpit design. When something goes wrong, one tends to assume the fault is with the system, or the governmental structure, and that therefore new laws are necessary and desirable. In our opinion this is not the case here. One tends also to forget that New Jersey's water supply standards over the years are among the highest in the world, and that with very few exceptions we have been notably successful in keeping ahead of extraordinary residential and industrial expansion in an already crowded state. It is hard to see where a super-agency would have helped in the following four instances which we consider examples of mistakes in water supply planning in recent years.

1. The design for the Round Valley reservoir did not include provisions for releasing its stored waters back to the Raritan during periods of low flow, even though such use (as a balancing reservoir) would result in far less cost per unit volume and far greater water yield than would be the case for direct transmission from reservoir to customers.

2. This mistake was first publicly noted by Commissioner Roe (See Exhibit A, next page), but by that time a second error had been made. The construction had been authorized and had proceeded (including the one-way intake) long before any commitments for purchase of the water had been received. These two mistakes will cost several million dollars to correct, and are the reason why the State has 28 billion gallons of unusable water in storage at present.

It is hard for us to see how a super-agency would have done better, however. Rather, it would seem that these mistakes were committed and the extra delay and expense incurred precisely because a super-agency psychology prevailed at the time, which gave no weight to expressions of caution, nor considered dissenting opinions.

3. The third mistake was evidenced in the 1965 drought, and its effect on certain areas dependent on the Passaic Watershed. These effects could have been avoided, as proven by the fact that a similar drought would not bring the same restrictions nor panic today. The situation was not attributable to any one action or lack of action, but more to the truism that "water is taken for granted until the tap runs dry". To some degree communication, cooperation, allocation of responsibility, awareness of potential demands in relation to guaranteed minimum flows, the ingredients of water management, were lacking. A multiplicity of

Exhibit A

The State of New Jersey has raised the anticipated output of the Spruce Run-Round Valley reservoir system by more than 50% through a major innovation in the distribution plan. This was announced today by Commissioner Robert A. Roe of the Department of Conservation and Economic Development after he granted his approval to action by the Water Policy and Supply Council recommending the new program.

The new distribution program will produce an optimum yield of 200 million gallons per day instead of the 130 million gallons per day originally contemplated for the Spruce Run-Round Valley reservoir system.

The higher yield is achieved by drawing the output of both reservoirs from the Raritan River at Bound Brook and to make available the Round Valley supply directly at the reservoir.

The new plan was devised after an intensive review of the entire water program by the Water Policy and Supply Council with Commissioner Roe. It was based on the Council's July 1964 recommendations to the Commissioner which included their findings of fact and conclusions of law resulting from the testimony and technical data received during extensive hearings held by the Council.

Commissioner of Conservation and Economic Development

For Release Monday P.M., December 7, 1964

suppliers including a great city, a water authority, many smaller municipalities, meant divided responsibilities, too much reliance on past success.

What happens yearly in many parts of the world would have been labeled disaster in New Jersey. And yet, the solution was relatively simple. As the crisis approached for the Passaic Watershed, Newark called for help from the Raritan to the south. Within two months water was flowing through a new pipeline linking up the two watersheds. All of the communities involved have since been active in planning for the future.

The State was most helpful in alleviating the drought symptoms, and in helping to effect water exchanges and interconnections. It is hard to see how a super-agency would have prevented the situation, although a Commissioner specifically invested with a directive of "continuous surveillance" might have been able to foresee the dangers and stimulate action in time to forestall the crisis.

4. The fourth mistake has not been made yet, but we see it foreshadowed in the constant promotional efforts on behalf of the so-called Raritan-Valley pipeline. Many who are active in this effort are citizens or leaders who simply do not have the facts or the background in water management to make a valid judgment on this controversy. For these latter we prepared the attached Exhibit B some time ago, and we are hereby submitting it, including the map as part of your record.

The problem as we see it concerns the question of a state subsidy to make possible the building of an extravagant and unnecessary pipeline for the supposed benefit of those who no longer want it. The pipeline project was first conceived when there was no connection between the Passaic and Raritan watersheds.

The concept is now obsolete, since there are already connections to Irvington, Springfield and Newark. Raritan water is now available to Passaic Watershed consumers. Billions of gallons have actually been transferred in the past several years.

Since these transfers are made by means of a transmission grid located squarely between the two watersheds, the capacities can be increased in stages, as needed, in economical fashion, limited only by the allocated yield of the Raritan River supplemented by the Round Valley and Spruce Run storage reservoirs. This would seem to us a far happier solution than an entirely new water system, so expensive that it would have to be subsidized by taxpayers deriving no benefits from it. There are certainly urgent priorities in other public areas for the \$60,000,000 it has been estimated to cost. In the water supply field the highest priority for public funds should be given to the acquisition and ultimately the development of reservoir sites in those areas where private enterprise cannot undertake these tasks.

A cardinal principal that should be adhered to is that the ultimate beneficiary should pay the costs of water development in the form of water rates. Another is that free enterprise has done an outstanding job and should be supported rather than discouraged by subsidized competition.

We are much encouraged by the formation of this Joint Legislative Commission on Water Supply Policy. We would urge that it not disband after making recommendations based on these hearings. There is a real need for legislators to keep abreast of water supply problems in New Jersey, and there

are sure to be problems arising from time to time that need an informed legislative approach to provide solutions.

We are grateful for having been afforded the opportunity to express our views at this time. We have only scratched the surface of a complicated subject. If the Commission or any of its members would like to question us on any subjects related to water supply, we would be delighted to make ourselves available at your convenience.

A handwritten signature in dark ink, appearing to read "R. W. Kean, Jr.", is positioned above the typed name.

Elizabethtown Water Company
Robert W. Kean, Jr.
President

THE RARITAN WATER SOURCES

The Raritan Valley Watershed can be compared to the Passaic Valley Watershed, since both comprise approximately the same square mileage of drainage area, and therefore their potential yields of potable water supply are similar.

Since high concentration of population and industry first settled in areas dependent on the Passaic, this watershed was the first to be rather fully developed. Newark's Pequannock Reservoirs, Jersey City's Boonton Reservoir, the North Jersey District Water Supply Commission's Wanaque Reservoir, the reservoirs of the Passaic Valley Water Commission, and those of the Commonwealth Water Company all provide storage to capture and regulate the flows of the Passaic River and its tributaries.

The guaranteed safe yield of this River, therefore, is in excess of 300 million gallons daily at the present time.

The Raritan Watershed on the other hand is still far short of full development, and in fact its very first development came with implementation of the Water Supply Law of 1958. Prior to that time it could be termed a "flash flood" river, and although its flows averaged better than 600 MGD, they fell to less than 40 MGD during drought periods. Those counties now principally dependent on it, namely Middlesex, Hunterdon, Somerset and Union, derived the bulk of their needs from well supplies, from smaller local streams, and from the Delaware and Raritan Canal.

As post-war growth in the area indicated needs far surpassing local resources, the Elizabethtown Water Company in 1955 announced plans for development of the Raritan by a series of moderately sized dams and reservoirs. The State countered with larger plans for a multipurpose Raritan development project embodying both flood control and water supply. After defeat of their first attempted "Chimney Rock" proposal by the voters in 1955, the Spruce Run, Round Valley plan was proposed in the 1958 Water Law which was approved in that year by a large majority of the voters.

The Elizabethtown Company had subordinated its plans to the State's multipurpose concepts, and worked with the joint legislative committee which developed the 1958 law. Several controversial items were resolved in such a way that the legislation as finally drafted received sufficiently strong support from the various geographical areas of New Jersey to pass both legislative and voter referendum approval, namely:

1. The Central New Jersey "Raritan interests" were most reluctant to see "their" future water supplies developed in such a way as to be transported to other areas of the state. These counties supported the legislation only after:
 - a. a "compensating flow" of 90 MGD to improve the River was established in the law.
 - b. it was agreed that transmission mains would not be included in the legislation since this would be "subsidized" export of water from the areas most dependent on the Raritan.

2. Although the Raritan project in the legislation was balanced by allocations for development of the Wharton Tract in southern New Jersey, it was felt that a further huge expenditure for transmission pipelines would have no support except in a localized area and would lead to defeat of the legislation. For this reason also, the bond issues were restricted to development of water sources, and the distribution was left on a "come and get it" basis.

The Raritan development plan was later modified to provide more water and at lower unit costs by using both Spruce Run and Round Valley as balancing reservoirs, and thereby bringing the guaranteed minimum flow of the river up to over 250 MGD. The Elizabethtown Water Company presently has diversion rights for 70 MGD from this source, thereby benefiting some 750,000 people and countless industries and fire departments. We are fully aware, however, that we must apply for further diversion grants as necessary, and that the Raritan River can and should be developed by means of further reservoirs for at least an additional 100 MGD.

The 1965 Drought

Several consecutive years of deficient rainfall led to drought conditions and rationing of water supplies over much of the Eastern seaboard, peaking in 1965.

For the first time it was necessary to transfer supplies from the Raritan watershed to Passaic supply areas. By this time the Elizabethtown Company

had built major pipe lines up to Linden, Elizabeth and Hillside, and it was a relatively simple matter for the Commonwealth Water Company to secure Raritan supplies from us at Irvington and Springfield connections so that those areas, normally supplied by Passaic sources, would be freed from drought restrictions. Later we arranged to supply the City of Elizabeth, most of whose supplies had formerly been from the Passaic. During the most acute drought months, plans were designed and construction undertaken whereby a pipeline from Linden to Newark would make major Raritan supplies available to areas normally supplied from the Passaic. After that, the Passaic reservoir levels improved steadily, until the occurrence of more normal rainfall patterns brought an official end to the drought. Incidentally, Newark still takes up to 30 MGD through that drought-inspired pipeline when necessary to assure that its reservoirs will be full in the Spring.

One most significant result of the drought therefore was that it caused the two watersheds to be linked. The pipelines, pumps and purification plants are designed so as to be expandable in stages, as needed, by looping or piece-meal construction, on relatively short notice.

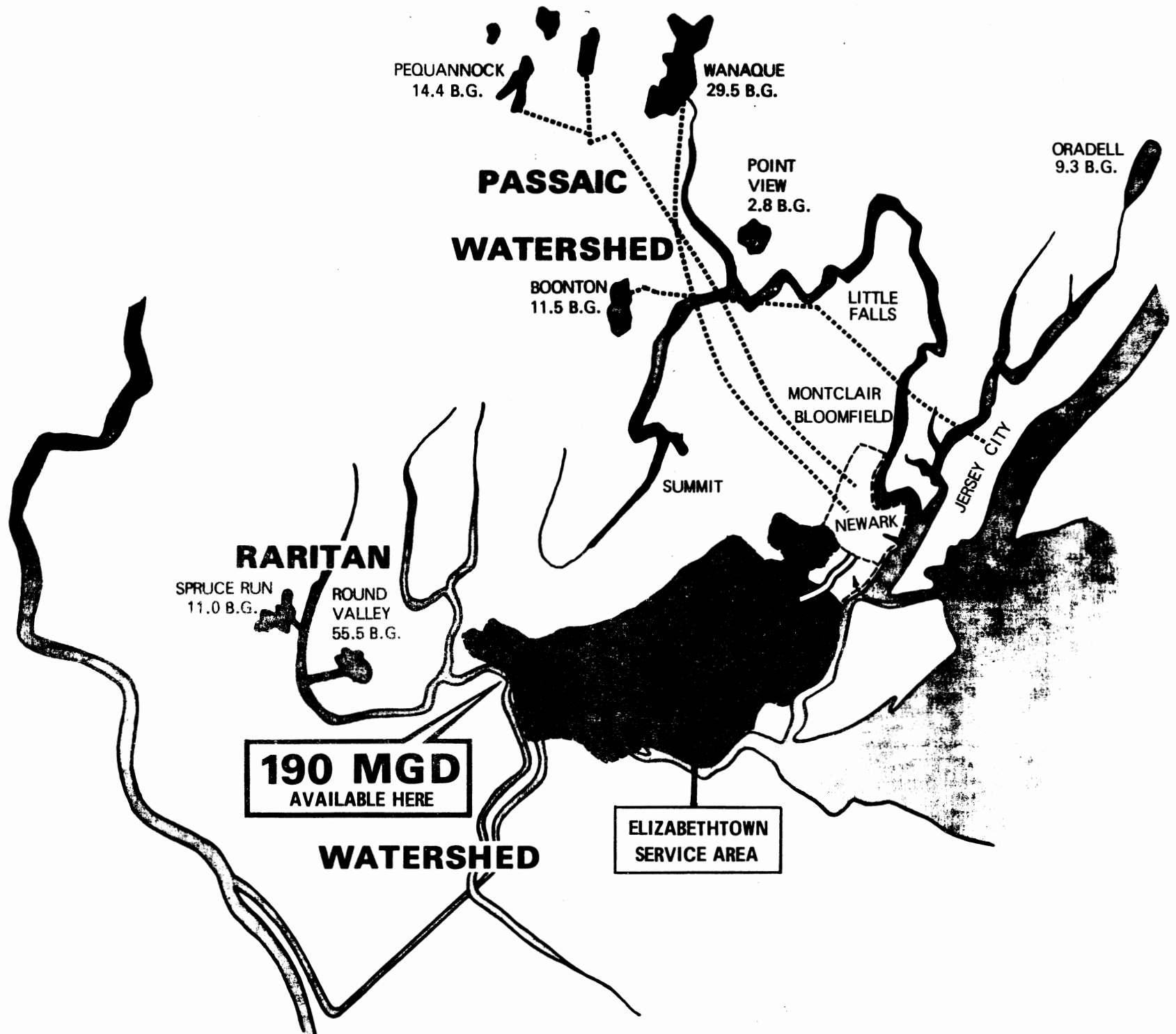
RECOMMENDATIONS

Our conclusions from the above are as follows:

1. The Raritan Watershed must be developed to its maximum potential, and it is appropriate that this be done by the State. The reservoir land acquisitions should be pursued immediately, and construction of dams can follow as needed.

The Division of Water Policy and Supply, of the Department of Conservation and Economic Development, already has engineering studies for much of this work in its possession. The facilities can ultimately be paid for by water users, as in the Round Valley, Spruce Run plan.

2. A new pipeline and purification and pumping facilities from the Raritan to the Passaic Watersheds would be of dubious value. Major transmission connections already exist, which can be expanded as needed, more quickly, and far more economically than an entirely new installation at today's costs. Besides, it is not recommended that the State go into the business of transporting water in direct competition with business organizations fully qualified to do the job. Two arguments are continuously repeated by those interested in promoting a State-subsidized pipeline between the two watersheds. The first is that the legislature (and presumably the voters) "forgot" or "neglected" to include a pipeline in the 1958 Water Law. The second is that without such a new pipeline, the reservoirs are useless. Both of these are myths.



Statement of Herman Kleindienst, President
of the New Jersey Association of Soil Con-
servation District Supervisors on behalf
of the Soil Conservation Districts in New
Jersey to the Legislation Study Commission
on Long Range Water Needs and Policy

Mr. Chairman and members of the Commission: My name is Herman Kleindienst. I am a resident of Newton, New Jersey and am Chairman of the Sussex County Soil Conservation District and President of the New Jersey Association of Soil Conservation District Supervisors.

There are 15 Soil Conservation Districts in New Jersey. They are charged by state law with the responsibility for conserving our soil and water resources, and for carrying out flood control projects on small watersheds. This is done by working cooperatively with municipal, county, state, and federal groups and agencies.

Through a memorandum of understanding with the Soil Conservation Service of the United States Department of Agriculture, Districts secure technical and financial assistance in carrying out a resource development and management program, including the program provided by the Watershed Protection and Flood Prevention Act.

I would like to address this Committee regarding the value of the National Watershed Protection and Flood Prevention Act. This is commonly referred to as the PL-566 Small Watershed Act. In any long range consideration of total water needs for the state, provisions should be made to take full advantage of this act.

There are several reasons for placing emphasis on this act to fill part of New Jersey's long range water needs. I will comment on them only briefly since this committee can easily investigate them in depth at its convenience.

1. Recreation water areas can be developed in small and rural areas.

There is no question but that New Jersey faces a tremendous need for additional water based recreational developments, especially local areas for rural people who cannot avail themselves of the more widely scattered state and county facilities.

2. Water for agriculture will always be needed in New Jersey. All our long range plans call for a viable agriculture in spite of the fact that there is an ever increasing need for available water in these agricultural areas. PL-566 provides for the development of agricultural water supplies, with the federal government paying up to 50% of the cost.

3. There is an ever increasing demand for water for municipal and industrial needs in the smaller towns and rural areas. Developments to supply water for these needs can be a part of the PL-566 program. At present, there is no federal cost sharing for this additional input, but it is expected that proposed changes in the law will provide 50% of this cost.

4. Unpolluted water is fast becoming a scarce resource in New Jersey. Sedimentation is by far the greatest pollutant of the state's waters. It costs the state unknown thousands of tax dollars each year to remedy this damage. Flood control impoundments are also sediment reducing impoundments. The land treatment phase of the program further reduces erosion and sedimentation.

5. Numerous developments and changes in land use have aggravated the flood damage in many of the stream areas throughout the state. PL-566 provides for the development of flood control dams to prevent these floods. The

cost of these structures are 100% federal. These same structures provide for the sediment control previously mentioned.

6. Water needs for fish and wildlife are expected to increase over the years. PL-566 provides for water developments for this purpose. The federal government pays up to 50% of this cost.
7. Water for low flow implementation is likewise a growing need. Extra water storage can be built into impoundment structures to provide for this need. At present, there is no federal cost sharing for this added input, but it is expected that the present law will be revised to allow future federal cost sharing for this purpose.
8. As we are all aware, inadequate drainage adds to our mosquito and encephalitis problems. The PL-566 program provides for drainage, if appropriate. Up to fifty percent of this cost is paid from federal funds for agricultural drainage.

There are several additional benefits provided under this program.

- Any project must be developed with and approved by the local people involved.
- The planning party is provided by the federal government.
- All engineering design and construction supervision, and contracting if requested by the local sponsor, are done by the federal government. This relieves the state of the cost of providing these services by a department already overworked.
- Plans developed must agree with long range county and state plans.
- Each project must be justified economically to insure a wise expenditure of funds.

- These projects do much to develop the resources of local areas, making them more desirable areas in which to live and thus playing a part in slowing down the rural to urban population trend which is the root of so many of our social problems.
- Every effort is made to provide for multiple use of water developments. We can no longer afford the luxury of single use water projects.
- PL-566 projects increase land values adding to municipal ratables.

It has been conservatively figured that for every dollar of state money invested in the PL-566 program to date in New Jersey, there has been a return of well over \$10.00 of federal money. This is a water development program the state cannot afford to ignore. This is especially true when one considers the numerous related benefits which accrue.

The PL-566 Small Watershed Act requires that local people - private, municipal, county, or state - provide certain inputs for each project. Much of this is in the form of easements and rights of way for impoundment sites. Frequently municipal and county people do not have adequate funds, or must spend one or more years securing funds. This delays the development and construction of the overall project. These delays often result in the loss of the site to other irreversible land uses and the project must be abandoned. Water development sites are scarce. They need to be preserved for future development.

I would like to recommend to this Committee

- (1) That any long range plans to meet future water needs include an expanded use of the PL-566 Small Watershed Program.
- (2) That consideration be given to providing a state policy to make funds available to assist local people in securing easements and rights of way for impoundment sites. This would guarantee the availability of the site, and would speed up and assure success of small watershed projects.

- (3) That consideration be given to increasing the limited planning staff of the Soil Conservation Service by funding an additional planning party to encourage greater participation in this all inclusive water development program.



Herman Kleindienst
Chairman
New Jersey Association of
Soil Conservation District Supervisors
October 28, 1968

FREDERICK F. RICHARDSON
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NEW BRUNSWICK, NEW JERSEY 08903
TELEPHONE 247-1936

October 7, 1968

Thomas P. Bryan,
Research Assistant
Law Revision & Legislative Services
State House
Trenton, New Jersey 08625

Dear Mr. Bryan:

I am mailing you this enclosed statement, in case I can't appear tomorrow, Tuesday or Wednesday. As former Mayor of New Brunswick and later its Water Counsel, I am somewhat familiar with the conditions discussed and would be glad to testify, if I can get away.

I served as an active member of Governor Meyner's Water Advisory Group back in 1958, and I am still interested in implementing the real progress then made.

Very truly yours,

Frederick F. Richardson
FREDERICK F. RICHARDSON

FFR:mac
Enc.

STATE OF N.J.
LEGISLATIVE
SERVICES
OCT 8 AM 9 14

In New Jersey, the 1959 Bond Referendum to create new water supplies (Spruce Run and Round Valley) took effect. Both were built and are now operational. Water was to be sold to the public at Bound Brook on a cash and carry basis. North Jersey District Water Supply Commission was to construct a pipe line to various municipalities in the Northern part of the state for quantities in excess of 61 mgd at an estimated cost of \$165 to \$185 per mg. This project has been held up by litigation and the estimated cost is now \$217 to \$251 per mg, and the litigation continues.

It was precisely these areas that the greatest shortage existed and will exist again if not now corrected. The state should step in and if the District Commission is unable to go through with this contract, the State should go it alone on the pipeline which is the main stumbling block, and deliver water to the municipalities at a cost that is reasonable, including condemnation of the pipe line. No further protracted delay should be allowed if these warring parties can't amicably resolve their differences without further delay. The point of take off from the River, is one affording high grade water and is one of the prime take off spots of the whole river and should be utilized as soon as possible. The water is clean at this point and plentiful and relatively cheap, and the understanding ~~was~~ when this bond issue was adopted and these reservoirs built, was that these

northern municipalities would have first call. Not to proceed now, would be a breach of faith, but the State can't hold up indefinitely. It must move and by condemnation of the connecting pipe line, or by any other means available. If the state shows it means business, these fractious parties now at odds for so long, may come to their senses.

Further down the river, the State Board of Health has classified the Bound Brook area north to the confluence of Millstone with the Raritan, as permissible pollution. This utterly destroys the possibility of buying pure water at Bound Brook as was intended by the Legislature, and this area should be up graded at once in order to validate the integrity of these bonds and effectuate the overriding purpose of their issuance. While some think this water characteristic is only temporary, the fact remains that it has now gone on for years and should be corrected forthwith.

Below Bound Brook where the real pollution is felt most noticeably, the water is rated by the State Board of Health as "potable where permitted". How with upstream being permissibly pollutable, downstream can be potably permissive, is so directly conflicting that it makes no sense. If it's polluted at or above Bound Brook, it can't be potably used below and that's the predicament and ~~delirious~~ dilemma the City of New Brunswick finds itself facing. It has potable water rights costing in 1893, about \$300,000, acquired when the river was relatively clean and which have since been rendered worthless by pollution.

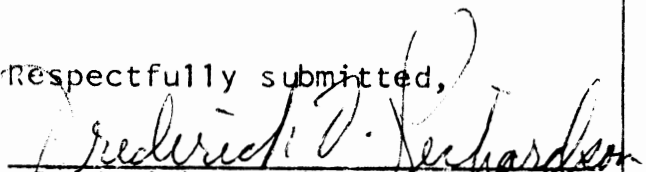
When the Legislature passed the Bond Issues, it intended this fresh mountain water to go at least as far as New Brunswick and it assumed that by the time the reservoirs were built, this pollution would be abated. This of course, was a fallacy considering the attitude of those responsible for the abatement and it continues a fallacy even as of now. To New Brunswick and its environs, it has been a big joke or would be if it was not so tragic in its effects, both on potable as well as industrial water supply.

What the State needs is to exert plenary power to see that the public gets its full value out of ~~xxx~~ these bond expenditures and that the purposes of these bond issues are not continually thwarted by industrial and to some extent, domestic pollution. The river is supposed to have volume now 90 mgd average, but it is suspected and indeed it has been verified that there are times when this supply is cut off. Some dependable and accurate monitoring should be installed to see that this volume prescribed by the Legislature is maintained. At the time of this writing, October 1968, one can walk across the river at New Brunswick without getting wet feet. The river bottom is in full view in many spots just north of the Albany Street bridge at New Brunswick. It is to be hoped this matter will be corrected at an early date, even assuming the new Middlesex Water Co. construction work may be partly responsible.

It is a considered opinion that while the Water Supply Bond Issues were successful, the carrying out of their landable purposes has been frustrated by the responsible agencies in charge. It's a matter to be carefully looked xx into and corrected before we tackle the now pressing on coming intrusion of salt water going further and further upstream.

I recommend a committee be appointed by the Legislature to evaluate the results of the Water Supply Bond Issue, and to try and give better direction to the enforcement of its purposes.

Respectfully submitted,


Frederick F. Richardson

Dated: October 7, 1968

November 7, 1968

The Honorable Herbert M. Rinaldi, Chairman
Joint Legislative Commission to Study the
Feasibility of Formulating and Implementing
a Comprehensive Water Supply Policy and
Program (ACR-31, 1968)
State House
Trenton, New Jersey 08601

Chairman Rinaldi and members of the Joint Legislative Commission:

The Woodbridge Area Chamber of Commerce has been most interested in the creation and preservation of an adequate supply of water for household, industrial and commercial use. It is no secret that the level of our economy and well-being is largely dependant on a good supply of good water. In 1965, the first year of the Chambers services this organization held a tour of the Raritan River with local officials and General Lack of the Delaware River Basin Authority. The purpose of this trip was to see at first hand the possibilities of the proposed Crab Island Dam and the reservoir it would create in the Raritan and South Rivers. At a large meeting, the same day, the Chamber endorsed the Crab Island Dam and proposed that the Fuhhteam would do the job very well and be more economical therefore the saving may help to bring the facility to us much earlier. The concept of using a rubber-fabric dam was adopted by the New Jersey Division of Water Policy and Supply.

Having established our interest in the water supply of our Raritan Valley area we recognize that a prime source of supply would be the Delaware-Raritan Canal. May we suggest that plans

-More-

to fully develop this supply line be implemented as rapidly as possible by the present departments that can well handle this project if given the authority.

Thank you for the privilege of communicating some of our thoughts to you on this most important subject.

Sincerely,

A handwritten signature in cursive script, appearing to read "Joseph Ostrower", written over a horizontal line.

Joseph Ostrower
Vice President in charge
Area Development Division

