TH JERSEY DISTRICT, WATER SUPPLY COMMISSIO

OF THE STATE OF NEW JERSEY.

REPORT ON WATER SUPPLY

DECEMBER 31, 1945

974

North Jersey District
Water Supply Commission
of the
State of New Jersey

REPORT ON WATER SUPPLY

COMMISSIONERS

SAMUEL S. FERSTER,
Chairman

THOMAS J. BROGAN

WILLIAM P. FURREY

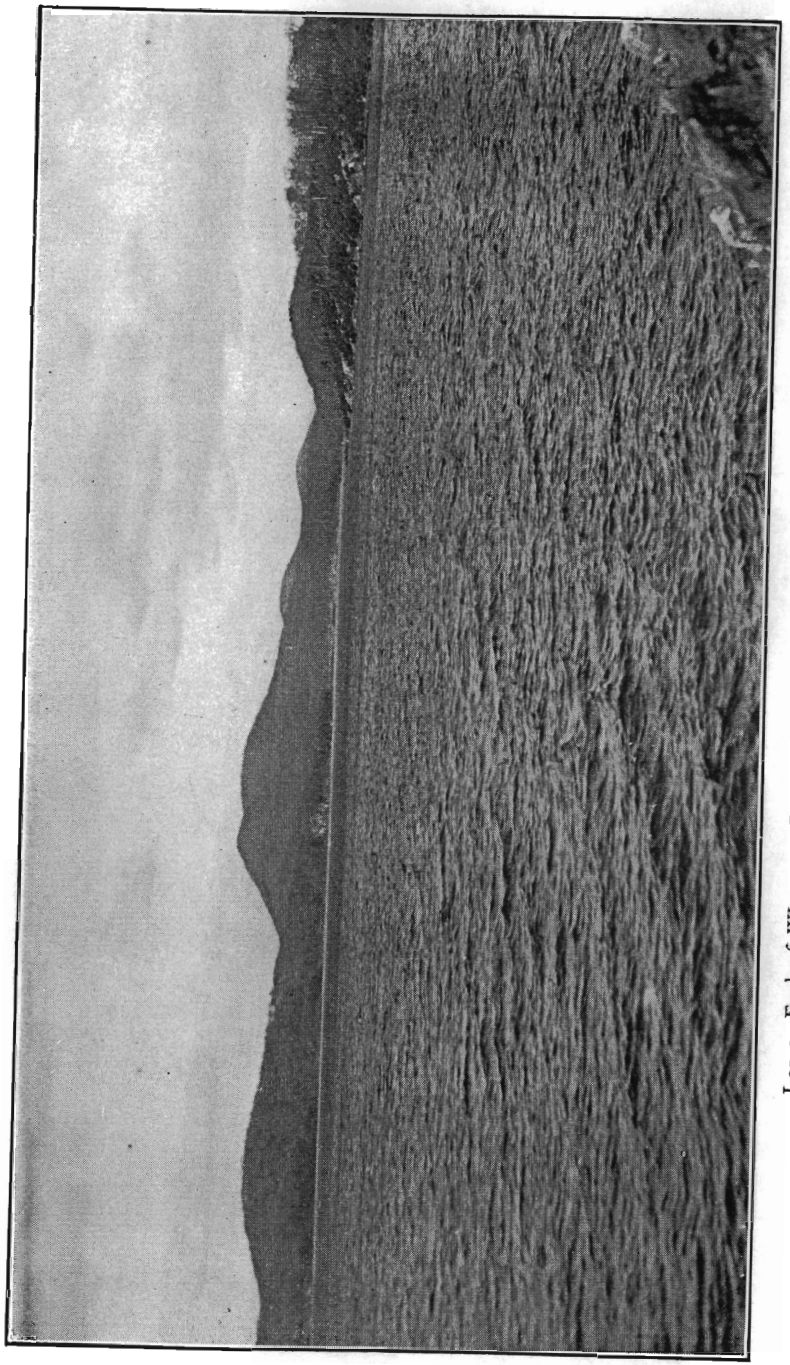
ELSA H. FLOWER

JOHN G. FLANIGAN

Office of the Commission

Wanaque, New Jersey

December 31, 1945



Lower End of Wanaque Reservoir. Water in foreground is 90 Feet Deep.

REPORT ON WATER SUPPLY

Introduction

Much of the complex system of living that now exists in this country is dependent on an adequate supply of water. Fundamentally all water originates in the form of rain and because of this, people attach a continually increasing importance to the matter of rainfall.

Careful observations of rainfall have been made in northern New Jersey for more than fifty years. In this period it has been found that the average annual precipitation in the upland areas from which water supplies have been developed amounts to about 47 inches. In the period of 1930 to 1932, inclusive, the annual rainfall showed a deficiency of more than six inches in 1930, three inches in 1931 and eight inches for the first nine months of 1932. This was a period of industrial depression and the reduced demands of factories saved the day for the water supplies.

Corresponding variations in recent years have been as follows: 1940, an excess of 7 inches; 1941, a deficiency of 8 inches; 1942, an excess of 9 inches; 1943, a deficiency of 7 inches; 1944, a deficiency of 3 inches; and 1945, an excess of 13 inches.

Had the steady accumulation of the deficiency found in the early thirties occurred during the war years, many of New Jersey's war plants would have been either rationed for water or shut down. They might even have been in the unenviable position of having to give points for water in the same manner that the housewife had to give points for meat.

Even more important from the standpoint of the water works man is the term "run-off". This too, is measured in inches and represents the volume of water which actually gets into the streams after ground absorption and evaporation have been met. As a general rule in northern New Jersey, this equals roughly one-half of the annual rainfall.

Accumulated deficiencies in this figure for the same period as mentioned are far more impressive than the rainfall records as shown in the following table:

Year	Deficiency	Excess	Year	Deficiency	Excess
1930	10″		1940		6″
1931	5″		1941	11″	
1932			1942		6″
(First 9 mos.)	8″		1943	5″	
			1944	4″	
			1945		12″

In the early thirties there was a steady accumulation of deficiency which had water men truly and literally gasping. During the war years there have been wide variations but at no time has a great deficiency accumulated.

Universal Need of Water

It might be well at this juncture to point out the significance of water on world events of the past. Much of the mystery of the rise and fall of ancient civilizations has gradually been removed. Recent studies have shown that the Babylonian Empire fell when its water supply failed. The Egyptian dynasties were noted for the ingenious methods devised by their engineers to raise water from wells to supply the populace. When this failed, the power of the Empire waned either through partial extinction of the race or through migration to other more fertile locations.

Similarly the well-advanced organizations of the Mayas in Yucatan and the Incas in Peru rose and fell as their water supply flourished and later disintegrated. Possibly pollution of the water caused widespread epidemics. At any rate the ultimate result in each case was the same.

In recent times, many of our western ghost towns of today can trace the beginning of their oblivion to long periods of drought that forced the inhabitants to move or die of thirst. In World War II, the fall of Warsaw, Singapore, Hongkong, Bataan, Rome, and Berlin were all accomplished after their water supply had been either cut off or

reduced to a mere trickle. The mighty Krupp Works at Essen were rendered inoperative long before their eventual demolition, by a single, well-placed bomb that broke the water main beyond reasonable repair under wartime conditions. At Coventry the fire damage was largely attributable to the severing of a water artery and subsequent lack of fire-fighting streams.

Water Supply as a Business

Perhaps one of the most striking illustrations of the magnitude of the water works business of today is contained in a summary of facts recently given out by Mr. Leonard N. Thompson of St. Paul, Minn., President of the American Water Works Association. This summary was as follows:

(All these facts refer to the United States)

Investment in water works — Four billion dollars

Annual revenue — Four hundred fifty million dollars

Persons supplied by public water supply — Eighty-five million

Persons employed — Sixty thousand

Gross output of water — Thirty-three million tons per day

In three days, the output of water equals the annual tonnage output of steel.

In eight days, it equals the annual tonnage output of all agriculture.

In twenty-seven days, it equals the annual tonnage output of all coal mined.

Water is used far more generously in this country than anywhere else in the world. As a general average, the per capita consumption in the United States is around 100 gallons per day. In Europe it is generally less than half this quantity.

New Jersey is comparable to the rest of the country in its water business and requirements. As a result it has

experienced the same need for careful planning of its future with respect to water supply that applies to the requirements for any other utility or similar business.

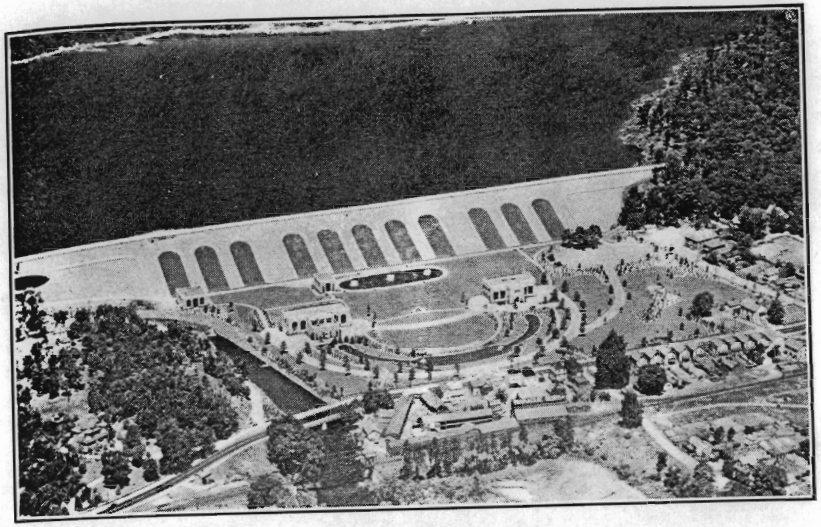
This report deals with some of the various difficulties that have been involved in such developments in New Jersey, particularly that section generally referred to as the northeastern metropolitan area.

Early History in New Jersey

When the early settlers arrived in New Jersey, they established their homes for the most part along the Hudson and Delaware rivers and tributaries where suitable land could be found adjacent to sheltered harbors. Later when they established industries, water power and the sites along the rivers, particularly where sufficient fall existed to permit large development of such power, became of prime importance.

For many years, in spite of the rapid increase in population, these same rivers or local streams and wells, were depended upon for drinking water. New York City set the stage for remote upland supplies of water by bringing into use the first Croton aqueduct in 1842. Newark, Jersey City and Paterson all took steps within the next few years to improve their own sources. Gradually, waters near these cities became polluted and after the Civil War there was a definte trend toward more remote locations for water. This was greatly accelerated by some disastrous epidemics of water-borne typhoid fever. By 1905 most of the larger supplies in northeastern New Jersey were from upland or filtered sources.

During the last quarter of the nineteenth century and the early years of the present century, many efforts were made to bring about consolidated action for future water supplies under state guidance and control. All of these fell short of their mark and the result of one of these failures was the recognition by the City of Newark and others that



Aerial View of Wanaque Headworks, Raymond Dam and Wanaque Reservoir.

a regional agency would stand a better chance of success. Accordingly, the State was divided into the North and South Jersey water supply districts.

The North Jersey District Water Supply Commission was created and formed under Chapter 70 and 71, P. L. 1916 of the State of New Jersey. The purpose of these Acts of Legislature was to provide for obtaining, constructing and operating water supplies by the Commission, as agent of and by contract with municipal or other corporations in the District.

Under these Acts, and amendments and supplements thereto, the North Jersey District Water Supply Commission completed and has for 16 years operated the Wanaque Water Supply System, largest in New Jersey — an outstanding example of a cooperative project benefiting the participating municipalities and their customers.

Reports were issued for the years 1925 to 1938, inclusive, but have been omitted since then on advice of the War Department. The necessity for withholding much of the information available in such reports has been obviat-

ed by the cessation of the War and this report has been prepared in answer to the many requests for a continuation of publication.

Wanaque as the First Cooperative Water Project

Possibilities of the use of the Wanaque River as a source of water supply was recognized as early as 1879 in a report to the City of Newark. The Pequannock and Rockaway rivers were also studied and supplies thereon were established in 1892 and 1904, respectively. Efforts to crystallize further action had been made by the State Water Supply Commission of 1882 and the State Water Supply Commission of 1907. Failures in both these attempts led, as mentioned before, to the eventual formation of the North Jersey District Water Supply Commission.

Application was made to the Department of Conservation and Development in 1916 for permission to divert 50 million gallons per day from the Wanaque River as a new water supply for Newark, Paterson and other municipalities. The first contract, with Newark, was signed October 31, 1918.

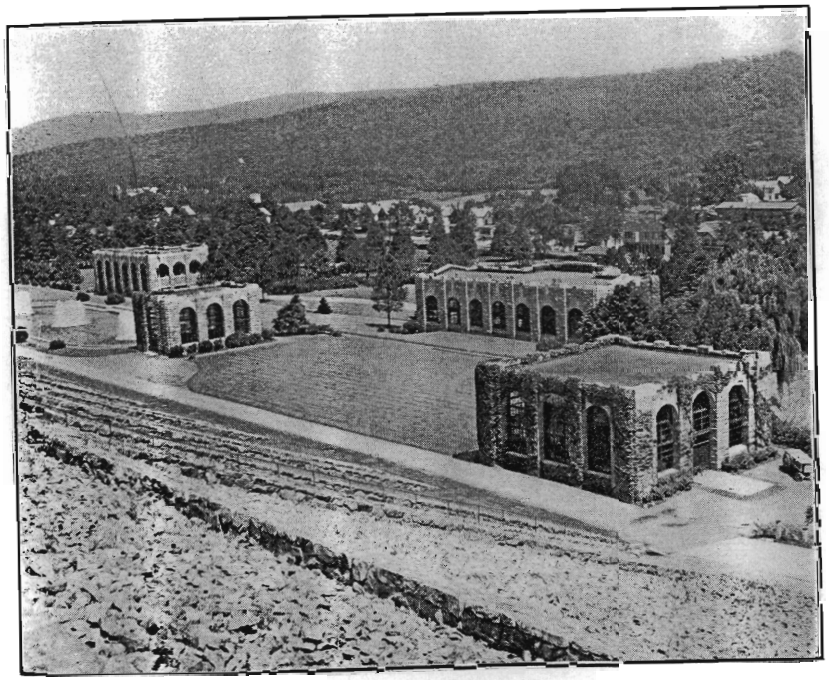
Construction started in 1920 but the needs of other municipalities necessitated enlargement of the plan to the full development of the Wanaque River. A new grant was obtained and the final allotments in terms of percentage output were as follows:

Newark	40.5	Clifton	6.75
Paterson	20.	Montclair	5.
Kearny	12.	Bloomfield	4.
Passaic	11.	Glen Ridge	0.75

Description of Wanaque Project

This system was brought into being by construction of a dam across the Wanaque River in Wanaque. Pertinent information regarding the supply is contained in the following tabulation:

Elevation of water surface (full) above sea-level	300.3
Elevation of water surface with flashboards	302.
Capacity of reservoir (at Elevation 302)	29,000 mil. gals.
Area of water surface	2,310 acres
Length of Reservoir	6.6 miles
Greatest width	1.2 miles
Average width	½ mile
Greatest depth	90 feet
Average depth	37 feet
Length of main dam	1,500 feet
Type of main dam: Earth fill (with concrete corewall to bed-rock) containing	1,000,000 cu. yds.
Area owned	5,700 acres
Length of shore line	30 miles
Watershed area	94.4 sq. mi.
Length of Aqueduct	21 miles
Size of aqueduct	14 miles of twin 74-inch mains 2 miles of 7 foot tunnel 5 miles of single 74-inch main



Wanaque Headworks.

Operation of Wanaque System

Official turning on of water occurred on March 20, 1930. Not all of the participants were able to connect immediately and as a result full use of the system did not occur for more than two years. The effect of the depression was markedly noticeable during the first few years of operation. Business recovery exerted a pronounced influence and as a result the system has been operating at or above its ultimate safe yield for some time. Figure I shows graphically the use of Wanaque water.

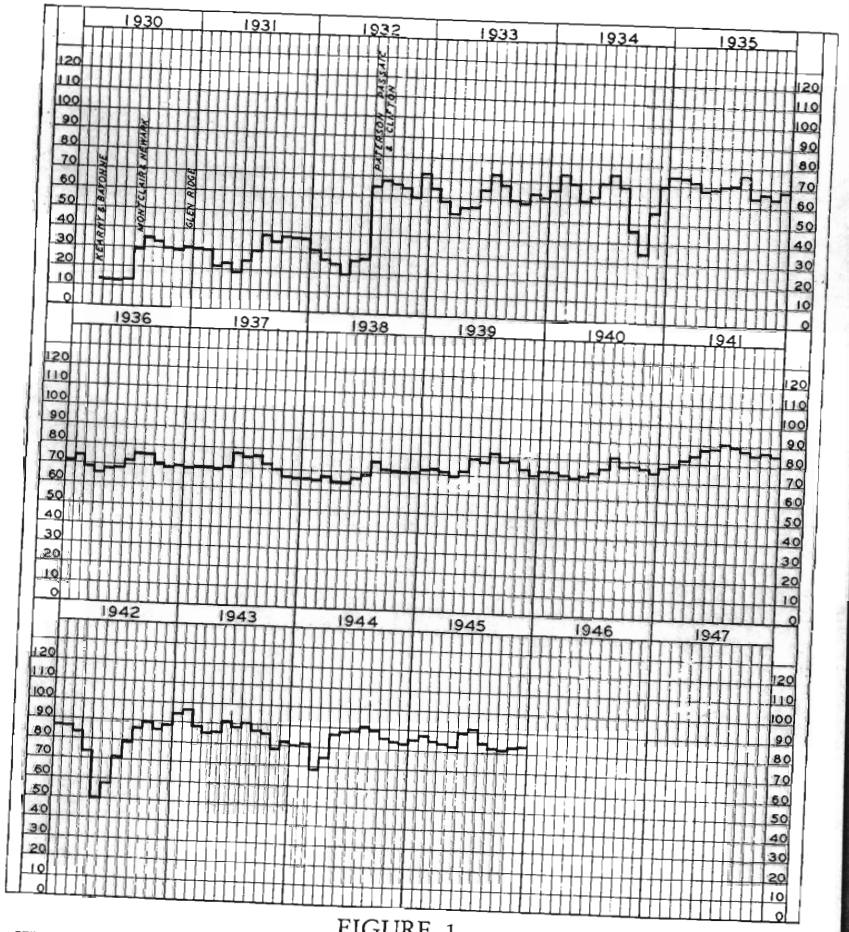


FIGURE 1
Water delivered from Wanaque Supply since Beginning of Operation March 20, 1930 to December 31, 1945

Wanaque River — Main Feeder to Wanaque Reservoir; Typical of Streams in this Area.

In Figure II there is shown the storage in the reservoir over this same period of operation. It is important to note that had the dry period of 1929 to 1932 been encountered during the last few years, it would have been necessary to curtail the use of Wanaque water and thereby reduce the output of many important war industries.

Sales of Wanaque water to other municipalities that are not participants in the project have included those by the participants and those by the Commission. The value of such transactions has totalled over $9,000,000 during the period of operation of which about half was received by the participants and half by the Commission. This latter portion has been redistributed to the participants after deducting rental assessments, excess diversion charges and other items. Operation expenses of the Wana-

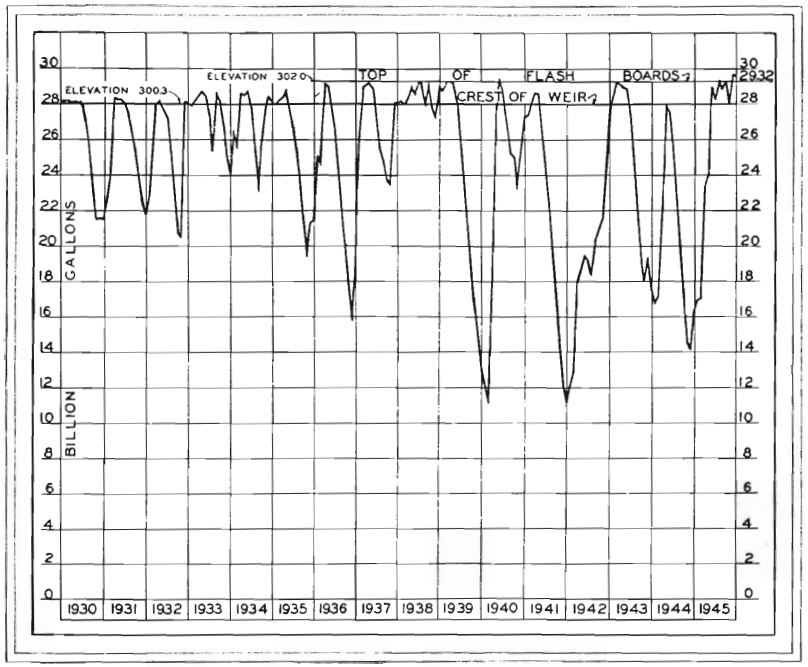


FIGURE II
Water in Storage in Wanaque Reservoir since Beginning of Operation
March 20, 1930 to December 31, 1945

que project for the same period have totalled about $4,600,000.

Figure III shows the area furnished with water from the Wanaque supply.

Need for Water

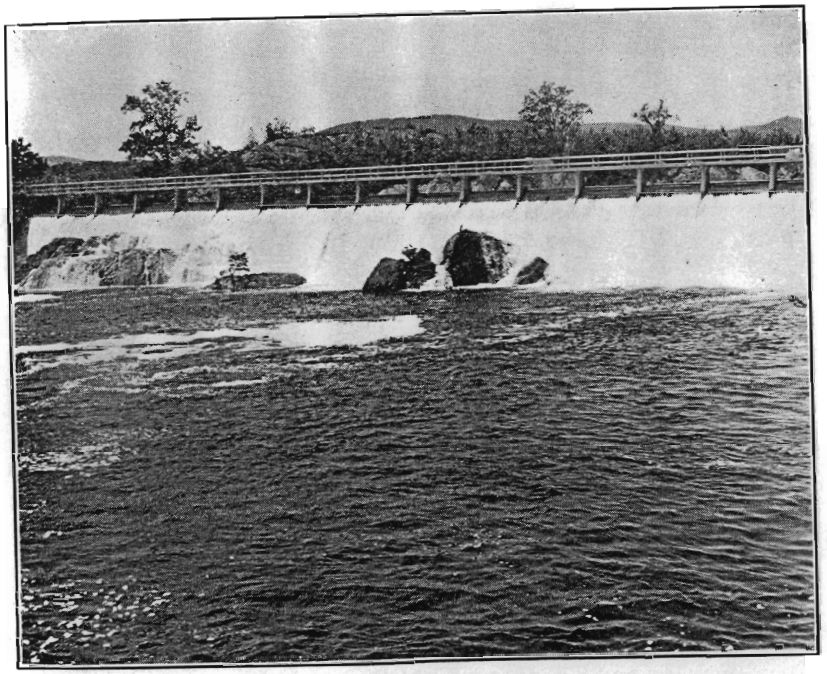
Variations in the use of water in the North Jersey District have followed a pattern similar to that of other utility uses. During the twenties a number of predictions were made, based on the rate of increase then taking place. Most of these were reasonably correct up to the year 1930. Beyond that they failed, just as predictions failed in almost all lines of endeavor.

It became apparent to everyone connected with the water business that the dormant situation of the thirties

could not continue indefinitely. Actually many water supply men were simply living in a fool's paradise insofar as water reserves were concerned.

Those closely connected with the situation made predictions that the capabilities of existing sources would be reached by 1943 if an extremely dry period should occur. The reasonableness of this prediction has been amply sustained by subsequent events.

It may be all very well to say that peak demands of wartime activity were met and that no such peaks will ever occur again. No one denies that part of the increase during the War was caused by somewhat wasteful use. A slight decrease has occurred since the War terminated. A severe drop was anticipated, but peace-time expansion has taken up most of the slack. When full production is resumed, new peaks in water consumption will probably



Spillway of Wanaque Reservoir with Flashboards in place.

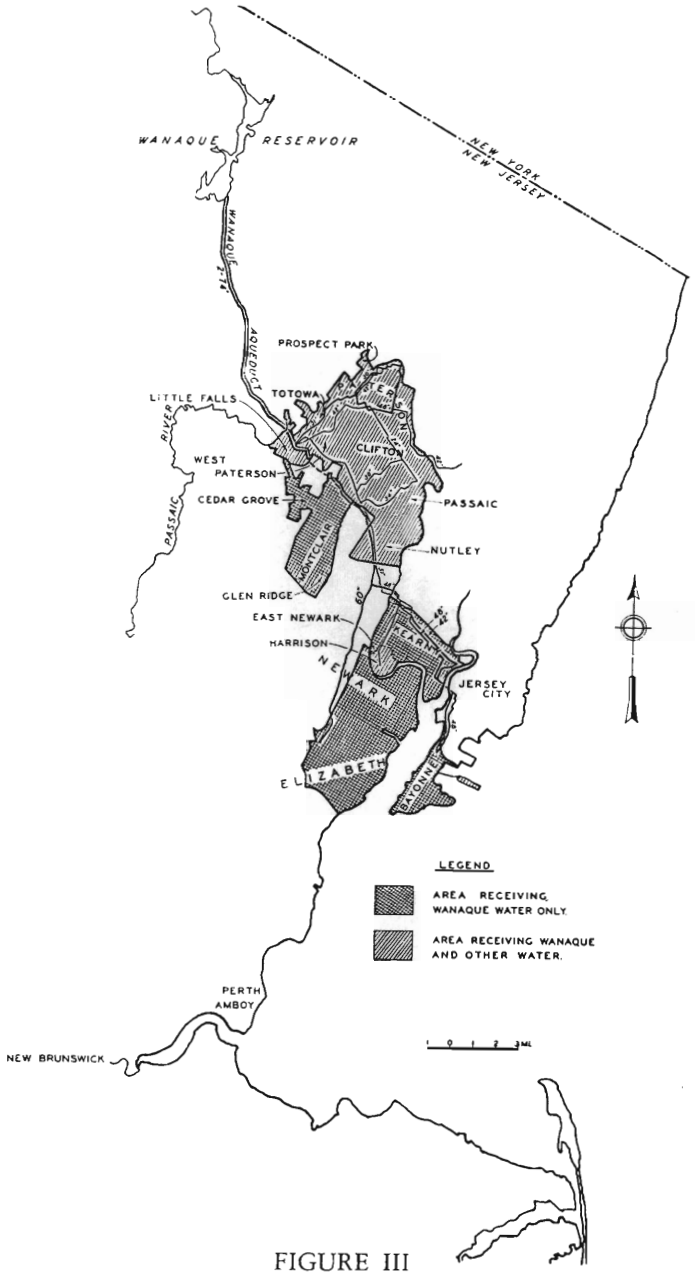


FIGURE III

Area furnished with water from Wanaque Supply.

Note: Substantial parts of Newark and Elizabeth receive other waters, and some small areas not shown on this map receive varying quantities of Wanaque water.

be reached. It may be well to note that the northeastern section of New Jersey is one of the most densely populated manufacturing areas in this country or in the world. It has one of the greatest varieties of industries and particularly those of a chemical or similar nature that require large volumes of water. Almost every major industry in the country has one or more plants located here. There must be ample reserve supply if New Jersey is to maintain its position in the front rank as an industrial state.

A parallel case exists in the business of supplying electricity. Use of power has varied in much the same manner as that of water. The Public Service Electric and Gas Company has had to strain every effort to meet the demand for power—and has succeeded. During the latter part of the War, that Company made application to the authorities in Washington for permission to install a new generating station, reported to have a capacity of 100,000 K. W. It is understood that this plan is to be fulfilled. Certainly this would not be the case if the Company believed that New Jersey is to become a deserted village in the post-war period.

Water supply can be likened to a bank account. The more one has in reserve, the better he feels. Drawing an account down to the last cent is not good business. The same applies, in still greater degree, to water reserves, as additional resources cannot be built up overnight. Experience has shown that a period of fifteen years usually intervenes between the initial discussion and completion of a water project. Therefore we must always look fifteen years ahead in our planning to determine future needs.

The Program

This should be divided into two parts. The first would be the reasonable enlargement of existing supplies. One of the foremost of these plans would be the expansion of the Wanaque system by diversion of the flood waters of the Ramapo River at Pompton Lakes and thus increasing the yield of the Wanaque up to about 110 million gallons per

day instead of the 85 million gallons per day which is about all that can be counted on in a real dry period.

The City of Newark may increase its Pequannock supply by constructing additional storage. Jersey City may do the same with its Rockaway supply. The Passaic Valley Water Commission may supplement its yield from the Passaic River by constructing the so-called Pancake Hollow Reservoir.

All of these are primarily aids to the area north of Union County. It is believed by this Commission that additional sources will eventually be needed in the counties of Union, Middlesex and possibly Somerset.

To meet these demands it is suggested that the Dock Watch Hollow area be purchased and dedicated as a future reservoir site. In the meantime, it can be used as a State Park. Arrangements should be made to pay taxes on the property just as if a private party had actually taken title to the land. If and when sufficient applications for additional water are made, the development could be carried out by this Commission as at present permitted under existing statutes. Unless this is done, the area will probably develop to the point where land values will become prohibitive. The Commission realizes that this proposal may be regarded as being too visionary, but believes it embodies only prudent foresight.

Origin of Dock Watch Hollow Reservoir Proposal

As is true in many instances, the date of the first realization of the possibilities of use of Dock Watch Hollow as a reservoir site is rather obscure. During the first World War, the Bound Brook Water Company experienced considerable difficulty in furnishing water to its customers. This condition continued to be aggravated as the community grew.

As a result, the consulting engineer for the Water Company, Mr. Clyde Potts, made an exhaustive study of the methods by which the supply could be increased. These

investigations included a careful review of all reservoir sites in the vicinity, of which Dock Watch Hollow was one. These efforts were observed by Mr. Berkeley W. Moore, later a member of North Jersey District Water Supply Commission, who brought these facts before the Commission during the period from 1923 to 1931.

The North Jersey District Water Supply Commisssion concluded that the Chimney Rock site, at the lower end of the valley, was better adapted for a large water development than any other in the vicinity. Some consideration was given, however, to an auxiliary high-level supply with Dock Watch Hollow as the reservoir for this purpose. Estimates of cost showed that the combination was not particularly economical.

In 1938, Governor A. Harry Moore advocated use of Dock Watch Hollow as an impounding reservoir for the proposed supply from the Delaware and Raritan Canal. The first plan contemplated only a partial development of the area, but with provisions for ultimately increasing the storage to full development. Later it was advised that all the capacity of the area be used, with a flow line at elevation 460. All of these facts were well known to many engineers and others.

Dock Watch Hollow is an excellent reservoir site. It has a dam site in a deep ravine cut through a massive trap rock formation. The side slopes of the valley are reasonably steep and the great depth would form an admirable basin in which the water could attain the low temperature so desirable to insure its palatability. Because of the almost negligible watershed area, all water must be delivered to the reservoir from an outside source.

Diversions to Dock Watch Hollow Reservoir

When Governor Walter E. Edge announced his intention of attempting to adequately solve the water problem of the State, a number of solutions were studied by him. Among these was a modest plan submitted by North Jersey District Water Supply Commission proposing use of

Dock Watch Hollow Reservoir with several possible methods of obtaining a supply. Proposals to fill the reservoir have included pumping from the Chimney Rock Reservoir, from the Delaware and Raritan Canal, from the Passaic River, from the North Branch, and from the lower Raritan River, and a gravity supply from the South Branch.

Estimates of cost of pumping from Chimney Rock Reservoir were made by this Commission shortly after the Chimney Rock Report of 1930 had been completed. Costs of water obtained by this method were high because of the fact that a dual pipe line would have to be laid to the point of delivery and the need of such high-level water merely for the benefit of additional pressure did not appear justified.

The plan advanced by Governor Moore in 1938 suggested pumping water from the Delaware and Raritan Canal into this basin. The plan was feasible just so long as the Canal was available. When, in 1944, legislation was passed dedicating the Canal to use as an industrial water supply, the situation changed and other means had to be found to fill the reservoir.

In 1923 a report was made to the City of Elizabeth by the late Weston E. Fuller, suggesting use of the Stony Brook Reservoir (just north of Plainfield) with water to be supplied from the Passaic River, a short distance away, during flood periods. This required pumping, but the lift was not great. In 1925 the North Jersey District Water Supply Commission submitted a further detailed report to the City of Elizabeth on this same project.

Feasibility of such pumping has long been recognized and the concept of transferring the pump location to a point just a short distance upstream was a natural one. The force main would be similar in length to the one mentioned in the preceding paragraph, but would deliver into Dock Watch Hollow instead of Stony Brook Reservoir. The point of diversion would be at the confluence of the Dead River and Passaic River.

The possibility of diverting water from the North Branch and Lamington rivers at Burnt Mills was recognized many years ago and was considered by the Commission as a possible location for pumping water into the Chimney Rock Reservoir. It was not seriously promoted at that time, however, because of the then prevailing idea of only seeking gravity sources. When Dock Watch Hollow came into greater prominence as a reservoir site, the value of the Burnt Mills pumping station was again pointed out, particularly in view of the difficulty of using Dock Watch Hollow without some pumping.

In one of the reviews of additional supply made by the Commission more than 20 years ago, the so-called Upper Pleasant Valley Reservoir on the North Branch was studied. This was a high-level reservoir and one method of delivering water into it by gravity was by a diversion aqueduct running from a point on the South Branch of the Raritan River near Middle Valley. A slight change in direction and some additional length on the easterly end was all that was necessary to convert that line from use with the Upper Pleasant Valley Reservoir to use with Dock Watch Hollow. This plan was studied several years ago and was included in proposed legislation (Senate Bill 157) prepared for the Legislature at the last session, as were the other two diversions previously described herein.

Opposition from Somerset County

It is only natural that the dislocation of residents of any proposed reservoir site will cause a certain amount of disturbance. Sentiment attached to a home cannot be compensated for by any payment in dollars. Experience has shown, however, that not only do owners get a fair and just price for their holdings but that in many instances they are able to obtain better locations at no greater cost.

The argument against the loss of tax revenues can scarcely be supported because in most instances the tax levies paid by a water supply are greater than those of the original owners. Roads are always made better and

straightened, grades are reduced and scenery is beautified. In the case of the Wanaque Reservoir, many sales of property have been expedited by the fact that the adjacent property is held for reservoir purposes and will never be sold. In fact, the value of adjoining property has been greatly enhanced by this very situation. In the long run, values in such an area become greater than they ever could without such development and the ultimate tax receipts are increased rather than reduced.

One viewpoint that has been expressed is that all additional water needed in the future in this area could be taken from the lower Raritan River basin without storage. Such a diversion is now being made by the Elizabethtown Water Company and the water is being transmitted to users without storage or with minor storage. The present diversion constitutes a large portion of the dry-weather flow of the River and any further diversion is certain to cause serious objection from downstream owners unless sufficient storage is provided to obviate the necessity for taking water during dry periods.

Actually the Dock Watch Hollow area is an ideal reservoir site even though its features are not quite all that could be desired from the standpoint of elevation and capacity. Storage of water in a deep reservoir of this type will remove the most serious objections to river water, namely those that occur with high temperature. An important point favoring a reservoir such as this is the proximity of a large storage basin to the terminus of the Newark-Elizabeth 60-inch pipe line. A tie-in of two large systems at this point will aid materially in the routing of water in the future and will protect users against shortage of supply caused by breakdown of existing facilities.

Objections from Morris County

These are predicated largely on the belief that construction of a new reservoir will affect the level of lakes. It is true that Lake Hopatcong was affected when the

Morris Canal was in use. It has not been affected since. The owners there have never enjoyed such security as they now have under state control.

North Jersey District Water Supply Commission has Greenwood Lake, another former feeder for the Morris Canal, in its back-yard. Nevertheless, the owners there have never suffered in the slightest during the 15 years of operation of the Wanaque system. The bugaboo of effect on lake properties is not only dispelled but in fact such properties in the vicinity of Wanaque Reservoir have actually been enhanced in value by the very presence of a scenic improvement.

Right now a real estate development company, having purchased a large tract adjacent to Commission property, has made a point of seeking to be reassured that Commission property will not be sold, as they wish to take advantage of the value of having an undisturbed neighborhood.

Rather than continue to invite opposition from this direction it would be preferable to eliminate the idea of obtaining gravity water from the South Branch and to dedicate the third step in the Dock Watch Hollow plan to diversion from the lower Raritan River at or near Somerville. It is believed that such diversion will not be needed for a generation or more and the outlook then may be such as to preclude consideration of either of these methods.

Round Valley Project

An extremely interesting geological phenomenon is the Cushetunk Mountain which is shaped like a horseshoe that has been almost bent together at the open end. It encloses Round Valley which for years has been recognized as a possible reservoir site.

One of the first major efforts to promote this site for a reservoir was made by the late Frank Bergen in a speech on water needs in North Jersey given before the New Jersey Sanitary Association at Lakewood, N. J., on December 3, 1920. Representatives of this Commission were present

and noted that the speech did not stir any large sympathetic concurrence of viewpoint. After proposing Round Valley, with an intake located at Califon on the South Branch, a flow line elevation of about 350 and capacity of 94 billion gallons, Mr. Bergen said

> "This suggestion may be worth considering some time in the future, but for the present I think it would be better to confine our attention to the necessities of our own time and let later generations struggle with their own problems. It is gratifying, however, to know that there is plenty of water in North Jersey for many generations to come without drawing on the Musconetcong or Delaware Rivers." . . . . "Notwithstanding the dismal outlook, we must have more water, even if we are compelled to wade through a sea of troubles to obtain it, but important and urgent as this matter is, I think that those who have the power to move at all should proceed no faster with the work of construction in these costly times than is strictly necessary to keep out of danger. But there is a great deal of preliminary work that should be done as soon as possible."

In a meeting held at Somerville on January 28, 1928, Mr. Bergen made a statement on the Chimney Rock project, reiterated his advocacy of the Round Valley proposal, and added the following statement:

> "Probably about 45,000,000 gallons a day could be obtained by gravity, which would relieve the situation for a few years. When more water shall be needed, it would cost less to pump it into the reservoir than the interest on the cost of constructing conduits and driving tunnels by gravity from streams beyond the mountains. In the distant future I suppose it will be necessary for the towns in northern New Jersey to tap additional sources in the northwestern part of the state, such as the Musconetcong river, and, ultimately, the Delaware river, but we need not concern ourselves with that matter now. The reservoir at Round Valley would fit in very well with any larger development of sources further west or northwest that may be necessary in the future.
>
> "We are all interested in the development and welfare of New Jersey, no matter in what part of the state we may live, and should not lose sight of the fact, nor fail to realize, that the cities and towns in the counties I mentioned at the beginning of my remarks must soon obtain an adequate supply of water or cease to grow."

The North Jersey District Water Supply Commission, having considered the Round Valley site on several occasions in the past, studied its possibilities at great length in 1929 and concluded that while it offered many distinct advantages, its greater distance from the centers of population overbalanced its inherent value. In the thirties, when there was possibility of Federal funds for part of the work, the Commission made further estimates of cost and entertained the suggestion that the site be developed and used as a state park until it would be needed as a reservoir. The great length of transmission line required, however, acted as a deterrent unless and until such a high use could be guaranteed as to warrant a large expenditure of funds.

Selection of Project

Projects that have had much attention in more recent years have been the Chimney Rock, the Bunnvale, and the Delaware and Raritan Canal. All of these visualized the need for about 150 million gallons daily. On the basis of full usage all of these plans were reasonable in cost. Furthermore, while they have certain advantages and disadvantages, each would result in a project that could be amply justified from a purely engineering standpoint.

The principal drawback in each case is the large initial investment required and the relatively high cost of water that would ensue during the period before full use. While it would be possible to create a certain type of stage development in each instance, the fundamental concepts are such that the value of partial development cannot be fully realized.

The Dock Watch Hollow project, as outlined previously in this report, is, in modern parlance, streamlined precisely in order to attain the goal of reasonable stage development. The cost is modest and the entire plan is devised for flexibility of expansion if and when needed. Engineering opinion generally substantiates the plan. Evidence of this exists in the report of the State Water Policy Commission dated February 5, 1945.

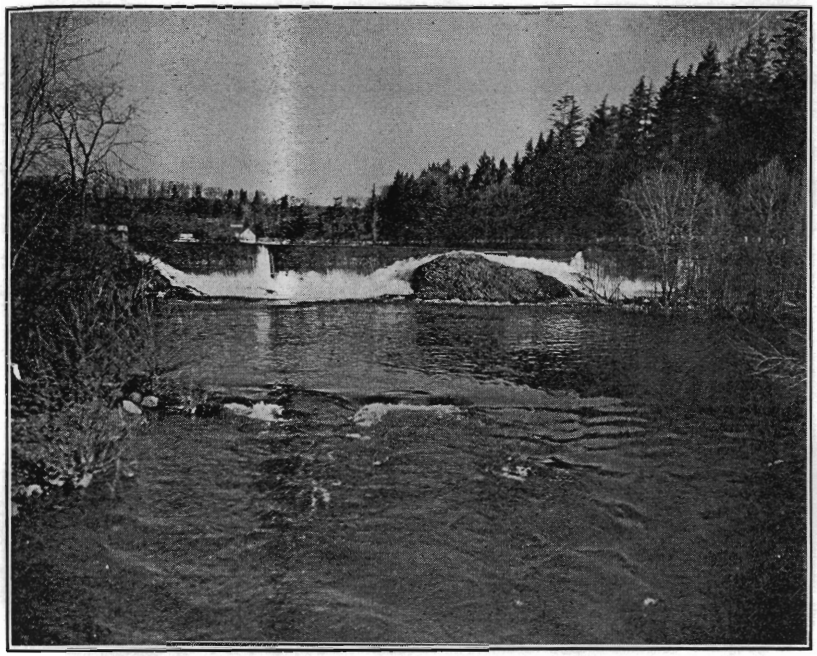
Ramapo Project

Development of the Ramapo River as a source of water supply is by no means a new idea. Its possibilities have been known for more than half a century. Probably the application for use of the Ramapo by Bayonne a quarter of a century ago was the first determined effort to utilize this source, although consideration had been given by New York to divert water from the upper reaches of this stream in 1883.

The City of Bayonne obtained a grant to divert 50 million gallons per day from the Ramapo on March 23, 1922. In September 1923 the Court of Errors and Appeals disallowed the grant. Thereafter the North Jersey District Water Supply Commission made some studies of the possibility of diverting water from the Ramapo River into Wanaque system by direct introduction into the gravity aqueduct that was then planned.

Later, when decision was made to construct a pressure aqueduct, it became obvious that water from the Ramapo would have to be pumped in order to attain sufficient pressure to enter the Wanaque system. Direct delivery into the aqueduct would have certain fundamental objections, largely because of variations in pressure, velocity, temperature and quality that would ensue. For this reason, it became obvious that the most desirable method would be to deliver water to the Wanaque Reservoir at a suitable location and to draw the increased quantity directly from the normal intake. Governor Edge reviewed these various phases and concluded that such a development had merit. As a result he advocated legislation which would permit this Commission to obtain funds to start a study of this project and to obtain the necessary rights-of-way if the plan is favorably considered by interested municipalities. This legislation was enacted in 1945.

It is proposed to locate a pumping station at or near the Pompton Lakes dam and to draw water from that point only during the periods when flow from the 160 square miles of watershed is sufficient to permit diversion



Dam at Pompton Lakes. Proposed diversion at this point would have little effect on volume of overflow.

without any great effect on downstream users. Tentatively a total pump capacity of 100 million gallons per day would be used depending on the flow of the stream. Records show that such a diversion can readily be made during a considerable portion of each year and the water can be stored in Wanaque Reservoir for withdrawal as needed. Such a method would not affect the present use of Pompton Lakes, particularly since most of the diversion would necessarily take place during the cold months when the waters are not being used for recreational purposes. The diversion plan provides for maintaining the level of the Lake.

The most advantageous location for the pumping station is that of the dismantled power station, presently maintained by the Jersey Central Power and Light Company as a storage site, but which is to be abandoned.

It is estimated that the cost of this work will be $3,000,000, for which an additional 25 million gallons per day can be assured. This is by far the most economical method of obtaining a supply of this magnitude even if pumping costs are capitalized and added to the initial investment. By comparison, a development at Dock Watch Hollow would cost $15,000,000 for the initial stage of 25 million gallons per day, but the cost per million gallons daily would reduce as other stages were added. It should be pointed out, however, that the Ramapo supply would take advantage of the existing Wanaque Reservoir and pipe line and that any other municipality desiring to become a participant for say 10 million gallons per day would have to pay considerably more than ten twenty-fifths of the cost of the Ramapo adjunct in order to reimburse other participants for the share of the existing facilities which they now own. This, of course, would constitute a rebate to those participants which have invested money in the Wanaque project and should benefit by any returns that might be forthcoming.

Original Wanaque Pipe Lines before covering with earth. Diameter of each is 74 inches. New line of about equal size would parallel these for three miles.

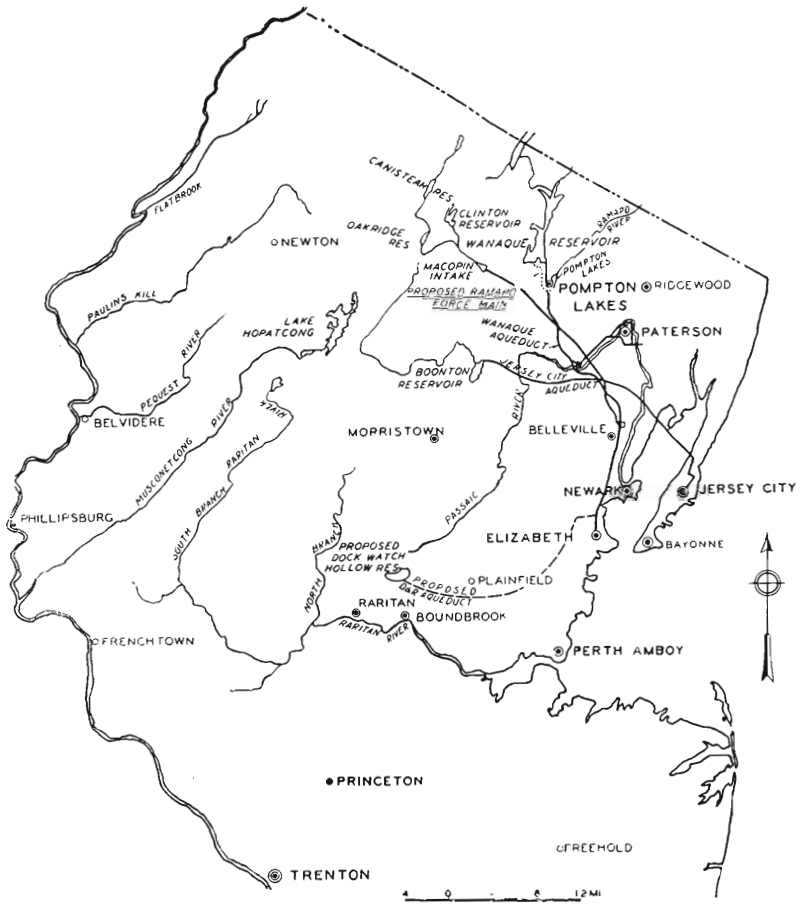


FIGURE IV

Existing and Proposed Water Supply Developments in Northeastern New Jersey

Another important point is the fact that construction of this system can be consummated in the shortest time of any proposed plan of similar volume because of both the nature and location of the work.

Figure IV gives an outline of existing and proposed water supply developments in northeastern New Jersey.

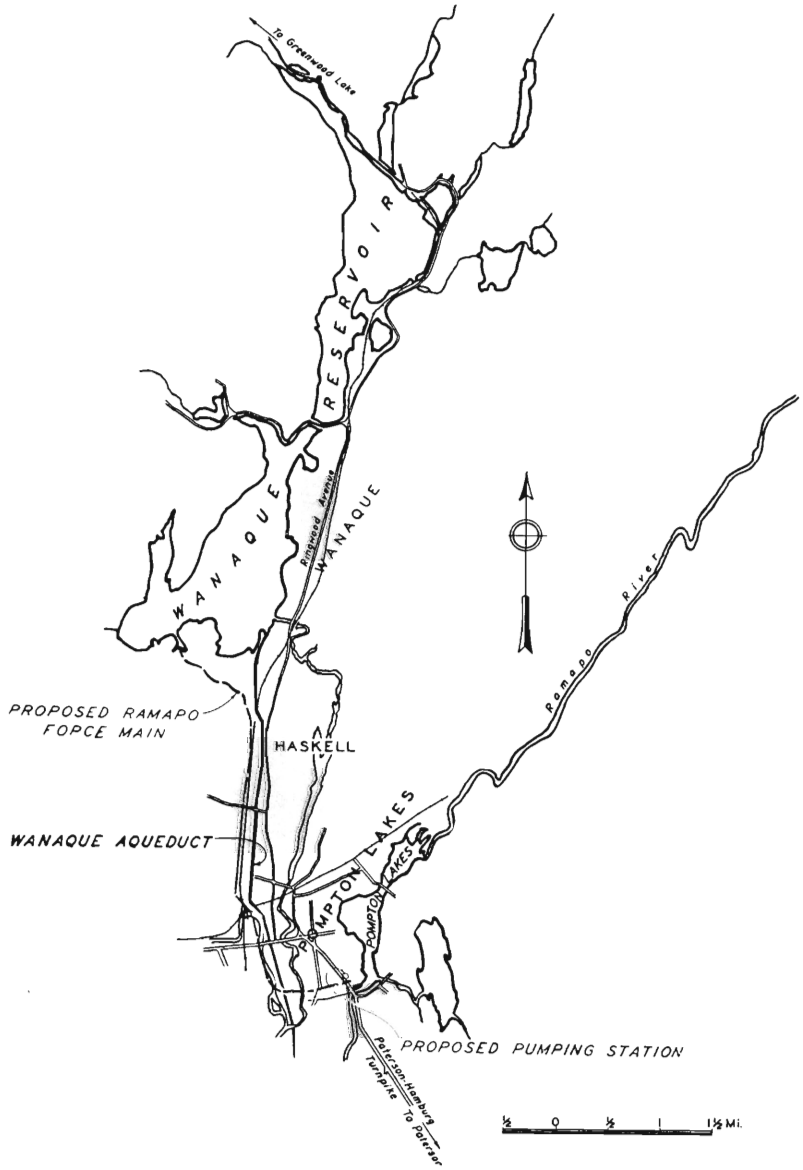


FIGURE V

Location of Proposed Development of Additional Supply from Ramapo River

Figure V shows a more detailed location of the proposed development of an additional supply from the Ramapo River as an adjunct to the existing Wanaque supply.

Progress and Policy

With a view to fulfilling its obligations to the municipalities for which it operates the Wanaque system, and to prepare for applications which may be filed, the North Jersey District Water Supply Commission has recently received a loan from the Federal Works Agency of funds for advance planning. In such an undertaking the Federal Government and the Commission share nearly equally in the cost of preparing plans for such work.

Preliminary surveys have been nearly completed and a tentative pipe line route has been selected. Charts and data are being prepared showing the effect on the Ramapo River of diverting water therefrom and these will be submitted with an application to the State of New Jersey for the right to divert such water. It is anticipated that this application will be made shortly and that as soon as a decision has been reached, the remainder of the planning program will be effectuated.

This program is one of the first, if not the first, major post-war water supply expansion projects to be actively considered in this area. If water needs in the metropolitan zone follow the anticipated pattern it will only be a relatively few years before the slack of existing supplies, and this addition as well, have been absorbed. The margin of safety is not at present sufficient and the proposed expenditure for the Ramapo Project is not considered a large one. To this end every effort will be made to assure the inhabitants of this area an adequate supply of water at a reasonable cost.

At the present time no financial arrangements have been completed for construction of this project. It will necessarily depend upon participation by municipalities

or grants from the State or Federal governments. This Commission has no power to borrow in its own right. It is hoped that more municipalities will eventually recognize the merit of permanent ownership rather than temporary contracts. Public ownership assures the most economical administration of this vital utility. This is the policy to which this Commission is dedicated both by direction of the Legislature and by spirit.