
INFRASTRUCTURE
REPLACEMENT PLAN
2001–2020
Providence
Water

PROVIDENCE WATER SUPPLY BOARD

INFRASTRUCTURE REPLACEMENT PLAN
For Fiscal Years 2001 Through 2020

Prepared In-House by the
Project Development Team of

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Chief Engineer and General Manager
Robert J. Kilduff, P.E., ESQ.

MARCH 2001

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EXECUTIVE SUMMARY

Providence Water

March 30, 2001

Patricia A. Nolan, M.D., M.P.H.
Director of Health
R. I. Department of Health
3 Capitol Hill
Providence, Rhode Island 02908

Dear Dr. Nolan:

Providence Water is submitting six (6) copies of its Infrastructure Replacement Plan consistent with the requirements of The Comprehensive Clean Water Infrastructure Act of 1993 in accordance with Chapter 46-15.6 of the General Laws of the State of Rhode Island and the appropriate rules and regulations pertaining to the Act.

The overall intent of the plan is to replace aging facilities and components of the water system before they fail or before frequent repairs jeopardize the reliability of water service, placing the public's health and welfare at risk. Funding for the plan will come from revenues annually set aside in a restricted account.

Our report is intended to present the accomplishments to date, to address funding requirements to meet the objectives of the Act, and to submit a plan which will lead to the continued delivery of a reliable water supply for fire suppression and healthy drinking water for the enjoyment of our customers throughout our service area.

On November 8, 2000 we advised you that we were in the process of finalizing our assessment of our IFR needs to be incorporated into our twenty (20) year submission. We have completed the plan and have matched the first years of expenditures in agreement with the funding authorized by the Public Utilities Commission as part of our general rate filing for Docket 3163.

The implementation of the work is well under way. Since submitting our report in 1996, we have made substantial improvements to our facilities, having invested approximately $52.2 million into our treatment plant, storage reservoirs, pump stations, dams, and transmission and distribution system. Since 1990 we have invested a total of $70 million into needed improvements. Included in this plan document is a status report of our accomplishments for the period July 1996 through June 2000 under the first five years of our previously submitted IFR plan.

Our plan was prepared entirely by our in-house staff and reflects our best determination at this time of our anticipated system needs. The plan is, however, of course subject to adjustments as may become necessary as the result of changes in rates of deterioration, obsolescence, regulatory requirements or unforeseen events which cannot reliably be predicted over a 20-year period.

Respectfully yours,
PROVIDENCE WATER SUPPLY BOARD

Robert J. Kilduff

Robert J. Kilduff, P. E., ESQ.
General Manager and Chief Engineer

EXHIBIT 7

PROVIDENCE WATER

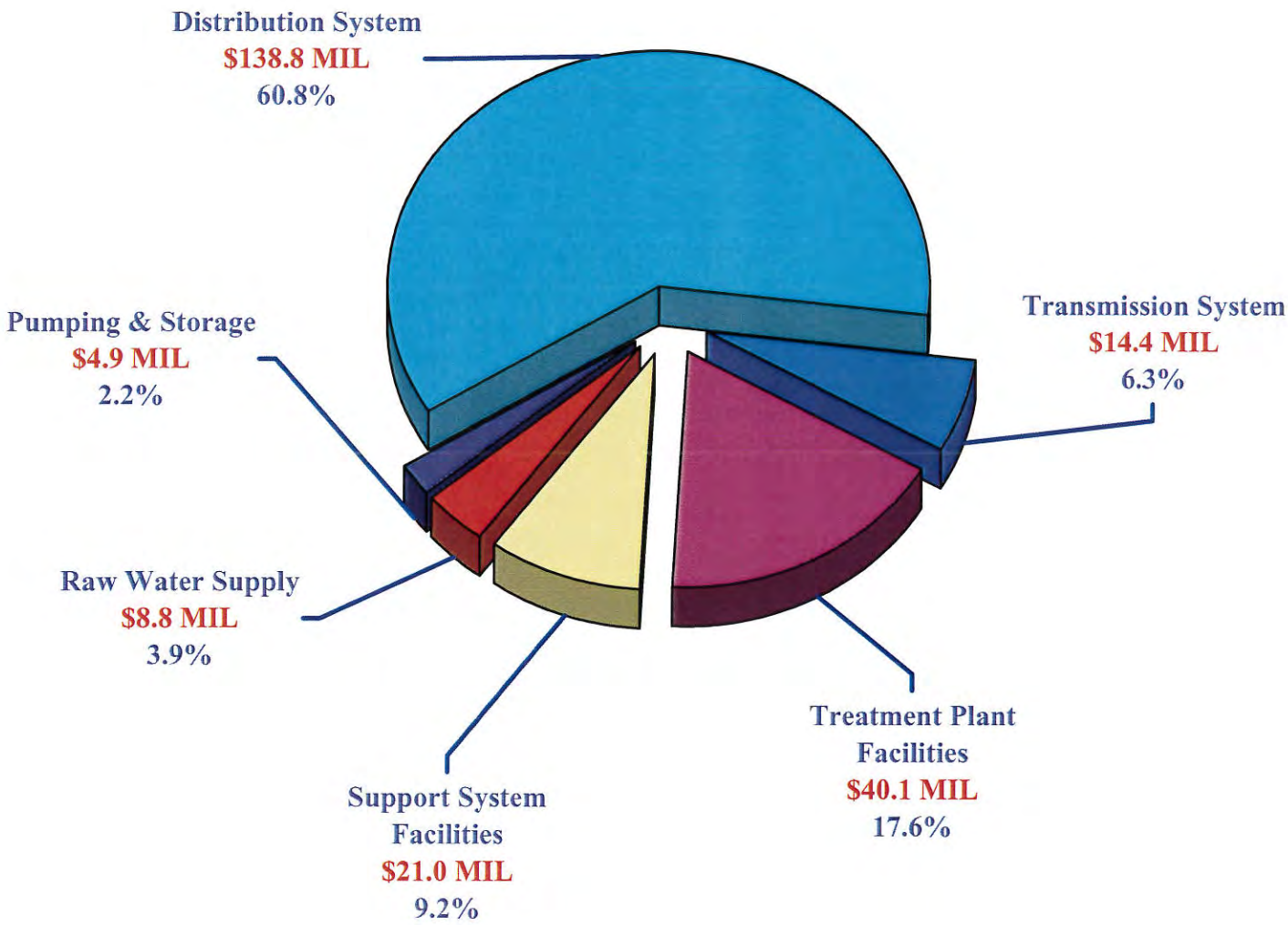
20 Year IFR Expenditure Plan

Fiscal Years 2001 to 2020

Project Description	Total Amount	Fiscal Years 2001 - 2005	Fiscal Years 2006 - 2010	Fiscal Years 2011 - 2015	Fiscal Years 2016 - 2020
Raw Water Supply	**8,800,000**	6,050,000	1,250,000	750,000	750,000
Treatment Plant Facilities	**40,100,000**	22,660,000	13,580,000	950,000	2,910,000
Transmission System	**14,430,000**	9,030,000	1,700,000	1,600,000	2,100,000
Distribution System	**138,740,000**	11,650,000	35,420,000	39,330,000	52,340,000
Pumping and Storage	**4,920,000**	3,910,000	410,000	300,000	300,000
Support System Facilities	**20,980,000**	1,040,000	1,240,000	16,900,000	1,800,000
	$227,970,000	**$54,340,000**	**$53,600,000**	**$59,830,000**	**$60,200,000**

EXHIBIT 8
PROVIDENCE WATER

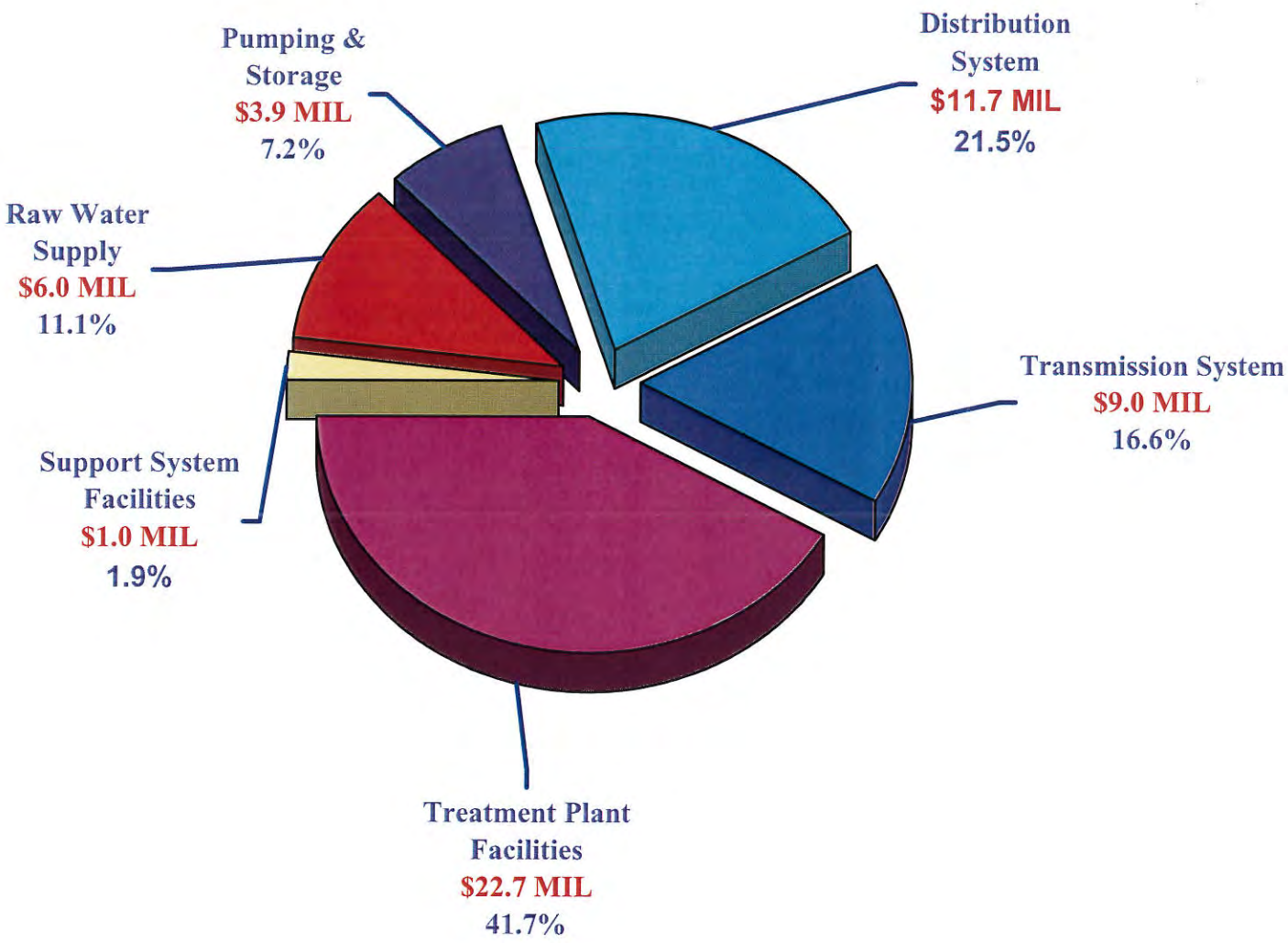
Planned IFR Expenditures For Fiscal Years 2001 Through 2020



Total 20 Year Investment Into System of $228 MIL.

EXHIBIT 10
PROVIDENCE WATER

Planned IFR Expenditures For Fiscal Years 2001 Through 2005



Total 5 Year Investment Into System of $54.3 MIL.

EXHIBIT 12

PROVIDENCE WATER

Sources and Uses of Funds

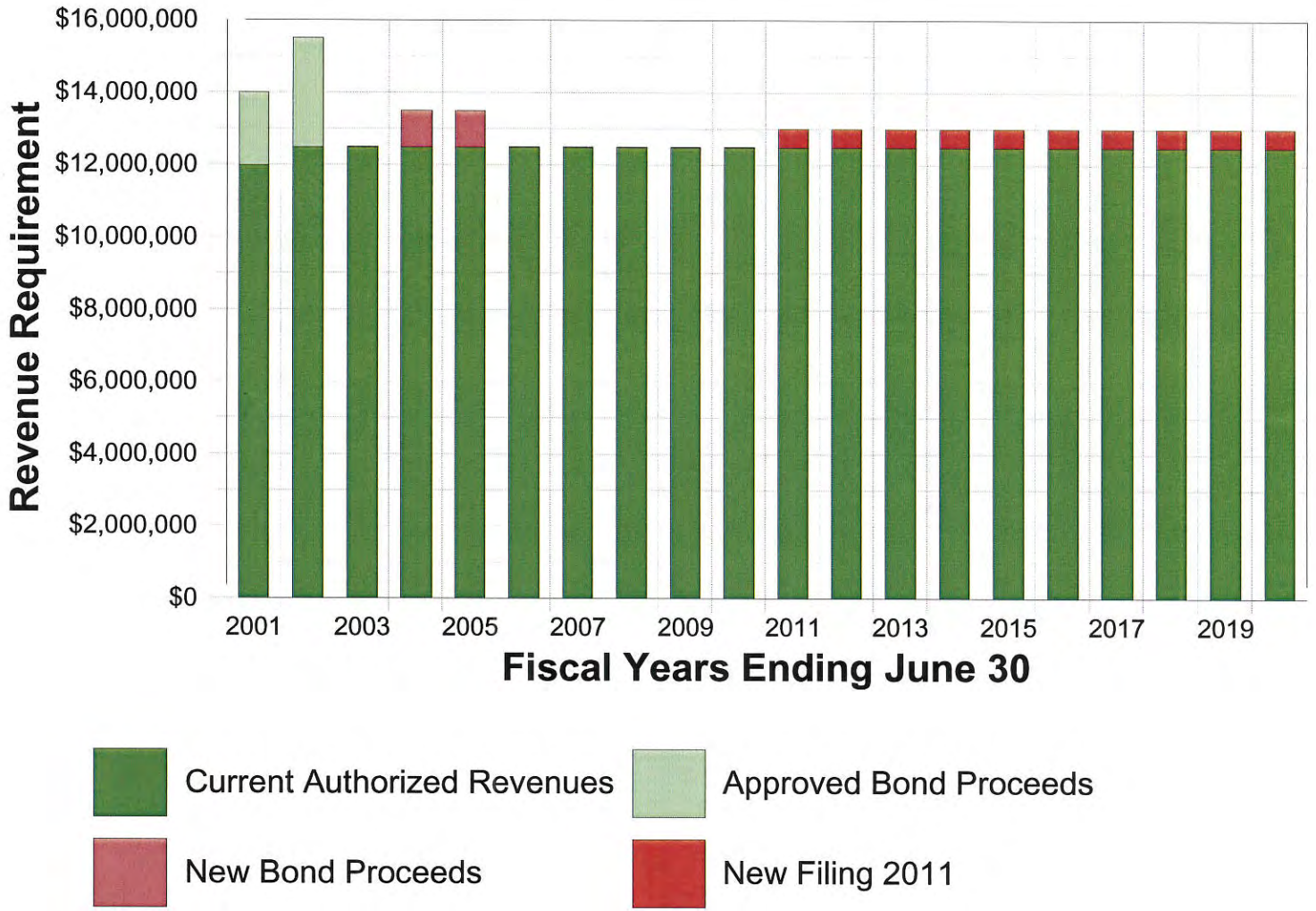
IFR Funding & Expenditure Projections

Five-Year Phases for Fiscal Years 2001 - 2020

	2001-2005	2006-2010	2011-2015	2016-2020	2001-2020
	Phase 1	Phase 2	Phase 3	Phase 4	Total
Sources of Funding:					
Current Authorized Funding	$62,000,000	$62,500,000	$62,500,000	$62,500,000	$249,500,000
New Bond Proceeds	2,000,000	0	0	0	2,000,000
Approved Bond Proceeds	5,000,000	0	0	0	5,000,000
Projected Additional Funding	0	0	2,500,000	2,500,000	5,000,000
Total Sources of Funds	69,000,000	62,500,000	65,000,000	65,000,000	261,500,000
Uses of Funding:					
Cash Funded Construction Projects	$47,340,000	$53,600,000	$59,830,000	$60,200,000	$220,970,000
New Bond Projects	2,000,000	0	0	0	2,000,000
Existing Bond Projects	5,000,000	0	0	0	5,000,000
New Debt Service	518,018	1,295,045	777,027	0	2,590,090
Existing Debt Service	14,137,069	7,594,162	4,349,350	0	26,080,581
Total Uses of Funds	68,995,087	62,489,207	64,956,377	60,200,000	256,640,671
IFR Program Surplus/(Deficit)	$4,913	$10,793	$43,623	$4,800,000	$4,859,329

EXHIBIT 13

IFR Funding Projections



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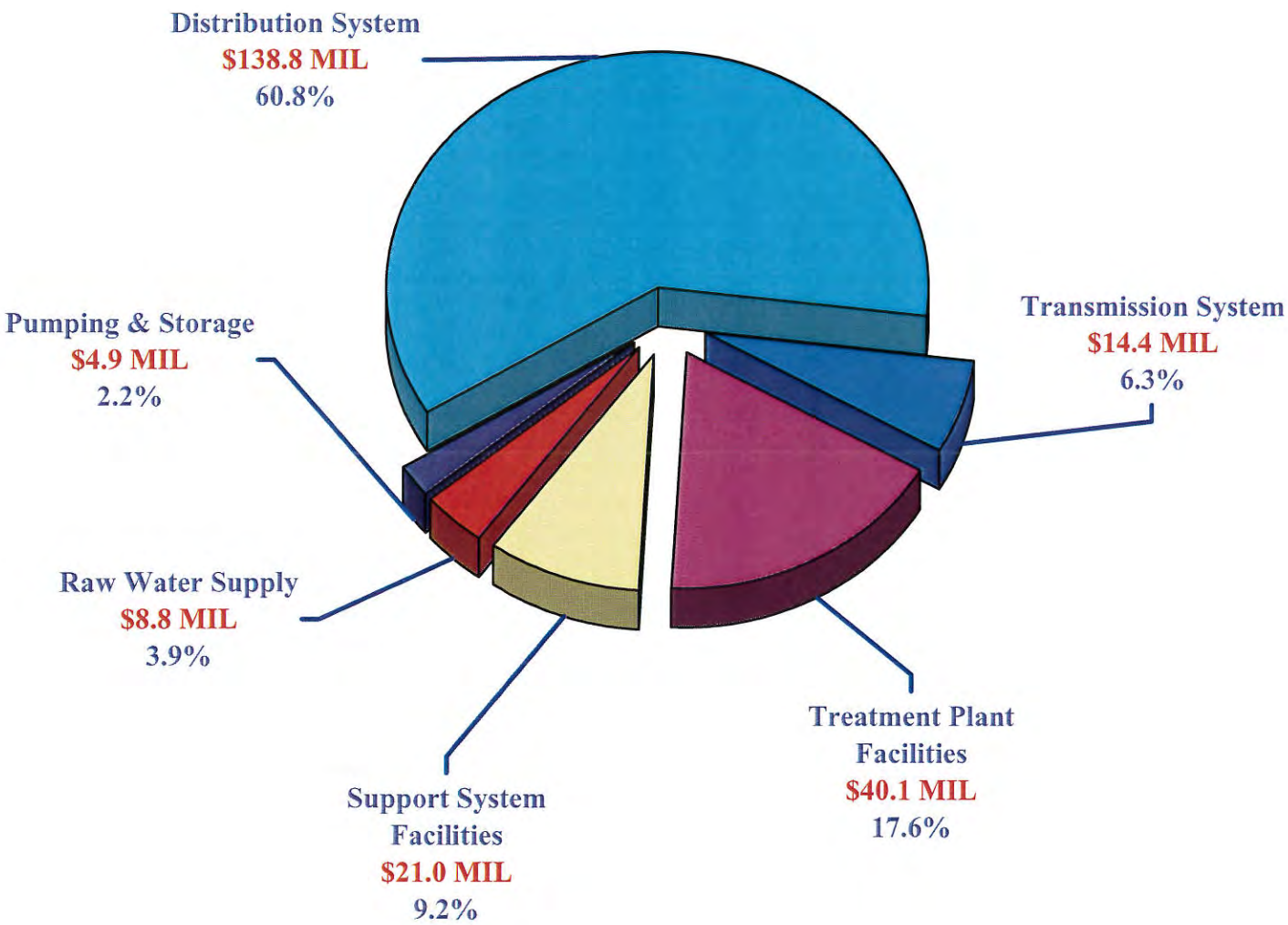

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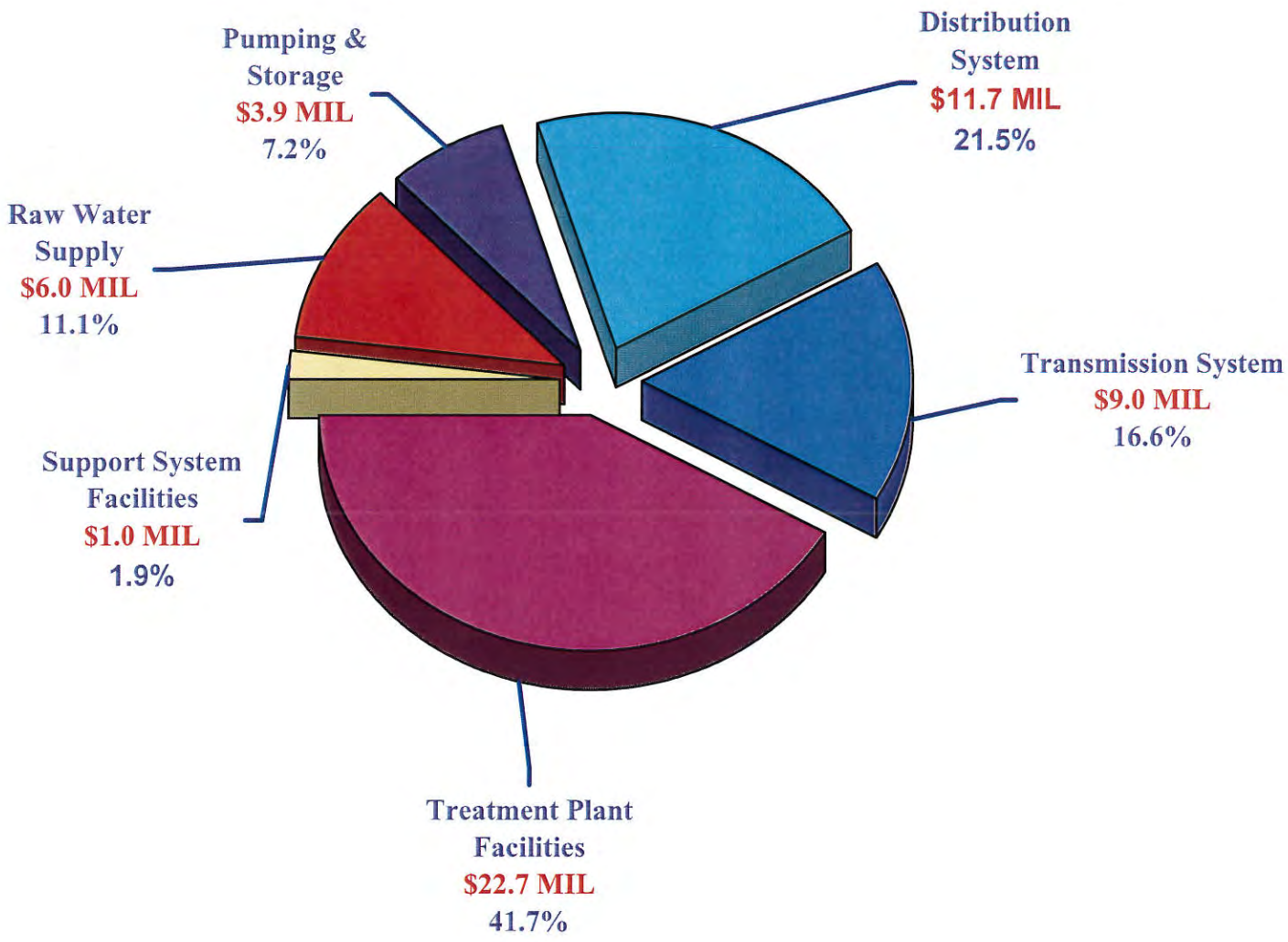

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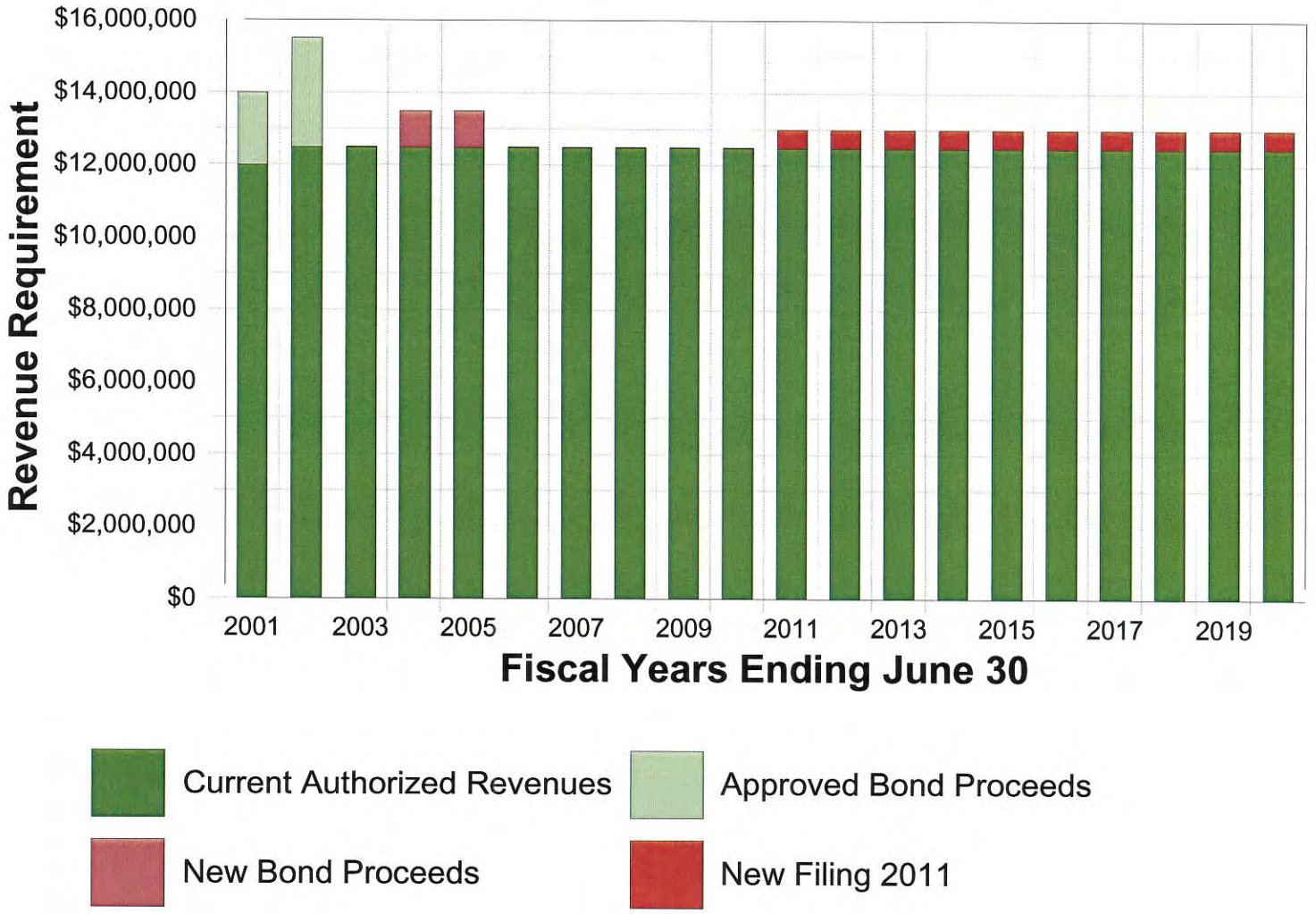


INFRASTRUCTURE REPLACEMENT PLAN FY 2001 - 2020

SECTION I
FACILITIES DESCRIPTION

SYSTEM DESCRIPTION

WATER SUPPLY SOURCES

The sole source of water used by Providence Water is the Scituate Reservoir Complex. The Scituate Reservoir complex consists of six reservoirs: the main (Scituate) reservoir and five smaller reservoirs which are tributary to the main reservoir.

Scituate Reservoir Complex

Scituate Reservoir

Water in the Scituate Reservoir is impounded behind the Gainer Dam, a large zoned earth structure at the southeast end of the Reservoir which is traversed along its 3,200 foot length by Rhode Island Route 12. Elevation of the crest of the dam is 299.0 Mean High Water Datum (MHW).

The total storage capacity of the Scituate Reservoir is 37.011 billion gallons (BG). Dead storage is 400 million gallons (MG), resulting in a net storage volume of 36.611 BG. The reservoir has a water surface area of 5.30 square miles, and a watershed area of 92.8 square miles.

Gainer Dam

The spillway is located to the right of the right abutment of the main embankment and is an uncontrolled, reinforced concrete structure 440.0 feet long. The weir is an ogee section with provisions for stop-log (removable timber) flashboards. Crest elevation is 284.01 (MHW). The flow discharges through a natural rock channel to the Pawtuxet River below the dam.

Three intakes at the center of the dam provide for withdrawal of water to the treatment works. Manually and electrically controlled gates and stop shutters provide for regulation of intake flow through the gatehouse through twin 60-inch aqueducts in a tunnel in the main embankment.

Regulating Reservoir

The dam impounding the waters in the Regulating Reservoir is an approximately 220 foot long structure with masonry overfall. It is located at the southern limit of the Reservoir, on the north side of Danielson Pike. Wing walls connect the structure to the Danielson Pike Bridge. Elevation of the crest of the overflow is 285.50 (MHW).

Regulating Reservoir has a total storage capacity of 428 MG, of which 7 MG is dead storage. The drainage area of this reservoir is 22.3 square miles, while the water surface area is 0.38 square miles.

Barden Reservoir

The total storage in Barden Reservoir is 853 MG. Dead storage is 0, due to the arrangement of the outlets. Water surface area is 0.38 square miles, and the watershed area is 33.0 square miles.

Barden Reservoir

The Barden Reservoir Dam is located on the northeast end of the Barden Reservoir. It is an earth embankment structure with a concrete corewall. The length, including the spillway, is approximately 612 feet. The crest of the dam is at elevation 352.2 (MHW).

Discharges from the dam are over the spillway and through two outlet works. The 81.5 feet long uncontrolled spillway is a stone masonry arched overflow weir located at the right abutment of the dam. Elevation of the crest of the spillway is 345.1 (MHW).

One of the outlet works is a gated (manually operated) 30-inch diameter cast iron pipe conduit located at the left abutment of the spillway. The other outlet work structure is a double-barreled stone masonry box culvert, with a manually operated sluice gate at the upstream slope of the dam.

Moswansicut Reservoir

The dam forming Moswansicut Reservoir is a 450 feet long embankment structure located on Moswansicut Brook at the western terminus of the reservoir. There are two spillways as follows:

1. An overflow spillway consisting of an uncontrolled reinforced concrete circular (12 feet diameter) drop discharging to a 5 feet 6 inch wide by 8 feet high arched conduit which flows through the embankment to the downstream discharge.

2. An emergency spillway located about 1,500 feet north of the embankment consisting of a 42 inch diameter concrete culvert.

Elevation of the overflow spillway crest is 301.90 (MHW); elevation of the emergency spillway crest is 303.4 (MHW).

The outlet works for the Reservoir is incorporated into the overflow spillway structure and is a rectangular opening, controlled by stop logs placed in guide channels in the sidewalls. Discharges flow through the spillway conduit to the downstream channel.

Moswansicut Reservoir covers a surface area of about 0.44 square miles. It has a total storage capacity of 1.781 BG and dead storage of 1.066 BG, for a net storage of 715 MG. The drainage area of this reservoir is about 3.9 square miles.

Ponaganset Reservoir

Ponaganset Reservoir has a watershed area of 2.1 square miles, and a water surface area of 0.36 square miles. Total storage in the reservoir is 742 MG of which 49 MG is dead storage. Net storage capacity is 693 MG.

The dam impounding the Ponaganset Reservoir is an approximately 635 feet long earth embankment structure which is traversed by George Allen Road. Crest of the dam is elevation 641.4 (MHW).

The spillway consists of an uncontrolled double-barreled reinforced concrete culvert under George Allen Road. Spillway crest elevation is 633.05 (MHW).

Ponaganset Reservoir

The regulating outlet consists of a 24-inch diameter cast iron pipe through the dam, located near the left side of the embankment; control is by a manually operated sluice gate in a protective steel enclosure on a concrete pier. Invert of the outlet is at elevation 613.6 (MHW).

Westconnaug Reservoir

Westconnaug Reservoir has a total storage capacity of 453 MG with no dead storage. Its surface area covers about 0.27 square miles. It has a drainage area of 4 square miles.

The dam is located at the north end of the Westconnaug Reservoir, on the Westconnaug Brook. It is an earth embankment structure approximately 320 feet long, with a crest elevation of 457.2 (MHW).

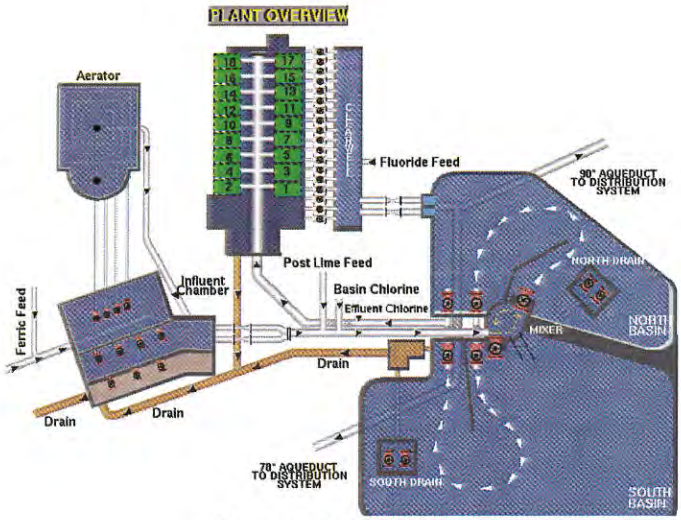
A concrete spillway, 16 feet wide, is located to the right of center of the dam, and is bounded by two vertical masonry training walls approximately 3 feet high. Crest elevation of the spillway is 454.17 (MHW).

An outlet (invert elevation 440.95 MHW) consisting of a 16-inch diameter cast iron pipe passes through the dam to the right of the spillway. The outlet control structure consists of a gate chamber with a grated inlet and a reinforced concrete structure. A key is used to manually operate a 16-inch butterfly valve on the pipe.

Both the spillway and the outlet conduit discharge into Westconnaug Brook.

TREATMENT FACILITIES

Providence Water operates one water treatment plant to purify the Scituate Reservoir water. The water quality received from Scituate Reservoir is typical of surface water supplies in the New England region. It is a low pH, low alkaline, low turbidity water with seasonal overturn events resulting in elevated coliform, and iron and manganese concentrations.



Treatment Plant Overview

The plant is located approximately 4,400 feet from the Gainer Dam in Scituate and operates as a conventional treatment process. The hydraulics of the plant allow it to be normally operated under gravity flow conditions. A raw water pumping station is available for pumping water to the plant under extremely low reservoir conditions. The treatment process consists of aeration, coagulation-flocculation, lime addition for corrosion control, sedimentation, rapid sand filtration, disinfection and fluoridation.

Flow Description

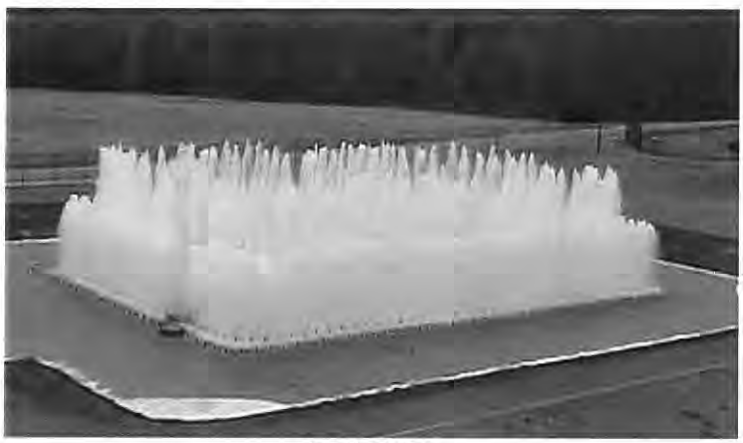
Water is withdrawn from the Scituate Reservoir through a concrete structure (gate house) near the middle of Gainer Dam. The gate house has three separate intakes located at elevations 253.0, 235.0 and 213.0 feet above MHW. The water then enters twin 60-inch transmission mains that deliver water to the junction chamber where flow then continues by gravity through a 90-inch diameter steel aqueduct to the treatment works. If insufficient head exists in Scituate Reservoir to meet demand, a raw water booster pump station may be utilized. The raw water pump station is located upstream of the junction chamber approximately 1,000 feet from the gate house and is connected to the 60-inch water transmission mains.

Influent Control Chamber

The influent control chamber is the control structure located just outside the treatment plant that regulates the flow of water entering the plant. The main chamber is a reinforced concrete structure which is split into two separate subchambers by a two foot thick wall. The 90" diameter influent pipe enters the north subchamber. This chamber contains four 48" diameter pipes which feed the aerator. Each 48" pipe has a 36" gate valve and a 36" butterfly valve which control flow to the aerator. There is a circular concrete manhole at one corner of the chamber. This manhole accesses a 4' by 7' concrete drain which leads to the lagoons. There is a pit in the western end of this subchamber where the ferric sulfate is added to the raw water by feeder pipes that are connected directly to the 90" diameter influent pipe. The south subchamber houses four 36" gate valves used to divert the raw water directly towards the venturi meters, mixer, and coagulation basins. Below the gate valves are three 36" square sluice gates used to drain the subchamber. At the east end of this subchamber are two 72" diameter concrete pipe openings which lead to the influent venturi meters and then converge to one rectangular concrete conduit which leads to the mixer. There is a sluice gate on the north pipe. On the north wall at the east end of the chamber is a 9' diameter opening. This is the effluent conduit from the influent aerator.

Aeration Basin

Water flows through four 48-inch diameter pipes from the influent chamber to the aeration basin. Under normal operating conditions, the aeration process consists of three rectangular loops of steel pipe which have spray ports every 24 inches. There is also a fourth, circular multi-port nozzle assembly in the center of the basin. The aeration system works under gravity pressure and sprays water into the air in a fountain style. This treatment step removes volatile organics and gases. The aerated water travels through a 108-inch diameter pipe from the center at the aerator back to the influent control chamber.



Aeration Basin

Basin Influent Conduit

The aerated water travels from the influent control chamber into two 6' x 3' diameter venturi tubes which measure the influent flow. Water then travels from the venturi meters through an 8.5-foot wide, 10-foot high conduit to the tangential mixer.

Coagulation/Flocculation

Quicklime is added in the basin influent tunnel between the influent control chamber and the tangential mixer and reacts with the ferric sulfate to form a ferric hydroxide floc. Further mixing takes place in the tangential mixer. The water enters the mixer through a 4 foot wide, 3 foot high opening at the bottom of the mixing chamber, tangent to the edge of the chamber. The mixer works under gravity feed and imparts a slow cyclical motion to the water. The cyclical motion aids in the destabilization of colloidal material and the formation of floc. These steps are commonly known as coagulation and flocculation. The next step is the removal of the flocculated colloidal material through sedimentation. The treatment plant has two large sedimentation basins; the north basin (43 million gallon capacity) and the south basin (111 million gallon capacity). They are both open, concrete structures enclosed by concrete-lined earthen dams. Here, the flocculated material is allowed to settle on the bottom of the basins. The resulting ferric sludge must be removed by periodically draining and flushing the basins manually.

Filtration

Settled water travels from the open basins through a 10 foot wide, 11 foot high conduit to the sand filters. There are eighteen (18) single media rapid sand filters which remove non-settleable floc and impurities remaining following the coagulation, flocculation, and sedimentation stages. Each filter is operated over a flow range of 5 to 8 million gallons per day. The number of filters on-line concurrently is dependent upon water demand. Each filter has two 16-inch effluent lines with 12"

Filter Gallery

butterfly valves that discharge into the clearwell. The average filter run is approximately 72 hours and is initiated when head loss through the filter reaches approximately 6.5 feet of water. The backwash water is supplied by gravity via a 400,000 gallon wash water tank and is discharged to waste lagoons.

Emergency Provisions

Emergency provisions at the plant include stand-by power and an emergency by-pass process. The treatment plant processes can be by-passed by closing the gates in the tangential mixer and opening the gates between the basin influent chamber and the effluent chamber located downstream of the clearwell.

The plant currently uses approximately 4000 KWH per day to power its treatment operation. This power is used by chemical feed equipment, backwash pumps, metering equipment, air conditioning, lighting, etc. The emergency power for the plant is provided by a 2000 KW diesel generator located at the raw water pumping station. This generator provides ample power to operate the pump station as well as the treatment works. In an emergency, the generator needs to be manually started and manually brought on-line. The treatment plant also has its own 175 KW generator located in the transformer house adjacent to the plant.

Chemical Feed Systems

Ferric Sulfate

The plant uses ferric sulfate as a coagulant. Ferric sulfate arrives at the plant in liquid form and is stored in three (3) 12,000 gallon storage tanks (36,000 gallon total capacity). The liquid is then transferred by pumps as needed into two (2) day tanks with a capacity of 700 gallons each located in the treatment plant. Metering pumps are then used to provide a measured feed rate to the raw water.

Ferric Storage Tanks

Quicklime

Quicklime is added to aerated water for pH adjustment and is stored in a 180 ton silo located adjacent to the ferric sulfate silo. A pneumatic transfer system is utilized to convey lime from the silo to secondary storage hoppers located in the treatment facility. Secondary storage hoppers, gravimetric feeders, slakers, float tank, and pumps are utilized to add lime to the aerated water.

Quicklime Silo

Chlorine

Chlorine is added to the open basins and to the settled water for disinfection. Chlorine is delivered to the Purification Works in one ton containers. The containers are transported to a storage room by overhead monorail. The storage room is equipped with a ventilation system that turns on and exhausts air to the outdoors when a chlorine leak is detected.

Sodium Silicofluoride

Sodium silicofluoride is added to filtered water. The fluoride feed system is similar to that of the ferric and lime feed systems. Fluoride is delivered in 400 pound drums prior to being stored in the chemical and control building. The transfer snorkel transports fluoride from the storage room to the hopper/filter units of the feeders.

Gravimetric feeders similar to the ferric and lime system feed the fluoride to dissolving tanks which feed fluoride by gravity to the injection point downstream of the filters.

Solids Handling and Disposal

The treatment plant produces ferric hydroxide sludge from both the sedimentation and filtration processes which require handling and disposal.

The cleaning of the basins is initiated by draining the basin. The exposed sludge is manually scoured using high pressure water. Collection of the scoured material and existing sludge is facilitated through the use of a drain system which consists of a central drainage port and drainage troughs located in the bottom of the basins. The sludge is directed through the drain chamber and conduit to a series of sludge lagoons located downstream of Gainer Dam and between Route 116 and the Pawtuxet River west of the plant.

The volume of backwash water which needs to be handled and disposed of is dependent upon the demand of the facility as well as the efficiency of the coagulation/sedimentation process. The backwash water is also sent to the sludge lagoons.

Lagoon Description

Ferric sludge from the two coagulation basins and from the backwash water is collected in a settling lagoon system. The lagoon system consists of three settling lagoons, three overflow structures and outfalls, and one conduit connecting Lagoons No. 2 and No. 3. Water flows from Lagoon No. 1 through a small connecting stream to Lagoon No. 2. Presently, no water enters Lagoon No. 3. Lagoon No. 3 has never been utilized. Discharge limits are presently met with only Lagoons No. 1 and No. 2 in service.

STORAGE FACILITIES

Providence Water operates five storage facilities throughout the distribution system. Water is also collected in a 260,000 gallon clearwell at the plant before being delivered to the distribution system. These facilities are used to optimize operating efficiencies by equalizing demands, improving and stabilizing system flows and pressures, and providing reserve supplies for fire fighting.

Aqueduct Reservoir

The Aqueduct Reservoir has a storage capacity of 43.4 MG and is located on Scituate Avenue in the Town of Cranston. The reservoir is a 390 x 590 foot enclosed concrete structure with a water depth of approximately 25 feet and an overflow elevation of 231 feet mean high water (MHW). The facility provides operational storage for the low service area and operates by gravity feed. Water is supplied to the reservoir through a 60-inch diameter prestressed reinforced concrete cylinder pipe conduit which connects the reservoir with the 60-inch diameter Neutaconkanut Conduit.

Aqueduct Reservoir

Neutaconkanut Reservoir

The Neutaconkanut Reservoir has a storage capacity of 42.09 MG and is located near the intersection of Central Avenue and the Plainfield Pike in the Town of Johnston. The reservoir is an enclosed concrete structure with a water depth of approximately 25 feet and an overflow elevation of 227 MHW. The facility feeds the gravity fed low service system and the Neutaconkanut Pumping Station . Water is supplied to the reservoir through the 60-inch diameter Neutaconkanut Conduit.

Longview Reservoir

The Longview Reservoir has a storage capacity of 24.8 MG and is located at the intersection of Mineral Spring Avenue and Smithfield Road in North Providence. The original below grade concrete structure was put on line in 1928 and has an overflow elevation of 306 MHW. A 200' x 323' x 29' deep cast in place concrete underground addition was constructed immediately adjacent to the existing reservoir and was put on line in 1990. This doubled the capacity of the reservoir. The reservoirs are connected by a sluice gate in the common wall of the two reservoirs. The facility provides operational storage to the high service area. Water is pumped to the reservoir by the Neutaconkanut and Bath Street Pump Stations.

Ridge Road Reservoir

The Ridge Road Reservoir has a capacity of 3.5 MG and is located off Ridge Road in Smithfield. The facility provides operational and fire storage for the extra-high service area. Water is pumped to the reservoir by the Fruit Hill Pumping Station. The structure is an above ground prestressed concrete tank with a water depth of 40 feet and an overflow elevation of 398 MHW.

Ridge Road Reservoir

Lawton Hill Reservoir

The Lawton Hill Reservoir has a storage capacity of 5.0 MG and is located on Plainfield Pike in the City of Cranston. The reservoir is a 187-foot by 187-foot underground enclosed concrete structure with a water depth of 20 feet and an overflow elevation of 485.00 mean high water (MHW). The facility provides operational storage for the high service area in Western Cranston. Water is supplied to the reservoir through a 24-inch DI pipe from the Aqueduct Pump Station.

Lawton Hill Reservoir

PUMP STATIONS

In order to maintain an adequate supply of potable water at a sufficient pressure, Providence Water owns and operates ten potable water pump stations in the distribution system and one raw water pump station. A description of the pump stations follows:

Raw Water Pumping Station

The Raw Water Booster Pumping Station (RWBPS) contains four pumps, two with a pumping capacity of 50 MGD and two with a pumping capacity of 30 MGD and is located near the base of the Gainer Dam. The station is used to supplement head to the plant under low reservoir, high demand periods.

Raw Water Pumping Station

The RWBPS is equipped with emergency power supplied by a 2000 KW diesel generator. This generator also supplies the emergency power to the plant.

Garden Hills Pump Station

The Garden Hills Pump Station is located on Rockcrest Drive in the City of Cranston. The pump station contains two 400 GPM primary pumps, a 100 GPM jockey pump, and one natural gas driven 400 GPM pump used for emergency response. The station is used to maintain adequate pressures at the higher elevations of the Garden Hills subdivision in Cranston. The station contains an underground 7,200 gallon hydropneumatic storage tank (6' dia. x 30' long).

Garden Hills Pump Station

Dean Estates Pump Station

The Dean Estates Pump Station is located on Melody Lane in Cranston and serves the higher elevations in the Dean Estates sub-division. The pump station contains two 1,200 GPM primary pumps and one 1,200 GPM natural gas driven emergency pump. The facility utilizes two 10,000 gallon hydropneumatic storage tanks.

Dean Estates Pump Station

Greenville Ave. Pump Station

The Greenville Ave. Pump Station is located on Greenville Ave. in the Town of Johnston. The station contains three 320 GPM pumps and one 750 GPM pump. The 750 GPM pump is used for fire service or other demand emergencies. Emergency power is supplied by a 180 KW diesel generator.

Fruit Hill Pump Station

The Fruit Hill pump station is located on Smith Street in the Fruit Hill section of North Providence. The station contains two 1,500 GPM pumps and provides water to the extra high service area. Emergency power is provided by a 125 KW natural gas generator.

Bath Street Pump Station

The Bath Street Pump Station is located on Bath Street in the City of Providence. The pump station contains three pumps with a pumping capacity of approximately 6,700 GPM each. A 1000 KW diesel generator supplies emergency power for the station. The station provides water to the high service area as well as the high pressure fire zone in downtown Providence.

Bath Street Pump Station

Neutaconkanut Pump Station

The Neutaconkanut Pump Station is located off Ashby Street in the Town of Johnston. It draws water from the Neutaconkanut Reservoir and supplies water to the high service area. The pump station contains four 6,700 GPM pumps. The station is equipped with a 1,000 KW diesel engine backup power generator.

Neutaconkanut Pump Station

Aqueduct Reservoir Pump Station

The Aqueduct Reservoir Pump Station is located on Scituate Avenue in the City of Cranston. The station contains four 1050 GPM domestic pumps and a 1600 GPM prefabricated booster pump which provides water throughout the high service area of Western Cranston. Emergency power is supplied by a 450 KW diesel generator.

Aqueduct Reservoir Pump Station

Alpine Estates Pump Station

The Alpine Estates Pump Station is located on Basil Crossing in the City of Cranston. The station contains three 370 GPM domestic pumps and one 50 GPM jockey pump and provides water to approximately 150 residential services throughout the extra-high service area of the Alpine Estates subdivision in Western Cranston. Emergency power is supplied by a 75 KW diesel generator.

Ashby Pump Station

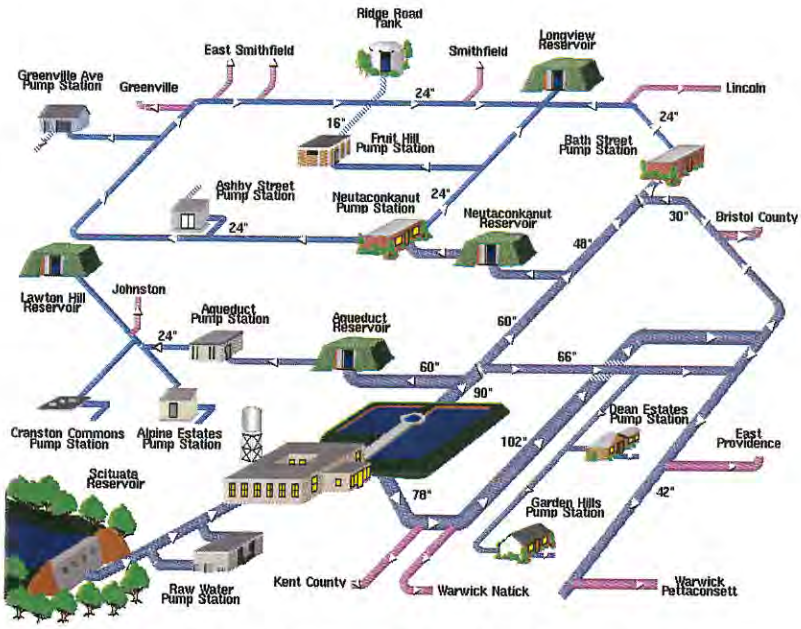
The Ashby Pump Station is located on Ashby Street in the Town of Johnston. The station contains two 100 GPM domestic pumps, one 750 GPM fire pump, and one 50 GPM jockey pump and provides water to approximately 100 residential services throughout the extra-high service area on Neutaconkanut Hill in Johnston. Electrical power and emergency power is supplied to the station from the Neutaconkanut Pump Station.

Cranston Commons Pump Station

The Cranston Commons Pump Station is located on Commerce Way in the City of Cranston. The underground station contains three 900 GPM domestic pumps and one 120 GPM jockey pump and provides water to approximately 260 residential and industrial services throughout the extra-high service area of the Cranston Commons subdivision in Western Cranston. The station utilizes an underground 530 gallon hydro-pneumatic storage tank. Emergency power is supplied by a diesel generator which is owned and maintained by PS&G (Professional Services Group) who also uses the generator to operate a booster pump station for the sewer system in the City of Cranston.

TRANSMISSION SYSTEM

Two 60-inch diameter raw water transmission lines converging into one 90-inch line, transfer water from the dam intakes to the treatment plant. Water flows from the intakes to the transmission lines by gravity and then directly to the treatment plant.



Finished water is transmitted from the clearwell to the distribution system through two major transmission conduits, the 90-inch diameter Scituate Tunnel and Aqueduct (ScTA) and the 78-inch diameter Supplemental Tunnel and Aqueduct (STA). These two conduits have an approximate capacity of 100 MGD and 77 MGD, respectively.

The treated water from the plant exits the clearwell and flows under gravity to structure "A" (the point of connection of the 90-inch and 78-inch aqueducts) via two 72-inch diameter conduits. At a flow rate of 70 MGD, the flow splits in structure "A" with approximately 65% of the water entering the ScTA and 35% flowing to the STA. As the flow rate increases, the distribution between the two aqueducts evens out with a 50%/50% distribution being realized at 136 MGD.

The 90-inch diameter concrete lined tunnel portion of the ScTA begins at the West Portal near the plant and finishes at the East Portal, covering a distance of approximately 3.4 miles. At the East Portal, the topography requires the ScTA to become an aboveground aqueduct. This aqueduct is a 90 inch concrete pipe which carries the water approximately 0.95 miles to the Siphon Chamber. From the Siphon Chamber, the transmission line splits into two lines, a 60-inch diameter concrete conduit and a 66-inch diameter steel pipeline. The 60-inch conduit continues on to feed the Neutaconkanut and Bath Street Pumping Stations and the Neutaconkanut Reservoir. The 66-inch pipeline continues to the general area of Budlong Road in Cranston from where further distribution begins.

East Portal

The STA begins at Structure "B" located at the plant. Structure "B" is a 76 foot deep shaft that accesses a 78-inch diameter concrete lined tunnel which travels underneath the South Basin of the treatment works. At this point, the tunnel enters Structure "C" also located on the plant property which is another 78-inch diameter shaft which carries the water upward for 68 feet. The water exits this structure and travels in a 78-inch diameter aqueduct for 3.8 miles until it reaches Structure "D". Structure "D" is a 36 foot deep 78-inch diameter shaft which accesses a 78 inch concrete lined tunnel. The tunnel continues for approximately 0.5 miles until it reaches Structure "E". Here, the water rises up 65 feet in a 120-inch shaft and enters the 102 inch diameter aqueduct portion of the STA. Structure "E" was constructed with provisions for a point of entry for the once proposed Big River Reservoir supply line. The 102-inch diameter aqueduct carries the water for approximately 4.1 miles to its termination in the general area of Budlong Road in Cranston where further distribution begins.

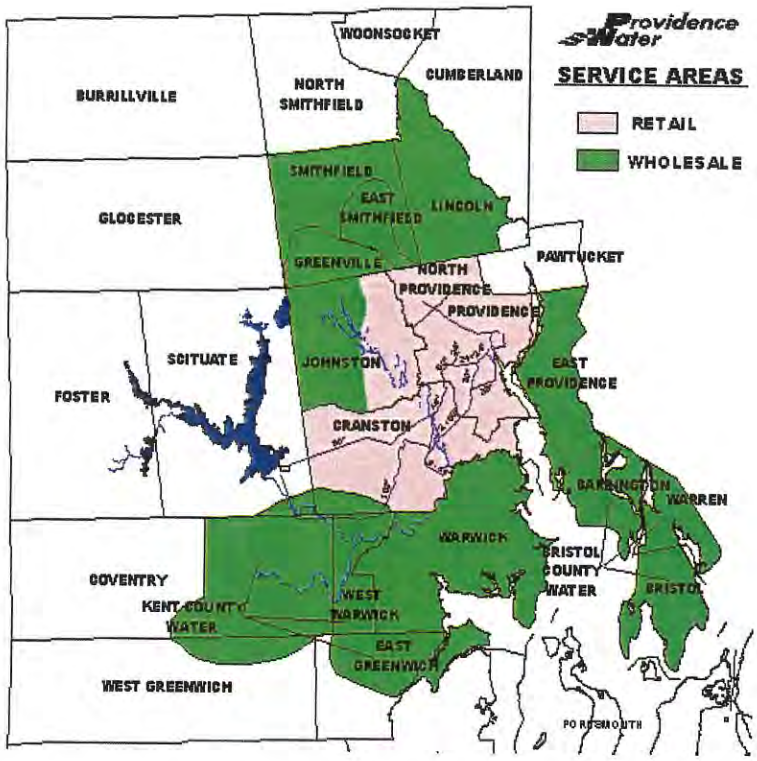
Structure D

Providence Water currently operates approximately 4 miles of concrete lined tunnel, 10 miles of concrete aqueduct, 85 miles of various transmission piping (16" to 66") and 838 miles of distribution piping (6" to 12").

SERVICE AREA

The Scituate Reservoir Complex is utilized by Providence Water as an active source which supplies approximately 600,000 people in the State of Rhode Island with potable water through both its retail and wholesale operations in Providence and in the surrounding communities.

The retail service area consists of portions of North Providence, Cranston, and Johnston, and all of Providence.



Providence Water provides wholesale water to nine water utilities in the Providence area. These utilities include the Bristol County Water Authority (BCWA), East Providence Water Division (EPWD), Greenville Water District (GWD), Kent County Water Authority (KCWA), Lincoln Water Commission (LWC), Smithfield Water Department (SWD), Warwick Water Department (WWD), Johnston Sewer and Water Department (JSWD), and the East Smithfield Water District (ESWD).

The Wholesale Interconnections

The WWD has two interconnections. One of the interconnections is a 30-inch diameter line located on Pettaconsett Avenue just over the Pawtuxet River in Cranston. The other interconnection is a 42-inch diameter line located on Natick Road near Wakefield Street in West Warwick.

The KCWA also has two interconnections with the Providence Water system. One of the interconnections is a 12-inch diameter line located on Oaklawn Avenue south of Brayton Road in Cranston. The other interconnection is a 30-inch diameter line located on Clinton Avenue in Scituate.

The EPWD has a single 42-inch diameter interconnection with the system. The interconnection is located off Budlong Road in Cranston.

The BCWA has a single 30-inch diameter interconnection with the system. The interconnection is located at the area of Vermont Avenue and Michigan Avenue in Columbia Park in Providence.

The LWC has two interconnections with the system. One of the interconnections is a 16-inch diameter line located at the corner of Mineral Spring Avenue and Woodward Road in North Providence. The other interconnection is a 12-inch diameter line located on Charles Street in North Providence and serves as an emergency connection.

The SWD has a single 12-inch diameter interconnection. The interconnection is located on Smithfield Road near the Longview Reservoir in North Providence.

The GWD has a single 8-inch diameter interconnection with the system. The interconnection is located at the corner of George Waterman Road, Taunton Ave and the Putnam Pike in Johnston.

The ESWD currently has two interconnections with the system. One interconnection is an 8-inch diameter main located on Dean Street at the Smithfield/Johnston town line. The other connection is a 12-inch diameter main located on Waterman Avenue in North Providence.

The JSWD has six separate interconnections on Plainfield Pike in Johnston. The interconnections are a 16" main on Green Hill Road, an 8" main on Everbloom Drive, an 8" main on Taylor Road, an 8" main on Simmonsville Avenue, an 8" main on Capital Street, and an 8" main on Nardolillo Street.

The Retail Area

The Providence Water retail area currently has 72,106 service connections. These connections include residential, industrial, commercial, and fire service connections.

The retail service area is divided into three separate pressure zones; the low service, high service and extra high service areas. Providence Water also maintains a high pressure fire system within the downtown area of Providence.

The low service area comprises the larger portion of the retail area and serves portions of Cranston, Johnston and the southern portions of Providence. The low service area is generally defined as the area with elevations from 0 to 140 feet above Mean High Water (MHW). The pressure in the low service area is maintained by the levels at the Neutaconkanut and Aqueduct Reservoirs which are maintained at approximately elevations 225 and 230 MHW respectively. The low service area is supplied with water from a combination of the 90" line which supplies the 60" and 66" mains and terminates at the siphon chamber, the 60-inch line which supplies Neutaconkanut and Aqueduct Reservoirs, the 66-inch line which supplies Aqueduct Reservoir and terminating at Budlong Road, the 78" line which terminates at structure "E", and the 102-inch STA which also terminates at Budlong Road.

The high service area serves the northern and higher elevation sections of North Providence, Providence and the Town of Johnston. The high service area is generally defined as the area with elevations from 140 to 220 feet above MHW. The pressure in the high service area is maintained by the operating level at the Longview Reservoir which is maintained when full at 305 feet MHW. Water for the high service area is supplied by water pumped from the low service system by the Neutaconkanut and Bath Street Pumping Stations. A second high service area encompasses 3.5% of the retail area which serves the Western Cranston area. The pressure in this high service area is maintained by the operating level at Lawton Hill Reservoir which is 484 feet MHW when full.

The extra high service area serves a small portion of the retail area in the Fruit Hill section of North Providence. The extra high service area is generally defined as the area with elevations from 220 feet to 315 feet above MHW. The water for this service area is drawn from the high service system and pumped from the Fruit Hill Pumping Station to the Ridge Road Reservoir where water level is maintained at elevation 397 MHW.

Service area mains range in size from 6 inches to 48 inches in diameter and constructed of a variety of materials including cast iron, ductile iron, concrete, steel, and asbestos cement. Service connections range from 5/8-inch to 12-inches and are sized based upon the customer's demand. Service connections are constructed of lead, copper, galvanized steel, cast iron, or ductile iron. All services are metered.

SYSTEM METERING

Providence Water meters water produced at the treatment plant and meters 100% of its service connections. Raw water flowing into the plant is measured by two 72" x 36" diameter venturi meters. These venturi meters measure the flow of raw water from the influent control chamber to the sedimentation basins.

The flow of effluent discharged from the plant to the distribution system is measured by 36 master plant effluent meters. These meters are 12-inch venturi tube meters located on the effluent lines of the rapid sand filters at the treatment plant. Plant effluent flows are also measured by two 72" X 42" finished water effluent venturi meters.

In addition to metering water produced by the treatment facility, Providence Water meters its entire distribution system. Distribution system metering includes meters at interconnections to wholesale customers as well as normal metering of all service connections.

The retail service area contains a variety of water consumers including large industrial and manufacturing accounts, commercial accounts, and residential users. The Board adopted an ownership policy for small meters, less than two inches (2") on February 17, 1993. On August 18, 1997 the policy was expanded to include the ownership of all meters.

Industrial Meter

EXHIBIT 1
SYSTEM MAP

Exhibit 1 is a general overview map of the Providence Water Supply Board system showing the locations of the reservoir, treatment plant, distribution reservoirs, major pumping stations, wholesale connections, and the aqueducts and transmission piping feeding the system. Pipelines are shown in color to indicate pressure zones of the system.

EXHIBIT 1

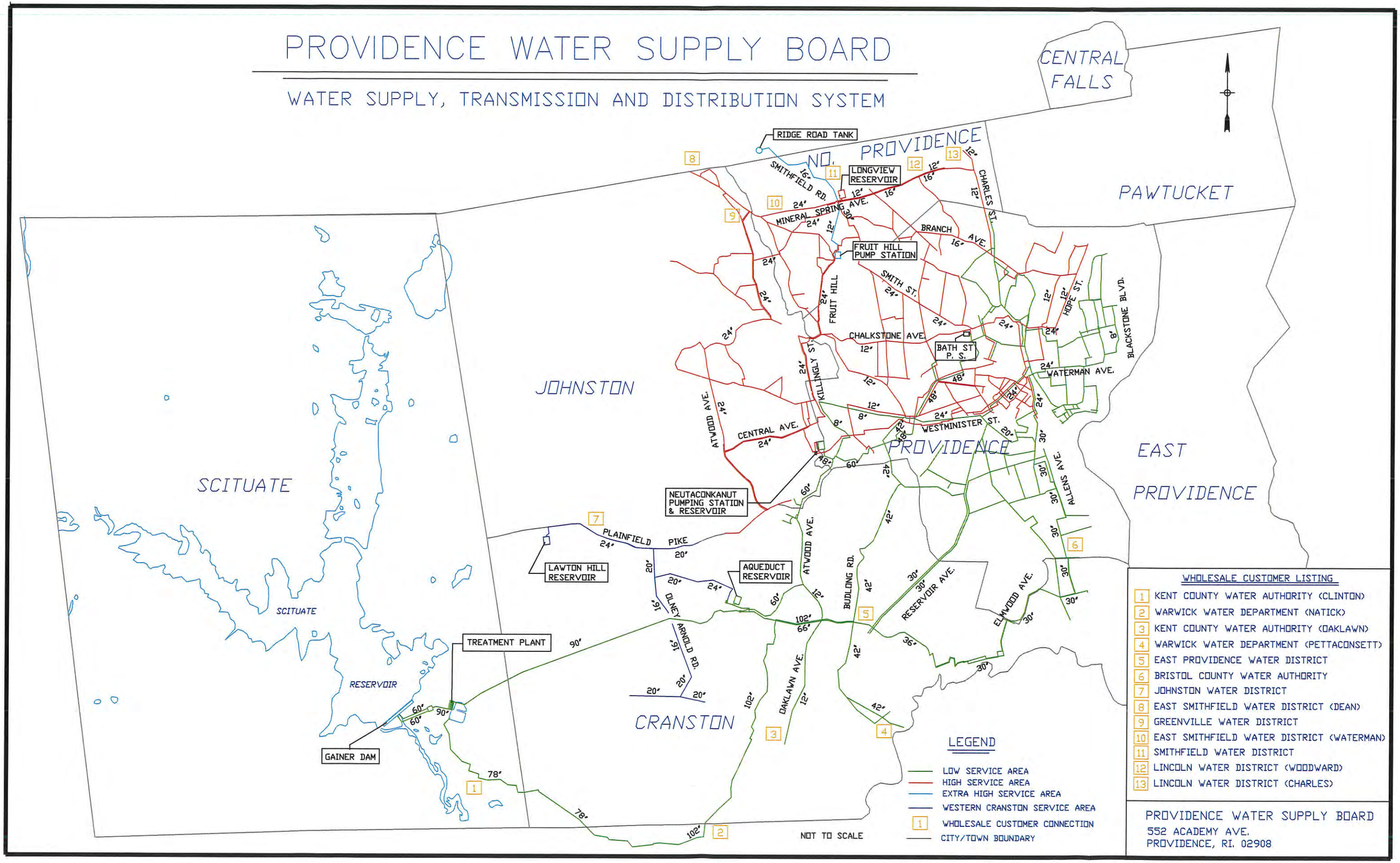
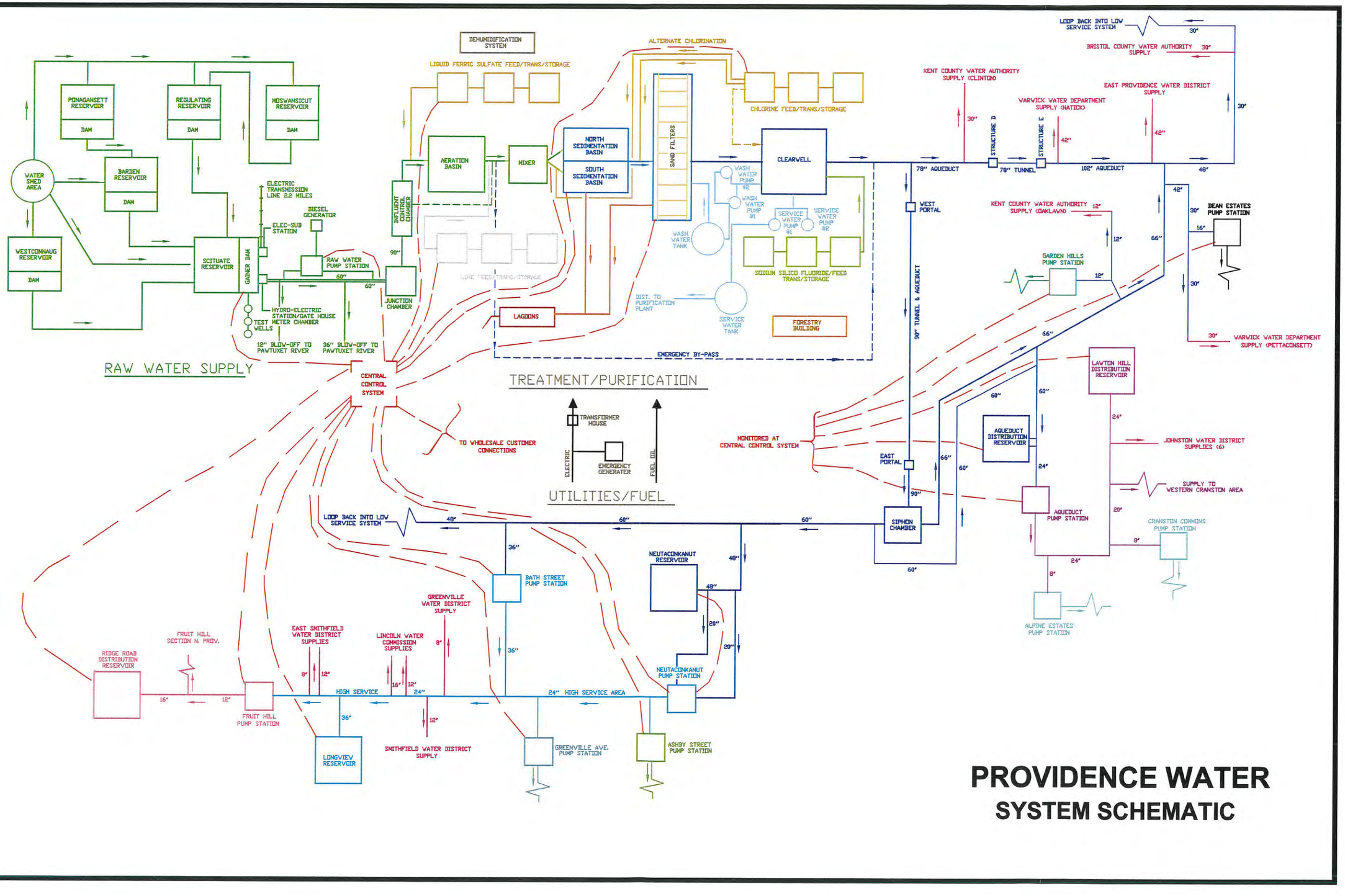

PROVIDENCE WATER SUPPLY BOARD
WATER SUPPLY, TRANSMISSION AND DISTRIBUTION SYSTEM
CENTRAL FALLS
PAWTUCKET
PROVIDENCE
NO.
JOHNSTON
SCITUATE
EAST PROVIDENCE
CRANSTON
RIDGE ROAD TANK
LONGVIEW RESERVOIR
FRUIT HILL PUMP STATION
NEUTACONKANUT PUMPING STATION & RESERVOIR
LAWTON HILL RESERVOIR
AQUEDUCT RESERVOIR
TREATMENT PLANT
GAINER DAM
RESERVOIR
SMITHFIELD RD.
MINERAL SPRING AVE.
BRANCH AVE.
CHARLES ST.
FRUIT HILL
SMITH ST.
CHALKSTONE AVE.
BATH ST P. S.
KILLINGLY ST.
ATWOOD AVE.
CENTRAL AVE.
WESTMINSTER ST.
WATERMAN AVE.
HOPE ST.
BLACKSTONE BLVD.
ALLENS AVE.
PLAINFIELD PIKE
DILNEY
ARNOLD RD.
OAKLAWN AVE.
BUDLONG RD.
RESERVOIR AVE.
ELMWOOD AVE.
NOT TO SCALE
LEGEND
LOW SERVICE AREA
HIGH SERVICE AREA
EXTRA HIGH SERVICE AREA
WESTERN CRANSTON SERVICE AREA
1 WHOLESALE CUSTOMER CONNECTION
CITY/TOWN BOUNDARY
WHOLESALE CUSTOMER LISTING
1 KENT COUNTY WATER AUTHORITY (CLINTON)
2 WARWICK WATER DEPARTMENT (NATICK)
3 KENT COUNTY WATER AUTHORITY (OAKLAWN)
4 WARWICK WATER DEPARTMENT (PETTACONSETT)
5 EAST PROVIDENCE WATER DISTRICT
6 BRISTOL COUNTY WATER AUTHORITY
7 JOHNSTON WATER DISTRICT
8 EAST SMITHFIELD WATER DISTRICT (DEAN)
9 GREENVILLE WATER DISTRICT
10 EAST SMITHFIELD WATER DISTRICT (WATERMAN)
11 SMITHFIELD WATER DISTRICT
12 LINCOLN WATER DISTRICT (WOODWARD)
13 LINCOLN WATER DISTRICT (CHARLES)
PROVIDENCE WATER SUPPLY BOARD
552 ACADEMY AVE.
PROVIDENCE, RI. 02908

EXHIBIT 2
PROCESS DIAGRAM

Exhibit 2 is a process diagram of the Providence Water Supply Board system. It shows in schematic form the sequence and inter-relation of the various water treatment and delivery processes.

EXHIBIT 2



PROVIDENCE WATER
SYSTEM SCHEMATIC

EXHIBIT 3
SUMMARY OF THE SYSTEM'S PRINCIPAL COMPONENTS BY FACILITY CATEGORY

Exhibit 3 is a tabular listing of the various major components of the Providence Water Supply Board system. Provided is a brief narrative description of the general condition of the facility, its approximate average age, and an estimate of its approximate remaining life.

EXHIBIT 3

PROVIDENCE WATER

SUMMARY OF PRINCIPAL COMPONENTS BY FACILITY CATEGORY

PRINCIPAL COMPONENTS BY CATEGORY	Approximate Installation Date(s)	Average Approx. Age of Component	Approx. Practical Remaining Life (years)	Condition
RAW WATER SUPPLY				
Principal Reservoirs and Dams	1917 to 1927	various	100	The concrete spillway, the blowoff structure, and the meter chamber, have been rehabilitated at Gainer Dam. Corrective work was conducted for the spillway footing at Regulating Reservoir. Ponaganset Reservoir has been rehabilitated. Additional geotechnical, hydraulic, and concrete rehabilitative work is needed at the principal reservoirs and dams as recommended in the Phase II Dam Study and as identified by PWSB staff.
Reservoir Watershed Area	various	various	50	Various rehabilitative work is needed to fencing, gates, maintenance and access roads.
Gainer Dam Gate House	1927	73	50	The gatehouse dates back to its original construction in the 1920s. It is in need of architectural and structural rehabilitation.
60 inch Conduits	1926	74	50	The exposed section of the twin 60 inch mains inside the meter and junction chambers have been rehabilitated and cathodic protection system was installed for the underground portion.
90 inch Steel Aqueduct	1926	74	50	Dates back to original plant construction. Structure is in relatively good condition.
Raw Water Booster Pump Station	1966	34	20	A new 2000 kW generator was installed replacing the old diesel generator. The 60" control valves to the station have been adjusted and are in good working condition. The suction and discharge valves for each of the booster pumps need to be replaced.
Electrical Supply System - Treatment Plant	various	various	various	The substation that feeds the treatment plant from Hope substation has been replaced. The feeder lines from Hope substation all the way to the treatment plant have been replaced. A new 480 volt transformer has been installed at the treatment plant with a new feed line into the plant. The secondary voltage for the plant is 550V instead of the standard 480V and the system needs to be replaced. The generator directly feeding the plant needs to be replaced and increased in size.

EXHIBIT 3

PROVIDENCE WATER

SUMMARY OF PRINCIPAL COMPONENTS BY FACILITY CATEGORY

PRINCIPAL COMPONENTS BY CATEGORY	Approximate Installation Date(s)	Average Approx. Age of Component	Approx. Practical Remaining Life (years)	Condition
TREATMENT PLANT FACILITIES				
Treatment Plant Structure / Infrastructure	1926	74	30	The plant building is in need of various architectural, structural, mechanical, and electrical upgrading.
Aeration Basin	1926	74	10	Basin dates back to the 1920s. The concrete surfaces of the structure have deteriorated and need to be rehabilitated. Hydraulic improvements need to be made.
Sedimentation Basins	1939	61	20	The concrete surfaces of both north and south basins and baffles are deteriorated and need to be rehabilitated.
Filters	1968	32	5	The mono-media filters are old and have outlived their useful life. The filters need to be replaced.
Venturi Tube Effluent Meters	1927/1943/1968	60	10	The plant's 36 venturi effluent meters are in good condition but will need some remedial work.
Clearwell	1927/1943/1968	60	50	The exterior yard and the interior of the clearwell has been fully rehabilitated. The two venturi meters leaving the plant have been rehabilitated.
Wash Water System	1926	74	10	The pumps are over 30 years old and will need replacement. The washwater tank needs concrete rehabilitative work.
Service Water System	1960	40	10	The pumps are over 30 years old and will need replacing.
Ferric Storage/Transfer/Feed System	1997	3	20	A new complete liquid ferric system has been installed.
Lime Storage/Transfer/Feed System Storage system Transfer system Feed system	 1949 1965 1998	 51 35 2	 20 5 20	The lime feeders have been replaced. The storage and pneumatic lime transfer system needs upgrading.
Chlorine Storage/Transfer/Feed System	1997	3	20	A new complete chlorine system has been installed.
Fluoride Storage/Transfer/Feed System Storage system Transfer system Feed system	 1952 1952 1996	 48 48 4	 10 10 20	The fluoride feeders have been replaced. The storage and transfer system needs upgrading.
Sludge Handling / Disposal System	1926	74	25	Sludge has been removed from lagoon #1 to replace lost storage capacity, and a residuals management system is being planned that will provide flexibility for alternating between each side of the lagoon which will result in sludge removal savings.
Process Control / Data Acquisition System	2000	0	15	A new SCADA system has been installed and is fully operational.

EXHIBIT 3

PROVIDENCE WATER

SUMMARY OF PRINCIPAL COMPONENTS BY FACILITY CATEGORY

PRINCIPAL COMPONENTS BY CATEGORY	Approximate Installation Date(s)	Average Approx. Age of Component	Approx. Practical Remaining Life (years)	Condition
TRANSMISSION SYSTEM				
90-inch Scituate Tunnel and Aqueduct	1925	75	50	Extensive concrete corrosion damage has been detected along the 90 inch aqueduct as it leaves the plant.
Supplemental Tunnel and Aqueduct (102" & 78")	1970	30	50	A section of the 102" portion of the aqueduct failed in 1996 and was subsequently repaired. The 102" has been fully inspected and rehabilitated where problems were identified. The 78" portion of the aqueduct will need to be inspected.
Transmission Mains (16" to 66")	1871-1984	83	various	Some of the mains are older than 100 years and will eventually need to be replaced.
Transmission Valves (16" to 60")	1871-2000	47	various	Many of the valves are old and need to be replaced. Plans are to replace 16" and larger valves in the system that are older than 75 years with new butterfly valves. Plans are to replace approximately 138 valves in the first five year period.

EXHIBIT 3

PROVIDENCE WATER

SUMMARY OF PRINCIPAL COMPONENTS BY FACILITY CATEGORY

PRINCIPAL COMPONENTS BY CATEGORY	Approximate Installation Date(s)	Average Approx. Age of Component	Approx. Practical Remaining Life (years)	Condition
DISTRIBUTION SYSTEM				
Distribution Mains (6" to 12")	1871-2000	69	various	Approximately 30% of mains consist of unlined cast iron pipe installed prior to 1900. Main replacements will be necessary.
Distribution Valves (6" to 12")	1871-2000	59	various	Of the approximately 12,608 valves in the system, 1,717 have been identified as 6", 8" and 12" diameter valves 100 years and older. Plans are to replace these valves in conjunction with the main replacement program. Older distribution valves that are found to be defective and valves in areas of local and state road resurfacing projects will also be replaced.
Services	1871-2000	91	various	Approximately 37 percent of all of the services in the system are lead. Plans are to initially replace these services on main replacement projects. The goal is to replace all lead services over a 30 year period.
Hydrants	1941-2000	31	various	Plans are to replace all hydrants as they become 50 years old with new breakaway style hydrants.
Meters	1950 -2000	25	5	Plans are to replace all older customer water meters which have outlived their standard useful life with new meters over the next six years. The objective thereafter will be to replace meters every 15 years.

EXHIBIT 3

PROVIDENCE WATER

SUMMARY OF PRINCIPAL COMPONENTS BY FACILITY CATEGORY

PRINCIPAL COMPONENTS BY CATEGORY	Approximate Installation Date(s)	Average Approx. Age of Component	Approx. Practical Remaining Life (years)	Condition
PUMPING AND STORAGE				
Aqueduct Reservoir and Gatehouse	1962	38	50	The reservoir has been fully rehabilitated. Exterior waterproffing was applied and cracks and construction joints on the interior of the structure were sealed.
Neutaconkanut Reservoir and Gatehouse	1928	72	35	Dates back to the 1920s. The interior of the reservoir needs to be inspected. The need for some concrete rehabilitative work is anticipated. The roof of the gatehouse was replaced but the structure is in need of structural rehabilitation.
Longview Reservoir and Gatehouse	1928, 1990	41	50	The reservoir has been fully rehabilitated. Exterior waterproffing was applied and cracks and construction joints on the interior of the structure were sealed. The gatehouse is in good condition.
Ridge Road Reservoir	1989	11	40	The storage tank is relatively new and in good condition.
Lawton Hills Reservoir	1972	28	40	The interior of the reservoir needs to be inspected. The need for some concrete rehabilitative work is anticipated. The roof of the gatehouse was replaced but the structure is in need of structural rehabilitation.
Garden Hills Pump Station	1959	41	10	The pump station dates back to 1960 but is in relatively good condition. The pumps and hydropneumatic tank are old and will need to be targetted for future replacement.
Dean Estates Pump Station	1982	18	10	The pump station dates back to the 1980s and is in relatively good condition. The roof of the building was replaced. The pumps and hydropneumatic tanks will need to be considered for future replacement.
Fruit Hill Pump Station	1989	11	20	The pump station is relatively new and in good condition.
Bath Street Pump Station	1928	72	25	The pump station has been fully rehabilitated to include replacing pumps, replacing suction and discharge piping, instrumentation and electrical system upgrades, architectural and structural improvements, and installation of an emergency power generator.
Neutaconkanut Pump Station	1935	65	25	The pump station has been fully rehabilitated to include replacing pumps, replacing suction and discharge piping, instrumentation and electrical system upgrades, architectural and structural improvements, and installation of an emergency power generator.
Greenville Ave Pump Station	1994	6	20	The pump station is relatively new and in good condition.
Scituate Ave Pump Station	1972	28	10	The four (4) original booster pumps need to be replaced with new pumps of increased capacity. The suction and discharge lines need to be repiped for increased size. Pump starters, pump feeders, instrumentation and controls, and system wiring, need to be replaced.
Alpine Estates Pump Station	1988	12	5	The station needs an upgrade to the electrical supply, new valves and piping for the pumps, a new pneumatic pressure tank, and various new system controls.
Ashby Street Pump Station	1999	1	25	The pump station is new and in excellent condition.
Cranston Commons Pump Station	1996	4	20	The pump station is relatively new and in good condition.

EXHIBIT 3

PROVIDENCE WATER

SUMMARY OF PRINCIPAL COMPONENTS BY FACILITY CATEGORY

PRINCIPAL COMPONENTS BY CATEGORY	Approximate Installation Date(s)	Average Approx. Age of Component	Approx. Practical Remaining Life (years)	Condition
SUPPORT SYSTEMS & FACILITIES				
Forestry Garage	1962	38	30	Various rehabilitative work has been conducted to the facility. The building is 38 years old and will require structural, architectural, and mechanical rehabilitation as dictated by need.
Academy Ave Administration Building	1954	46	10	Various rehabilitative work has been conducted to the facility. The building is 46 years old and will require structural, architectural, and mechanical rehabilitation as dictated by need. A new administration building is needed.
Aqueduct Reservoir Administration Building	1997	3	10	The building is constructed out of modular units. The facility is considered to be temporary and will need to be replaced.

SECTION II
IFR PROGRAM ACCOMPLISHMENTS

SUMMARY OF IFR PROGRAM ACCOMPLISHMENTS
1996 - 2000

In 1996, Providence Water prepared and submitted its first 20-year Infrastructure Replacement Plan consistent with the provisions of the Comprehensive Clean Water Infrastructure Act in 1993 in accordance with Chapter 46-15.6 of the General Laws of the State of Rhode Island. The plan was structured to provide for a program of systematic and scheduled improvements to the system, both to stem the tide of deterioration that had taken place, and to provide for a continued program of scheduled upgrades of system components as they reach the end of their useful life in order to ensure the continued reliability of the water system into the future.

In that plan, we outlined an aggressive plan of infrastructure replacement work in all areas of the system, with particular attention in the first years targeted especially to the critical components of the system whose age had made them susceptible to failure and to operational problems and which had the potential to threaten the integrity of the water supply. Many of these system components dated all the way back to the original plant construction in the 1920's or at the latest, to the last round of improvements which were done to the system in the 1960's and early 70's.

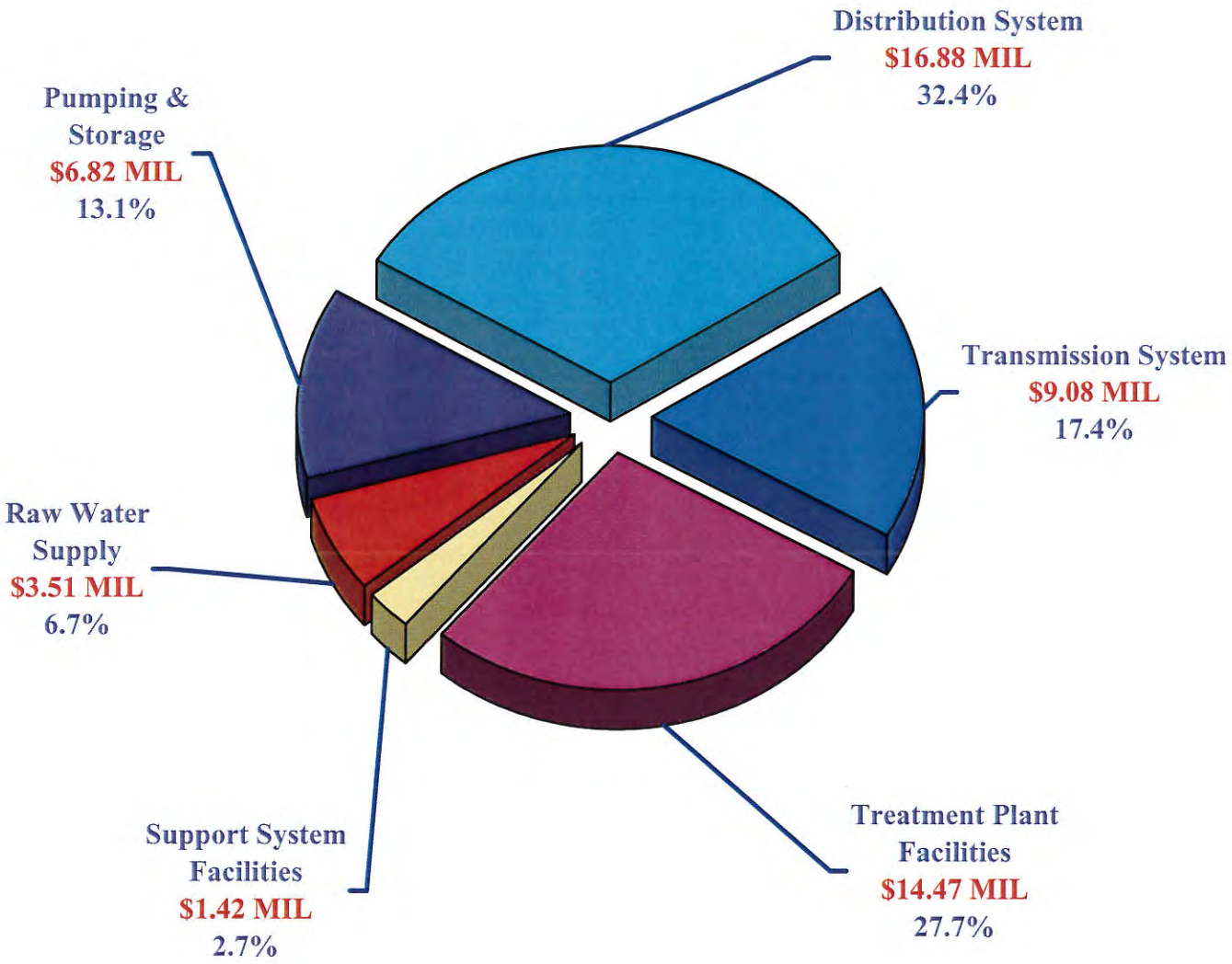
The plan identified approximately $200,000,000 in needed upgrade work to be accomplished over the ensuing 20-year period. Of this, an ambitious $44 million in work was planned for the 5-year period beginning with the 1996 submission of the plan. At that point, sufficient funding for accomplishing this work over the 5-year period was not yet in place and Providence Water petitioned the Public Utilities Commission (PUC) for the necessary funding authorizations. The PUC did subsequently authorize a gradually escalating funding mechanism through rate revenues upon which we then embarked aggressively on getting these needed improvements to the system done.

Our initial 5-year effort was a resounding success, with us not only meeting the objectives of our plan but exceeding them in terms of needed reinvestment into the system. Over our 5-year fiscal period from January 1996 through June 2000 we exceeded our $44 million project goal, investing a total of $53 million into the badly needed improvements to our system. Part of this effort included the unexpected and unplanned for work resulting from the catastrophic failure of our 102" aqueduct line.

The following section describes the substantial improvements made to our system during this 5-year period.

EXHIBIT 4
PROVIDENCE WATER

IFR Expenditures For Fiscal Years 1996 Through 2000



Total 5 Year Investment Into System $52.18 MIL.

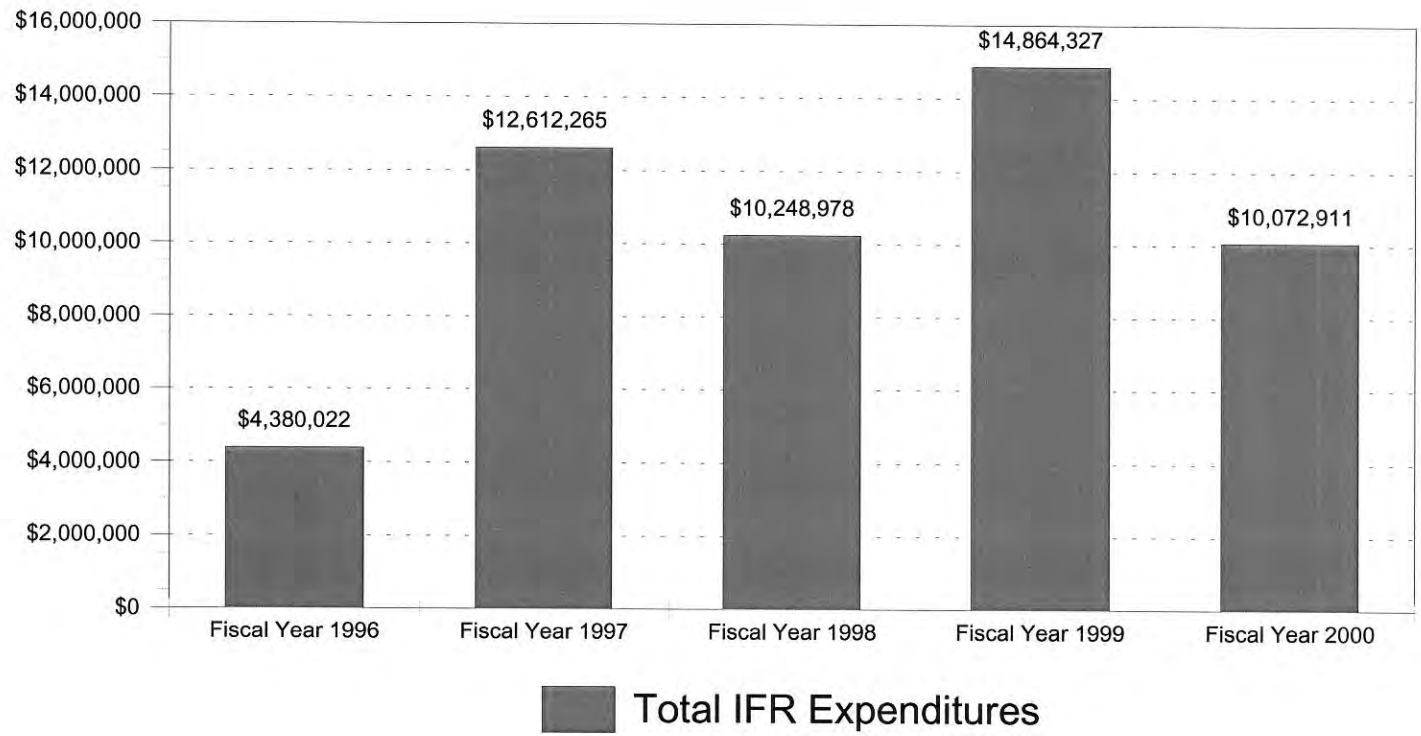
EXHIBIT 5

PROVIDENCE WATER

Summary Of IFR Expenditures

Fiscal Years 1996 To 2000

	Fiscal Year 1996	Fiscal Year 1997	Fiscal Year 1998	Fiscal Year 1999	Fiscal Year 2000	Totals to Date
Total IFR Expenditures	$4,380,022	$12,612,265	$10,248,978	$14,864,327	$10,072,911	$52,178,503



IFR PROJECT STATUS REPORT

PROVIDENCE WATER

5 YEAR INFRASTRUCTURE REPLACEMENT PROGRAM

Years 1996 - 2000

STATUS OF PROJECTS

PROJECTS COMPLETED

Upgrade Bath Street Pump Station

Construction is complete. Rehabilitation of the facility included replacing pumps, replacing suction and discharge piping, instrumentation and electrical system upgrades, architectural and structural improvements, and installation of an emergency power generator. Final pump control programming has been completed.

Bath Street Pump Station before upgrade

Bath Street Pump Station after upgrade

New 1000 kilowatt generator enclosure and transformer at Bath Street Pump Station

Upgrade Neutaconkanut Pump Station

Construction is complete. Rehabilitation of the facility included replacing pumps, replacing suction and discharge piping, instrumentation and electrical system upgrades, and architectural and structural improvements. Final pump control programming has been completed.

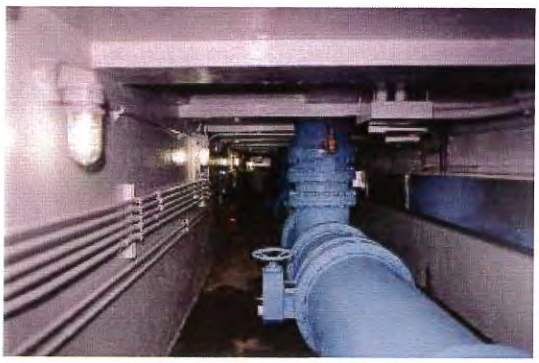
Exterior of Neutaconkanut Pump Station before rehabilitation

Exterior of Neutaconkanut Pump Station after rehabilitation

Interior of Neutaconkanut Pump Station before rehabilitation

Interior of Neutaconkanut Pump Station after rehabilitation

Neutaconkanut Pump Station piping before rehabilitation



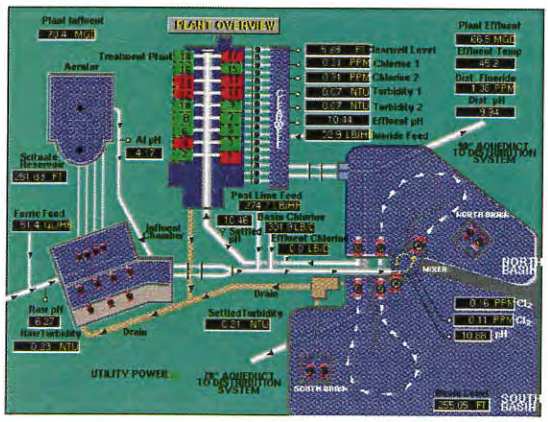
Neutaconkanut Pump Station piping after rehabilitation

Process Control / Data Acquisition System
(Central Control Board Replacement)

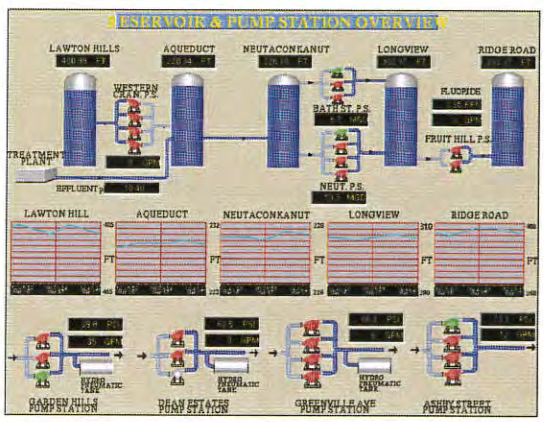
Construction to install a new computerized control, instrumentation, and data acquisition system at the treatment plant is complete. The system to monitor and control the operation of the entire treatment plant is now in operation. Construction of the new control room has been completed, process control equipment has been installed, all remote pump stations and reservoirs are on-line, and all of the in-plant points have been tied into the new control system. Wholesale facilities have been tied into the SCADA (Supervisory Control and Data Acquisition) system. Certification for Y2K compliance has been received from the prime contractor. Logs and reports are fully operational.

Old analog Central Control Board at treatment plant

New state-of-the art computerized Central Control System



Screen display of treatment plant showing all critical operating data



Screen display of operating status of pump stations and distribution reservoirs

Chlorine Room Rehabilitation

Construction is complete for enlarging the chlorine storage room and providing outside access only to the room. Chlorine feeders and storage equipment were replaced and a new emergency ventilation system has been installed in both the chlorine feed and storage areas.

New automated chlorine feeders at treatment plant

The contractor for the project has filed for arbitration for the resolution of outstanding claims. PW has provided Discovery Documents in response to the contractor being sued by one of his subcontractors, and PW legal counsel will advise accordingly to reach project closeout.

Replace Telephone System *

Construction that replaced the existing telephone system with a new system that is better able to handle the needs of the organization is complete. The new system provides additional capacity and is more responsive to customer service needs.

Academy Avenue Administration Building - Heating System

A project has been completed to replace the old malfunctioning boiler and controls with a new boiler. It was necessary to replace the existing boiler due to increasing maintenance and repair costs, and because of a number of leaks occurring on the unit.

Academy Avenue Administration Building - Ventilation Improvements

Construction has been completed to replace the 4 air conditioning roof units and supplemental controls at the Academy Avenue Service building. Replacement of the system increased the capacity by 120,000 BTU=s. The work was needed because the old units were a constant source of problems, unreliable, and in need of numerous repairs. Additionally, the existing units were not adequate for the size of the building.

Academy Avenue Administration Building - Roof/Insulation

Construction was completed to replace the roof at the Academy Avenue Administration Building. The project schedule was accelerated because the old roof had started leaking in a number of locations.

Forestry Garage Roof / Insulation

Included as part of the roof replacement for the treatment plant, the roof at the forestry garage building was replaced and completed during May 1997. The decision was made to move the project up in schedule because the roof was leaking in a number of locations. The construction consisted of removal of the existing roof to the concrete deck and replacement with rubber membrane roofing.

Various Pump Stations - Electronic Equipment Upgrades

Consists of modernizing and replacing electronic instrumentation equipment at various pump stations and distribution reservoirs in the system. To date, transmitters and other equipment have been replaced at Fruit Hill, Garden Hills, Neutaconkanut, Western Cranston, and Dean Estates pump stations, and the Lawton Hills reservoir.

New electrical control system for Western Cranston Pump Station

Dean Estates Pump Station

Neutaconkanut Gate House - Replace Roof

The project has been completed.

Dean Estates Pump Station - Replace Roof

The project has been completed.

Aqueduct Siphon Chamber - Replace Roof

The project has been completed.

Rehabilitate Burton Pond Dam

The project has been completed. The breached area of the earth/masonry dam has been reconditioned. Riprap was installed along the top upstream face of the dam to provide continued slope protection.

Burton Pond Dam

Improvements to Large Dams (Gainer Dam/ Regulating Dam)

Construction has been completed to rehabilitate the 400 feet long Gainer Dam concrete spillway, the blowoff structure, and the meter chamber. Also completed was work to correct undermining of the Regulating Dam spillway structure footing.

PW has resolved the claims with the contractor in an out of court settlement, filed by the contractor, in a superior court suit.

400 foot Gainer Dam spillway showing new concrete facing

Improvements to Large Dams (Ponaganset Reservoir)

Construction is complete for the rehabilitation of Ponaganset Reservoir. Work included repair of dam erosion and placement of riprap, construction of a downstream buttress, restoration of the gate structure and outlet works, improvements to the discharge channel, and reconstruction of the road and drainage system over the dam

Ponaganset Reservoir before rehabilitation

Ponaganset Reservoir after rehabilitation

Auxiliary Wash and Blower System for Filters

Installation of the new air blowers and piping for providing the capacity to air backwash the filters has been completed.

New air blower system at treatment plant for air scour backwashing of filters

Typical new effluent valve actuator at treatment plant providing precise plant effluent control

Replace Effluent Valve Actuators

Valve actuators for all of the plant's filters have been replaced with new internally programmable actuators that will provide improved effluent flow control and compatibility with the new control board system.

Replace Lime Feed Equipment

The old lime feeders at the plant have been replaced with 4 new feeders. New injection piping has been installed to provide for an additional lime injection point prior to raw water aeration for corrosion control optimization purposes. The corrosion control optimization measures are necessary as a result of the lead and copper rule.

Two of four new lime feeders installed at treatment plant

The old tile floor of the room was removed and replaced with a new chemical resistant non-skid epoxy floor.

Replace Ferric Feed Equipment

Installation of a new liquid feed system consisting of new chemical storage tanks, new feeder pumps, controls and piping has been completed. The system replaces the old problem-ridden dry feed system.

New liquid ferric sulfate storage tanks for new chemical feed system

New sulfate feeder equipment and day tanks for liquid ferric sulfate coagulant injection

Longview Reservoir Structural Rehabilitation

Construction is complete for the rehabilitation of the original section of Longview Reservoir. The rehabilitation work consisted of the application of a hot-applied reinforced rubber membrane sealant over the entire roof surface of the reservoir, sealing of all cracks and construction joints on the walls and floor of the interior of the reservoir, replacement of the sluice gate, and replacement of the stop shutters.

Rehabilitation and waterproofing of Longview Distribution Reservoir roof slab

Old Longview Reservoir sluice gate being removed

Aqueduct Reservoir - Inspection / Rehabilitation

Construction is complete to rehabilitate Aqueduct Reservoir. Exterior waterproofing was conducted and application of a hot-applied reinforced rubber membrane sealant over the entire roof surface of the reservoir was installed. Cracks and construction joints on the interior walls and floor of the reservoir were sealed. Final acceptance of loaming and seeding is scheduled for the Fall of 2000.

Installation of new access hatch into the 43 million gallon Aqueduct Distribution Reservoir

Rehabilitation and waterproofing application on top of Aqueduct Distribution Reservoir

Replace Electronic Process Monitoring Equipment

A residual chlorine meter was installed in the clearwell to replace a failed unit. New sonar elevation equipment was installed for the filters to replace the old, unreliable elevation equipment.

Upgrade Service Water / Wash Water System Controls

Work was completed to replace elevation monitoring and control equipment for the service water tank and to install a new remote terminal unit (RTU) for transmitting service water data to the new centralized control system.

Treatment Plant Roof/Insulation

The replacement of the entire roof at the treatment plant has been completed. Construction consisted of the removal of the existing roof to the concrete deck and installation of new roof insulation and a new rubber membrane roof.

New treatment plant replacement roof

Treatment Plant - Replace Boilers and Water Heaters

Replacement of the old deteriorating water heaters and boilers at the treatment plant has been completed. The water heaters and boilers provide heat for the building, and hot water for domestic use and for the treatment process.

Corrosion Protection Twin 60" Mains

Construction was completed to rehabilitate and recoat the 900 feet long exposed portions of the twin 60 inch mains that run from underneath Gainer Dam to the treatment plant. Rusting was removed, the pipes sandblasted, and protective coatings applied.

The exposed portion of twin 60 inch mains inside the junction chamber structure were sandblasted and protective coatings applied to protect against corrosion. In the process two lead joints that were found leaking were resealed.

Corrosion on 60 inch main prior to rehabilitation

Twin 60 inch mains after rehabilitation

Construction has been completed to provide cathodic protection to 1000 feet of the underground portion of the two 60 inch riveted steel underground transmission mains that transport raw water from the Scituate Reservoir to the treatment plant. Four impressed current anode beds have been installed to complete the protection system.

Electrical rectifier to provide cathodic protection to the twin 60 inch mains feeding raw water to the treatment plant

Upgrade Electrical Supply System to Treatment Plant

Construction has been completed for replacement of the old 1920's vintage antiquated substation that fed the treatment plant, rehabilitation of the high voltage sub-transmission line from the Hope Substation to the new substation, replacement of the underground electrical feeders to the treatment plant with new above ground feeders, and provision of a 480 volt transformer and feed line into the plant. This essentially provides a completely new and reliable electrical feed service system to the plant.

New 23,000 / 2,300 transformer and switchgear replacing obsolete electrical feed system to the treatment plant

102" Aqueduct - Investigation/Rehabilitation *

A portion of the 102" transmission aqueduct failed in November 1996. A failure analysis was conducted to determine the cause of the failure and corrective measures needed to prevent future failure. A risk assessment and internal inspection was performed between March 1998 and April 1998. The inspection and risk assessment resulted in recommendations to rehabilitate portions of the 102" main.

Rupture of the 102" Aqueduct – November 17, 1996

Temporary supports to adjacent 66" transmission main

In November 1998 work commenced on the 102" main consisting of exterior rehabilitation, internal reinforcing of sections of pipe with carbon fiber linings, installation of manholes for additional access points, and performing additional inspections of the main.

During January 2000, eleven sections of pipe were rehabilitated with carbon fiber linings, external restoration was conducted to seven sections of pipe with concrete mortar, and three manholes were installed for additional access and de-watering points. A 60" butterfly valve was installed at Budlong Road to replace a defective valve. Approximately 2.5 miles of the 5 mile long pipeline easement was cleared of trees and brush in order to have access to the pipeline for monitoring and maintenance. The entire 5 mile long pipeline route is now accessible by vehicle.

102" Aqueduct prepared for replacement sections

Impact Echo testing of 102" Aqueduct from interior

Exposing deteriorated section of 102" Aqueduct discovered through interior echo testing

Close-up of failed pre-stressed wires of the 102" Aqueduct

Installation of new access manhole into 102" Aqueduct

Crew applying Carbon Fiber Lining to interior of deteriorated section of 102" Aqueduct

Application of carbon fiber to exterior of deteriorated section of 102" Aqueduct

Installation of a new 60" butterfly valve to replace a defective valve at Budlong Road

Rehabilitate Interior of Clearwell

Construction is complete to rehabilitate the interior of the clearwell. Work consisted of rehabilitating eroded concrete surfaces and cracks, and leaking construction joints inside the interior of the structure. Also included in the scope was the structural rehabilitation of two cast-in place concrete 72" x 42" effluent venturi meters. The instrumentation has been fully restored with a new pressure sensing diaphragm type system replacing the annular rings. New process piping and signal wiring has been installed to carry the signal flow to the SCADA system.

Concrete reconstruction and installation of new instrumentation in treatment plant's 72" x 42" effluent venturi meter

Concrete Repairs - Effluent Clearwell Yard

Construction is substantially complete for the rehabilitation of the area of the effluent yard located directly over the clearwell. The scope of work for the project consisted of installation of a new protective structure directly above the clearwell to eliminate the possibility of rainwater or contaminants from entering the clearwell. Also included was rehabilitation of the existing drainage system and replacement of deteriorated

Interior of the Clearwell

concrete slabs. Only waterproofing of the exterior of the clearwell roof remains to provide the surface with a protective coating.

Effluent clearwell yard at treatment plant prior to rehabilitation

Construction of clearwell protective structure

Completed clearwell protective structure

New Access Hatches and instrumentation panel installed over the opening of the venturi meters

Aqueduct Pump Station (electrical upgrade) *

A project was completed to upgrade the electrical service for the pump station to 1200 amps. The old service was undersized and needed to be increased for additional capacity. The upgrade enables all five pumps to run simultaneously and provides extra capacity for future upgrades of the station.

Aqueduct Pump Station (pump upgrades) *

A project was completed to increase the pumping capacity for the station from 4200 gpm to 5800 gpm. Due to the rapid development of housing in the western Cranston area of the system, the elevation at Lawton Hills Reservoir during high summer demand periods could not be properly maintained. With the addition of a fifth pump, the elevation at the reservoir is now stable, and shows little variance during high demand periods.

Wash Water Tank - Replace Check Valves

Two 18" check valves on the washwater pump suction lines were replaced. The old check valves experienced leakage and were not capable of holding prime to the pumps.

One of two new 18 inch check valves on suction lines to wash water pumps

New Raw Water Booster Pump Station generator for backup power to treatment plant

Raw Water Booster Pump Station - Replace Generator *

In March 1996, the engine of the old diesel generator failed and became inoperable. The unit was obsolete and the cost made it unfeasible to further repair the generator. In December 1996 a new 2000 kW generator was installed to replace the old 1750 kW generator. This generator has the capacity to power the entire treatment plant and raw water pumps in the event of an emergency power outage.

Installation of Level Measuring Equipment *

New sonar equipment was installed at Gainer Dam to replace older float style equipment in order to monitor reservoir elevations.

Gainer Dam reservoir elevation monitoring equipment

Filter Gallery Rehabilitation *

A project was completed in March 1996 in which a portion of the east and west walls of the filter gallery were reconditioned. The work was needed because tiles were loosening from the wall and falling in the filters.

Rehabilitate Roads/Fencing Pump Stations and Transmission Lines

Construction is complete for the restoration of the 2500 feet of access road leading into the Neutaconkanut pump station. The project consisted of removal of the badly deteriorated road and curbing, and installation of a new bituminous concrete surface over the entire length.

Construction is complete for the restoration of the north access road leading into the treatment plant. The project consisted of removal of the deteriorated pavement and installation of a new bituminous concrete surface.

Rehabilitated north Access Road to treatment plant

Construction is complete for the restoration of the access road surrounding the storage tank at the Ridge Road site.

Construction is complete for replacing the fencing and relocating the gate structure away from the street at the Engineering and Finance Department office building at the Aqueduct Reservoir site in Cranston in order to address safety concerns associated with the prior entrance configuration.

Various Support System and Facility Improvements *

Various projects have been completed for the rehabilitation to the employee parking lot at the Administration Building at Academy Ave. Portions of the lot were repaved, parking areas were relined, additional parking spaces were created, and an area was allocated for outside access of inventory supplies.

Improvements were made to the fire supply line entering the Academy Ave. building by installing a backflow prevention device to protect the water system and correct fluctuations in water pressure that will prevent the fire alarm system from inadvertently activating.

Construction has been completed for the restoration of the masonry and brickwork for the administration building at Academy Ave. Areas of the building surface had cracked and deteriorated because of age and exposure to the external elements.

Various Distribution System Improvements *

Improvements have been completed in two particular sections of the distribution system. In the Port of Providence, meters have been installed in various industrial buildings to individually meter these accounts. The Port of Providence had previously been metered through old inaccurate master meters. At Harborside Blvd., new mains were installed to Providence Water standards to replace some of the older mains in this area, new fire hydrants were installed, and individual building meters were installed to replace the older inaccurate master meter serving the area.

In the western Cranston section of the system two pressure reducing valves have been rehabilitated, and two others have been replaced. The valves are now fully functional and regulate the static pressure to that area of the system.

Various Treatment Plant Facilities Projects *

Costs were associated with IFR projects that were in progress prior to the submission of the IFR plan commencing fiscal year 1996. These projects consisted of the elimination of the stormwater runoff from entering the filters; replacement of the fluoride feed equipment, and improvements to the pipe gallery wall.

New fluoride feed equipment at treatment plant

PROJECTS IN CONSTRUCTION

Replace Distribution Valves

Since the beginning of fiscal year 1996, 345 distribution valves have been replaced. Construction is ongoing to replace older distribution valves in the system that are found defective. Replacement of valves was significantly accelerated during the 1998 construction season to take advantage of the massive street repaving program conducted by the City of Providence.

Replace Fire Hydrants

Since the beginning of fiscal year 1996, 289 older and obsolete hydrants have been replaced. Construction is ongoing to replace fire hydrants in the system that become damaged or defective. All hydrants being installed are of the newer breakaway type. Older hydrants were additionally replaced by contractors in conjunction with water main replacement projects.

Replace Lead Services

Since the beginning of fiscal year 1996, 2907 lead services have been replaced. Replacement of lead services was significantly accelerated during the 1998 construction season to take advantage of the massive street repaving program conducted by the City of Providence.

Lead services are also being replaced on an ongoing basis when requested by the customer, and at sites identified by the Department of Health as having potential lead contamination problems, even though the lead is generally acquired primarily from sources other than water.

Typical lead service being replaced with a new copper service

Replace 16" and Larger Valves

Three separate contracts were completed for replacing 61 old and outmoded transmission valves in the system. The old gate style valves were replaced with new butterfly valves. The valves were comprised of the following sizes: two (2) 16", thirty-six (36) 24", nineteen (19) 30", and four (4) 42".

Bids have been awarded for the replacement of one-hundred-nine (109) 16", seven (7) 20", and one (1) 30". Construction will commence upon procurement of insurance and bonds, and execution of contract.

Antiquated 16 inch transmission gate valve prepared for replacement

Removal of old 42 inch transmission gate valve

Replace / Upgrade Water Mains

Four separate contracts were completed in which 24,663 feet of main were replaced at 53 locations. All of the mains replaced were bleeder mains and dead-ended mains for which water quality complaints had been received. Bleeder mains are dead-ended mains in which past rusty water problems had necessitated the installation of a continuously discharging small diameter pipe at the end of the main. Out of the 53 locations, 49 were bleeder mains. These have since been eliminated, resulting in a substantial reduction in the wasting of water.

A bid has been awarded for the replacement of approximately 3,350 feet of main at six separate locations. Five of these locations are dead-end bleeder mains, and one location is where water quality complaints were received. Construction will commence upon procurement of insurance and bonds, and execution of contract.

Replace Water Meters *

Plans are to essentially replace all older non-encoded customer water meters that have outlived their standard useful life with new meters. Meters are currently being replace by in-house forces. Since the beginning of fiscal year 1996, 18,570 meters have been replaced. This will result in more accurate readings and better water accountability.

Planning is in progress to replace the older large commercial meters with new meters. These meters register water for large industrial accounts, and are sized 3" and above. Because of the large volume of water that they meter, the need for accuracy is essential.

Sludge Handling/Disposal

Removal of sludge from lagoon #1 began in June 1998. Approximately 23,000 dry tons of ferric sludge were dredged and disposed of. Under the continuing contract, an additional 64,000 wet tons of sludge will be removed over the next five years. A new culvert and stop-log structure was installed between both sections of the lagoon to replace the existing clogged culvert and to provide better control of the deposit of residuals. The overall project consists of the removal, dewatering, and disposal of accumulated sludge from all of lagoon #1 to replace lost storage capacity.

Aerial view of settling lagoons prior to sludge removal

The scope of this project has been expanded to include the design, permitting, and construction of a new residuals management system. The new system, when complete, will allow for the isolation of both sides of lagoon #1 for settling and drying. This will provide system flexibility on being able to alternate between each side of the settling lagoon to allow natural drying of the sludge resulting in considerable future sludge removal cost savings

New culvert and stop-log structure prior to final backfill

Sludge lagoon at the beginning of dredging operations

Sludge lagoon after dredging operations

Sludge lagoon dredging operations in progress

Sludge lagoon dredging operations in progress

Treatment Plant - Upgrade Electrical System - 550V to 480V

A design / build project has been completed to supply power from the 175 kW generator located in the transformer house to the 480 volt motor control center located inside the treatment plant. The generator formerly provided power to only the older 550 volt equipment. The project enabled power supplied from the 175 kW generator located outside the plant to feed both the 550 volt and the new 480 volt motor control centers. As equipment is being upgraded, PW is converting the outmoded 550 volt system to the standard 480 volts.

New 480 volt transformer and motor control center at treatment plant

A study, which reported on the conversion and standardization of all major electrical equipment at the treatment plant from 550v to 480v, was completed and accepted. Design / build documents are currently out to bid for the phase-over from 550v to 480v. The phase-over includes, but is not limited to, the construction of a new electrical room dedicated solely to electrical panelboards and switchgear, the replacement of the 175KW generator with a new 600KW generator and the installation of new power and control wiring to each filter influent and drain actuator.

Academy Ave. - Office Renovation *

The office area of the Academy Ave. building was in poor condition and in need of rehabilitation. The recent phase to rehabilitate the offices for administrative personnel has been completed. Renovation of the customer service entrance is in progress.

Replace Sand Filters

In July 1997 the project to rebuild one filter was substantially completed. The sand media was replaced with a tri media system comprised of anthracite coal, sand, and garnet, and a new underdrain system was installed. An engineering consulting firm performed the design of the new filter upgrade. During July 1997, while conducting a test of the backwash system, a structural failure occurred to the filter in which the new concrete floor slab separated and lifted from the existing concrete. The incident also resulted in damage to some of the underdrain laterals. An independent investigation was conducted by an engineering firm engaged by Providence Water to determine the cause of the failure. The final report was completed in May 1998 which indicated that the failure was due to a design deficiency by the design firm. The filter is presently inoperable and out of service. Schedule for completion of the project is contingent on legal issues. Providence Water has engaged legal counsel to resolve settlement with the designer. Non-binding-mediation is being explored by both parties as a means for resolution.

Providence Water has awarded a bid for the installation of an alternate air scour backwash system for trial on an existing filter. A notice to proceed has been issued to the contractor and PW is awaiting delivery of material for fabrication of the system on-site. The system is intended to improve the effectiveness of the backwash, improve water quality, and extend filter life. The system can be easily installed and removed for repair and maintenance.

Remove/Replace Underground Storage Tanks

Two (2) underground fuel storage tanks have been removed and replaced with two (2) above ground tanks at Raw Water Booster pump station and the Western Cranston pump station at Aqueduct Reservoir. On another regulated tank in Scituate leak monitoring equipment was installed, and modifications were made to the suction and return piping to comply with DEM regulations.

An assessment is being conducted for inspecting and evaluating all tanks located on PW property for compliance in accordance with RIDEM regulations. Recommendations resulting from the assessment will result in further remedial work being performed in accordance with regulatory requirements.

Removal of old underground fuel storage tank at the Western Cranston Pumping Station

Delivery of new above ground fuel storage tank at the Western Cranston Pumping Station

PROJECTS IN ADVERTISEMENT/BID/AWARD

Raw Water Booster Pump Station - Replace Valves

The four 60-inch Raw Water Aqueduct valves that isolate the treatment plant and the Raw Water booster pump station have been tested and evaluated. All four of the valves are in good condition and will not need to be replaced. The electrically operated South Aqueduct Valve formerly had failed to provide a proper seal. The mechanical and electrical stops were adjusted to properly seal the valve. A complete shutdown of the plant can now be performed.

Additionally, the suction and discharge valves for each of the four Raw Water Booster Pumps inside the station were evaluated. All eight suction and discharge valves located inside the pump station do not provide a complete seal. Construction specifications have been advertised replace all eight valves and PW is in the process of evaluating the bids.

Existing Raw Water Booster pumps and valves

Emergency Bypass – Rehabilitation

The rehabilitation of the emergency bypass structure, located at the treatment plant, has been awarded. The project consists of rehabilitation of the sluice gates and access ladders and restoration of the concrete surfaces of the structure. In addition, a new crack-bridging cementitious coating will be applied to the exterior of the new clearwell enclosure and the exterior of the emergency bypass structure. Construction is scheduled to begin in October 2000.

Exterior corrosion of 48" steel transmission main prior to rehabilitation

Cathodic Protection - Transmission Mains *

In 1990, a preliminary corrosion evaluation was conducted on a section of 48" steel transmission main that recommended corrosion protection of the structure to arrest any further deterioration. In order to accomplish this, the main needed to be electrically isolated. The installation of four

isolation couplings to effect this has been completed. Bids have been awarded for the installation of an impressed current cathodic protection system. Construction will commence upon procurement of insurance and bonds, and execution of contract.

In addition to cathodic protection, approximately 1400 feet of the 48" steel water main from Budlong Road to Reservoir Ave. was cleaned and relined with cement mortar to eliminate the leaks that were found on the main.

Interior cement mortar lining machine in 48" steel transmission main

Lining machine applying and troweling cement mortar in 48" steel transmission main

Improvements to Large Dams (Moswansicut Reservoir)

During June 1999 a sand boil and localized seepage was observed in the vicinity of the Dam's left abutment. Immediate action was not required. A design has been completed and due to be advertised for remedial work, which would include construction of a toe drain system and flattening the downstream slope of the dam by the addition of a gravel buttress.

Moswansicut Dam

Neutaconkanut Reservoir Gatehouse Rehabilitation *

A bid has been awarded for masonry restoration of the gatehouse. Various bricks at the northeast section of the building are in disrepair and the foundation at that corner has deteriorated. Work will consist of replacing bad sections of the foundation, replacing the brick, and pressure injecting the exterior and interior of the of the entire structure.

Construction will commence upon procurement of insurance and bonds, and execution of contract.

PROJECTS IN DESIGN

Purification Plant Lab Space Modifications

A design is being updated (because the specification was on hold due to the unavailability of funds) to upgrade the testing laboratory at the Scituate treatment plant. Planned improvements consist of replacement of the laboratory benches and equipment, the installation of new lighting, the installation of a new HVAC system, replacement of the fume hood, and the replacement of the floor.

Improvements to Large Dams (Barden Reservoir)

A contract for design, construction administration, and inspection services has been awarded, and the design is in the early stages to rehabilitate the dam. Rehabilitative work will consist of improvements to spillway area, the upstream slope, and the downstream face and crest of the dam.

Barden Dam

PROJECTS IN PLANNING

Rehabilitation of 90" Effluent Finished Water Aqueduct *

Extensive concrete corrosion damage was discovered in the treatment plant effluent conduit during the rehabilitation of the south venturi meter. Subsequently, a video inspection in mid November 1999 revealed further extensive concrete corrosion damage continuing along the 90" aqueduct as it leaves the plant. Following the inspection, cracks and joints that were found leaking were sealed to eliminate any outside source of water from entering the conduit. Extensive rehabilitative work remains to be done on the aqueduct.

Concrete corrosion damage to the lower half of the effluent conduit

Extensive concrete corrosion damage in vicinity of south venturi meter

A design concept report has been developed to determine approaches for renewing the aqueduct, with multiple methodologies being explored. One preferred option is rehabilitation of the 90" aqueduct using fast curing cementitious materials applied during multiple successful plant shutdowns. Also being planned is the installation of a new valve structure to be located in the 90" aqueduct downstream of the 78" connection. Providence Water presently has no means to isolate the 90" aqueduct in the event of a break or other emergency situation other than shutting down the entire plant. This new valve will provide the means and flexibility to send the plant effluent through either the 78" connection or the 90" aqueduct.

Rehabilitation - 48" Washwater Main - Corrosion Protection
The 48" washwater pipe located in the Pipe Gallery of the treatment plant has shown considerable corrosion of its exterior surface. PW is currently in the process of evaluating possible rehabilitation methods and materials. The ambient conditions in the gallery will determine what coating materials are used to rehabilitate the exterior of the main.

Study / Evaluation of Secondary Dams
An RFP is under development that will assess risks and needs for the smaller secondary dams along the watershed, that will establish a scope of work for future rehabilitation work.

Improvements to Large Dams (Westconnaug Reservoir)
An RFP for design, construction administration, and inspection services is in the early stages to rehabilitate the dam. Rehabilitative work will consist of improvements to the spillway to accommodate design flood capacity, rehabilitation of the spillway base, improvements to the upstream slope, the downstream face, and the crest of the dam.

A design for the smaller Jordan Pond Dam will also be included in the RFP, because of its close proximity the Westconnaug dam. The dam is in disrepair and in need of numerous improvements to include the spillway area, and the outlet masonry structures and discharge pipe.

Mortaring of approximately 40 feet of the downstream face of the stone retaining wall of the dam where seepage had occurred has been accomplished to address immediate structural concerns.

Greenville Ave. P. S. - Replace surge valve *
The existing surge valve, which controls water hammer for the station, is a continuing maintenance problem and a cause for leaks. A project is in the early planning stages to replace the existing 90 degree angle valve with a new butterfly type valve.

PROJECTS PENDING

Rehabilitate Access Roads and Fencing Watershed Area
A physical review of all roads has been conducted. This project has moved down in priority due to other system needs.

Neutaconkanut Reservoir - Inspection / Rehabilitation
Project was scheduled for fiscal years 1999 / 2000 in the IFR plan. Due to funding and priority considerations this has been deferred to a later date.

Lime Silo - Replace Dust Bin, Shaker, and Motor
Project was originally scheduled for fiscal year 1998 in the IFR plan. This has been deferred to a later date.

Hydraulic Rehabilitation Influent Aerator - Nozzles and Valves
Project was originally scheduled for fiscal year 1998 in the IFR plan. This has been deferred to a later date.

Structural Rehabilitation Wash Water Tank
Project was scheduled for fiscal year 2000 in the IFR plan. This has been deferred to a later date.

Treatment Plant Heating System Upgrade
Project was scheduled for fiscal year 2000 in the IFR plan. This has been deferred to a later date.

Treatment Plant - Replace Windows
Project was scheduled for fiscal year 2000 in the IFR plan. This has been deferred to a later date.

Treatment Plant - Replace Exterior Panels
Project was scheduled for fiscal year 2000 in the IFR plan. This has been deferred to a later date.

Influent Structure - Replace Valve Stems
Project was scheduled for fiscal year 1997 in the IFR plan. This has been deferred to a later date.

Treatment Plant - Replace Emergency Generator
Project was planned for fiscal year 1999 in the IFR plan. This has been deferred to a later date.

PROJECTS DELETED FROM PLAN

Structural Rehabilitation Tunk Hill Fire Tower
The tower is no longer utilized by Providence Water personnel. There are no benefits to repairing the tower relative to the cost. The project has been deleted from the plan.

* **Project added to the 5 Year IFR Plan since submission of the 1996 plan**

EXHIBIT 6
IFR PROJECT COST & SCHEDULE REPORT

EXHIBIT 6
IFR PROJECT COST AND SCHEDULE REPORT
commencing Fy 1996

PROJECT DESCRIPTION	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 6/30/00	Funds Needed to Complete
PROJECTS COMPLETED								
Upgrade Bath Street pump station	Planning	In House	Nov 89	100%	Jan 93	NA	$2,471,127	NA
	Design	Feb 93	Oct 93	100%	Apr 95			
	Construction	May 95	Oct 95	100%	Nov 99			
Upgrade Neutaconkanut pump station	Planning	In House	Nov 89	100%	Jan 93	NA	$1,846,799	NA
	Design	Feb 93	Oct 93	100%	Apr 95			
	Construction	May 95	Oct 95	100%	Nov 99			
Process Control / Data Aquisition System (Central Control Board Replacement)	Planning	In House	Jan 92	100%	Sep 93	$2,600,000	$2,472,282	$127,718
	Design	Sep 93	Aug 94	100%	Feb 96			
	Construction	Mar 96	Jun 96	99%	(Dec 00)			
Chlorine room rehabilitation	Planning	In House	Feb 92	100%	May 94	$600,000	$570,822	$29,178
	Design	Jun 94	Jan 95	100%	Dec 95			
	Construction	Jan 96	Jun 96	99%	(see narrative)			
Replace telephone system *	Planning	In House	Apr 97	100%	Jun 97	NA	$350,370	NA
	Design	In House	Jun 97	100%	Jul 97			
	Construction	Jul 97	Nov 97	100%	Nov 98			
Academy Avenue Administration Building - heating system	Planning	In House	May 97	100%	Jun 97	NA	$40,370	NA
	Design	In House	Jun 97	100%	Jul 97			
	Construction	Jul 97	Oct 97	100%	Oct 97			
Academy Avenue Administration Building - ventilation improvements	Planning	In House	Apr 97	100%	Apr 97	NA	$63,773	NA
	Design	In House	May 97	100%	May 97			
	Construction	May 97	Oct 97	100%	Oct 98			
Academy Avenue Administration Building - roof / insulation	Planning	In House	Mar 95	100%	Apr 95	NA	$69,208	NA
	Design	In House	Apr 95	100%	Mar 95			
	Construction	Jun 95	Oct 95	100%	Aug 96			
Forestry garage roof / insulation	Planning	In House	Mar 96	100%	Apr 96	NA	Costs included w/Treatment Plant Roof/Insulation	NA
	Design	Jan 95	Apr 96	100%	Jun 96			
	Construction	Jul 96	Apr 97	100%	Dec 97			
Various Pump Stations - electronic equipment upgrades	Planning	In House	Jan 96	100%	Mar 96	NA	Costs to be determined next report	NA
	Design	In House	Apr 96	100%	May 96			
	Construction	May 96	Jun 96	100%	Jul 97			
Neutaconkanut Gate House - replace roof	Planning	In House	Jan 96	100%	Jul 96	NA	$5,754	NA
	Design	In House	Jul 96	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Aug 98			
Dean Estates Pump Station - replace roof	Planning	In House	Jan 96	100%	Jul 96	NA	$5,754	NA
	Design	In House	Jul 96	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Aug 98			
Aqueduct Siphon Chamber - replace roof	Planning	In House	Jan 96	100%	Jul 96	NA	$5,754	NA
	Design	In House	Jul 96	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Aug 98			
Rehabilitate Burton Pond Dam	Planning	In House	Feb 93	100%	Mar 93	NA	$36,307	NA
	Design	In House	Mar 93	100%	Jun 95			
	Construction	Jul 95	Sep 95	100%	Oct 95			
Improvements to large dams (Gainer/Regulating Dam)	Planning	In House	Jan 95	100%	Nov 95	NA	$1,740,094	NA
	Design	Dec 95	Jun 96	100%	Dec 96			
	Construction	Dec 95	Jun 96	100%	Oct 97			
Improvements to large dams (Ponaganset Reservoir)	Planning	In House	Feb 97	100%	Nov 97	NA	$862,467	NA
	Design	Jan 97	Nov 97	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Oct 99			

EXHIBIT 6
IFR PROJECT COST AND SCHEDULE REPORT
commencing Fy 1996

PROJECT DESCRIPTION	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 6/30/00	Funds Needed to Complete
Auxilary wash and blower system for filters	Planning Design Construction	In House Feb 93 Oct 95	Mar 93 Feb 94 Apr 96	100% 100% 100%	Jan 94 Oct 95 Jul 97	NA	Costs included w/ Replace sand filters	NA
Replace effluent valve actuators	Planning Design Construction	In House In House Apr 96	Jan 96 Mar 96 Jan 97	100% 100% 100%	Mar 96 Apr 96 Jun 98	NA	$310,334	NA
Replace lime feed equipment	Planning Design Construction	In House Jan 95 Apr 96	Jun 95 Jul 95 Oct 96	100% 100% 100%	Jul 95 Mar 96 Jan 98	NA	$837,465	NA
Replace ferric feed equipment	Planning Design Construction	In House Feb 93 Feb 95	Apr 92 Jan 94 Jul 95	100% 100% 100%	Dec 93 Feb 95 Jun 97	NA	$630,277	NA
Longview reservoir - structural rehabilitation	Planning Design Construction	In House May 96 Jun 97	Jan 96 Jan 97 Apr 98	100% 100% 100%	Mar 96 Jun 97 Sep 99	NA	$652,748	NA
Aqueduct reservoir - inspection / rehabilitation	Planning Design Construction	In House May 96 Mar 98	Jan 96 Sep 97 Apr 99	100% 100% 99%	Mar 96 Feb 98 (Oct 00)	$1,500,000	$1,352,407	$147,593
Replace electronic process monitoring equipment	Planning Design Construction	In House In House In House	Jan 96 Apr 96 Jun 96	100% 100% 100%	Mar 96 May 96 Jul 97	NA	Costs to be determined next report	NA
Upgrade service water / wash water system controls	Planning Design Construction	In House In House In House	May 95 May 95 Jun 95	100% 100% 100%	May 95 May 95 Oct 95	NA	Costs to be determined next report	NA
Treatment Plant roof/insulation	Planning Design Construction	In House Jan 95 Jul 96	Mar 96 Apr 96 Apr 97	100% 100% 100%	Apr 96 Jun 96 Dec 97	NA	$324,824	NA
Treatment Plant - Replace boilers & water heaters	Planning Design Construction	In House Feb 93 Dec 94	Dec 93 Feb 94 Jun 95	100% 100% 100%	Jan 94 Dec 94 Jun 97	NA	$202,087	NA
Corrosion protection twin 60" mains	Planning Design Construction	In House In House Jan 98	May 94 May 97 May 98	100% 100% 100%	Oct 94 Dec 97 Jun 99	NA	$462,311	NA
Upgrade Electrical Supply System to Treatment Plant	Planning Design Construction	In House Jan 95 Aug 95	Jan 94 Feb 95 Mar 96	100% 100% 100%	Jan 95 May 95 Sep 96	NA	$945,081	NA
102" Aqueduct-Investigation/Rehabilitation *	Planning Design Construction	In House N/A N/A	Dec 96 Nov 98 Jan 00	100% 100% 100%	Feb 98 Oct 99 Apr 00	NA	$5,891,419	NA
Rehabilitate interior of clearwell	Planning Design Construction	In House May 96 Feb 99	Jan 96 Apr 97 Sep 99	100% 100% 100%	Mar 96 Jan 99 May 00	$1,400,000	$1,237,725	$162,275
Concrete repairs effluent clearwell yard	Planning Design Construction	In House May 96 Feb 99	Jan 96 Apr 97 Jun 99	100% 100% 99%	Mar 96 Jan 99 (Nov 00)	Cost Estimate is Included in "Rehab. Interior of clearwell"	Expenditures are Included in "Rehab. Interior of clearwell"	NA
Aqueduct pump station (electrical upgrade) *	Planning Design Construction	NA NA Jul 99	Jul 98 Jan 99 Oct 99	100% 100% 100%	Dec 98 Apr 99 Mar 00	NA	$105,723	NA

EXHIBIT 6
IFR PROJECT COST AND SCHEDULE REPORT
commencing Fy 1996

PROJECT DESCRIPTION	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 6/30/00	Funds Needed to Complete
Aqueduct pump station (pump upgrade) *	Planning	In House	Mar 00	100%	Apr 00	$80,000	$2,460	$77,540
	Design	In House	Mar 00	100%	Apr 00			
	Construction	Apr 00	Jun 00	100%	Jul 00			
Wash Water Tank - replace check valves	Planning	In House	Jan 96	100%	Feb 96	NA	$25,349	NA
	Design	In House	Feb 96	100%	Mar 96			
	Construction	Apr 96	Sep 96	100%	Jun 97			
Raw Water BPS - replace generator *	Planning	In House	Feb 96	100%	Mar 96	NA	$506,045	NA
	Design	In House	Mar 96	100%	Apr 96			
	Construction	Jun 96	Oct 96	100%	May 97			
Installation of Level Measuring Equipment *	Planning	*various projects*				NA	$7,383	NA
	Design							
	Construction							
Filter Gallery Rehabilitation *	Planning	In House	Jan 95	100%	Jan 95	NA	$55,426	NA
	Design	In House	Jan 95	100%	Feb 95			
	Construction	Mar 95	Jan 96	100%	Mar 96			
Rehab. roads/fencing pump stations / trans. lines	Planning	*various projects*				NA	$218,315	NA
	Design							
	Construction							
Various Support System and Facility Improvements *	Planning	*various projects*				NA	$35,797	NA
	Design							
	Construction							
Various Distribution System Improvements *	Planning	*various projects*				NA	$474,218	NA
	Design							
	Construction							
Various Treatment Plant Facilities Projects *	Planning	*various projects*				NA	$79,689	NA
	Design							
	Construction							

EXHIBIT 6
IFR PROJECT COST AND SCHEDULE REPORT
commencing Fy 1996

PROJECT DESCRIPTION	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 6/30/00	Funds Needed to Complete
CONSTRUCTION								
Replace distribution valves	Planning Design Construction	Work is Ongoing - 345 valves replaced				(1)	$1,458,697	NA
Replace fire hydrants	Planning Design Construction	Work is Ongoing - 289 fire hydrants replaced				(1)	$1,020,999	NA
Replace lead services	Planning Design Construction	Work is Ongoing - 2907 lead services replaced				(1)	$9,143,853	NA
Replace 16 inch & larger valves	Planning Design Construction	Work is Ongoing - 61 large valves replaced				(1)	$2,616,146	NA
Replace / upgrade water mains	Planning Design Construction	Work is Ongoing - 24,663 feet of main replaced				(1)	$2,847,194	NA
Replace water meters *	Planning Design Construction	Work is Ongoing - 18,570 meters replaced				$4,200,000	$1,958,356	$2,241,644
Sludge handling / disposal	Planning Design Construction	In House Jan 95 Sep 97	Jan 96 Feb 96 Jun 98	100% 100% 50%	Feb 96 Apr 97 (Jul 04)	$14,000,000	$6,567,644	$7,432,356
Treatment Plant - Upgrade electrical system - 550V to 480V	Planning Design Construction	In House - - - - - Jun 00	Feb 99 Jun 99 (Nov 00)	100% 100% 0%	Feb 00 Feb 00 (Aug 01)	$1,200,000	$98,777	$1,101,223
Academy Ave - office renovation *	Planning Design Construction	*various projects*				NA	$196,193	NA
Replace sand filters	Planning Design Construction	In House Feb 93 Oct 95	Mar 93 Feb 94 Apr 96	100% 100% see narrative	Jan 94 Oct 95 see narrative	unknown (see narrative)	$890,704	NA
Remove / replace underground storage tanks	Planning Design Construction	*various projects*				NA	$185,763	NA

EXHIBIT 6
IFR PROJECT COST AND SCHEDULE REPORT
commencing Fy 1996

PROJECT DESCRIPTION	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 6/30/00	Funds Needed to Complete
ADVERTISEMENT/BID/AWARD								
Raw Water Booster Pump Station - replace valves	Planning	In House	Dec 96	100%	Apr 98	$200,000	$22,509	$177,491
	Design	In House	Jan 99	100%	Apr 99			
	Construction	Jul 00	(Nov 00)	-----	-----			
Emergency by-pass rehabilitation	Planning	In House	Jan 96	100%	Mar 96	$225,000	$15,681	$209,319
	Design	May 96	Mar 99	100%	Oct 99			
	Construction	Jun 00	(Oct 00)	0%	(Feb 01)			
Cathodic protection - transmission mains *	Planning	In House	Apr 97	100%	Jun 98	$100,000	$40,495	$59,505
	Design	Jun 98	Jul 98	100%	Jan 00			
	Construction	Jul 00	(Aug 00)	40%	(Oct 00)			
Improvements to large dams (Moswansicut Reservoir) (Schedule is for first phase of project)	Planning	In House	Jun 99	100%	Feb 00	$300,000	$23,822	$276,178
	Design	In House	Feb 00	100%	Jun 00			
	Construction	Aug 00	(Mar 01)	0%	(May 01)			
Neutaconkanut Reservoir Gatehouse Rehabilitation *	Planning	In House	Oct 99	100%	Mar 00	$50,000	$7,628	$42,372
	Design	In House	Apr 00	100%	Jun 00			
	Construction	Jul 00	(Nov 00)	0%	(Dec 00)			
DESIGN								
Purification Plant lab space modifications	Planning	In House	Oct 94	100%	Jul 96	$270,000	$45,688	$224,312
	Design	In House	Aug 96	90%	(Nov 00)			
	Construction	-----	-----	-----	-----			
Improvements to large dams (Barden Reservoir)	Planning	In House	Apr 99	100%	May 00	$2,000,000	$15,645	$1,984,355
	Design	Apr 00	Jul 00	25%	(May 01)			
	Construction	-----	-----	-----	-----			
PLANNING								
Rehabilitation of 90" effluent finished water aqueduct *	Planning	In House	Apr 99	80%	(May 01)	$5,000,000	$65,687	$4,934,313
	Design	NA	Jun 00	10%	(May 01)			
	Construction	NA	Jun 00	10%	(May 01)			
Rehabilitation - 48" Washwater Main - Corrosion Protection *	Planning	In House	Jul 00	10%	(Oct 00)	$400,000	$44	$399,956
	Design	In House	Jul 00	0%	(Dec 00)			
	Construction	-----	-----	-----	-----			
Study / evaluation of secondary dams	Planning	Oct 99	Dec 99	95%	(Oct 00)	$100,000	$29,852	$70,148
	Design	NA	NA	NA	NA			
	Construction	NA	NA	NA	NA			
Improvements to large dams (Westconaug Reservoir)	Planning	In House	Jun 00	95%	(Sep 00)	$800,000	$5,589	$794,411
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
Greenville Ave P.S. - Replace surge valve *	Planning	In House	Apr 00	10%	-----	$40,000	$745	$39,255
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			

EXHIBIT 6
IFR PROJECT COST AND SCHEDULE REPORT
commencing Fy 1996

PROJECT DESCRIPTION	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 6/30/00	Funds Needed to Complete
PENDING								
Rehabilitate access roads and fencing watershed area	Planning Design Construction	In House ----- -----	Sep 96 ----- -----	50% ----- -----	----- ----- -----	$800,000	$22,829	$777,171
Neutaconkanut reservoir - inspection / rehabilitation	Planning Design Construction	No Action				$2,200,000	$0	$2,200,000
Lime Silo - Replace dust bin, shaker, and motor	Planning Design Construction	No Action				$20,000	$0	$20,000
Hydraulic rehabilitation influent aerator - nozzles and valves	Planning Design Construction	No Action				$50,000	$0	$50,000
Structural rehabilitation wash water tank	Planning Design Construction	No Action				$70,000	$0	$70,000
Treatment Plant heating system upgrade	Planning Design Construction	No Action				$500,000	$0	$500,000
Treatment Plant replace windows	Planning Design Construction	No Action				$325,000	$0	$325,000
Treatment plant - Replace exterior panels	Planning Design Construction	No Action				$820,000	$0	$820,000
Influent Structure - replace valve stems	Planning Design Construction	No Action				$40,000	$0	$40,000
Treatment Plant - Replace Emergency Generator	Planning Design Construction	Project has been moved and is now included in the project *"Convert secondary voltage from 550V to 480V."*				NA	$0	NA
DELETED FROM PLAN								
Structural rehabilitation Tunk Hill fire tower	Planning Design Construction	Project deleted from plan - See narrative				NA	$0	NA

Total Expenditures $52,178,503

* Projects added to IFR Plan after submission of original plan
(1) Distribution work is ongoing and long term

SECTION III
INFRASTRUCTURE REPLACEMENT EXPENDITURE PLAN

Background - Infrastructure Replacement Expenditure Plan

The plans contained herein are the twenty (20), five (5), and fifteen (15) year forecasts of project needs and expenditures. The twenty year plan is a composite of expenditure forecast for the next twenty years (fiscal years 2001 through 2020), aggregated by major system category into four separate five-year plan increments. The five year plan is organized by specific projects with projects grouped according to functional categories over the five-year period from FY 2001 through FY 2005. The fifteen year plan is generally summarized according to major system components and aggregated into three individual 5-year time increments over the 15-year period from FY 2006 through FY 2020.

The original water supply for our system was obtained from the Pawtuxet River at Pettaconsett in the City of Cranston, with the first service pipe being opened on December 1, 1871. From 1871 to 1902, water was pumped directly from the river and discharged into the system without any purification treatment. In 1906, the City's first slow sand filter water purification system was constructed on the Warwick side of the Pawtuxet River. In addition to Providence, the original water works served Cranston, Warwick, Johnston, and North Providence.

As early as 1910, only 39 years after the completion of this supply, it was apparent that with the growth of Providence and the extension of the distribution system in nearby communities, it would not be many years before the flow from the Pawtuxet River would be inadequate to meet the increased demands. In fact, for a number of years, the consumption during extremely dry weather exceeded the natural flow of the river, and the shortage was made up from water stored in small reservoirs owned by companies operating mills further up the stream.

The constant menace of a possible shortage of water resulted in the appointment by the City Council in January 1913, of a committee to investigate the possibility of developing an increased water supply. Legislation was enacted under which the present supply was built.

The Pawtuxet River served the City of Providence from the time water first reached residents' homes in 1871 to 1926 when the deteriorating quality of water, affected by disposal of residential and industrial pollutants into the area's groundwater system, became a serious problem.

By 1926, health issues and the increasing demand on the Pawtuxet River prompted a milestone Providence City Council decision to develop a new modern water supply system. This consisted of the construction of a large reservoir and treatment plant on the north branch of the Pawtuxet River in the town of Scituate. This system, which today still provides water to most of the State of Rhode Island, consists of the main Scituate Reservoir supply and its five tributary reservoirs.

The main Scituate reservoir was formed by the construction of a dam across the Pawtuxet River at the former village of Kent. The dam, principally of earth, is about 3,200 feet long and 100 feet high. Water storage in the reservoir began on November 10, 1925. An aqueduct from the dam feeds the nearby treatment plant which was placed in operation on September 30, 1926.

The original treatment plant was state-of-the-art at the time of its construction. The plant was considered to be among the most technologically advanced of its day, and for many years the filtration system was the only plant of its type in New England. As demand continued to grow, the treatment plant underwent major expansions and renovations in the 1940's and again in the 1960's. Today, the plant has a maximum treatment capacity of 144 million gallons of water per day and still remains the largest treatment facility in New England.

The system has continued to expand where today it consists of almost 70,000 service connections serving almost two-thirds of the State of Rhode Island through a system of storage tanks, pumping stations, and 937 miles of transmission and distribution mains.

Subsequent to its original construction in the 1920s, Providence Water undertook expansion and capital improvement programs in the 1940's and again in the 1960's. In the context of replacement work, this consisted primarily of improvements to the treatment plant and pumping stations. Since that time, no significant replacement work was accomplished again until the 1990's when Providence Water developed and implemented a proactive infrastructure replacement program intended to reverse the trend of aging and deterioration.

In January 1993 the Rhode Island State Legislature enacted the Comprehensive Clean Water Infrastructure Act. The intent of the legislation was for water suppliers to develop long-term infrastructure replacement programs which would ensure the continued integrity of their systems and provide for funding of this program from water rates.

Pursuant to the enactment of the legislation, the Rhode Island Department of Health, Division of Drinking Water Quality, promulgated Rules and Regulations governing infrastructure replacements for water suppliers. The Rules and Regulations for Clean Water Infrastructure Plans were enacted in January 1995.

On February 29, 1996, Providence Water submitted its first 20 Year Infrastructure Replacement Plan to the Rhode Island Department of Health. In that submission, Providence Water identified $204,215,000 of improvements over a twenty period (fiscal years 1996 through 2015). During the first five years of the plan (fiscal years 1996 through 2000) $44,285,000 of improvements were identified on a specific project-by-project basis.

The plan was amended at various times since 1996 to meet new challenges, and to address the changing needs and priorities. Since 1996, through the end of FY 2000, $53.8 million has been reinvested back into the system, with $15 million of improvements in the distribution system, $14.9 million in treatment, $9.1 million in the transmission system, $7.1 on pumping and storage facilities, $3.5 million to reservoirs and dams, $2.6 million on meter replacements, and $1.7 million on support facilities. Since the inception of our program of infrastructure replacements in 1990, approximately $70 million has been spent on improvements to the system.

Our new plan continues to address improvements to all area of the system in accordance with the Regulations of the Act, intending to provide for a continued program of scheduled upgrades of system components as they reach the end of their useful lives to ensure the continued reliability of the water system into the future.

Our plan addresses $228 million of improvements over the next twenty year period with $54 million scheduled over the first five years of the plan. The latter years of the plan emphasize a major shift and concentration of work into the distribution area. The oldest portion of the distribution system is 130 years old, with approximately 30 percent of the mains having been installed in the 1800's. To insure the integrity and reliability of the system into the future, the upgrading and replacement of distribution mains and their appurtenances will be one of the major concentrations of the Infrastructure Replacement Program.

EXHIBIT 7
TWENTY YEAR
IFR EXPENDITURE PLAN
BY FIVE YEAR PHASES

The twenty year infrastructure replacement expenditure plan is a summary of forecasted expenditure needs for the next twenty years, from fiscal year (FY) 2001 (ending June 30, 2001) through FY 2020 (ending June 30, 2020) aggregated by major system categories into four separate five year plan increments. Senior management staff at Providence Water assessed the facilities consistent with the definitions within the regulations and developed a twenty year project plan. Project needs were determined based on factors such as age, condition, level of priority, and use of engineering and practical judgement.

Project needs are based on the best information and assessments available at this time and will be adjusted and/or modified as changing needs, priorities, or regulatory requirements may necessitate. We consider this plan to be a living document subject to amendments as may be required to match changing State and Federal regulations and changing field conditions. The system's needs have been and will continue to be reevaluated by Providence Water staff on an ongoing basis. Our schedule of proposed facility replacements is consistent with deterioration or obsolescence as we know conditions to be now. The plan's focus is on replacement of facilities necessary to continue to deliver a reliable and healthy water supply to all our customers consistent with drinking water standards and regulations as they presently exist.

All the expenditure estimates calculated herein include a 2% annual cost adjustment for inflation.

EXHIBIT 7

PROVIDENCE WATER

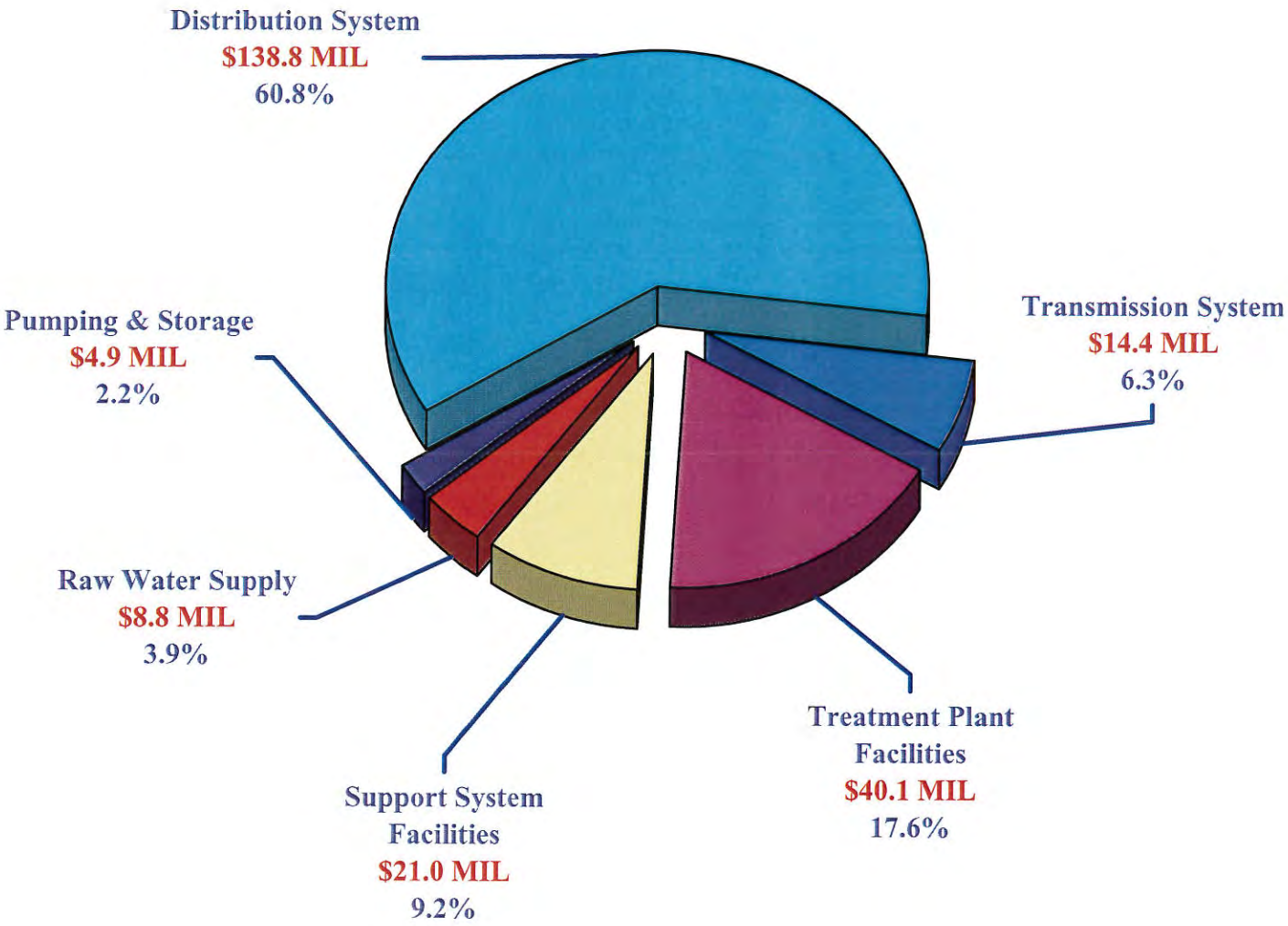
20 Year IFR Expenditure Plan

Fiscal Years 2001 to 2020

Project Description	Total Amount	Fiscal Years 2001 - 2005	Fiscal Years 2006 - 2010	Fiscal Years 2011 - 2015	Fiscal Years 2016 - 2020
Raw Water Supply	**8,800,000**	6,050,000	1,250,000	750,000	750,000
Treatment Plant Facilities	**40,100,000**	22,660,000	13,580,000	950,000	2,910,000
Transmission System	**14,430,000**	9,030,000	1,700,000	1,600,000	2,100,000
Distribution System	**138,740,000**	11,650,000	35,420,000	39,330,000	52,340,000
Pumping and Storage	**4,920,000**	3,910,000	410,000	300,000	300,000
Support System Facilities	**20,980,000**	1,040,000	1,240,000	16,900,000	1,800,000
	$227,970,000	**$54,340,000**	**$53,600,000**	**$59,830,000**	**$60,200,000**

EXHIBIT 8
PROVIDENCE WATER

Planned IFR Expenditures For Fiscal Years 2001 Through 2020



Total 20 Year Investment Into System of $228 MIL.

EXHIBIT 9
FIVE YEAR
IFR EXPENDITURE PLAN
FY 2001- 2005

The Five Year Expenditure Plan is a detail of the planned infrastructure replacement program over the five year period from FY 2001 through FY 2005. The plan is detailed on a project-by-project basis with projects grouped according to functional categories within the system. Project needs are based on the best available information and assessments available at this point in time. The plan will be adjusted and/or modified as changing needs and priorities may require. All expenditure estimates include a 2% annual inflationary cost adjustment. The tabular project listing is followed by a brief narrative overview of the scope of each project.

EXHIBIT 9

PROVIDENCE WATER

5 Year IFR Expenditure Plan

Fiscal Years 2001 to 2005

Project Description	Total Amount	Fiscal Year 2001	Fiscal Year 2002	Fiscal Year 2003	Fiscal Year 2004	Fiscal Year 2005
Raw Water Supply						
Evaluation of secondary dams	**70,000**	70,000				
RWBPS - replace valves	**170,000**	170,000				
Rehabilitate large dams						
Moswansicut Pond Dam	**330,000**	130,000		200,000		
Barden Reservoir Dam	**2,000,000**		2,000,000			
Regulating Reservoir Dam	**1,200,000**					1,200,000
Westconnaug Reservoir Dam	**1,000,000**			1,000,000		
Hydro gate house - repl. valve shafts, guides, stop shutters	**170,000**			40,000	130,000	
Gainer Dam gate house - arch. & struct. rehabilitation	**200,000**			200,000		
Raw Water Booster P.S. - replace boiler and heating system	**100,000**		100,000			
Rehabilitate Gainer Dam stonewall	**400,000**			400,000		
60" influent conduits - replace valves	**370,000**				370,000	
90" iInch influent conduit - inspection	**40,000**		40,000			
Subtotal	**$6,050,000**	**$370,000**	**$2,140,000**	**$1,840,000**	**$500,000**	**$1,200,000**
Treatment Plant Facilities						
Rehabilitate pipe gallery main	**530,000**	530,000				
PW lab improvements	**400,000**	400,000				
Sludge removal and disposal	**7,510,000**	3,150,000	2,560,000	1,800,000		
SCADA system upgrades	**500,000**	100,000	100,000	100,000	100,000	100,000
Emergency bypass rehabilitation	**230,000**	230,000				
Replace sand filters	**8,700,000**	750,000	760,000	780,000	3,170,000	3,240,000
Rehabilitate Venturi tube effluent meters - 12 inch diameter	**400,000**			400,000		
Replace aerator actuators & influent valves	**600,000**				600,000	
Structural rehabilitation - wash water tank	**100,000**			100,000		
Replace drain gates for sedimentation basins	**300,000**			300,000		
Mixer - structural concrete rehabilitation	**500,000**			500,000		
Rehabilitate lime transfer system	**470,000**		470,000			
Treatment plant heating system upgrade	**150,000**			150,000		
Influent structure - replace valve stems	**100,000**		100,000			
Convert secondary voltage from 550V to 480V	**1,300,000**	1,300,000				
Replace wash water pumps	**220,000**			220,000		
Replace service water pumps	**20,000**		20,000			
Replace effluent valves	**280,000**				280,000	
Rehabilitate limestone and granite exterior blocks	**100,000**					100,000
Replace water heaters for process water	**20,000**		20,000			
Office a/c and ventilation upgrades	**60,000**		60,000			
Access road drainage improvements	**30,000**					30,000
Ferric sulfate - metering system	**20,000**		20,000			
Particle counters and process meter replacement	**120,000**		10,000	100,000		10,000
Subtotal	**$22,660,000**	**$6,460,000**	**$4,120,000**	**$4,450,000**	**$4,150,000**	**$3,480,000**

EXHIBIT 9

PROVIDENCE WATER

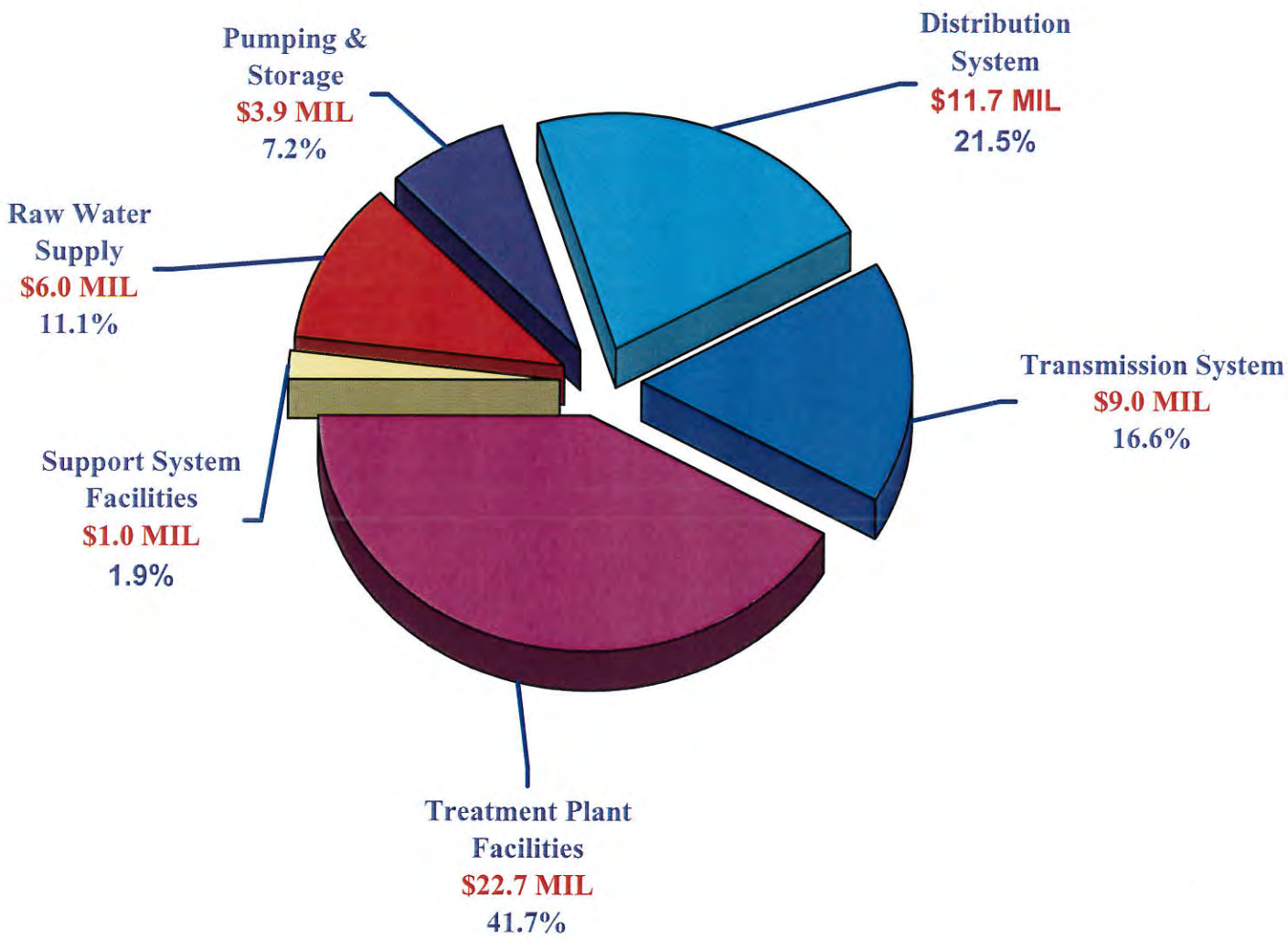
5 Year IFR Expenditure Plan

Fiscal Years 2001 to 2005

Project Description	Total Amount	Fiscal Year 2001	Fiscal Year 2002	Fiscal Year 2003	Fiscal Year 2004	Fiscal Year 2005
Transmission System						
Replace 16 inch & larger valves	**3,300,000**	1,000,000	1,200,000		550,000	550,000
Cathodic protection - 48" steel main	**50,000**	50,000				
Inspect / rehabilitate 90" aqueduct	**5,000,000**	2,500,000	2,500,000			
Inspection 102" aqueduct	**270,000**					270,000
Inspection of 78" aqueduct	**270,000**				270,000	
Piping for transmitters for 78" Venturi meter	**40,000**		40,000			
Improvements to structure "D"	**100,000**				100,000	
Subtotal	**$9,030,000**	**$3,550,000**	**$3,740,000**	**$0**	**$920,000**	**$820,000**
Distribution System						
Replace / upgrade water mains	**2,500,000**	400,000	400,000	400,000	600,000	700,000
Replace distribution valves	**900,000**	100,000	200,000	200,000	200,000	200,000
Replace lead services	**900,000**	100,000	100,000	100,000	300,000	300,000
Replace fire hydrants	**900,000**	100,000	100,000	100,000	300,000	300,000
Replace water meters	**6,350,000**	1,200,000	1,200,000	1,200,000	1,250,000	1,500,000
Leak detection	**100,000**			30,000	30,000	40,000
Subtotal	**$11,650,000**	**$1,900,000**	**$2,000,000**	**$2,030,000**	**$2,680,000**	**$3,040,000**
Pumping and Storage						
Alpine Estates - pumping station upgrade	**180,000**	20,000	160,000			
Aqueduct Pump station upgrades	**1,150,000**	80,000	1,070,000			
Lawton Hills reservoir - inspect / rehabilitate	**400,000**			400,000		
Neutaconkanut reservoir - inspect / rehabilitate	**2,000,000**			50,000	950,000	1,000,000
Neutaconkanut gate house rehabilitation	**40,000**	40,000				
Greenville Ave. P. S. - replace surge valve	**40,000**	40,000				
Garden Hills P. S. upgrade	**100,000**					100,000
Subtotal	**$3,910,000**	**$180,000**	**$1,230,000**	**$450,000**	**$950,000**	**$1,100,000**
Support System Facilities						
Academy Ave - general building improvements	**500,000**	100,000	100,000	100,000	100,000	100,000
Replace underground storage tanks	**390,000**	50,000	170,000	170,000		
Rehabilitate fencing and roads	**50,000**		50,000			
Forestry Building - heating system upgrade	**100,000**				100,000	
Subtotal	**$1,040,000**	**$150,000**	**$320,000**	**$270,000**	**$200,000**	**$100,000**
Total	**$54,340,000**	**$12,610,000**	**$13,550,000**	**$9,040,000**	**$9,400,000**	**$9,740,000**

EXHIBIT 10
PROVIDENCE WATER

Planned IFR Expenditures For Fiscal Years 2001 Through 2005



Total 5 Year Investment Into System of $54.3 MIL.

FIVE YEAR IFR EXPENDITURE PLAN
PROJECT OVERVIEW FY 2001 - 2005

PROVIDENCE WATER

FIVE YEAR INFRASTRUCTURE REPLACEMENT PROGRAM

PROJECT OVERVIEW

Years 2001 - 2005

RAW WATER SUPPLY

Evaluation of Secondary Dams

There are several secondary dams located throughout the watershed. These secondary dams were constructed in the mid to late 1800's prior to the development of the Scituate Reservoir. A study is needed to provide a risk assessment and structural analysis for these smaller secondary dams along the watershed that will establish a scope of work for future rehabilitation work.

Raw Water Booster Pump Station - Replace Valves

The suction and discharge valves for each of the four Raw Water Booster Pumps inside the station do not provide a complete seal and need to be replaced. Four (4) 30" valves and four (4) 36" valves need replacement.

Rehabilitate Large Dams

At Moswansicut Reservoir Dam, plans are to perform remedial work which will include construction of a toe drain system and further stabilizing the downstream slope of the dam by the addition of a gravel buttress. A later phase of the project will address such work as armoring the upstream slope, regrading the crest of the dam, and clearing and grubbing both the spillway and the emergency spillway discharge channels. Also planned is regrading of the access road to the dam and concrete restoration of the drop inlet spillway structure.

At Barden Reservoir Dam, plans are for improvements to the spillway area, the upstream slope, regrading the crest and downstream slope to further stabilize the dam, improvements to enable the dam to meet the spillway design flood capacity, rehabilitation of the outlet structures and discharge channels, and regrading the access road to the dam.

At Regulating Reservoir Dam, plans are for armoring the upstream slope of the dam to prevent erosion, construction of a paved drainage ditch at the right abutment to control runoff, correcting erosion behind the downstream wingwalls, and rehabilitation of the spillway structure. Work also planned is the installation of a sluice gate in the outlet works which would replace the current stop log channel, creating a safer operation for employees.

At Westconnaug Reservoir Dam, rehabilitative work will consist of improvements to allow the dam to accommodate the spillway design flood capacity, rehabilitation of the spillway base, and improvements to the upstream slope, the downstream face, and the crest of the dam. Improvements for the smaller Jordan Pond Dam will also be included in this work because of its close proximity to the Westconnaug Dam. The dam is in disrepair and in need of numerous improvements including the spillway area, and the outlet masonry structures and discharge pipe.

Hydro Gate House - Replace Valve Shafts, Shaft Guides, and Stop Shutters

The stems, stem guides, and fasteners for the gates at the Gainer Dam Gatehouse have rusted and show deterioration. Plans are to replace the devices with new hardware. Approximately fifty (50) stop shutters at the gatehouse also need to be replaced.

Gainer Dam Gate House - Architectural and Structural Rehabilitation

Rehabilitative work is needed at the Gainer Dam Gate House consisting of replacement of the roof and rehabilitation of the interior and exterior portions of the building to include areas of the basement, main floor, switch room, and attic gallery.

Raw Water Booster Pump Station - Replace Boiler and Heating System

The boiler is old and unreliable and dates back to the original construction of the pump station. The boiler experiences electrical problems, leaks, and requires continual maintenance. The plan is to replace the boiler.

Rehabilitate Gainer Dam Stone Wall

The stone wall that runs along both sides on the top of Gainer Dam on Route 12 (Scituate Ave.) has deteriorated and is in need of rehabilitation. The stone guard wall was constructed in 1921 and is a dry masonry type wall approximately 2.5' high and 7200' long. The wall is considered an aesthetic landmark within the local community and was identified as such in the Town of Scituate Comprehensive Plan (1991). A portion of this project qualifies for funding through the Transportation Enhancement Program. The Town of Scituate would act as the applicant as required by the legislation.

60" Influent Conduits - Replace Gate Valves

The two (2) 48" valves located in the junction chamber that control the flow of water for the twin 60" mains that transport water from Gainer Dam to the 90" main that delivers water to the treatment plant are approximately seventy-five years old. One of the valves doesn't close properly causing a significant escape of water by the valve. The plan is to remove both valves, and to install two (2) new 48" replacement valves.

90" Influent Conduits - Inspection

The 90" influent conduit that transport raw water from Gainer Dam to the treatment plant is approximately seventy-five years old. The plan is to inspect this main to determine its condition and evaluate its need for any rehabilitative work.

TREATMENT PLANT FACILITIES

Rehabilitate Pipe Gallery Main

The existing 48" steel filter washwater delivery main located in the pipe gallery was installed during three different construction phases. The first pipe section was installed during the original construction of the plant. The additional sections were installed during the 1940's, with another section added during the 1960's. Various degrees of coating failure and corrosion have occurred along the entire 370' length of pipe. The pipe is affected by the ambient conditions which are continually cool and damp. All of the existing coatings on the steel main and the thirty-six (36) associated laterals need to be removed, and a new protective coating system needs to be installed to extend the life of the main.

PW Lab Improvements

The testing laboratory was last renovated in the early 1960's. Since then, no alterations or improvements have been made to the area. The laboratory is in need of improvements and upgrading consisting of replacement of the floor, replacement of the laboratory benches and equipment, electrical upgrades, plumbing improvements, and the installation of HVAC equipment.

Sludge Removal and Disposal

The overall project consists of the removal, dewatering, and disposal of all of the accumulated sludge from lagoon #1 to replace lost storage capacity. The project also includes installation of a new culvert and stop-log structure between both sections of the lagoon to replace the existing culvert, and to provide better control of the deposits of treatment residuals. A new residual management system consisting of new conveyance channels and control structures will be provided for system flexibility and to alternately isolate each side of the lagoon. This will provide for considerable future savings in the sludge removal process.

SCADA System Upgrades

A new computerized control, instrumentation, and data acquisition system that monitors and controls the operation of the entire treatment plant has been installed. The system comprises state-of-the-art computer technology equipment. Technology is ever-changing however and upgrades are routinely needed. The annual amount is included as a budget number to anticipate ongoing needs which include hardware replacements, software upgrades, and additional hardware and software for future applications. Hardware needs will consist of replacing printers, monitors, memory modules, and upgrades to the workstation. Software upgrades will consist of upgrades for newer versions of existing software for optimizing use of the system and for new applications. Any additional applications for the system will require the acquisition of data input/output cards, modems, remote terminal units, and software revisions for incorporation of the new equipment into the system.

Emergency Bypass Rehabilitation

The treatment plant's concrete emergency by-pass conduit and effluent chamber need work consisting of restoration of the concrete surfaces and rehabilitation of the sluice gates and access ladders.

Replace Sand Filters

The filter media in the plant filters dates back to the 1960's and parts of the underdrain system date back to the plant's original construction in the 1920's. Two (2) filters have failed and are presently out of service. Plans have been to refurbish all of the plant's filters.

During 1997, while conducting a backwash test for the first filter that was refurbished, a structural failure occurred which resulted in delay of this entire project. An independent investigation conducted by an engineering firm concluded that the failure was due to a design deficiency by the firm hired to perform the design. Resolution of resultant legal issues has delayed this entire project.

With the legal claims now resolved, plans are to replace the mono-media sand system with an alternate multi-media system and to install new filter underdrains. Plans are to upgrade eleven (11) of the eighteen (18) filters over the five year plan.

Rehabilitate Venturi Tube Effluent Meters - 12" diameter

The existing effluent meters date back to the age of the filters. Plans are to replace or rehabilitate the meters.

Replace Aerator Actuators and Influent Valves

There are four (4) 36" influent butterfly valves for the aerators that need to be replaced due to corrosion and age. The project consists of replacing all four valves, replacing all electrical ducts, installing new power wiring and a new motor control system, and adding new RTU equipment for communication with the SCADA system.

Structural Rehabilitation Wash Water Tank

The washwater tank is a circular concrete underground tank located near the base of the elevated service tank north of the treatment plant. The tank needs to be inspected. From a previous inspection, and from what is fairly typical of concrete tanks, any deteriorated and cracked concrete surfaces on the interior of the storage tank would need to be rehabilitated, and the brickwork surrounding the 48" diameter inlet/outlet pipe will need some restoration.

Replace Drain Gates for Sedimentation Basins

The drain gates for the sedimentation basins are old and worn and need to be replaced. They date back to the original plant construction. The project consists of replacing the two (2) drain sluice valves for the south basin and the two (2) drain sluice valves for the north basin. The work will include all the associated rehabilitative work for the concrete walkways. Electrical work would include providing three-phase power to the gates, a remote starter system, and SCADA connections to the main plant.

Mixer - Structural Concrete Rehabilitation

There is substantial structural and concrete spalling at the mixer and in the area of the walkways adjacent to mixer. The mixer needs to be rehabilitated to correct the problem.

Rehabilitate Lime Transfer System

Parts of the lime transfer system have worn down due to age and corrosion. The entire system inside the silo needs to be mechanically rehabilitated to restore its useful life consisting of replacing the fan equipment, the shaker, the blower, and the valves. The piping from the storage bins to the hoppers needs to be replaced.

Treatment Plant Heating System Upgrade

Upgrades are needed to the heating system at the treatment plant to include replacing approximately forty (40) unit heaters, thirty (30) thermostats, adding a heat exchanger, and replacing miscellaneous piping.

Influent Structure Replace (Drain and By-pass) Valve Stems

The stems for the valves are worn and need replacement. The project calls for the replacement of the stems for four (4) by-pass gate valves and the stems for the three (3) drain valve sluice gates for the influent structure.

Convert Secondary Voltage from 550V to 480V

The existing electrical system at the treatment plant is an antiquated non-standard 550 volt system. The system needs to be updated and modernized and converted to a standard 480 volt system.

As equipment is being upgraded, PW is converting the outmoded 550 volt equipment to the standard 480 volt system. Plans are to construct a new electrical room dedicated solely to electrical panelboards and switchgear, replacement of the 175 KW generator with a new 600 KW generator, and installation of new power and control wiring to each filter influent and drain actuator.

Replace Wash Water Pumps

The two (2) 5600 GPM pumps for the service water system are almost forty years old and need to be replaced. Plans are to replace the two pumps.

Replace Service Water Pumps

The two (2) 1750 GPM pumps for the service water system are almost forty years old and need to be replaced. Plans are to replace the two pumps.

Replace Effluent Valves

Each of the plant's eighteen (18) filters have two (2) effluent valves. The valves regulate and isolate the volume of water leaving the plant. Six (6) of the valves were changed on previous projects. Some of the remaining thirty (30) valves do not maintain a complete shutdown when closed. Plans are to replace all of the thirty (30) 12" valves with new 12" butterfly valves.

Rehabilitate Limestone and Granite Exterior Blocks

Areas of the building surface for the treatment plant have cracked and deteriorated because of age and exposure to the external elements. Plans are to rehabilitate the limestone and granite in the area of the steps and walls of the main entrance.

Replace Water Heaters for Process Water

The two (2) water heaters at the plant need replacement. Both units have failed and are out of service. The process water is presently heated by one of the two (2) large heating boilers. It would be more cost efficient to replace the two (2) heaters with a small boiler to be used to only heat the process water. A heat exchanger would be added to the system to supply redundancy to the entire heating system in the event the existing heat exchanger fails.

Office Air Conditioning and Ventilation Upgrades

The plan is to upgrade some of the basement offices at the treatment plant by installing an HVAC system. This will require the installation of rooftop units for office air conditioning, and the installation of heating coils to the existing system to replace the old blower units. An air-conditioning system presently does not exist for these offices, and the current heating system is ineffective.

Access Road Drainage Improvements

The road following the perimeter of the north sedimentation basin has a poor drainage condition causing ponding several inches deep in certain areas resulting in severe erosion of the road. Nine (9) culverts for the system are not operating properly. The system needs to be rehabilitated to correct the problem.

Ferric Sulfate - Metering System

The amount of liquid ferric in the three (3) bulk storage tanks is electronically monitored and sent to the SCADA system through sonar level indicators. The amount of ferric that is delivered through trucks is determined by marking the elevation differences in the tanks and allowing for use of the chemical during the treatment process. A more direct and accurate way to calculate ferric deliveries is needed. Plans to install a single ferric supply meter that would manifold to all three (3) tanks.

Particle Counters and Process Meter Replacement

Several types of process metering equipment are used at the treatment plant and in the distribution system for monitoring and maintaining water quality. The data is collected and logged for record and reporting purposes. This equipment is replaced on regular recommended intervals to ensure accuracy and reliability. Based on a scheduled replacement, PW is planning to replace two (2) fluoride residual meters, two (2) chlorine residual meters, twenty (20) particle counters, eight (8) pH meters, and four (4) chlorine residual meters in the first five years of the plan.

TRANSMISSION SYSTEM

Replace 16" and Larger Valves

Because of their size, the ability to successfully operate these valves when needed is critical in an emergency shutdown. Plans are to replace the 16" and larger valves in the system that are older than seventy-five years with new butterfly valves. In the five year plan approximately one hundred thirty-eight (138) valves are planned for replacement.

Cathodic Protection - 48" Steel Main

A section of 48" steel transmission main on Budlong Rd. in Cranston needs to be protected against corrosion to arrest any further deterioration. The installation of an impressed current cathodic protection system is needed to protect the main against further corrosion.

Inspect / Rehabilitate 90" Aqueduct

Extensive concrete corrosion damage was discovered in the treatment plant effluent 90" aqueduct during the rehabilitation of the south effluent venturi meter. Subsequently, a video inspection revealed further extensive concrete corrosion damage continuing along the 90" aqueduct as it leaves the plant.

Plans are to rehabilitate the 90" aqueduct from the Effluent Chamber to the West Portal (approximately 1,000') using fast curing cementitious materials applied during multiple plant shutdown periods. Plans are to also install a new valve structure to be located in the 90" aqueduct downstream of the 78" connection. Providence Water has no means to isolate the 90" aqueduct in the event of a break or other emergency situations other than shutting down the entire plant. This new valve will provide the means and flexibility to shut down the 90" aqueduct and still be able to deliver water through the 78"/102" supplemental aqueduct.

Inspection of 102" Aqueduct

Finished water is transmitted from the treatment plant to the distribution system through two (2) major aqueducts, the 90" diameter Scituate Tunnel & Aqueduct and the 78"/102" Supplemental Tunnel & Aqueduct. A section of the 102" aqueduct underwent a catastrophic failure in 1996 and was repaired shortly thereafter. A failure analysis was conducted to determine the cause of the failure and corrective

measures needed to prevent future failure, and a risk assessment and internal inspection were performed which resulted in recommendations to rehabilitate portions of the 102" main.

From November 1998 through January 2000 work was conducted on the 102" main consisting of exterior rehabilitation with concrete mortar, internal reinforcing of sections of pipe with carbon fiber linings, and installation of manholes for additional access and dewatering points.

The risk assessment report additionally recommended that periodic internal inspection of the 102" aqueduct be performed at intervals not exceeding every five years.

Inspection of 78" Aqueduct

Finished water is transmitted from the treatment plant to the distribution system through two (2) major aqueducts, the 90" diameter Scituate Tunnel & Aqueduct and the 78"/102" Supplemental Tunnel & Aqueduct. The 78" main begins at structure "A" (at the tee for the 90" main) and ends at structure "E" (where the 102" main begins) and runs for an approximate length of 4.5 miles. Plans are to internally inspect this aqueduct.

Piping for Transmitters for 78" Venturi Meter

The 78" Venturi meter which measures the flow of water through the 78" Supplemental Tunnel and Aqueduct is located downstream of structure "C". The meter is in good structural condition but the instrumentation is in need of rehabilitation. Plans are to install new sensor piping from the Venturi to a new flow transmitter to be located in an adjacent manhole which will transmit the signal to the SCADA system.

Improvements to Structure "D"

The stop-shutters for structure "D" that are used to shutdown the 102" aqueduct are operated manually. Plans are to install a new crane rail and electrical hoist to replace the manual system. The building has no electrical power and a new electrical service would be installed. The size of the building needs to be increased to accommodate the new electrical crane rail to install and remove the stop shutters that are used during a shutdown.

DISTRIBUTION SYSTEM

Replace / Upgrade Water Mains

The Providence Water system consists of approximately eight hundred thirty-eight (838) miles of pipe ranging in size from 6" to 12". Of these mains, approximately 30% are older than one hundred years and will be candidates for upgrading or replacement. The first order of priority has been to replace "bleeder mains" and dead-ended mains where water quality complaints have been received. Bleeder mains are dead-ended mains in which past rusty water problems had necessitated the installation of a continuously discharging small diameter pipe at the end of the main. There are approximately ten (10) bleeder mains remaining that will be targeted for replacement. The need for replacing additional distribution mains will require subsequent study and evaluation. Generally, older unlined cast iron mains will need to receive first priority. Factors such as flow tests, hydraulic modeling, water quality complaints, past leak history, and main sampling will all be considered. Emphasis will also be given to replacements in areas of local and state road resurfacing projects. The upgrading or replacement of distribution mains will be one of the major concentrations of the future of the program.

Replace Distribution Valves

Of the approximately 12,608 valves in the system, 1,717 have been identified as 6", 8" and 12" diameter valves over one hundred years and older. Plans are to replace these valves in conjunction with the main replacement program. This will generally prioritize the replacement of valves, using the same criteria for mains, by age and overall condition. Priority will be given to replace older distribution valves that are found to be defective. Also, in accordance with current practice, emphasis will continue to be given to replacements in areas of local and state road resurfacing projects.

Replace Lead Services

As is the case with valves, emphasis will be given to replace lead services in conjunction with the main replacement program. Lead services were installed up until 1937 (with a few isolated exceptions) at which time copper was used to the present day. Of the 72,217 service connections, 27,341 (37%) of these are lead services. As a result of lead testing within the system under the requirements of the Lead and Copper Rule, it is not required that Providence Water replace lead services. However, Providence Water will continue to replace lead services in conjunction with street resurfacing projects, and services

that are found to be leaking. Services will also be replaced on an ongoing basis under special conditions when requested by the owner in accordance with internal policy, and at sites identified by the Department of Health as having lead contamination problems, even though the lead is generally acquired primarily from sources other than water.

Replace Fire Hydrants

Plans are generally to replace all hydrants as they become fifty years old with new breakaway style hydrants. Hydrant replacements over the first three years of the plan are expected to be at a level of about thirty (30) hydrants per year, as a result of hydrants becoming damaged or defective. During the fourth and fifth years of the plan, two hundred seventy (270) hydrants in all will be replaced which will complete the first five years of the program resulting in no hydrant in the system older than fifty years.

Replace Water Meters

Plans are to essentially replace all older non-encoded customer water meters which have outlived their standard useful life with new meters over the next six years. The plan is to replace about 85% of these meters over the first five years. Work funded through the replacement program is limited to the replacement of the meters only and does not include the funding of new encoder or AMR equipment.

Plans are to replace the older larger commercial meters with new meters. These meters register water for large industrial accounts, and are sized three inches and above. Because of the large volume of water that they register, the need for accuracy is essential.

Leak Detection

In 1993 Providence Water completed a leak detection survey of the entire system. Plans are to resurvey the entire system over a three year period beginning in the third year of the plan.

PUMPING AND STORAGE

Alpine Estates - Pumping Station Upgrade

The station is in need of an upgrade to the electrical supply, new valves and pump re-piping, installation of a new pneumatic pressure tank to improve station operation and system pressure control operation, and various new system controls.

Aqueduct Pump Station Upgrades

This project involves the replacement of the four (4) original booster pumps with new pumps of increased capacity. Included in the hydraulic improvements is the re-piping of the suction and discharge lines. Electrical improvements will consist of replacement of pump starters, pump feeders, instrumentation and controls, and system wiring.

Lawton Hills Reservoir - Inspect / Rehabilitate

Plans are to inspect the interior of the Lawton Hills distribution storage reservoir in order to assess its condition and determine the scope of any needed improvements. Cost estimates are based on proportional estimates based on inspection / repair of various other underground reservoirs in the system. Plans are to install a waterproof membrane roof, and to seal construction joints and any cracks found during the inspection.

Neutaconkanut Reservoir - Inspect / Rehabilitate

Plans are to inspect the interior of the Neutaconkanut distribution storage reservoir in order to assess its condition and determine the scope of any needed improvements. Costs estimates are based on proportional estimates based on inspection / repair of various other underground reservoirs in the system. Plans are to install a waterproof membrane roof, and to seal construction joints and any cracks found during the inspection.

Neutaconkanut Gate House Rehabilitation

Plans are to rehabilitate the gatehouse structure at Neutaconkanut Reservoir consisting of rehabilitating the concrete foundation, masonry restoration, and ventilation improvements.

Greenville Ave Pump Station - Replace Surge Valve

The surge control valve that functions to control water hammer on the suction side of the station needs to be replaced. Because of the position and the style of the valve the seals sometime fail causing the valve to leak. Plans are to install an alternate type valve or system to alleviate the condition.

Garden Hills Pump Station Upgrade

The station dates back to 1959 with no significant improvements since its original construction. Plans are to replace the four (4) pumps with new variable frequency drive pumps, and installation of new recirculating line that will eliminate the need for the present hydro-pneumatic tank, and various electrical improvements.

SUPPORT SYSTEM FACILITIES

Academy Ave - General Building Improvements

The building is old and in need of occasional unforeseen improvements. Money has been budgeted to account for reconditioning the offices, architectural and structural improvements, rehabilitation of the electrical, plumbing, and mechanical systems, and site improvements.

Replace Underground Storage Tanks

An environmental assessment and precision testing is needed to determine remedial work to comply with RIDEM regulations. Planned remedial work will consist of replacing underground fuel tanks located at the forestry garage, the treatment plant, at the Raw Water Booster pump station, and at the Academy Ave. administration building.

Rehabilitate Fencing and Roads

The project calls for the restoration of the south access road leading into the treatment plant. The road is in poor condition.

Forestry Building - Heating System Upgrades

The original boiler for the forestry garage dates back to the 1960's and in need of replacement. The boiler has pneumatic controls and draws power off of the 600V electrical service where replacement parts are difficult and expensive to obtain. Plans are to replace the boiler along with new zone valves, circulating pumps, a hot water heater, and a new burner.

EXHIBIT 11
FIFTEEN YEAR
IFR EXPENDITURE PLAN
FY 2006 - 2020

The Fifteen Year Expenditure Plan is a summary of the planned infrastructure replacement program over the fifteen year period from FY 2006 through FY 2020. Projects and estimated expenditures over this time-frame are less detailed than those of the initial five year plan. They are generally summarized according to major system components and aggregated into three individual five year time increments. Project needs are based on the best available information and assessments available at this point in time and will be adjusted and/or modified as changing needs and priorities may dictate. All expenditure estimates include a 2% annual inflation cost adjustment. The tabular project listing is followed by a brief narrative explanation of the scope of anticipated replacement work associated with each major component of the system.

EXHIBIT 11

PROVIDENCE WATER

15 Year IFR Expenditure Plan

Fiscal Years 2006 to 2020

Project Description	Total Amount	Fiscal Years 2006 to 2010	Fiscal Years 2011 to 2015	Fiscal Years 2016 to 2020
Raw Water Supply				
Reservoirs and Dams	1,500,000	500,000	500,000	500,000
Secondary dams	500,000	500,000		
Watershed - rehabilitate fencing and roads	750,000	250,000	250,000	250,000
Subtotal	**$2,750,000**	**$1,250,000**	**$750,000**	**$750,000**
Treatment Plant Facilities				
Replace sand filters	6,000,000	6,000,000		
Sedimentation basins - structural rehabilitation	2,800,000	2,800,000		
PW lab improvements	500,000	50,000	50,000	400,000
Sludge removal and disposal	0			
Upgrade SCADA system	1,500,000	500,000	500,000	500,000
Aeration basin - structural rehabilitation	250,000	250,000		
Aeration basin - replace piping	350,000	350,000		
Fluoride system	440,000	180,000		260,000
Lime system	1,360,000		100,000	1,260,000
Ferric system	170,000	20,000	100,000	50,000
Chlorine system	240,000			240,000
Service water tank - inspection / rehabilitation	150,000		150,000	
Treatment plant - replace exterior siding	2,800,000	2,800,000		
Replace fire hydrants at sedimentation basins	60,000	60,000		
Particle counters and process meter replacements	400,000	150,000	50,000	200,000
Treatment plant - replace windows	300,000	300,000		
Treatment plant - replace dehumidifier	120,000	120,000		
Subtotal	**$17,440,000**	**$13,580,000**	**$950,000**	**$2,910,000**

EXHIBIT 11

PROVIDENCE WATER

15 Year IFR Expenditure Plan

Fiscal Years 2006 to 2020

Project Description	Total Amount	Fiscal Years 2006 to 2010	Fiscal Years 2011 to 2015	Fiscal Years 2016 to 2020
Transmission System				
Transmission mains	2,400,000	800,000	600,000	1,000,000
Transmission valves	3,000,000	900,000	1,000,000	1,100,000
Subtotal	**$5,400,000**	**$1,700,000**	**$1,600,000**	**$2,100,000**
Distribution System				
Distribution mains	67,000,000	19,000,000	22,000,000	26,000,000
Distribution valves	6,000,000	1,800,000	2,000,000	2,200,000
Services	31,000,000	9,000,000	10,000,000	12,000,000
Hydrants	13,700,000	4,100,000	4,600,000	5,000,000
Meters	9,000,000	1,400,000	600,000	7,000,000
Leak detection	390,000	120,000	130,000	140,000
Subtotal	**$127,090,000**	**$35,420,000**	**$39,330,000**	**$52,340,000**
Pumping and Storage				
Dean Estates pump station upgrades	160,000	160,000		
Inspection of storage reservoirs	850,000	250,000	300,000	300,000
Subtotal	**$1,010,000**	**$410,000**	**$300,000**	**$300,000**
Support System Facilities				
Administration building and facilities	16,000,000		16,000,000	
Replace underground storage tanks	200,000			200,000
Improvements to administration building and facilities	1,140,000	640,000	300,000	200,000
Rehabilitate fencing and roads	2,600,000	600,000	600,000	1,400,000
Subtotal	**$19,940,000**	**$1,240,000**	**$16,900,000**	**$1,800,000**
Total	**$173,630,000**	**$53,600,000**	**$59,830,000**	**$60,200,000**

FIFTEEN YEAR IFR EXPENDITURE PLAN
PROJECT OVERVIEW - FY 2006 - 2020

PROVIDENCE WATER

FIFTEEN YEAR INFRASTRUCTURE REPLACEMENT PROGRAM

PROJECT OVERVIEW

Years 2006 - 2020

RAW WATER SUPPLY

Reservoirs and Dams

Plans are to inspect the dams and structures and to provide any remedial work that will address improvements in order to continue to preserve their useful lives. The five year incremental amounts are budgeted allocations for potential needs that may arise.

Secondary Dams

In the five year IFR plan, a study is planned that will provide for a risk assessment and structural analysis for the smaller secondary dams on the watershed that will determine a scope of work for future rehabilitation work. Some of the work in the twenty year plan is anticipated to consist of rehabilitation of Coomer Reservoir Dam, Kimball Reservoir Dam, and Harrisdale Pond Dam. At Coomer Dam improvements are needed to the upstream and downstream slopes, and to the crest of the dam. The outlet works, the spillway, and the spillway discharge channel are also in need of improvements. At Kimball Dam improvements are needed to the drop inlet structure and the stone masonry wall located at the downstream slope. At Harrisdale Dam improvements are needed to the upstream slope and at the downstream toe of the dam. Should any more urgently needed work be identified in the assessment study, it will accordingly be added to the five year program.

Watershed - Rehabilitate Fencing and Access Roads

Plans are to replace about six (6) miles out of the forty (40) miles of fencing and to rehabilitate about thirty-eight (38) miles of the sixty-six (66) miles of access roads and lanes on the watershed and Providence Water owned property. The fences and access roads date back to their original construction in the 1920's and are generally in poor condition. The fencing and roads are selected by priority as determined by previously conducted inventories and evaluations.

TREATMENT PLANT FACILITIES

Replace Sand Filters

As a continuance of the five year IFR plan, plans are to replace the remaining seven (7) filters at the treatment plant. This will complete the replacement of all eighteen (18) filters.

Sedimentation Basin - Structural Rehabilitation

The concrete slabs and baffle walls of the sedimentation basins have undergone deterioration. Needed improvements consist of replacing heaved and broken slabs, sealing existing cracks and joints, and rehabilitating the concrete baffle walls and walkways.

PW Lab Improvements

Testing of the raw and treated water is required on a regularly scheduled basis to comply with State and Federal regulatory requirements. The testing and monitoring equipment has a normal life ranging from four to ten years depending on the type of equipment and frequency of use. The plan is to replace this equipment as it becomes necessary. The budget amounts shown in the plan are for anticipated needs. Included in the plan is renovation of the laboratory is the last fifteen year period.

Sludge Removal and Disposal

The five year plan addresses the removal, dewatering, and disposal of all of the accumulated sludge from Lagoon #1 to replace lost storage capacity. The project also includes a new residual management system which will allow for system flexibility, to alternate and isolate each side of Lagoon #1, and to divert sludge directly into Lagoon #2. This will provide for considerable future savings in the sludge removal process. The five year plan did not address the water treatment residuals that have accumulated in Lagoon #2. Lagoon #2 was viewed as the lowest priority because it was estimated to be 60% full at the outset of the project.

With the new residuals management system, which will involve more frequent removal of treatment residuals from Lagoon 1A and 1B, the need for removal of residuals in Lagoon #2 may be able to be significantly delayed. No money is being budgeted for this project at this point.

Upgrade SCADA System

Given that the nature of computer technology is ever changing, a budget amount is accounted for in the plan to anticipate continued upgrade needs for the SCADA system. Needs will be comprised of hardware replacements, software upgrades, and additional hardware and software for additions to the system.

It is anticipated that a complete replacement of the control and monitoring system may need to occur in the next to ten to fifteen year period. However the actual life cycle may be longer or shorter and is generally determined by technological advancements of both hardware and software.

Aeration Basin - Structural Rehabilitation

The concrete slabs and associated concrete structures of the influent aerator are exhibiting signs of displacement and deterioration. Needed improvements consist of rehabilitating/replacing the displaced slabs and the exposed reinforcement, and resurfacing of concrete surfaces.

Aeration Basin - Replace Piping

The influent aerator piping dates back to its original construction in the 1920's. The piping will need to be targeted for future replacement.

Fluoride System

The existing pneumatic fluoride transfer system dates back to its original installation in the early 1960's and will need to be replaced or upgraded. The plan is to replace the two (2) existing blowers, to upgrade the shaker system located inside the hoppers, and to replace all the piping leading to the hoppers. The fluoride feeders were replaced in 1996. Plans are to replace the feeders in the last few years of the plan.

Lime System

Due to the abrasive nature of the chemical the existing pneumatic lime transfer piping will need to be replaced from the lime silo to the chemical hoppers. The piping was last replaced in 1994.

The lime feeders were replaced in 1998. The plan is to replace the feeders in the last few years of the plan.

Ferric System

The ferric system will eventually require periodic upgrading of equipment consisting of replacing the metering pumps, the transfer pumps, and the associated piping. The new liquid chemical system was first placed in service in 1997.

Chlorine System

The chemical feeders were replaced in 1997. The plan is to replace the feeders in the last few years of the plan.

Service Water Tank - Inspection / Rehabilitation

The 40,000 gallon welded steel service water tank was constructed in 1960. In 1993, the interior and exterior surfaces of the tank were fully rehabilitated and painted. It is planned that the tank will again need to be inspected and that remedial work may be required as a result of the inspection.

Treatment Plant - Replace Exterior Siding

The exterior metal panels of the treatment plant building are faded and deteriorating. In some areas they are loosely attached to the building or missing. The siding needs to be replaced with a new exterior covering.

Replace Fire Hydrants at the Sedimentation Basins

There are eleven (11) fire hydrants that surround the north and south sedimentation basins which are used for cleaning the ferric sludge from the basins. The hydrants are a non-breakaway type dating back to 1967. Replacement parts for these hydrants are difficult to obtain. The plan is to replace these hydrants with new hydrants that are standard to the distribution system.

Particle Counters and Process Meter Replacements

Several types of process metering equipment are used at the treatment plant and in the distribution system for monitoring and maintaining water quality. The data is collected and logged for record and reporting purposes. This equipment is replaced on a regular interval to ensure accuracy and reliability. Based on a scheduled replacement in the next fifteen years of the plan, PW is planning to replace fluoride residual meters, chlorine residual meters, particle counters, pH meters, and chlorine residual meters.

Treatment Plant - Replace Windows

The existing windows are old, poorly functioning, and are not energy efficient. Plans are to replace the windows in the Filter Gallery and the Chemical Control Building with new energy efficient units.

Treatment Plant - Replace Dehumidifier

The dehumidifier located in the pipe gallery controls the environment in that area because of the humid conditions and the nature of the sensitive electronic process metering equipment located in the gallery. The demands on the unit are high and it runs almost continuously and will need to be replaced.

TRANSMISSION SYSTEM

Transmission Mains

The plan is to inspect and test the major transmission mains in the system for structural integrity. Planned in this group of transmission mains are the 90" Scituate Tunnel and Aqueduct, the 78" / 102" Tunnel and Aqueduct, the 66" steel Scituate Aqueduct, and the 60" steel Neutaconkanut Conduit. No money is budgeted at this time for remedial work, pending the outcome of the inspections.

Transmission Valves

All transmission valves installed through 1950 are being targeted for replacement over the fifty year period. Eighty (80) valves, ranging in size from 16" to 36", have been identified as having been installed prior to 1950.

DISTRIBUTION SYSTEM

Distribution Mains

The system consists of approximately 838 miles of pipe ranging in size from 6" to 12". Of these mains, approximately 30% are older than one hundred years and will be candidates for upgrading or replacement. Generally, older unlined cast iron mains will need to receive first priority. The upgrading or replacement of distribution mains will be one of the major concentrations of the future of the program. The initial general plan is to replace all pre 1900 mains over an approximate thirty year time frame. This would involve the replacement of approximately 250 miles of cast iron mains. Final

determinations of mains to be replaced will of course be based on other factors including the flow capacity and overall condition of the mains.

Distribution Valves

Distribution valves will generally need to be replaced on an oldest first basis. Approximately 1,717 have been identified as 6", 8", and 12" diameter valves over one hundred years old. Plans are to replace these valves in conjunction with the main replacement program. This will generally prioritize the replacement of valves, using the same criteria for mains, by age and overall condition. Priority will be given to replace older distribution valves that are found to be defective, and in accordance with current practice, emphasis will continue to be given to replacements in areas of local and state road resurfacing projects.

Services

Approximately 27,341 services, about 37 percent of the total services in the system, are identified as lead. As is the case with valves, emphasis will be given to replace lead services in conjunction with the main replacement program. Providence Water will also continue to replace lead services in conjunction with street resurfacing projects, and services that are found to be leaking. Services will also be replaced on an ongoing basis when requested by the owner in accordance with internal policy, and at sites identified by the Department of Health as having lead contamination problems, even though the lead is generally acquired primarily from sources other than water. The schedule is to replace all lead services within a thirty year time frame. This is consistent with the same replacement schedule as pre-1900 water mains.

Hydrants

The objective of the hydrant replacement program will be to generally maintain ages of hydrants in the system at no more than fifty years old. Hydrant replacements during the fifteen years of the plan are expected to total approximately 3000 hydrants.

Meters

The overall objective of meter replacements will be to replace meters every fifteen years. The replacement of all non-encoded water meters is planned to be completed in the first year of the fifteen year plan. Thereafter the meters will be replaced on a fifteen year schedule and on an as needed basis as malfunctioning meters are encountered. Work funded through the replacement program is limited to the replacement of the meters only and does not include the funding of encoder or AMR equipment.

The replacement of the older larger commercial meters is expected to be completed in the first five years of the plan. Plans are to thereafter regularly test these meters and replace them as it becomes necessary.

Leak Detection

The plan is to perform a leak detection survey of the entire system every five years in the fifteen year plan.

PUMPING AND STORAGE

Dean Estates Pump Station Upgrades

The Dean Estates pumping station was constructed in the 1980's. The pumps and hydro-pneumatic tank date back to the original construction. The plan is to replace the three (3) pumps and to add variable frequency drives and a recirculating line that will eliminate the need for the present hydro-pneumatic tank.

Inspection of Storage Reservoirs

The plan is to alternate a visual inspection and an extensive inspection five years apart for each of the five (5) tanks in the system. A visual inspection is defined as exploration of a tank by a diver without dewatering the structure. Provided with this is a general description of the condition of the tank addressing any deficiencies that exist. An extensive inspection is defined as a video inspection performed by a structural specialist, full dewatering of the structure, and a comprehensive report that evaluates the tank's condition and provides for remedial recommendations.

SUPPORT SYSTEMS AND FACILITIES

Administration Building and Facilities

The aged Academy Avenue administration building does not provide adequate office and field personnel and equipment facilities for the organization. A new office facility and a separate facility for field personnel and equipment will be needed.

Replace Underground Storage Tanks

Planned work is scheduled for the last five years of the fifteen year plan consisting of replacing the underground diesel tank at the transformer building in Scituate, and replacing the diesel tank located at Academy Ave. The replacement schedule is in accordance with the life expectancy of the tanks and in consideration of EPA and RIDEM regulations for underground storage tanks.

Improvements to Administration Building and Facilities

The administration building is old and in need of ongoing improvements. Money has been budgeted to account for reconditioning the offices, architectural and structural improvements, rehabilitation of the electrical, plumbing, and mechanical systems, security upgrades, and site improvements.

The forestry building dates back to the 1960's and is in need of general improvements to include improvements to the air conditioning system and replacement of windows.

Rehabilitate Fencing and Roads

It is anticipated during the last five years of the plan that various facility access roads will need to resurfaced at approximately fourteen (14) separate locations. The restoration of some of these roads may be included with the rehabilitation of the various facilities prior to the projected schedule. The fencing at these facilities are presently in good condition and not included in the plan.

SECTION IV
REVENUE REQUIREMENTS

Overview of Revenue Requirements

Providence Water has developed a Sources and Uses of Funds Plan based on planned replacement needs, current authorized funding, and minimal proposed new funding. EXHIBIT - 12 lists the projected Sources and Uses of Funds in four five year phases. The current authorized funding is $12.5 million per year effective January 1, 2001. Providence Water will be able to balance our program with a small additional bonding in Phase 1 and a small projected annual rate increase beginning in Phase 3 of the plan. The plan is subject to change as it is implemented. Any additional funding or borrowing will be addressed as we move forward.

Sources of Funds

Providence Water began funding a restricted Infrastructure Replacement fund in 1996. The RI Public Utilities Commission granted Providence Water a phase in approach to begin our IFR program. In 1996, we were authorized $4 million per year. In January of 1997 and May of 1998 the amount was increased by $2 million each time to a total of $8 million. Providence Water requested an additional increase that was approved and effective February 2000. The latest increase was effective January 2001, bringing the total annual authorized amount to $12.5 million. This plan projects a modest $500,000 per year increase in funding to an annual $13 million, effective in fiscal 2011.

In fiscal year 2000, Providence Water needed to amend its IFR Program to include the rehabilitation of our 90-inch Scituate Tunnel and Aqueduct. This project was unanticipated and was not included in Providence Water's IFR plan prepared in 1996. In order to fund this critical project, Providence Water sought the necessary approvals to issue bonds and spread the costs associated with this unplanned event. The bond proceeds for this project are estimated at $5 million in Phase 1. Providence Water also proposes to do an additional $2 million in borrowing in Phase 1 to be used for the Neutaconkanut Reservoir upgrade that will commence in 2003. While this $2 million borrowing is incorporated in this plan, the approval process has not begun.

EXHIBIT - 13 provides a graphical depiction of the sources of funds in each year of the twenty year plan. Most of the funds are currently authorized. The plan is funded with current revenue and approved bond proceeds in 2001 and 2002. Additional bonds will need to be issued in 2004 and 2005 and authorized funding sought to commence in 2011.
Overall, our twenty year plan includes $250 million of current authorized revenue, a modest $7 million of borrowing and a projected request for an additional $5 million in funding. Total sources of funds are $262 million.

Uses of funds

The debt service on the bonding listed in the sources of funds is included as a use of funds in this plan. The new debt service listed on EXHIBIT-12 is the debt service on the new $2 million bond project. Existing debt service includes the debt service on the $5 million approved bond project and existing debt. There was an older bond, issued prior to 1996, that was re-classified to the IFR program. In 1999 Providence Water also issued bonds to finance three IFR projects. This debt is also attributable to the IFR program. As the debt service on these bond issues is paid off, Providence Water plans to use the funding to support cash funded construction projects.

To recap, total cash funded construction projects are $221 million, bond funded construction projects total $7 million, new and existing debt service totals $29 million for total uses of funds of $257 million. There is a small accumulated surplus of funds of $5 million over the twenty year period. Most of this surplus being generated in Phase 4 of the plan. A detailed spending plan is presented in section III of this plan.

Our IFR Plan is subject to change and we will invariably have to make amendments to this plan to match changing State and Federal regulations and changing field conditions. Our replacement plan is based on the best information available at this time.

EXHIBIT 12
SOURCES AND USES OF FUNDS
FIVE YEAR PHASES
FISCAL YEARS 2001 - 2020

EXHIBIT 12

PROVIDENCE WATER

Sources and Uses of Funds

IFR Funding & Expenditure Projections

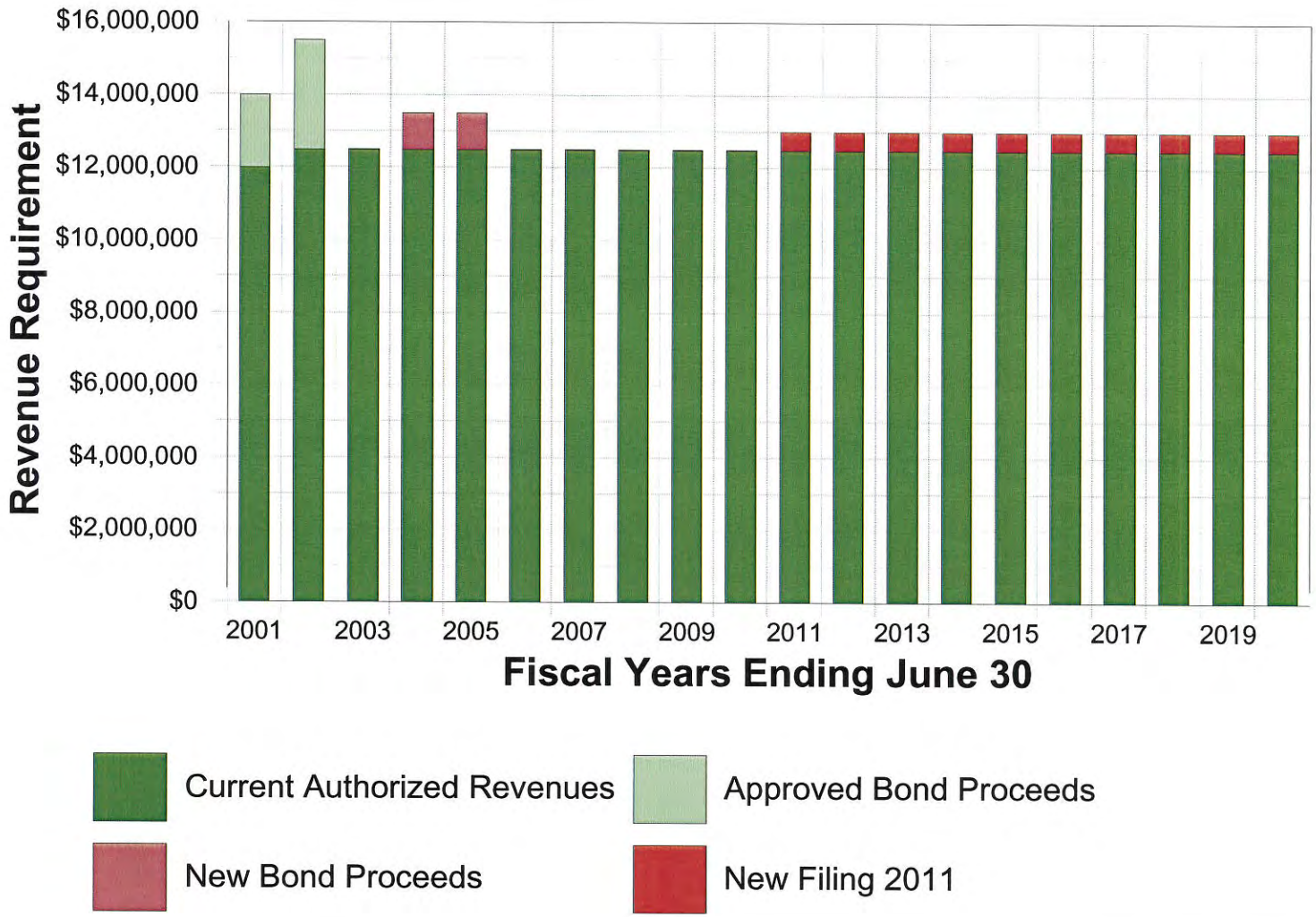
Five-Year Phases for Fiscal Years 2001 - 2020

	2001-2005	2006-2010	2011-2015	2016-2020	2001-2020
	Phase 1	Phase 2	Phase 3	Phase 4	Total
Sources of Funding:					
Current Authorized Funding	$62,000,000	$62,500,000	$62,500,000	$62,500,000	$249,500,000
New Bond Proceeds	2,000,000	0	0	0	2,000,000
Approved Bond Proceeds	5,000,000	0	0	0	5,000,000
Projected Additional Funding	0	0	2,500,000	2,500,000	5,000,000
Total Sources of Funds	69,000,000	62,500,000	65,000,000	65,000,000	261,500,000
Uses of Funding:					
Cash Funded Construction Projects	$47,340,000	$53,600,000	$59,830,000	$60,200,000	$220,970,000
New Bond Projects	2,000,000	0	0	0	2,000,000
Existing Bond Projects	5,000,000	0	0	0	5,000,000
New Debt Service	518,018	1,295,045	777,027	0	2,590,090
Existing Debt Service	14,137,069	7,594,162	4,349,350	0	26,080,581
Total Uses of Funds	68,995,087	62,489,207	64,956,377	60,200,000	256,640,671
IFR Program Surplus/(Deficit)	$4,913	$10,793	$43,623	$4,800,000	$4,859,329

EXHIBIT 13
GRAPH OF IFR FUNDING PROJECTIONS

EXHIBIT 13

IFR Funding Projections



APPENDIX

THE COMPREHENSIVE CLEAN WATER INFRASTRUCTURE REPLACEMENT ACT OF 1993

Title 46 - Waters and Navigation
Chapter 46-15.6 - Clean Water Infrastructure

§ 46-15.6-1 Short title. – This chapter shall be referred to as the "Comprehensive Clean Water Infrastructure Act of 1993".

§ 46-15.6-2 Legislative findings, intent, and objectives. – The general assembly hereby recognizes and declares that:

(1) Water is vital to life and comprises an invaluable natural resource which is not to be abused by any segment of the state's population or its economy. It is the policy of this state to restore, enhance, and maintain the chemical, physical, and biological integrity of its waters to protect health;

(2) The waters of this state are a critical renewable resource which must be protected to insure the availability of safe and potable drinking water for present and future needs.

(3) It is a paramount policy of the state to protect the purity of present and future drinking water supplies by protecting the infrastructure of potable water, including treatment plants, pipes, valves, pumping stations, storage facilities, interconnections, and water mains.

(4) It is imperative to provide a uniform and valid mechanism to base assistance for the construction, repair, protection, and/or improvement of potable water infrastructure replacement.

(5) The decay of infrastructure and related construction due to deterioration or functional obsolescence can threaten the quality of supplies and, therefore, can endanger public health; thus it is necessary to take immediate and continuing steps to repair and replace the infrastructure used to deliver water supplies in order to restore water system facilities.

(6) Failure to replace the infrastructure used to deliver water supplies may cause and probably will continue to degrade the quality of public drinking water.

(7) Protection of water quality is necessary from the collection source through the point of delivery to the ultimate consumer.

(8) The potable threat to public health caused by unsafe drinking water far outweighs the economic costs for the construction of the potable water infrastructure replacement.

(9) That the objectives of this chapter are:

(i) To establish a funding mechanism to insure that infrastructure replacement programs are carried out by each municipality and by each municipal department, agency, district, authority, or other entity engaged in or authorized to engage in the supply, treatment, transmission, or distribution of drinking water, and

(ii) That the plans and their execution achieve and insure that the investment of the public in such facilities is not eroded.

Title 46 - Waters and Navigation
Chapter 46-15.6 - Clean Water Infrastructure

§ 46-15.6-3 Infrastructure replacement program. – All municipalities, municipal departments and agencies, districts, authorities or other entities engaged in or authorized to engage in the supply, transmission, distribution of drinking water on a wholesale or retail basis, and which obtain, transport, purchase, or sell more than fifty million (50,000,000) gallons of water per year, shall be referred to as "water suppliers" for the purpose of this chapter. All water suppliers shall prepare, maintain, and carry out an infrastructure replacement program as described in this chapter.

§ 46-15.6-4 Content of infrastructure replacement component. – (a) The infrastructure replacement component (hereinafter referred to as component) shall include without limitation:

(1) A detailed financial forecast of facility replacement improvement requirements for the next twenty (20) years including but not limited to the principal components of the water system such as reservoirs, dams, treatment plants, pipes, valves, fire hydrants, pumping stations, storage facilities, pumping and well equipment, interconnections and water mains. Each financial forecast shall analyze the condition and life expectancy of the existing facilities, prioritize needed repairs and replacements and amortize such improvement requirements on an annual basis over the next twenty (20) years in accordance with rules and regulations promulgated herein. Water suppliers which have in effect infrastructure improvement or rehabilitation programs and mechanisms for funding approved by their appropriate governing bodies may submit their existing programs for complete or partial compliance with the provisions of this section.

(2) A method that establishes and maintains fiscal controls and accounting depreciation standards sufficient to ensure proper accounting for evaluation of facility requirements necessitated by this chapter in accordance with rules and regulations promulgated herein.

(b) Components shall be consistent with applicable local comprehensive plans in which the service areas are or are planned to be located.

(c) Proceeds from the watershed protection fund shall be usable for reimbursement of water suppliers for preparation of their infrastructure replacement components as described in this chapter up to fifty percent (50%) of the cost of the component.

Title 46 - Waters and Navigation
Chapter 46-15.6 - Clean Water Infrastructure

§ 46-15.6-5 Completion, filing, approval and implementation of infrastructure component.

(a) Each water supplier required by this chapter to prepare and maintain an infrastructure replacement component shall complete and adopt a component two (2) years subsequent to the date each party's water supply management plan per § 46-15.3-7.5 is due.

(b) Water suppliers subject to the requirements of § 46-15.6-3 shall file a copy of all components, only to the extent the components differ from plans filed under § 46-15.3-5.1 thereto with the following: the division of drinking water quality of the department of health (hereinafter referred to as "the department").

(c) A water supplier subject to § 46-15.6-3 shall review their components at least once every five (5) years and shall modify or replace their components as necessary.

(d) The department shall coordinate expeditious review of components prepared by water suppliers subject to this chapter. Upon receipt of components prepared by water suppliers under this chapter the department of environmental management's water supply management division, or its successor, and the division of public utilities and carriers (for those water suppliers within their jurisdiction) shall have one hundred and twenty (120) days to review the components and submit comments thereon to the department. Upon consideration of written comments by all agencies designated herein the department shall determine whether the component complies with the requirements of this chapter. This determination shall be made within eight (8) months of the initial submission. A thirty (30) day public comment period shall be included in this eight (8) month review period. Failure by the department to notify water suppliers of its determination within the prescribed time limit shall constitute approval.

(e) Each water supplier shall implement the requirements of its infrastructure replacement program and component, including its infrastructure replacement fund, as mandated by this chapter in accordance to rules and regulations promulgated per § 46-15.6-7.

Title 46 - Waters and Navigation
Chapter 46-15.6 - Clean Water Infrastructure

§ 46-15.6-6 Financing infrastructure replacement. – The cost of infrastructure replacement programs and indemnification as required by this chapter shall be financed as follows:

(1) The cost of programs to implement infrastructure replacement shall be paid by the water users at a rate directly proportionate to the users' water consumption. The charges shall be limited to those necessary and reasonable to undertake the actions required by this chapter. These charges shall be based upon the annual funding requirements of the facility improvements necessitated over each successive twenty (20) year period. Interest earned on money in this infrastructure replacement fund shall be credited to this infrastructure replacement fund.

(2) Each water supplier designated in § 46-15.6-3 shall establish a special account designated as the infrastructure replacement fund to be held as a restricted receipt account and to be administered by the water supplier solely to implement and carry out the replacement of infrastructure as required by this chapter.

(3) Any money which may accumulate in the infrastructure replacement fund in excess of that needed to implement the annual infrastructure replacement program or in excess of that exclusively pledged to repayment of outstanding bonds or notes or loan repayments to implement the infrastructure replacement program shall revert to the rate payers of that particular system on a biannual basis.

(4) Each water supplier designated in § 46-15.6-3 may, as a complete or partial alternative to direct funding of its infrastructure replacement program, finance its infrastructure replacement program through bonding. The annual debt service of each bond or bonds shall be applied and credited towards the annual requirement of the infrastructure replacement program's annual funding requirements.

(5) The Rhode Island public utilities commission, as to water suppliers within its jurisdiction, shall permit an increase for just and reasonable infrastructure replacement in the portion of the water suppliers' rate structure to comply with this chapter and shall allow the water supplier to add this required funding to its rate base in accordance with this chapter.

Title 46 - Waters and Navigation
Chapter 46-15.6 - Clean Water Infrastructure

§ 46-15.6-7 Rules governing content of programs, components, review, evaluation, funding, and implementation. – The department with the concurrence of the department of environmental management's water supply management division or its successor, and the Rhode Island public utilities commission, as to water suppliers within its jurisdiction, shall forthwith promulgate rules and regulations for the review of components as pertains to financial forecasts of facility replacement, improvement requirements and fiscal controls and accounting depreciation standards per § 46-15.6-4 (a)(1) and (a)(2). The department with the concurrence of the department of environmental management's water supply management division or its successor, and the Rhode Island public utilities commission, as to water suppliers within its jurisdiction, shall promulgate the criteria or standards which it will use to evaluate the implementation of approved components, programs and funding mechanisms.

§ 46-15.6-8 Severability. – If any provision of this chapter or of any rule, regulation or determination made thereunder, or the application thereof to any person, agency or circumstances, is held invalid by a court of competent jurisdiction, the remainder of the chapter, rule, regulation, or determination and the application of such provisions to other persons, agencies, or circumstances shall not be affected thereby. The invalidity of any section or sections of this chapter shall not affect the validity of the remainder of this chapter.

§ 46-15.6-9 Excluding requirement of state mandated cost. – The provisions of §§ 45-13-7 – 45-13-10 shall not apply to §§ 46-15.6-1 – 46-15.6-8.