
12. Cost of Distribution System

Costs for the water distribution system piping and appurtenances were calculated for each alternative. The costs were divided into capital and O&M costs.

Capital Costs

Unit Capital Costs for piping and appurtenances were developed utilizing USEPA databases, "Means Construction Cost Data", manufacturer's current pricing, and bid data from similar projects. The data developed is summarized in Table 12-1, Summary of Piping and Appurtenances Costs.

Costs for the distribution system piping was calculated with 4.5' of cover. Note that unit prices include 75% rock excavation due to the severe geology of the study area. Itemized cost estimates of the distribution system for both the connection to Cortlandt option and the new water treatment plant option are summarized in Itemized Cost Estimate Tables 12-2 and 12-3.

Operation & Maintenance (O&M) Costs

The annual O&M costs for the water distribution system were calculated either as 5% of the capital material costs of the distribution system components, from manufacturer's quotes, or based on O&M data from similar projects.

The operation and maintenance (O&M) of the water distribution system includes flushing the system once every 5 years, operating valves once a year, servicing of the pump station, some pipe repairs, and general inspection of the system and appurtenances on a scheduled preventive maintenance program.

12.1. Capital Costs

12.1.1. Capital Costs – Connection to the Cortlandt Consolidated Water District

The following are the distribution system and appurtenances capital costs for this alternative:

Capital Costs

Distribution Piping	\$ 14,931,000
Fire Hydrants	\$ 752,300
Isolation/Divide Valves	\$ 304,800
Distribution System PRV's	\$ 36,600
Storage Tanks	\$ 626,900
Rehab. Existing Pump Station	\$ 460,700
Distribution System Meter	\$ 50,000
Service Meters	\$ 90,400
Service Connections	\$ 1,808,000
Easements	\$ 20,000
Total Capital	\$ 19,081,000

12.1.2. Capital Costs – New Water Treatment Plant

The following are the distribution system and appurtenances capital costs for this alternative:

Capital Costs

Distribution Piping	\$ 14,954,200
Fire Hydrants	\$ 752,300
Isolation/Divide Valves	\$ 309,000
Distribution System PRV's	\$ 24,400
Standpipes	\$ 626,900
Distribution System Meter	\$ 50,000
<i>Service Meters</i> → Storage Tanks	\$ 90,400 → ?
Service Connections	\$ 1,808,000
Easements	\$ 20,000
Total Capital	\$ 18,635,000

Note that the pump station costs are included with the treatment plant capital costs for this option.

12.1.3. Capital Costs – Service Lines

As discussed in Chapter 11, a water service connection will be provided for every occupied parcel in the district by means of a ¾-inch service connection ending with a curb stop at the property/right of way line. It is typical for similar projects that each user pay an initial connection fee to connect to the water main. The fees can be structured that the hook up fee is proportional to the anticipated water usage, so single family residential homeowners don't have to share the burden of users with high water usage.

Each user is financially responsible for their service line installation from the curb stop to the building. Components of the service line installation are: piping (and associated excavation) costs of the piping from the curb stop to the existing plumbing, installation of service meter and pressure reducing valve (PRV) inside the building, any additional interior plumbing necessary

13. Cost Summary

Following is a summary of capital and annual O & M costs for the two Lake Peekskill water supply options.

The costs in this section are presented in 1999 dollars. If a particular water supply option is selected to move forward and real prospective dates for implementation are agreed to, then the 1999 costs should be adjusted to the mid-point of construction in the envisioned implementation schedule. Costs would be subsequently refined during the preliminary and final design phase if the planned project is to be implemented.

13.1. Costs - Treatment and Distribution

The capital and annual O&M costs for the connection to Cortlandt Consolidated Water District and new water treatment plant options are summarized below:

13.1.1. Connection to the Cortlandt Consolidated Water District

Treatment Capital Cost	Distribution System Capital Cost	Cost of Water	Treatment O&M Cost	Distribution System O&M Cost
\$0	\$19,081,000	\$1,225,684/yr	\$0/yr	\$181,400/yr

13.1.2. New Water Treatment Plant

Treatment Capital Cost	Distribution System Capital Cost	Cost of Water	Treatment O&M Cost	Distribution System O&M Cost
\$5,790,000	\$18,635,000	\$58,815/yr	\$332,800/yr	\$85,100/yr

13.2. User Fees

User fees can be used to pay for debt service and operational costs for implemented facilities. User fee computations are complex and require information on land use, occupancies, land areas, frontage, assessments, bond service, etc. For this facility plan, user fees were generally estimated and are explained below.

Estimated user fees for the new water treatment plant option were computed by utilizing the annual cost to repay the State Revolving Fund Loan used to cover the plant and distribution system capital costs, assuming the entire design capacity is constructed, no grant money is available, and a loan term of 0% interest over 20 years. Dividing this amount by the estimated number of future equivalent dwelling units, is the estimated user fee associated with capital costs. Added to this fee is the annual O&M divided by the estimated number of future equivalent dwelling units, since the O&M costs were based on the total design flow for the facilities. The cost of purchasing water from New York City must also be accounted for in the user fee calculations. The total future estimated water demand for the Lake Peekskill community is approximately 469,000 gpd. At a cost of \$343.58 per million gallons, the future annual cost for the raw Catskill Water would be approximately \$58,815.

Estimated user fees for the purchasing of treated water for the connection to the Cortlandt Consolidated Water District option were computed by utilizing the annual cost to repay the State Revolving Fund Loan used to cover distribution system capital costs, assuming the entire design capacity is constructed, no grant money is available, and a loan term of 0% interest over 20 years. Dividing this amount by the estimated number of future equivalent dwelling units, is the estimated user fee associated with capital costs. Added to this fee is the annual O&M divided by the estimated number of future equivalent dwelling units, since the O&M costs were based on the total design flow for the facilities. The cost of purchasing water from another municipality must also be accounted for in the user fee calculations. The total future estimated water demand for the Lake Peekskill community is approximately 469,000 gpd. At a cost of \$7.16 per 1,000 gallons, the estimated future annual cost for the treated water would be approximately \$1,225,684.

Typically, all property owners would pay the portion of user fee that includes the loan repayment. The user fee connected with O&M and the cost of water would be paid only by owners whose properties are actually connected to the distribution system, as these costs are related to use of the facilities. User fees associated with the design and construction of the facilities would be less if grant monies could be obtained. Initial user fees could be reduced with phasing of the construction of facilities. Future user fees would be dependent on the availability of future loans and grants for subsequent design and construction of the remaining design capacity of the facilities.

	Annual Cost of Water	Annual O&M Costs	Annual SRF Repayment
Connection to the CCWD	\$1,225,684	\$181,400	\$954,050
New Water Treatment Plant	\$58,815	\$417,900	\$1,221,250

for the connection, and abandonment of the existing well. Costs for a typical service line installation are estimated to be in the \$2,500 to \$4,000 range.

12.2. Operation & Maintenance (O&M) Costs

12.2.1. O&M Costs – Connection to the Cortlandt Consolidated Water District

The following are the distribution system and appurtenances annual O&M costs for this alternative:

O&M Costs (per year)		
Distribution Piping	\$	40,166
Fire Hydrants	\$	8,710
Isolation/Divide Valves	\$	7,692
Distribution System PRV's	\$	1,800
Storage Tanks	\$	14,790
Pump Station	\$	21,100
Distribution System Meter	\$	2,295
Service Connections & Meters	\$	9,892
Staffing	\$	75,000
Total O&M	\$	181,400

12.2.2. O&M Costs – New Water Treatment Plant

The following are the distribution system and appurtenances annual O&M costs for this alternative:

O&M Costs (per year)		
Distribution Piping	\$	40,422
Fire Hydrants	\$	8,710
Isolation/Divide Valves	\$	7,819
Distribution System PRV's	\$	1,200
Storage Tanks	\$	14,790
Distribution System Meter	\$	2,295
Service Connections & Meters	\$	9,892
Total O&M	\$	85,100

Note that the annual staffing costs and pump station O&M are included with the treatment plant O&M costs for this option.

12.2.3. O&M Costs – Service Lines

O&M costs for the service connections within road right-of-ways are included in the distribution system O&M costs. O&M costs for service lines on private property will be borne the users.

The total annual cost per user was calculated by taking the sum of the annual O&M cost, the annual SRF loan repayment, and the annual cost of water, and dividing the total by the number of equivalent dwelling units. The total estimated number of future equivalent dwelling units for the Lake Peekskill community is 1,378. Shown below are the sum of annual O&M, annual SRF loan repayment costs, the annual cost of water, and the estimated annual user fee.

	Total Annual Cost	Annual User Fee
Connection to the CCWD	\$2,361,134	\$1,713
New Water Treatment Plant	\$1,697,965	\$1,232

With potable water metering in place, the user fees costs for O&M would actually be based on a base meter charge plus actual metered potable water use, in lieu of a set fee for each dwelling unit.

The New York State Environmental Facilities Corporation (NYSEFC) administers the State Revolving Loan Fund Program. Funding levels to communities are based partly on a community's ability to pay for the service.

This ability to pay is called a Target Service Charge (TSC) and is compared to the Projected Service Charge (PSC) of the planned project. The TSC is computed based on a percentage of median household income, which about \$42,000 for Lake Peekskill. According to published information from the NYSEFC, the TSC for Lake Peekskill would be \$735. The PSC for the water project is \$1,232. Therefore, obtaining of grants and zero/low interest loans from various funding agencies would be needed to lower the PSC to the TSC.

14. Environmental Assessment

Funding and approvals associated with a water project will require fulfillment of mandated environmental review.

Federal law requires a State Environmental Review Process (SERP) to assess the potential environmental impacts of certain actions such as the proposed water project. The SERP integrates the New York State Environmental Quality Review (SEQR) process with the State Revolving Fund (SRF) environmental review requirements of the USEPA. The SERP review will satisfy the municipality's responsibilities under SEQR.

The SEQR regulations, (Title 6 of the New York Code of Rules and Regulations Part 617) provide a statewide regulatory framework for the implementation of SEQR by all state and local agencies. It includes: (1) procedural requirements for compliance with the law; (2) provisions for coordinating multiple agency environmental reviews through a single lead agency; (3) definitions of Type I, Type II, and unlisted projects; (4) model environmental assessment forms to aid in determining whether an action may have a significant adverse impact on the environment; and (5) examples of actions and classes of actions which are likely to require an Environmental Impact Statement (EIS).

The first step in initiating the SEQR process is the completion of Part I of a Full Environment Assessment Form (EAF). The Full EAF for the subject water project is attached in Appendix C. As the funding and approval process for the project proceeds, the SEQR process must proceed.

Table 8-1
Lake Peekskill Water Facility Plan
Membrane Filtration Plants Residuals

Backwashing and Chemical Cleaning

	Average Flow (mgd)		Backwash - % of Influent Flow	Backwash	Frequency of Backwash	Average Backwash Flow (mgd)	Backwash Disposal	Chemical		Chemical and Rinse Disposal
	Flow (mgd)	Max Day Flow (mgd)						Cleaning Volume per Skid (gal)	Frequency of Chemical Cleaning	
Memcot (USFilter)	0.6	1.5	7% - 10%	air, raw water rinse	Every 15 minutes	0.04 - 0.06	to stream, SPDES permit required	6,000 (9,000 every third cleaning)	citric acid every 3-4 weeks, citric acid and caustic every third cleaning	Memclean solution citric acid neutralized and hauled
KOCH	0.6	1.5	7% - 8%	permeate w/caustic & 100-200 mg/l sodium hypochlorite	Once per hour	0.04 - 0.05	to stream, neutralization & SPDES permit required	4,600	200 mg/l sodium hypochlorite, 0.5% citric acid, 0.5% caustic every month	to tank, neutralized and hauled
Zenon	0.6	1.5	3% - 10 %	permeate w/5 mg/l sodium hypochlorite solution	Every 22 minutes	0.02 - 0.06	to stream, neutralization & SPDES permit required	22,900	250 mg/l sodium hypochlorite, 1-2% citric acid every 2 -3 months	to tank, neutralized and hauled

**TABLE 10-1
LAKE PEEKSKILL WATER FACILITY PLAN
WATER TREATMENT PLANT**

**CAPITAL COSTS
Membrane Filtration Plant**

<u>COMPONENT</u>	<u>TOTAL</u>
Site Work	\$200,000
Building	\$762,000
Membrane Equipment	\$2,238,000
Clearwell	\$289,000
Feed Pump Station	\$382,000
Distribution Pump Station	\$118,000
Laboratory Equipment	\$99,000
Outside Piping	\$73,000
Inside Piping	\$75,000
Underground Storage Tank	\$131,000
Emergency Generator	\$60,000
Sodium Hypochlorite Feed System	\$15,000
Sodium Hydroxide Feed System	\$15,000
<u>Phosphate Feed System</u>	<u>\$15,000</u>
Subtotal (Includes 20% Contractor Overhead and Profit)	\$4,472,000
Engineering (Designs, O&M Manual, Start-up Services, Soils/Geotech, Surveying, Inspection, Permitting), Legal, Bond Counsel, Force Account, Fiscal Expenses, Miscellaneous Expenses - 25%	\$1,118,000
<u>Pilot Testing</u>	<u>\$200,000</u>
Total WTP Capital Cost (1999)	\$5,790,000

TABLE 10-2
LAKE PEEKSKILL WATER FACILITY PLAN
WATER TREATMENT PLANT

ESTIMATED O&M COSTS
Membrane Filtration Plant

FIRST YEAR O&M COSTS - 1999 DOLLARS

Staff	\$134,000
Building	\$19,600
Membrane Equipment	\$85,700
Feed Pump Station	\$34,500
Distribution Pumps	\$21,300
Laboratory	\$17,900
Residual Hauling, Treatment, and Disposal	\$10,100
Emergency Generator	\$3,000
Sodium Hypochlorite Feed System	\$1,400
Sodium Hydroxide Feed System	\$1,200
<u>Phosphate Feed System</u>	<u>\$4,100</u>

TOTAL= \$332,800

Table 12-1
Lake Peekskill Water Facility Plan
Summary of Piping and Appurtenances Costs
Town Road Pavement Restoration

Water Main - 4.5 ft of Cover

PVC - Class 200, DR 14

Water Main Piping Unit Costs

Pipe Dia. = 6 in	Pipe Dia. = 8 in	Pipe Dia. = 12 in
\$161/LF	\$178/LF	\$185/LF

Components of total costs for water main piping unit costs:

- 1 Pipe material and installation
- 2 Earth excavation (25 % of total excavation) backfill, and compaction
- 3 Rock excavation (75% of total excavation)
- 4 Bedding
- 5 Sheeting
- 6 Pavement Resurfacing.
- 7 Add 20 % contractor overhead and profit.
- 8 Add 25% for Engineering (Designs, O&M Manual Start-up Services, Soils/Geotech, Surveying, Inspection Permitting), Legal, Bond Counsel, Force Account, Fiscal Expenses, Interest on Bond, Miscellaneous Expenses.
- 9 Prices from *Mean's Guide for Site Work* and manufacturers' quotes
- 10 Use White Plains City Cost Index = 130.1
11. Prices as 1999.

Water Distribution System Appurtenances

<u>Hydrants</u>	<u>Isolation and Divide Valves*</u>	<u>Pressure Reducing Valves</u>	<u>Service Connections (water main to curb stop)</u>
\$ 5,787 each	6 inch \$ 1,317 each	\$ 12,200 each	\$ 2,000 each
	8 inch \$ 1,900 each		
	12 inch \$ 4,176 each		
<u>Includes</u>	<u>Includes</u>	<u>Includes</u>	<u>Includes</u>
1. 15 feet of 6 inch pvc pipe	1 Gate Valve	1 4 inch PRV	1 25 feet of 3/4 inch type "K" copper pipe
2. 6 inch gate valve	2 Valve Box	2 Vault	2 3/4 inch corporation stop
3. Valve box		3 Instrumentation & Controls	3 3/4 inch curb stop and valve box at property line
3. Hydrant			
4. 6 inch tee			

Components of total costs for water distribution system appurtenances

- 1 Earth excavation (25 % of total excavation), backfill, and compaction
- 2 Rock excavation (75% of total excavation).
- 3 Bedding
- 4 Sheeting
5. Pavement Resurfacing
6. Add 20 % contractor overhead and profit
7. Add 25% for Engineering (Designs, O&M Manual Start-up Services, Soils/Geotech, Surveying, Inspection Permitting), Legal, Bond Counsel, Force Account, Fiscal Expenses, Interest on Bond, Miscellaneous Expenses
8. Prices from *Mean's Guide for Site Work* and manufacturers' quotes
- 9 Use White Plains City Cost Index = 130.1
- 10 Prices as 1999

* Isolation and divide valve installation costs do not include excavation, bedding, sheeting, or pavement restoration. These costs are accounted for in the piping unit costs

LAKE PEEKSKILL WATER FACILITY PLAN
TOWN OF PUTNAM VALLEY
ITEMIZED COST ESTIMATE - DISTRIBUTION SYSTEM
CONNECTION TO CORTLANDT



TABLE 12-2

Description	Pipe Size	Unit	Quantity	Unit Cost	Amount
Distribution Piping	6"	L.F.	47,400	\$161.00	\$7,631,400.00
	8"	L.F.	30,200	\$178.00	\$5,375,600.00
	12"	L.F.	10,400	\$185.00	\$1,924,000.00
				Subtotal	\$14,931,000.00
Fire Hydrants	--	EACH	130	\$5,787.00	\$752,310.00
				Subtotal	\$752,300.00
Isolation/Divide Valves	6"	EACH	110	\$1,317.00	\$144,870.00
	8"	EACH	60	\$1,900.00	\$114,000.00
	12"	EACH	11	\$4,176.00	\$45,936.00
				Subtotal	\$304,800.00
Distribution System PRV's	--	EACH	3	\$12,200.00	\$36,600.00
				Subtotal	\$36,600.00
Storage Tanks	--	EACH	2	\$313,450.00	\$626,900.00
				Subtotal	\$626,900.00
Rehabilitate Existing Pump Station	--	EACH	1	\$460,700.00	\$460,700.00
				Subtotal	\$460,700.00
Distribution System Meter	6"	EACH	1	\$50,000.00	\$50,000.00
				Subtotal	\$50,000.00
Supply Service Meters With Remotes	5/8"	EACH	904	\$100.00	\$90,400.00
				Subtotal	\$90,400.00
Service Connections (Water Main to Curb Stop)	3/4"	EACH	904	\$2,000.00	\$1,808,000.00
				Subtotal	\$1,808,000.00
Easements	--	L.S.	1	\$20,000.00	\$20,000.00
				Subtotal	\$20,000.00
				TOTAL:	\$19,081,000.00

LAKE PEEKSKILL WATER FACILITY PLAN
 TOWN OF PUTNAM VALLEY
 ITEMIZED COST ESTIMATE - DISTRIBUTION SYSTEM
 NEW WATER TREATMENT PLANT



TABLE 12-3

Description	Pipe Size	Unit	Quantity	Unit Cost	Amount
Distribution Piping	6"	L.F.	46,200	\$161.00	\$7,438,200.00
	8"	L.F.	31,000	\$178.00	\$5,518,000.00
	12"	L.F.	10,800	\$185.00	\$1,998,000.00
			Subtotal		\$14,954,200.00
Fire Hydrants	--	EACH	130	\$5,787.00	\$752,310.00
			Subtotal		\$752,310.00
Isolation/Divide Valves	6"	EACH	110	\$1,317.00	\$144,870.00
	8"	EACH	60	\$1,900.00	\$114,000.00
	12"	EACH	12	\$4,176.00	\$50,112.00
			Subtotal		\$309,000.00
Distribution System PRV's	--	EACH	2	\$12,200.00	\$24,400.00
			Subtotal		\$24,400.00
Storage Tanks	--	EACH	2	\$313,450.00	\$626,900.00
			Subtotal		\$626,900.00
Distribution System Meter (For Emergency Connection to Corlandt)	6"	EACH	1	\$50,000.00	\$50,000.00
			Subtotal		\$50,000.00
Service Meters With Remotes	5/8"	EACH	904	\$100.00	\$90,400.00
			Subtotal		\$90,400.00
Service Connections (Water Main to Curb Stop)	3/4"	EACH	904	\$2,000.00	\$1,808,000.00
			Subtotal		\$1,808,000.00
Easements	--	L.S.	1	\$20,000.00	\$20,000.00
			Subtotal		\$20,000.00
			TOTAL:		\$18,635,000.00