

**BROOME COUNTY
WASTEWATER SYSTEMS
FINANCIAL FEASIBILITY STUDY
BROOME COUNTY, NEW YORK**

Prepared for
BROOME COUNTY, NEW YORK

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EXECUTIVE SUMMARY

Stearns & Wheeler, LLC was retained by the Broome County Department of Planning and Economic Development to determine the financial feasibility of County involvement in wastewater management, ownership, and operation within Broome County. In this respect, it is the County's desire to examine whether consolidated services would enhance the ability to promote development within the County. Currently, the County does not have the authority to offer wastewater infrastructure to potential new developments without the approval of the local municipality that owns and operates that particular treatment facility and collection system.

In 2002, The Hudson Group, LLC completed a study which investigated the potential for Broome County to take ownership of and manage wastewater treatment systems within the County. The Hudson Group report developed eight recommendations for a County-owned system. The eight recommendations included:

1. Obtain ownership and operation of the Binghamton-Johnson City Joint Sewage Treatment Plant (BJCJSTP).
2. Phased investigation of Endicott and Northgate WWTPs.
3. Creation of a County sewer district.
4. Enacting a County sewer ordinance.
5. Finance costs of the new district.
6. Request and review proposals for operation and maintenance of the acquired plants.
7. Evaluation of primary and secondary treatment capacity.
8. Revise existing intermunicipal contracts to be consistent and fair.

As a follow-up to the Hudson Group report, the objective of this report is to determine the financial feasibility of proceeding with the eight recommendations.

The study area included the wastewater treatment and collection systems in the Greater Binghamton Area: the BJCJSTP, the Endicott WWTP, and the Northgate WWTP, as well as potential wastewater expansion areas in the Town of Kirkwood and the Airport Corridor. Stearns & Wheeler conducted on-site visits to each facility, inventoried equipment, and gathered operations information and flow and load data. The data collected was utilized to determine the value of each facility, the facility operation costs, and available capacity for growth. The value of the treatment systems, coupled with the operation costs, was utilized to calculate the annual user cost that would result if the County were to take ownership of these wastewater systems.

Excess capacity for flow and load sharing was evaluated and it was determined that the Endicott and Northgate WWTPs are at or near their design flow capacity. There is reserve flow capacity at the BJCJSTP. Future treatment needs were determined for each facility. In light of the pending regulations and effluent discharge limits resulting from the Chesapeake Bay Initiative, improvements may be required at each facility. The effluent discharge limits set forth by the Chesapeake Bay Initiative focus on nitrogen and phosphorus removal. The current upgrade for the BJCJSTP includes nitrogen removal, but does not include phosphorus removal. The BJCJSTP does not presently have a phosphorus limit included in their discharge permit; but if a phosphorus limit was added as part of the Chesapeake Bay Initiative, the BJCJSTP would need to be upgraded for phosphorus removal. To meet the potential nitrogen and phosphorus limits at the Endicott and Northgate WWTPs, these facilities would need to be upgraded. Capital costs for future upgrades were compiled along with future operation and maintenance costs to determine future annual user costs based on compliance with the Chesapeake Bay Initiative.

Current staff at each facility was documented and compared to future staff required for operation and maintenance of each facility following upgrade to meet the Chesapeake Bay Initiative requirements. A staffing chart showing quantity and title of staff required with a County-owned system is presented in Chapter 4.

Alternatives for ownership structure include development of a sewer district, development of a sewer authority, or instituting intermunicipal agreements. The structure, procedures required to implement, and the powers of each entity are presented in this report.

To better evaluate the positive and negative aspects of County ownership of the wastewater systems, a risk benefit analysis was performed. The risks and benefits were evaluated for:

1. Capital costs.
2. User costs.
3. Operation and management.
4. Future costs.
5. Environmental benefits.
6. Growth potential.
7. Flow sharing.
8. Rate standardization.
9. Plant capacity.
10. Plant expandability.
11. Value to municipalities.

Based on the findings of the report, it appears feasible for the County to take ownership of the wastewater systems in the Greater Binghamton Area. Before ultimately deciding to do so, it is recommended that the following steps be implemented:

1. Discuss range of compensation to be paid to each municipality to determine willingness to sell, and starting point for purchase price negotiations.
2. Determine what ownership structure is preferred by County officials to take over the management, operation, and ownership of the wastewater systems in the Greater Binghamton Area.
3. Conduct a detailed evaluation and cost analysis for additional infrastructure and improvements required for flow sharing between treatment facilities.
4. Perform a plant capacity analysis for the Endicott and Northgate WWTPs to determine future plant expansion costs that are in addition to upgrade costs to meet the Chesapeake Bay Initiative.
5. Conduct a comprehensive financial analysis of Broome County to determine the borrowing power of the County and the payment terms for purchasing one or all three treatment systems.

6. Perform a user rate study based on the financial terms of actual money to be borrowed for purchasing the wastewater systems.

A summary of the financial feasibility evaluation and information developed is included in Table ES-1.

TABLE ES-1

**COST SUMMARY ANALYSIS
YEAR CONSTRUCTED DOLLAR VALUE**

Capital Costs ¹	\$53,000,000	\$62,000,000	\$62,000,000	\$72,000,000	\$66,000,000	\$76,000,000	\$66,000,000	\$76,000,000	
Debt ²	\$60,000,000	\$68,000,000	\$68,000,000	\$76,000,000	\$70,000,000	\$78,000,000	\$70,000,000	\$78,000,000	
Future Costs ³	\$13,000,000	\$13,000,000	\$13,000,000	\$29,000,000	\$30,000,000	\$30,000,000	\$48,000,000	\$48,000,000	
Management & Operation	-	-	-	-	-	-	-	-	
- Current Costs	\$6,200,000	\$6,800,000	\$6,800,000	\$8,800,000	\$8,600,000	\$9,200,000	\$8,600,000	\$9,200,000	
- Future Costs ⁴	\$6,900,000	\$7,500,000	\$7,500,000	\$10,400,000	\$10,300,000	\$10,900,000	\$11,000,000	\$11,600,000	
Number of Users ⁵	27,405	44,775	44,775	47,175	47,175	47,175	47,175	47,175	
20-Year Financing ⁶	Future User Costs (Capital Costs) ⁹	\$440	\$490	\$490	\$410	\$380	\$410	\$430	\$460
	Future User Costs (Debt Takover) ¹⁰	\$470	\$510	\$420	\$390	\$390	\$410	\$430	\$460
30-Year Financing ⁷	Future User Costs (Capital Costs) ⁹	\$390	\$430	\$360	\$360	\$340	\$360	\$370	\$400
	Future User Costs (Debt Takover) ¹⁰	\$410	\$440	\$370	\$370	\$340	\$360	\$380	\$400
40-Year Financing ⁸	Future User Costs (Capital Costs) ⁹	\$390	\$430	\$360	\$360	\$340	\$360	\$370	\$400
	Future User Costs (Debt Takover) ¹⁰	\$410	\$450	\$370	\$370	\$340	\$360	\$380	\$400

Notes:

- Capital costs represent the estimated value of the existing wastewater infrastructure.
- It has been anticipated that any debt that may be outstanding for the Towns of Dickinson and Vestal sewer collection systems would be negligible as they pertain to the specific lines that have been identified for potential ownership and operation by the County under the "WWTPs, FSS, & Main Collector Sewers" scenario.
- "Future Costs" represent the estimated cost to upgrade the WWTPs to meet the effluent requirements of the upcoming Chesapeake Bay Initiative.
- "Future Costs" for the Management & Operation represents the estimated increase in the annual O&M costs based on the expected Chesapeake Bay Initiative upgrades. The value listed is the sum of the "Current Costs" value plus the future costs. The additional Endicott O&M costs are based on data from the "Nutrient Removal Assessment for the Village of Endicott Wastewater Treatment Plant" October 2005 Report completed by Starnus & Wheeler, LLC. The Binghamton-Johnson City Joint STP and the Northgate WWTP future cost increases have been estimated using ratios of the 2006 annual average plant flows for these plants to that of the Endicott WWTP.
- "Number of Users" represents the actual number of sewer users or connections that are billed by their respective municipality for use of the sewer system. Numbers were obtained from each municipality. Number of users does not include households that are not currently connected to the sewer system.
- 20-year financing is based on general bonding at an estimated interest rate of 5%.
- 30-year financing is based on bonding through NYS Environmental Facilities Corporation at an estimated interest rate of 4%.
- 40-year financing is based on federal bonding at an estimated interest rate of 5%.
- "User Costs" are based on stated Capital Costs, Management & Operation, and Future Costs. "User Costs" do not include other non-County owned infrastructure that continue to be operated & financed by the individual municipalities.
- "User Costs" are based on stated Debt, Management & Operation, and Future Costs. "User Costs" do not include other non-County owned infrastructure that continue to be operated & financed by the individual municipalities.
- This section does not include the Penview Package WWTP in the Town of Chenango.
- Additional users associated with the expansions in the Town of Kirkwood and the Airport Corridor have not been included with this number as there currently are no available estimates for the number of new users that may be added.

Note: Separate costs for each facility are presented in Chapters 2 and 3.

CHAPTER 1

INTRODUCTION

Broome County has expressed an interest in the management, operation, and ownership of wastewater infrastructure in the County to achieve consolidation of municipal services and promote economic development in the region. In August 2002, a study was completed by The Hudson Group, LLC, titled "*Broome County Wastewater Management.*" This report investigated the feasibility of County involvement in wastewater infrastructure in Broome County. The Hudson Group report evaluated all sewer and unsewered areas of the County to determine if there is sufficient justification for direct involvement of Broome County in the ownership and operation of the wastewater treatment plants (WWTPs) and collection systems (trunk sewers, collector sewers, pumping stations, combined sewer overflows) within the County. The report recommended a course of action which included:

1. Obtain ownership and operation of the Binghamton-Johnson City Joint Sewage Treatment Plant (BJCJSTP).
2. Phased investigation of Endicott and Northgate WWTPs.
3. Creation of a County sewer district.
4. Enacting a County sewer ordinance.
5. Finance costs of the new district.
6. Request and review proposals for operation and maintenance of the acquired plants.
7. Evaluation of primary and secondary treatment capacity.
8. Revise existing intermunicipal contracts to be consistent and fair.

As a follow-up to the Hudson Group report, the County retained Stearns & Wheeler, LLC to explore whether it would be financially feasibility for the County to implement the eight

recommendations presented in the Hudson Group report. As this report was focused on economic growth, the Department of Planning and Economic Development led this project.

Although there are five major municipal wastewater treatment facilities located in Broome County (BJCJSTP, Endicott WWTP, Northgate WWTP, Deposit Water Pollution Control Plant, and Whitney Point WWTP), the Department of Planning and Economic Development has identified the greatest potential growth in Broome County to be located in and around the Greater Binghamton Area as shown on the attached map (Appendix A). Based on the County's interest in addressing the needs for growth, it was determined that this study would focus only on the three major wastewater treatment facilities that serve the Greater Binghamton Area: the BJCJSTP, the Endicott WWTP, and the Northgate WWTP. In addition, the County has identified two particular growth areas that are currently unsewered, and has requested that Stearns & Wheler develop preliminary cost estimates to provide wastewater services for these areas, which are unsewered portions of the Town of Kirkwood and the Airport Corridor. These areas are discussed in more detail in Chapter 3, along with the preliminary cost estimates.

Consolidation of services has been and is a goal of the Broome County Executive and many Broome County officials and that of New York State Governor Spitzer. Many counties in New York State have realized the benefits of consolidation of services for wastewater treatment, just as Broome County is currently investigating. A map of New York State highlighting counties that own and manage wastewater infrastructure is provided in Appendix A.

1.1 BACKGROUND

A. Binghamton-Johnson City Joint Sewage Treatment Plant. The BJCJSTP, located at 4480 Old Vestal Road in Vestal, is owned by the City of Binghamton and the Village of Johnson City, and is managed by the Binghamton-Johnson City Joint Sewage Board (Board). The Board is made up of representatives from the two municipalities. There are approximately 27,000 sewer connections throughout 10 different municipalities that are serviced by the BJCJSTP. Each municipality is charged a fee for the volume of wastewater they discharge to the BJCJSTP. This cost is governed by intermunicipal agreements between each municipality and the Board. The rates vary from \$2.44 to \$3.02 per 100 cubic feet of wastewater. Whenever a project is undertaken at the BJCJSTP or the Terminal Pump Station and force main operated by the Board, it is financed through the City of Binghamton, the Village of Johnson City, or both, but the cost is ultimately divided among the 10 municipalities served by the BJCJSTP through the user fees

that are charged. The City of Binghamton and the Village of Johnson City alternate for the title of lead agency for project management and other tasks related to the plant.

The following table provides a summary of the sewer connections and the length of sewer system associated with each municipality.

BJCJSTP SERVICE AREA INFORMATION

MUNICIPALITY	NUMBER OF SEWER CONNECTIONS	LENGTH OF SEWER SYSTEM (MILES)
City of Binghamton	13,975	200
Village of Johnson City	5,900	45
Village of Port Dickinson	724	7.6
Town of Binghamton	831	12
Town of Conklin	298	5.5
Town of Dickinson	1,100	13
Town of Fenton	351	2.2
Town of Kirkwood	581	11
Town of Union	150	5.1
Town of Vestal	3,495	44
Total	27,054	348



1. **Collection System.** The collection system for the BJCJSTP is divided into two separate service areas -- the Binghamton Service Area and the Johnson City Service Area. Approximately 74 percent of the flow received at the BJCJSTP is from the Binghamton Service Area, while the remaining 26 percent is from the Johnson City Service Area. These flow percentages are based on reported flow volumes from each municipality as provided to the Board for billing purposes. The following table summarizes each municipality's discharge location through the two service areas to the BJCJSTP. A map displaying these two service areas is located in Appendix A.

BINGHAMTON SERVICE AREA	JOHNSON CITY SERVICE AREA
City of Binghamton	Village of Johnson City
Town of Vestal	Town of Vestal
Village of Port Dickinson	Town of Union
Town of Dickinson	Town of Dickinson
Town of Binghamton	
Town of Conklin	
Town of Kirkwood	
Town of Fenton	

a. **Binghamton Service Area.** A series of pumping stations and gravity sewers owned by the various municipalities convey the Binghamton Service Area flows to the BJCJSTP. All of the wastewater from this service area, except for the Town of Vestal portion, is transported to the plant through a large trunk sewer that runs along the south side of the Susquehanna River. A portion of the Town of Vestal has its own gravity sewer line that flows directly into the plant.

b. **Johnson City Service Area.** All of the wastewater from the Johnson City Service Area is pumped directly to the BJCJSTP from the Terminal Pump Station, located west of the treatment plant at the end of Gates Road in Vestal. Wastewater from the Towns of Dickinson and Union passes through the Village of Johnson City sewers to the Terminal Pump Station, while the remaining portion of the Town of Vestal not served through the Binghamton Service Area has a separate gravity sewer to the Terminal Pump Station.

2. Plant Description. The BJCJSTP was originally constructed in 1958 as a primary treatment plant to serve the City of Binghamton. In 1968, capacity was added to accommodate wastewater from the Village of Johnson City. In 1972, the plant was upgraded to provide secondary treatment by adding aeration basins and secondary clarifiers. During the period from 1972 to 1993, several improvements were made to the plant, mostly related to solids handling and odor control.

In 1998, the first phase of three major upgrades to the BJCJSTP commenced. Phase I improvements included expansion of the odor control system throughout the plant and installation of the supervisory control and data acquisition (SCADA) system to monitor priority processes at the plant. Phase II improvements included improvement of the treatment plant's hydraulic throughput, installation of vortex grit removal systems, and conversion of the gaseous chlorine disinfection system to a liquid sodium hypochlorite system.

The Phase III improvements are currently under construction (2007) and include replacement of the aerated basins with biological aerated filters (BAFs); conversion of several existing secondary clarifiers into primary clarifiers; installation of new chlorine contact tanks and chemical feed systems; pump station upgrades; and solids handling improvements, including digester modifications and installation of new sludge pumps. Replacement of the aerated basins with BAFs is a significant upgrade to the plant and represents the first overall change in process since 1972. The BAF upgrade was designed to provide secondary treatment for carbonaceous removal, nitrification, and denitrification.

Per the C&S Engineers' design report dated June 2003, the average daily design flow rate for the BAFs is 26 million gallons per day (mgd), and the peak hourly design flow rate for the carbonaceous and nitrification BAFs is 60 mgd. The denitrification BAF has a peak hourly design flow rate of 49.5 mgd. Therefore, the average daily design flow rate for the plant influent is 26 mgd, with a peak hourly design influent flow rate of 60 mgd and a maximum month flow rate of 35 mgd.

After the upgrades are complete (Phases I through III), wastewater from the Binghamton Service Area will be pumped to the plant by an influent lift pump station, where it passes through influent screening and a vortex grit removal system. Wastewater from the Johnson City Service Area will be pumped directly into a separate vortex grit removal system at the

plant and will not receive influent screening. After the flows are degrittled, the wastewater from the two service areas is combined prior to distribution to the primary clarifiers.

The upgraded BJCJSTP will have 10 primary clarifiers. Six of these units are existing, and four have been converted from secondary clarifiers to primary clarifiers as part of Phase III. These 10 units are rated for a peak flow of 60 mgd. Effluent from the primary clarifiers will be distributed to the new BAF system. The eight carbonaceous and eight nitrification filters are rated for a peak flow rate of 60 mgd. The BAF system also includes denitrification, which is rated for a peak flow rate of 49.5 mgd, and uses methanol feed as a carbon source for this biological process. Primary effluent will enter the carbonaceous filters, followed by the nitrification filters, and then the denitrification filters. The upgraded disinfection system will use liquid sodium hypochlorite in lieu of gaseous chlorine, followed by liquid sodium thiosulfite dechlorination. This system is rated for a peak flow rate of 60 mgd. After disinfection, the effluent flow is discharged into the Susquehanna River.

Solids handling at the BJCJSTP consists of gravity thickeners to thicken the primary and BAF sludge, followed by anaerobic digestion and centrifuge dewatering, or by centrifuge dewatering, and lime stabilization of the thickened sludge. The sludge is then transported to the Broome County Landfill for disposal.

State Pollutant Discharge Elimination System (SPDES) discharge permit (SPDES No. NY0024414) for the BJCJSTP has recently been revised based on the current upgrade that is still under construction. The permit for the BJCJSTP has several tiers of requirements based on the volume of flow being received at the plant. The summary table which follows contains the discharge permit limits for flows up to 35 mgd.

BJCJSTP SPDES PERMIT REQUIREMENTS

PARAMETER	MONTHLY AVERAGE	WEEKLY AVERAGE
Flow	35 mgd (12 month rolling average)	N/A
CBOD ₅	18 mg/L ⁽¹⁾	27 mg/L
TSS	20 mg/L ⁽¹⁾	30 mg/L
Settleable solids	0.3 ml/l (daily maximum)	N/A
Ammonia as NH ₃ (6/1 to 10/31)	2200 lbs/day	N/A
TKN nitrogen as N	45 mg/L (daily maximum) 13,700 lbs/day (daily maximum)	N/A

PARAMETER	MONTHLY AVERAGE	MONTHLY AVERAGE
Total nitrogen	6.0 mg/L	N/A
Fecal coliform ⁽¹⁾	200 /100 mL	400 /100 mL
Total residual chlorine	0.2 mg/L (daily maximum)	N/A
pH	6.0 to 9.0 range	N/A
Total mercury	200 ng/L (daily maximum)	N/A
Total cyanide	10 lbs/day (daily average)	N/A
Copper, total recoverable	20 lbs/day (daily maximum)	N/A
Iron, total recoverable	290 lbs/day (daily maximum)	N/A
Lead, total recoverable	18 lbs/day (daily maximum)	N/A

(1) Based on a geometric mean.

B. Endicott Wastewater Treatment Plant. The Endicott WWTP, located on Anson Road in Endicott, is owned and operated by the Village of Endicott. The WWTP discharges the treated effluent to the Susquehanna River. There are three municipalities (Village of Endicott, Town of Union, Town of Vestal) that discharge wastewater to the Endicott WWTP. Each individual user is charged \$1.25 per 1,000 gallons of wastewater. The following table provides a breakdown of the sewer connections and the length of sewer system (in miles) associated with each municipality.

ENDICOTT WWTP SERVICE AREA INFORMATION

MUNICIPALITY	NUMBER OF SEWER CONNECTIONS	LENGTH OF SEWER IN SYSTEM (MILES)
Village of Endicott	14,200	60
Town of Union	(1)	75
Town of Vestal	3,170	24
Total	17,370	159

(1) The total number of sewer connections for the Village of Endicott and the Town of Union are combined into one number, listed for the Village of Endicott.

The Village of Endicott operates the Argonne Avenue, Castle Gardens, Loder Avenue, and River Terrace Pumping Stations (see Greater Binghamton Area map in Appendix A), as well as an influent lift station located at the treatment plant. Wastewater from the Town of Union (flows that are not treated at the BJCJSTP) and the Village of Endicott is collected through a series of pumped force mains and gravity sewers. All the flow is combined and transported through one

pipe to the treatment plant. Flow from the Town of Vestal is pumped directly to the treatment plant from a pumping station located south of the plant on Castle Gardens Road in Vestal. A map showing the Endicott WWTP collection area is located in Appendix A.



The Endicott WWTP has a permitted maximum month flow of 10 mgd; the current average annual flow is 8.3 mgd with an associated maximum month flow of 14 mgd. The original plant was constructed in 1966 and included primary treatment. In 1973, the plant was upgraded to include secondary treatment with trickling filters. In 2002, the plant was again upgraded with new plastic media biotowers (trickling filters), solids contact tank, and additional secondary clarifiers.

The plant currently has influent screening and aerated grit chambers followed by three rectangular primary clarifiers. The effluent from the primary clarifiers flows to a pumping station that pumps the wastewater to the two biotowers. This pumping station constantly delivers 8 mgd of flow to each biotower. The flow to the biotowers is made up of a mixture of primary clarifier effluent and recycle flows. This same pumping station has a second set of pumps that pump the biotower effluent to a solids contact tank. Effluent from the solids contact tank is conveyed (via

gravity) to the secondary clarifiers. The activated sludge is returned to the solids contact tank and the waste sludge is sent to the primary clarifiers for co-settling. The secondary effluent is disinfected with sodium hypochlorite in a chlorine contact tank, and dechlorinated with sodium bisulfite prior to being discharged to the Susquehanna River.

The secondary treatment system is designed to treat a peak flow of 16 mgd. When plant influent exceeds 16 mgd, the additional primary clarifier effluent (greater than 16 mgd) automatically overflows directly into the chlorine contact tank for disinfection and discharge to the river.

The plant's solids handling system consists of gravity thickening of primary and waste activated sludge. The thickened sludge is anaerobically digested and dewatered with a belt filter press. The dewatered sludge is then mixed with sawdust and composted. The finished compost is sold wholesale.

The current discharge permit (SPDES No. NY0027669) for the Village of Endicott WWTP was issued in August 2003. The permit was amended in May 2005 to include effluent sampling, orthophosphate (OP), total phosphorus (TP), total Kjeldahl nitrogen (TKN), and nitrate (NO₃). A summary of the discharge permit limits is shown in the following table.

ENDICOTT WWTP SPDES PERMIT REQUIREMENTS

PARAMETER	MONTHLY AVERAGE	WEIGHTED AVERAGE
Flow	10 mgd	N/A
CBOD ₅	25 mg/L ⁽¹⁾	40 mg/L ⁽¹⁾
TSS	30 mg/L ⁽¹⁾	45 mg/L ⁽¹⁾
Settleable solids	0.3 ml/l (daily maximum)	N/A
Ammonia as NH ₃ (6/1 to 10/31)	830 lbs/day	N/A
Fecal coliform ⁽²⁾	200 /100 mL	400 /100 mL
Total residual chlorine	0.5 mg/L (daily maximum)	N/A
pH	6.0 to 9.0 range	N/A
Copper, total recoverable	10 lbs/day (daily maximum)	N/A
Iron, total recoverable	88 lbs/day (daily maximum)	N/A
Lead, total recoverable	4.7 lbs/day (daily maximum)	N/A

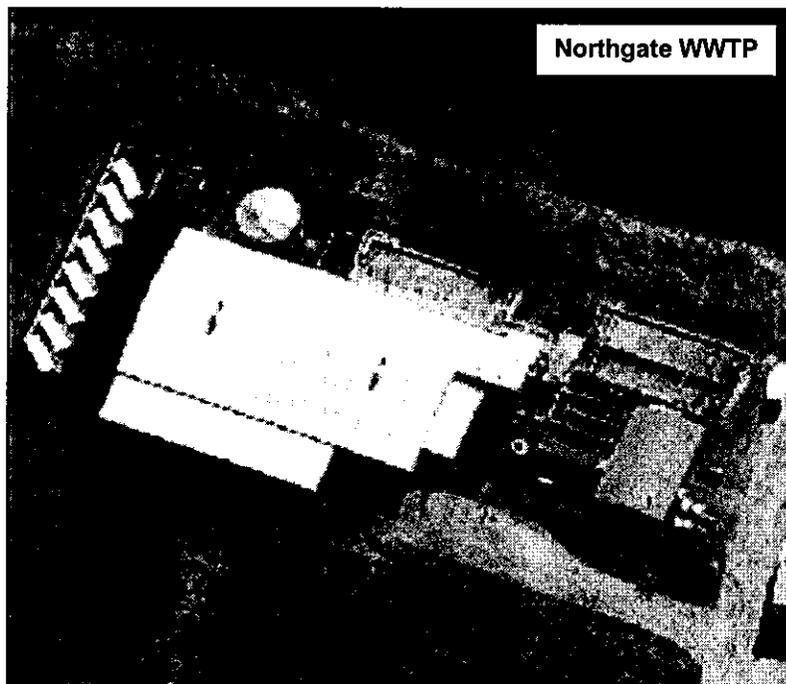
(1) The effluent CBOD₅ and TSS shall not exceed 15 percent of the influent values.

(2) Based on a geometric mean.

C. **Northgate Wastewater Treatment Plant.** The Northgate WWTP is located in the Town of Chenango at 1137 Front Street in Binghamton, NY. This facility is the main facility of two municipal WWTPs owned and operated by the Town of Chenango. The second facility, the Pennview WWTP, is located north of the Northgate WWTP off of Route 11 (see Sewered Areas and Potential Growth Locations Map in Appendix A). This facility is a package plant that treats wastewater from an apartment complex.

Municipal wastewater from the town is treated at the Northgate facility and then discharged into the Chenango River. The treatment plant currently serves approximately 2,400 sewer connections that convey wastewater to the plant through a 42-mile sewer collection system. The plant also accepts approximately 30,000 gallons per day of leachate, 5 days per week, that is trucked from the Broome County Landfill. A map showing the Northgate WWTP collection area is located in Appendix A.

The treatment plant has a permitted maximum month flow of 0.8 mgd; the current average annual flow is 0.64 mgd with an observed maximum month flow of 0.94 mgd. The original plant was constructed in 1993 for 0.5 mgd, and was expanded in 1997 to treat the current maximum month flow of 0.8 mgd. In 2001, the facility received an upgrade to its composting facilities, which provided additional solids handling capacity.



An influent lift station pumps the wastewater to the plant. Currently, the treatment facility has an influent grinding operation that macerates the raw wastewater prior to biological treatment. There are three sequencing batch reactors (SBR) employed for the biological treatment process as well as sludge settling (clarification). The effluent flow from the SBRs is then disinfected using gaseous chlorine in the chlorine contact tank prior to discharge to the Chenango River.

The plant's solids handling system consists of aerobic digestion, belt filter press dewatering, and sludge composting. The dewatered sludge is mixed with sawdust and composted. The finished compost is sold wholesale.

The current discharge permit (SPDES No. NY0213781) for the Northgate WWTP was issued in April 2001. A summary of the discharge permit limits for the treatment plant are presented in the following table.

NORTHGATE WWTP SPDES PERMIT REQUIREMENTS

Parameter	Monthly Average	Weekly Average
Flow	0.80 mgd	N/A
BOD ₅	30 mg/L ⁽¹⁾	45 mg/L ⁽¹⁾
TSS	30 mg/L ⁽¹⁾	45 mg/L ⁽¹⁾
Settleable solids	0.3 ml/l (daily maximum)	N/A
Fecal coliform ⁽²⁾ (5/1 to 10/1)	200 /100 mL	400 /100 mL
Total residual chlorine	2.0 mg/L (daily maximum)	N/A
pH	6.0 to 9.0 range	N/A
Total mercury	200 ng/L (daily maximum)	N/A
Total cyanide	10 lbs/day (daily average)	N/A
Copper, total recoverable	20 lbs/day (daily maximum)	N/A
Iron, total recoverable	290 lbs/day (daily maximum)	N/A
Lead, total recoverable	18 lbs/day (daily maximum)	N/A

(1) The effluent CBOD₅ and TSS shall not exceed 15 percent of the influent values.

(2) Based on a geometric mean.

CHAPTER 2

VALUATION

2.1 CAPITAL COSTS

The major goal of this study was to determine whether or not it would be financially feasible for Broome County to own and operate the three major wastewater treatment facilities. Therefore, it was necessary to evaluate each of the three wastewater treatment facilities and collection system components in the Greater Binghamton Area. The project team identified select collection system components for potential County acquisition based on the need to reach all of the existing Greater Binghamton Area sewered municipalities. A County-wide map and a Greater Binghamton Area map in Appendix A provide illustrations of the wastewater infrastructure identified by the project team for potential County acquisition.

Site visits were made to each of the three primary WWTPs to gain an understanding of how operations are conducted and to collect information on unit processes, equipment, and activities at each facility. During each site tour, the head operator was interviewed regarding the operations and general layout of the facility. Inventory sheets containing the equipment information collected during the site visits to the three wastewater treatment facilities are provided in Appendix B.

A. **Valuation Methodology.** For each WWTP included in the valuation, a list of buildings, tanks, equipment, and piping was developed identifying the year the item was constructed, and the total number of units present. For each item, one of two methods was used to determine the current value. Where available, the original purchase price of each item was obtained. This value is presented under the heading "Original Cost" in the "Construction Cost" column of the cost tables in Appendix C. If no original purchase price was available, an estimated value was assigned to the item based on current 2007 costs and was then derated back to the year it was constructed. The year 2007 value is presented under the heading "Estimated to 2007" in the "Construction Cost" column. The "Estimated to 2007" costs were adjusted to "Year of

Construction” dollars by applying the Engineering News-Record (ENR)¹ Construction Cost Index (CCI) ratio from January 2007 to the year each item was constructed. This value is presented in the “Year of Construction” column.

A depreciation rate was calculated for all costs based on a useful life of 20 years for equipment, 50 years for buildings, and 75 years for piping. Straight-line depreciation was used for all items. The depreciation rate is the dollar amount each item reduces in value per year of age. The depreciated value is the depreciation rate multiplied by the age of the item, subtracted from the “Year of Construction” construction cost. A sample calculation illustrating the methodology described above is included in Appendix B. The following table provides a summary of the asset valuations for each of the wastewater treatment facilities and associated collection system infrastructure.

CAPITAL COSTS

WASTEWATER TREATMENT FACILITIES	WASTEWATER COLLECTION SYSTEM	WASTEWATER TREATMENT AND MAINS COLLECTION SYSTEM
BJCJSTP	\$53,000,000	\$62,000,000
Endicott WWTP	9,000,000	10,000,000
Northgate WWTP	4,000,000	4,000,000
Total	\$66,000,000	\$76,000,000

(1) Costs are based on current (2007) dollar value.

Copies of the detailed asset valuation sheets for each of the facilities listed above are included in Appendix C, along with the ENR CCI table used in the asset valuation.

An alternative to the capital asset valuation would be for the County to acquire the existing facilities debt from each municipality for the selected wastewater infrastructure. The costs associated with this option are listed below.

¹ Engineering News-Record is an organization that tracks the increase and decrease of the cost of materials, labor, and construction. An ENR CCI is assigned to each year based on historical cost data. Historical construction costs can be converted to present-day construction costs by applying the ratio of the CCI for the year built and the 2007 CCI to the original cost. The reverse may also be done to convert present-day 2007 costs back to the year of original construction.

DEBT COSTS

WASTEWATER TREATMENT FACILITIES	WASTEWATER COSTS ⁽¹⁾	WASTES, DEBT, SEWERS, AND GAIN (LOSS) COSTS ⁽²⁾
BJCJSTP	\$60,000,000	\$68,000,000
Endicott WWTP	8,000,000	8,000,000
Northgate WWTP	2,000,000	2,000,000
Total	\$70,000,000	\$78,000,000

(1) Costs are based on current (2007) dollar value.

2.2 OPERATION AND MAINTENANCE (O&M) COSTS

Another significant cost associated with the ownership and operation of wastewater treatment facilities is the O&M costs. Unlike capital costs, which are finite, O&M costs are a recurring expense. Each of the wastewater treatment facilities in this study operates and maintains their respective unit processes and equipment with a full-time staff. The O&M costs used in this study are based on actual budget information obtained for each facility. These costs include staff salaries and benefits, electricity consumption, chemical consumption, spare parts, sludge disposal, building repair costs, etc. The current O&M costs for each facility are summarized below.

OPERATION AND MAINTENANCE COSTS

WASTEWATER TREATMENT FACILITIES	COSTS ⁽¹⁾
BJCJSTP	\$6,200,000 ⁽²⁾
Endicott WWTP	2,000,000
Northgate WWTP	360,000
Total⁽³⁾	\$8,600,000

- (1) Costs based on budget data collected from each facility.
- (2) Includes BAF System that is currently under construction.
- (3) Rounded.

2.3 USER COSTS

The capital and O&M costs associated with each wastewater treatment facility are paid for by the users that are connected into that facility. The charges levied against each user are referred to as user costs. Each treatment facility has its own system for charging its users, but generally, these

user costs are based on the volume of wastewater produced by each user, multiplied by a set rate of dollars per volume of wastewater.

A. Valuation Methodology. The user costs presented in this study have been developed using two different sets of capital asset values for the wastewater treatment facilities. One approach was to use the capital costs estimated from the asset valuation described in Section 2.1, and the second approach was to use the facility's debt based on the same assets included in the capital cost asset valuation. Regardless of the approach, the capital or debt costs used were annualized over 20 years at 5 percent interest, 30 years at 4 percent interest, and 40 years at 5 percent interest to show the different user costs under these three financing scenarios. The annualized values were then added to the annual O&M costs to develop the overall user costs. These user costs do not include costs associated with the local collection systems maintained by the individual municipalities.

The three financing scenarios identified above are based on the options generally available for municipal bonding. The 20-year, 5 percent interest financing option is known as general financing. The New York State Environmental Facilities Corporation provides improved financing based on 30 years at 4 percent interest, due to subsidized interest. The third financing option, 40 years at 5 percent interest, is a federal financing option available for certain qualifying projects. The anticipated user costs under the three financing scenarios to own and operate the facilities are summarized in the following tables.

ANNUAL USER COSTS
20-Year Financing at 5% Interest

WWTDS	WWTDS COSTS ⁽¹⁾		WWTDS O&M, REPAIRS, AND MAINTENANCE COSTS ⁽²⁾	
	CAPITAL COST BASIS	DEBT PAYMENT BASIS	CAPITAL COST BASIS	DEBT PAYMENT BASIS
BJCJSTP	\$380	\$400	\$430	\$450
BJCJSTP/Endicott WWTP	\$290	\$300	\$330	\$330
BJCJSTP/Endicott WWTP/Northgate WWTP	\$290	\$300	\$320	\$330

(1) Costs are based on current (2007) dollar value.

ANNUAL USER COSTS
30-Year Financing at 4% Interest

WWTPS	WWTPS ONLY ⁽¹⁾		WWTPS, PUMP STATIONS, AND MAIN COLLECTOR SYSTEMS ⁽¹⁾	
	CAPITAL COST BASIS	DEBT PAYOVER BASIS	CAPITAL COST BASIS	DEBT PAYOVER BASIS
BJCJSTP	\$340	\$350	\$380	\$390
BJCJSTP/Endicott WWTP	\$260	\$270	\$290	\$290
BJCJSTP/Endicott WWTP/Northgate WWTP	\$260	\$270	\$290	\$290

(1) Costs are based on current (2007) dollar value.

ANNUAL USER COSTS
40-Year Financing at 5% Interest

WWTPS	WWTPS ONLY ⁽¹⁾		WWTPS, PUMP STATIONS, AND MAIN COLLECTOR SYSTEMS ⁽¹⁾	
	CAPITAL COST BASIS	DEBT PAYOVER BASIS	CAPITAL COST BASIS	DEBT PAYOVER BASIS
BJCJSTP	\$340	\$350	\$380	\$390
BJCJSTP/Endicott WWTP	\$260	\$270	\$290	\$300
BJCJSTP/Endicott WWTP/Northgate WWTP	\$260	\$270	\$290	\$290

(1) Costs are based on current (2007) dollar value.

Widely varying user costs can be found for similar systems in New York State for which wastewater services have been consolidated. A number of factors can be attributed to this variability, such as level of treatment required at the wastewater treatment facility (e.g., nutrient removal), the inclusion of collection system components within the sewer district (e.g., sewer interceptors and pumping stations), overall system size, location, age, and the number of users contributing to the system. For comparison purposes with the estimated user costs presented above, three different sewer districts in New York State were contacted to determine their average user costs. The Saratoga County Sewer District charges its users an average fee of \$140 per year, which varies from user to user based on proximity to the wastewater treatment facility and the costs required to convey the wastewater to the plant. In Onondaga County, the average user cost is approximately \$300 per user; in Rockland County, the average per user cost for Rockland County Sewer District No. 1 is \$525.

The estimated user costs presented above for the consolidated Broome County wastewater system compare favorably with these three example systems. The estimated fees for Broome County range from \$260 to \$450 per year compared to \$140 to \$525 per year for the three example systems. It should be noted that any additional wastewater conveyance fees that may be levied by local municipalities within the example systems are not included in the average user costs presented here.

CHAPTER 3

FUTURE TREATMENT NEEDS

One of the critical factors of the feasibility study for Broome County was the identification of available plant capacity for new users. Based on the level of information developed for this study, Stearns & Wheeler utilized three major wastewater treatment parameters to determine if the wastewater treatment facilities had available capacity. These parameters are:

1. **Plant Flow.** Measured in volume of wastewater treated per day and reported as:
 - **Average Annual Flow** – The average of the daily volumes to be received for a continuous 12-month period.
 - **Maximum Month Flow** – The largest volume of flow to be received during a calendar month.
 - **Peak Day Flow** – The largest volume of flow to be received during a continuous 24-hour period.
2. **Biochemical Oxygen Demand (BOD).** Measured in concentration, the amount of oxygen demand per liter (mg/L) of wastewater.
3. **Total Suspended Solids (TSS).** Measured in concentration, amount of solids per liter (mg/L) of wastewater.

The following sections summarize the available information to determine the plant capacity at the BJCJSTP, Endicott, and Northgate facilities. This determination was based on the data available on the facilities' discharge monitoring reports over the last three years (2004, 2005, 2006), and on the facilities' SPDES permits, as issued by the New York State Department of Environmental Conservation (NYSDEC).

3.1 BINGHAMTON-JOHNSON CITY JOINT SEWAGE TREATMENT PLANT

The maximum 12-month rolling average flow at the BJCJSTP over the past three years has been 23.1 mgd, compared to a SPDES permitted 12-month rolling average effluent flow of 35 mgd. According to the June 2003 design report provided by the design engineer, C&S Engineers, the design average daily flow at the facility will be 26 mgd upon completion of the current upgrade project. Based on the stated design flow (26 mgd), there appears to be some excess plant capacity at the BJCJSTP, when compared with the maximum 12-month rolling average observed at the facility over the past three years (23.1 mgd).

Due to the construction being performed at the treatment plant for the current upgrade project, the facility is presently operating with interim permit limits and is only providing limited treatment to the wastewater being processed at the facility. Therefore, it is not possible at this time to determine if the facility will have excess treatment capacity for BOD and TSS removal upon completion of the current upgrade and implementation of their revised SPDES permit. A request has been made to the Binghamton-Johnson City Joint Sewage Board to obtain information on what the plant capacity is at the facility. In addition, once the current facility upgrade is complete, 18 months of plant optimization and testing will be conducted, which will aid in determining what level of treatment can be achieved at the facility.

3.2 ENDICOTT WWTP

The Endicott WWTP is currently permitted for a flow of 10 mgd on a maximum month basis under their SPDES permit. Based on the last modification performed at the facility, the maximum month design capacity is 10 mgd. Over the past three years, the Endicott facility has exceeded its permit limit for flow six times. Therefore, based on permitted and design plant flow, it does not appear that the Endicott WWTP has available flow capacity. Although, in terms of BOD and TSS removal, the Endicott facility has maintained effluent concentrations well below their permitted limit.

3.3 NORTHGATE WWTP

The Northgate WWTP is currently permitted for a plant flow of 0.8 mgd on a maximum month basis under their SPDES permit and was designed for this same flow during the facility's last upgrade. Over the past three years, the Northgate facility has experienced one permit exceedance

on flow. Therefore, based on permitted and design plant flow, the Northgate WWTP does not appear to have excess flow capacity.

In terms of BOD and TSS removal, the Northgate facility has maintained effluent concentrations well below their permitted limit.

A summary table containing the flows and loads for the three Greater Binghamton Area wastewater treatment facilities is provided in Appendix E, along with the supporting data for each facility.

3.4 CHESAPEAKE BAY INITIATIVE

The waters of the Chesapeake Bay have been and continue to be impaired by excess nutrients and sediments, which have deteriorated the aquatic habitat and fisheries. In 1983, the Chesapeake Bay Agreement was signed by Maryland, Pennsylvania, Virginia, the District of Columbia, the Chesapeake Bay Commission, and the U.S. Environmental Protection Agency. This Agreement was aimed at reducing nutrient, sediment, and toxin loadings to the Bay. However, the Chesapeake Bay waters remained impaired and efforts to reduce nutrient loadings were extended to the headwaters of the watershed with the signing of the Chesapeake Bay 2000 Agreement, which included Delaware, New York, and West Virginia. This Agreement includes the reduction of nutrient discharges from these states by 2010. The two wastewater treatment effluent parameters targeted for removal by the Chesapeake Bay Initiative are:

- **Total Nitrogen (TN)** – Measured in concentration, amount of nitrogen per liter (mg/L) of wastewater.
- **Total Phosphorus (TP)** – Measured in concentration, amount of phosphorus per liter (mg/L) of wastewater.

In New York State, the Susquehanna River Basin stretches across the central/southern portion of the State, and this watershed ultimately discharges to the Chesapeake Bay. NYSDEC has issued a draft tributary strategy for the Susquehanna River Basin (New York State Tributary Strategy for Chesapeake Bay Restoration, May 2007). This draft tributary strategy is proposing to implement new guidelines for the reduction of TN and TP for the largest wastewater treatment facilities on the Susquehanna River Basin in New York, but currently does not address the

smaller facilities within the river basin. This strategy is currently under review by USEPA and must be approved by them before it can be implemented by NYSDEC.

The draft tributary strategy for New York State has been set up with four action levels, each to be phased into action over time based on the results observed in the Chesapeake Bay and the need for more nutrient reduction:

1. Level One involves the establishment of an accurate nutrient discharge load to establish a baseline from which cost effective nutrient reduction upgrades can be identified, as well as ensuring compliance with existing New York State water quality program regulations.
2. Level Two of the draft tributary strategy is focused on establishing nutrient action level concentration limits (12 mg/L TN and 2 mg/L TP) for the discharge permits of significant wastewater treatment plants in the Chesapeake Bay watershed. Significant wastewater treatment plants are considered those receiving greater than 400,000 gallons per day. These action levels will be based on plant performance once sufficient monitoring data has been collected, and the facilities affected by these action level concentration limits will be required to take corrective action if they exceed these concentration limits. Facilities with higher action level concentrations (greater than 12 mg/L TN and 2 mg/L TP) will be required to investigate and implement actions to optimize nutrient removal, or enhance nutrient removal through minor treatment modifications.
3. Level Three of the draft tributary strategy will be to prioritize wastewater treatment plant improvements, which will involve major capital upgrades to these facilities. The prioritization will be based upon local water quality impairment, existing infrastructure deficiency, nutrient removal cost efficiency, and the overall potential for nutrient reduction to the Chesapeake Bay.
4. The final step outlined in the draft tributary strategy, Level Four, would involve widespread nutrient removal upgrades at the significant wastewater treatment plants discharging to the Chesapeake Bay. This would require all significant wastewater treatment plants to meet an effluent TN limit of 8 mg/L, or a limit of 5 mg/L TN for the largest seven facilities. In addition, the six largest facilities would be required to meet an

effluent TP of 0.5 mg/L, while the remaining significant wastewater treatment plants would be required to meet a TP of 1.0 mg/L.

Each of the three wastewater treatment facilities in the Greater Binghamton Area that are included in this study are located within the watershed described above and would be considered “significant wastewater treatment plants” by this standard (greater than 400,000 gpd). For the purpose of this study, it is anticipated that these facilities will be required to meet the removal requirements set forth by NYSDEC in the draft New York State Tributary Strategy. Based on the potential effluent nutrient limits for nitrogen and phosphorus that may be imposed on these wastewater treatment facilities under the Level Four action of the draft tributary strategy, we have anticipated the plant upgrades that will be required at the three facilities to bring them into compliance with the Chesapeake Bay Initiative. Therefore, the future treatment needs for all three facilities have been factored into this study, and preliminary costs for these upgrades have been included to more accurately evaluate what the County’s future costs would be if they proceed with the acquisition of wastewater infrastructure in Broome County.

A. Binghamton-Johnson City Joint Sewage Treatment Plant. The current plant upgrade, which is still under construction, has been designed for removal of TN. The new BAF system is designed to provide nitrification and denitrification of the wastewater for nitrogen removal, but it will not be known if the facility will have additional capacity for this parameter until the facility is operational and data can be collected for a period of approximately 18 months. The upgraded BJCJSTP will have a permit limit of 6.0 mg/L TN.

The new SPDES permit for the upgraded BJCJSTP does not have an effluent total phosphorus limit. It is currently unknown what, if any, effluent total phosphorus limit will be required by NYSDEC for this facility in the future. For phosphorus removal, the upgraded plant will provide chemically enhanced primary clarification, which should improve the total phosphorus removal at the facility. For the purposes of this study, and to provide a conservative approach for the County, it is anticipated that BJCJSTP will require effluent filtration to achieve a low effluent total phosphorus level. Therefore, the future costs for this facility consider the addition of an effluent phosphorus removal system.

B. Endicott WWTP. The Endicott WWTP currently provides secondary treatment and has a seasonal effluent ammonia permit limit. NYSDEC has not issued any new SPDES permit limits for the Endicott facility at this time, based on the draft tributary strategy for the Susquehanna

River Basin and the Chesapeake Bay Initiative. For the purposes of this study, it is anticipated that future effluent total nitrogen and total phosphorus limits will be issued. This will provide the County with a more conservative approach in terms of the potential capital improvements that may be required at this facility. Based on this information, it is estimated that an effluent denitrification filter will be required to remove the nitrogen and filter out the phosphorus.

C. **Northgate WWTP.** The Northgate WWTP currently provides secondary treatment. NYSDEC has not issued any new SPDES permit limits for the Northgate facility at this time, based on the draft tributary strategy for the Susquehanna River Basin and the Chesapeake Bay Initiative. For the purposes of this study, it is anticipated that future effluent total nitrogen and total phosphorus limits will be issued. This will provide the County with a more conservative approach in terms of the potential capital improvements that may be required at this facility.

D. **Potential Chesapeake Bay Initiative Costs.** Based on the approach selected for this study in regard to the potential impacts of the Chesapeake Bay Initiative and the subsequent tributary strategy for the Susquehanna River Basin by NYSDEC, preliminary planning costs have been estimated for future treatment plant upgrades at each of the three facilities discussed above. The following table summarizes these future costs:

CHESAPEAKE BAY INITIATIVE FUTURE COSTS

WASTEWATER TREATMENT FACILITY	COSTS ⁽¹⁾
BJCJSTP	\$13,000,000
Endicott WWTP	16,000,000
Northgate WWTP	1,000,000
Total	\$30,000,000

(1) Costs represent current (2007) dollars.

It is also anticipated that the O&M costs for each facility will increase as a result of the Chesapeake Bay Initiative upgrades. These cost increases would be needed to accommodate items such as new equipment, chemicals, and additional electrical consumption. The following table summarizes the estimated future O&M costs for each facility. These future O&M costs are a combination of the current O&M costs and the additional costs associated with the Chesapeake Bay Initiative upgrades.

FUTURE OPERATION AND MAINTENANCE COSTS

MUNICIPALITY	COSTS
BJCJSTP ⁽¹⁾	\$6,900,000
Endicott WWTP ⁽²⁾	2,900,000
Northgate WWTP ⁽²⁾	430,000
Total ⁽³⁾	\$11,000,000

- (1) Increases for the future O&M costs at the BJCJSTP are based on the addition of an effluent filtration system for phosphorus removal.
- (2) Costs for the Endicott WWTP are based on information presented in the "Nutrient Removal Assessment for the Village of Endicott Wastewater Treatment Plant" Report from October 2005 completed by Stearns & Wheler, LLC. Costs for the Northgate WWTP are scaled from the Endicott WWTP cost based on average annual flow.
- (3) Rounded.

3.5 OTHER TREATMENT NEEDS

The County has identified two specific areas in Broome County that would benefit from new or expanded wastewater service: the Town of Kirkwood, and the Airport Corridor. To accommodate new growth and increase the number of wastewater connections to existing users in the Town of Kirkwood and the Airport Corridor, it was determined that new wastewater treatment facilities or collection sewers would be required.

A. **Town of Kirkwood.** One of the potential growth areas, the Town of Kirkwood, is located east of the City of Binghamton. As a potential growth area, the County requested that Stearns & Wheler investigate the feasibility of bringing additional flows from Kirkwood to the BJCJSTP, where the Town's current flows are conveyed. The County also stated that there are potential hydraulic capacity limitations in the existing gravity sewers in the City of Binghamton that are currently limiting their ability to convey Kirkwood wastewater to the BJCJSTP. Therefore, it was decided that there were two options available for conveying and treating additional wastewater flows from the Town of Kirkwood: (1) installation of a new gravity sewer, pumping station, and force main; or (2) construction of a new WWTP in the Town of Kirkwood. Preliminary cost estimates have been developed for both alternatives.

In estimating the costs for Option One (new gravity sewer line, pumping station, and force main), it was anticipated that the new sewer lines would parallel the existing lines from the east side of the City of Binghamton to the BJCJSTP, via the Pennsylvania Avenue Pumping Station

(Penn Ave PS). It has been estimated that a new 15- to 18-inch gravity sewer would be adequate to handle the remaining wastewater flows from the currently unsewered portions of the Town of Kirkwood, as well as provide capacity for future growth in the Town. It has been estimated that the new parallel gravity sewer line would convey the Kirkwood wastewater to the existing Penn Ave PS, where modifications would be completed to provide new pumping facilities to convey these additional Kirkwood flows to the BJCJSTP, via a new 8-inch force main. It is anticipated that this force main would roughly parallel the existing line from the Penn Ave PS to the BJCJSTP.

The estimated cost of construction for this option is \$11,800,000. This estimate is preliminary in nature and does not account for potential issues that may be present with regard to constructability (i.e., poor soils, existing underground utilities, or limited easement use) during installation of these new facilities, and other factors that may impact costs that have not been identified at this level of estimating. In addition, this cost does not include the infrastructure required within the Town of Kirkwood to convey the wastewater to the discharge point of the two existing force mains from the Town into the City of Binghamton.

Option Two, which involves construction of a new WWTP in the Town of Kirkwood, anticipates that a new packaged WWTP would be installed in the Town to serve the remaining unsewered areas of Kirkwood. This packaged WWTP has been sized to handle approximately 500,000 gpd and produce an effluent that will meet the requirements of the draft Chesapeake Bay Tributary Strategy for nutrient removal (TN limit, 5 mg/L; TP limit, 0.5 mg/L). The estimated cost of construction for this option is \$9,700,000, which includes site work, structural foundation, Administration Building, emergency generator, and interconnecting piping and electrical wiring to and from the package plant. Examples of costs not included in this estimate are property acquisition for treatment plant, dewatering facilities (it is anticipated that sludge would be transported to another facility for dewatering), and the outfall pipe for the WWTP (which would vary depending on the location of the plant). The estimated O&M costs for this plant are approximately \$500,000 per year.

Based on the preliminary construction cost estimates that have been developed, Option Two would be the more cost-effective alternative in terms of capital costs for addressing new wastewater flows from the Town of Kirkwood, but would also be anticipated to result in higher O&M costs over time as compared to Option One. The anticipated higher O&M costs associated with Option Two (WWTP) can be attributed to higher electrical costs to operate plant equipment,

more equipment maintenance, chemical costs, and a small staff of full-time personnel to operate the plant. In contrast, the O&M costs associated with Option One would be anticipated to include pumping station electrical costs, sewer and pumping station maintenance, and part-time personnel to service these systems. A more thorough study of these options would be recommended before proceeding with one or the other.

A summary of the cost estimates for these two options is located in Appendix F.

B. Airport Corridor. Currently, there is no public sewer service available at the Broome County Airport and the nearby area known as the Airport Corridor, located north of the Village of Johnson City in the Town of Maine. The County has expressed an interest in providing public sewers for this area to promote growth for nearby businesses located within the Airport Corridor that are currently limited due to a lack of wastewater capacity. Therefore, Stearns & Wheeler was asked to develop a preliminary cost estimate for installation of a new packaged WWTP and collection system to convey and treat wastewater flows from the airport and nearby businesses. This packaged plant has been sized to treat 40,000 gpd and has been designed to produce low effluent levels of suspended solids and organic matter to meet NYSDEC requirements for discharge to an intermittent stream, as is required for this location based on the information provided. In addition, due to the Chesapeake Bay Initiative, the plant has also been designed for nutrient removal (effluent TN, 5 mg/L; TP, 0.5 mg/L). The preliminary estimated cost for construction of this packaged WWTP, including site work, buildings, equipment, and the interconnecting piping and electrical wiring, is \$2,900,000.

To convey wastewater from the Airport and Airport Corridor to this WWTP, a collection system would need to be installed, consisting of a combination of gravity sewers, pumping stations, and force mains. A preliminary cost estimate of \$5,100,000 was developed for this collection system based on existing quantity takeoffs presented in a 2003 report by Clough Harbor & Associates, LLP regarding wastewater infrastructure for the Airport Corridor. Therefore, the total estimated project cost for the Airport Corridor of \$8,000,000. The O&M costs associated with the new WWTP and collection system have been estimated at approximately \$150,000 per year.

A summary of this cost estimate is located in Appendix F.

3.6 FUTURE USER COSTS

Future user costs are anticipated to increase as a result of the Chesapeake Bay Initiative upgrades, as described in Section 3.4. The anticipated user cost increases associated with these upgrades are unrelated to County acquisition of wastewater infrastructure and would be incurred with or without County involvement, as required by the NYSDEC to satisfy the Chesapeake Bay Initiative. If the County opted to carry out the future wastewater expansion options for the Town of Kirkwood and the Airport Corridor, the costs associated with these projects would also be anticipated to increase future user costs. It should be noted that no additional users have been included for the estimated future user costs; therefore, the rates will be skewed higher than what would actually be anticipated. There are currently no estimates as to the number of users that would be added to the system with these expansions. For the purposes of estimating the future user costs, Option Two (new WWTP) was used.

The following tables summarize the estimated future user costs with the addition of the Chesapeake Bay Initiative upgrades as well as the future expansions in the Town of Kirkwood and the Airport Corridor and their corresponding increased O&M costs. The future user costs were estimated under the same three financing scenarios used in Chapter 2.

ANNUAL FUTURE USER COSTS ^(1,4)
20-Year Financing at 5% Interest

COUNTY ACQUISITION	WWTPS ONLY		WWTPS, PUMP STATIONS, AND MAINS (INCLUDING PUMPS)	
	CAPITAL COST DOLLAR ⁽²⁾	DEBT TAKEOVER BASIS	CAPITAL COST DOLLAR ⁽²⁾	DEBT TAKEOVER BASIS
BJCJSTP	\$440	\$470	\$490	\$510
BJCJSTP/Endicott WWTP	\$380	\$390	\$410	\$420
BJCJSTP/Endicott WWTP/ Northgate WWTP	\$380	\$390	\$410	\$410
Greater Binghamton Area ⁽³⁾	\$430	\$430	\$460	\$460

- (1) Costs are based on current (2007) dollar value.
- (2) The capital cost and debt takeover values include the estimated costs for the potential Chesapeake Bay Initiative upgrades.
- (3) The Greater Binghamton Area represents the BJCJSTP, Endicott WWTP, Northgate WWTP, and expansions for the Town of Kirkwood and the Airport Corridor (package WWTPs).
- (4) In addition to the annual future user costs, a one-time connection fee in the range of \$300 to \$400 will be charged for new sewer connections. Existing sewer connections will not incur a connection fee.

ANNUAL FUTURE USER COSTS ^(1,4)
30-Year Financing at 4% Interest

COMMUNITY ACQUISITION	WWTPS ONLY ⁽²⁾		WWTPS, PUMP STATIONS, AND MAIN COLLECTIONS SEWER ⁽²⁾	
	CAPITAL COST BASIS ⁽³⁾	DEBT TAKEOVER BASIS	CAPITAL COST BASIS ⁽³⁾	DEBT TAKEOVER BASIS
BJCJSTP	\$390	\$410	\$430	\$440
BJCJSTP/Endicott WWTP	\$340	\$340	\$360	\$370
BJCJSTP/Endicott WWTP/ Northgate WWTP	\$340	\$340	\$360	\$360
Greater Binghamton Area ⁽³⁾	\$370	\$380	\$400	\$400

- (1) Costs are based on current (2007) dollar value.
- (2) The capital cost and debt takeover values include the estimated costs for the potential Chesapeake Bay Initiative upgrades.
- (3) The Greater Binghamton Area represents the BJCJSTP, Endicott WWTP, Northgate WWTP, and expansions for the Town of Kirkwood and the Airport Corridor (package WWTPs).
- (4) In addition to the annual future user costs, a one-time connection fee in the range of \$300 to \$400 will be charged for new sewer connections. Existing sewer connections will not incur a connection fee.

ANNUAL FUTURE USER COSTS ^(1,4)
40-Year Financing at 5% Interest

COMMUNITY ACQUISITION	WWTPS ONLY ⁽²⁾		WWTPS, PUMP STATIONS, AND MAIN COLLECTIONS SEWER ⁽²⁾	
	CAPITAL COST BASIS ⁽³⁾	DEBT TAKEOVER BASIS	CAPITAL COST BASIS ⁽³⁾	DEBT TAKEOVER BASIS
BJCJSTP	\$390	\$410	\$430	\$450
BJCJSTP/Endicott WWTP	\$340	\$350	\$360	\$370
BJCJSTP/Endicott WWTP/ Northgate WWTP	\$340	\$340	\$360	\$360
Greater Binghamton Area ⁽³⁾	\$370	\$380	\$400	\$400

- (1) Costs are based on current (2007) dollar value.
- (2) The capital cost and debt takeover values include the estimated costs for the potential Chesapeake Bay Initiative upgrades.
- (3) The Greater Binghamton Area represents the BJCJSTP, Endicott WWTP, Northgate WWTP, and expansions for the Town of Kirkwood and the Airport Corridor (package WWTPs).
- (4) In addition to the annual future user costs, a one-time connection fee in the range of \$300 to \$400 will be charged for new sewer connections. Existing sewer connections will not incur a connection fee.

If the County does not choose to proceed with the acquisition of wastewater infrastructure within the County, the wastewater treatment facilities will still be required to upgrade as necessary to meet the requirements of the Chesapeake Bay Initiative. As a result, the future user costs associated with each wastewater treatment facility will still be anticipated to increase without County acquisition of these facilities. The graphs located in Appendix D show the estimated future user fees for each wastewater treatment facility without County involvement compared with the estimated future user fees if the County were to acquire the BJCJSTP, Endicott WWTP, and Northgate WWTP.

CHAPTER 4

STAFFING EVALUATION

4.1 CURRENT STAFF

Staffing costs represent a large portion of the annual operating budgets for the wastewater treatment facilities evaluated. The cost for staff salaries plus benefits represents approximately 45 percent of each treatment plant's annual operating budget. Any increased efficiency in staff utilization could eliminate the need to hire additional staff or eliminate the need to fill positions that have been vacated. A comparison of current staff at each treatment plant and a suggested staff distribution for a County-owned system is presented.

A. **Binghamton-Johnson City Joint Sewage Treatment Plant.** There are currently 34 staff positions at the BJCJSTP. Figure 4-1 illustrates the distribution and title of current staff, which generally consists of a superintendent, assistant superintendent, secretary, mechanics, electricians, laboratory personnel, operators, and maintainers. The actual number of personnel at the plant is less than 34, as some positions are vacant. Stearns & Wheeler completed a staffing and organization structure evaluation of the BJCJSTP to determine how many additional staff will be required to operate the facility after it is upgraded for nutrient removal. Based on the new and additional processes and testing required for the upgrade, it was determined that 14 additional staff will be required. This will result in a total of 48 staff members for the upgraded facility. Figure 4-2 illustrates the distribution and title of the staff required for the upgraded plant. Additional staff included more mechanics, operators, and electricians; and the addition of staff for office management, controls programming, instrumentation, and building and grounds.

B. **Endicott WWTP.** There are currently 12 staff at the Endicott WWTP. Figure 4-3 illustrates the distribution and title of current staff. The staff generally consists of a senior operator, operators, mechanics, laborers, and laboratory technicians. With future upgrades for nutrient removal, it is projected that one additional laborer would be required for the new and additional processes. The future projected staff is presented in Figure 4-4.

C. **Northgate WWTP.** There are currently four staff at the Northgate WWTP. Figure 4-5 illustrates the distribution and title of current staff. The staff generally consists of a senior operator, an operator, a mechanic, and a laborer. Due to the smaller capacity of the Northgate WWTP, it is projected the current staff level will be adequate to operate and maintain future upgrades for nutrient and phosphorus removal requirements due to the Chesapeake Bay Initiative.

4.2 FUTURE STAFF FOR COUNTY-OWNED SYSTEM

If the County were to own and operate the facilities, the total staff required for the BJCJSTP, Endicott, and Northgate WWTPs is 65 personnel based on future upgrades for nutrient and phosphorus removal. It is proposed that no net increase in staff would be required if the County were to own these treatment plants, major pump stations, and main trunk sewers. Figure 4-6 illustrates the staff distribution and title for a County-owned system. It is proposed that the existing staff from each facility will be utilized to fill similar positions for the entire system. For example, a senior operator or plant manager would fill the roles of system administrator and assistant system administrator. Current mechanics, laborers, and electricians would be shared among the three plants as work requirements dictate. Senior operators could be assigned to a specific plant, with the ability to cover operator duties at other plants as needed.

It is anticipated that sewer maintenance for the County-owned collection system would be provided through intermunicipal agreements with the municipalities where the sewer is located. This would eliminate the need for a County-owned sewer maintenance crew and equipment for a minimal length of sewer.

Currently, fiscal operations for billing and payments are handled at each municipality's office, separate from the treatment facility. It is proposed that the fiscal operations for the County-owned system would be taken over by the existing County Finance Department.

FIGURE 4-1

**CURRENT ORGANIZATIONAL CHART FOR BINGHAMTON-JOHNSON CITY
JOINT SEWAGE TREATMENT PLANT WITHOUT BAFs IN OPERATION**

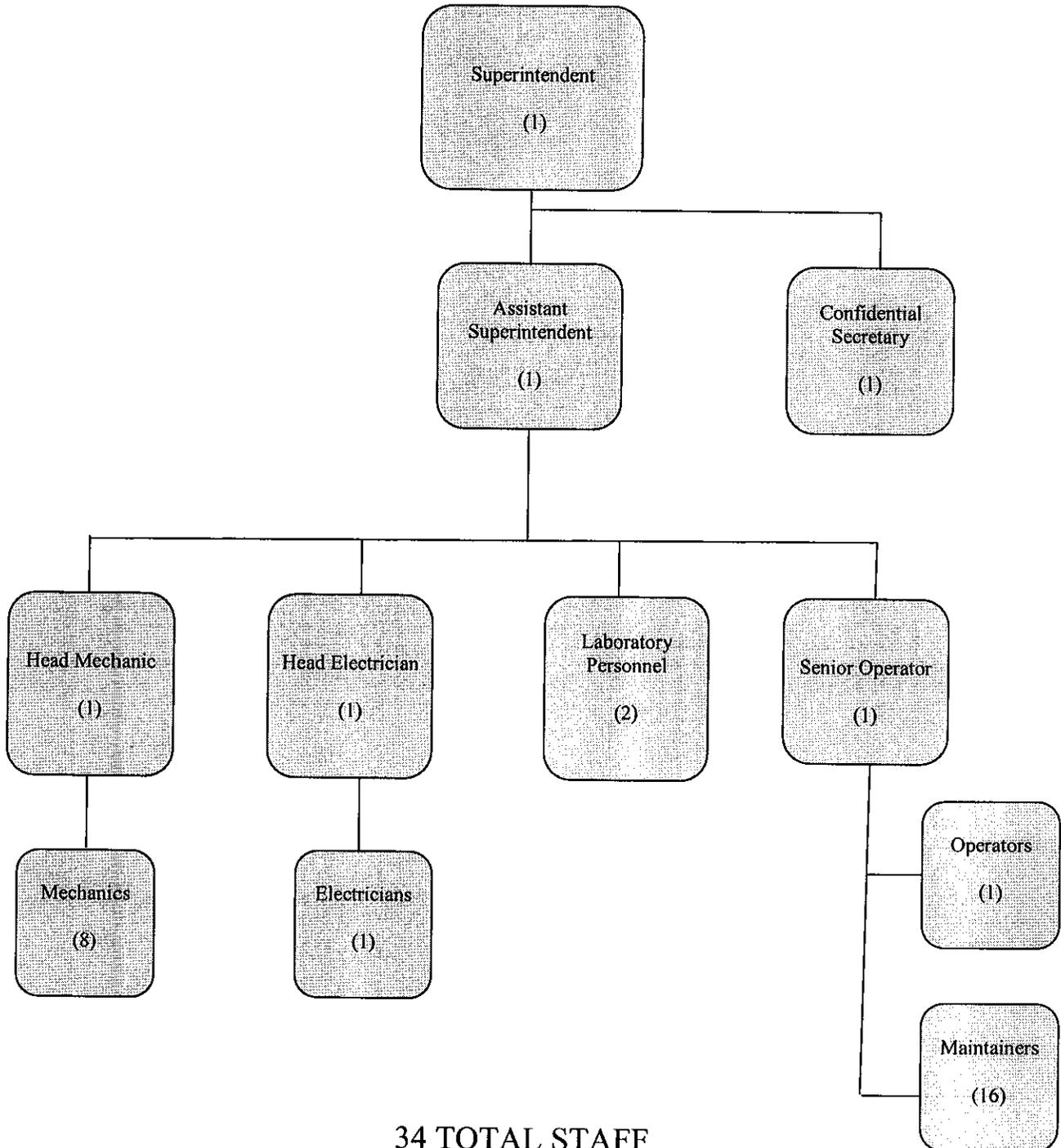
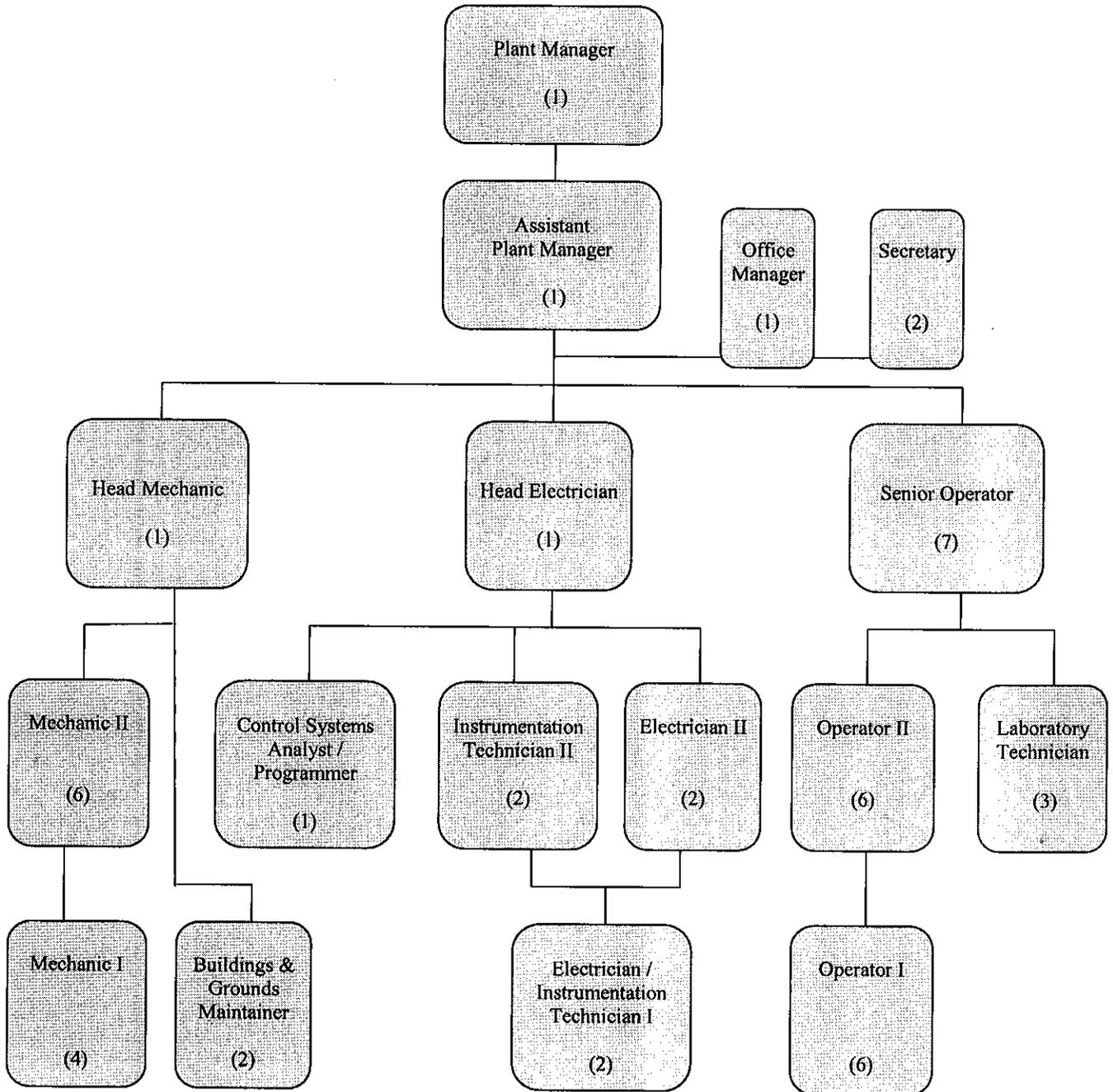


FIGURE 4-2

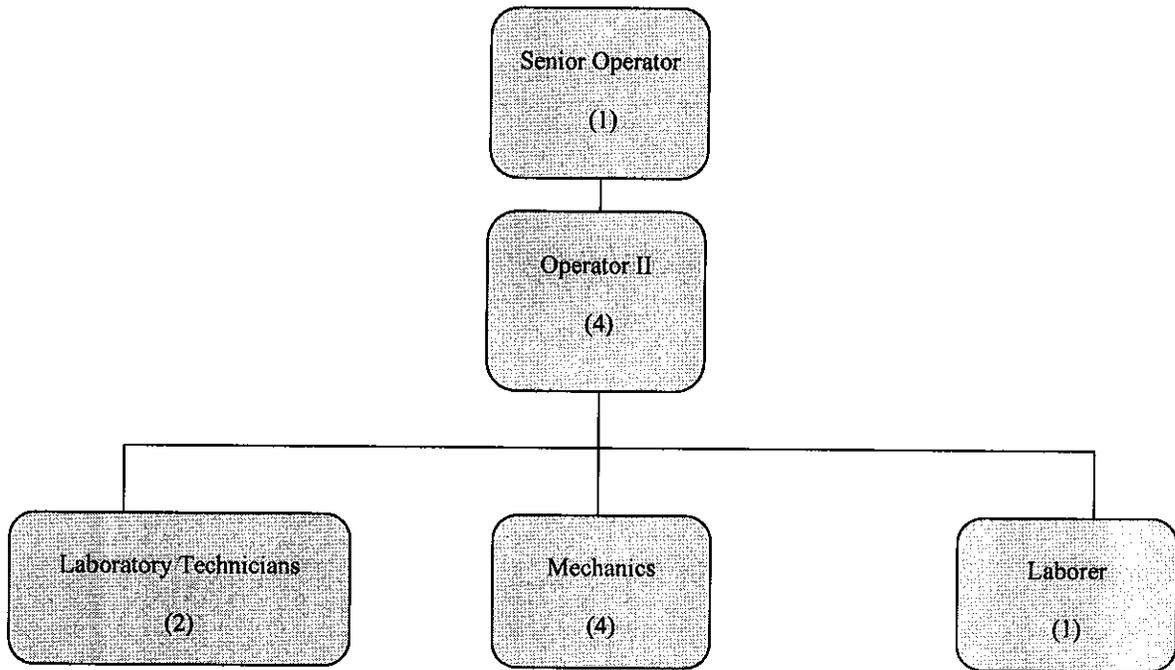
STAFFING CHART FOR BINGHAMTON-JOHNSON CITY
JOINT SEWAGE TREATMENT PLANT
(INCLUDES STAFF REQUIREMENTS FOR BAF UPGRADE)



48 TOTAL STAFF

FIGURE 4-3

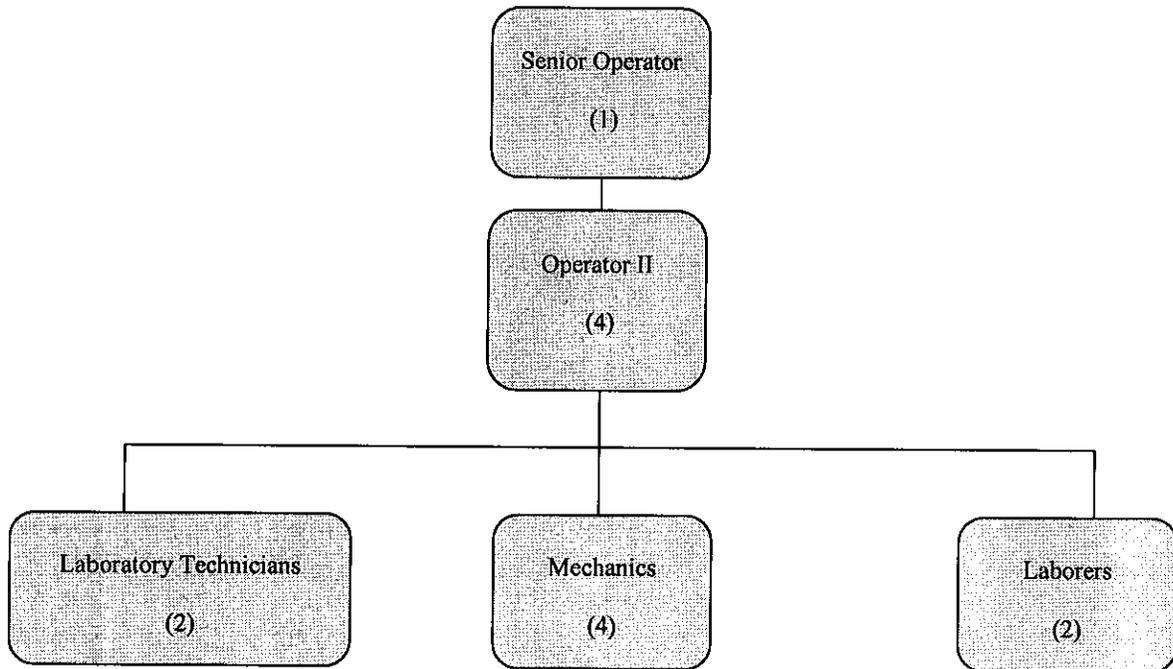
STAFFING CHART FOR CURRENT
ENDICOTT WASTEWATER TREATMENT PLANT



12 TOTAL STAFF

FIGURE 4-4

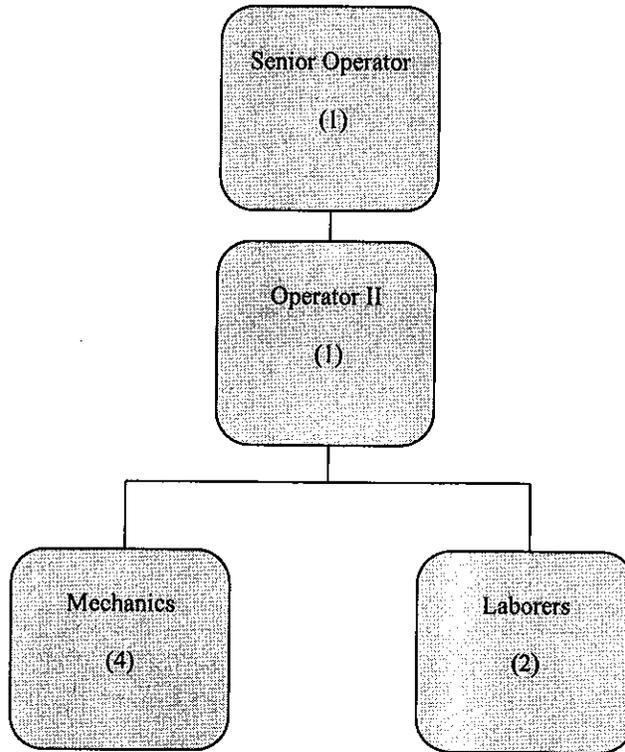
**STAFFING CHART FOR ENDICOTT WASTEWATER TREATMENT PLANT
(INCLUDES PROJECTED STAFF FOR
FUTURE NUTRIENT REMOVAL UPGRADE)**



13 TOTAL STAFF

FIGURE 4-5

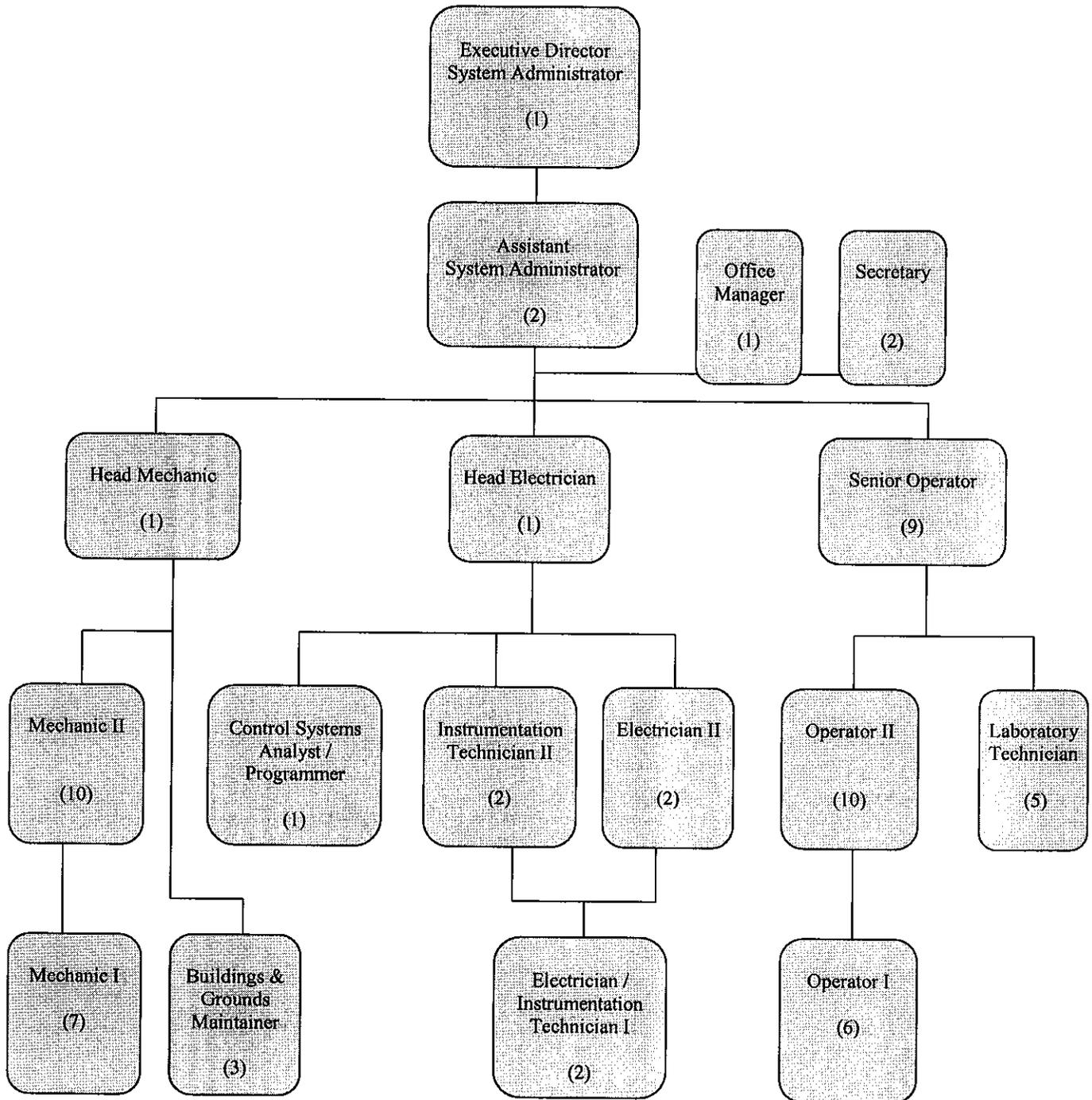
STAFFING CHART FOR NORTHGATE WASTEWATER TREATMENT PLANT



4 TOTAL STAFF

FIGURE 4-6

**STAFFING CHART FOR COUNTY-OWNED SYSTEM
BINGHAMTON-JOHNSON CITY, ENDICOTT, AND NORTHGATE**



65 TOTAL STAFF

CHAPTER 5

OWNERSHIP STRUCTURE

Generally, a county that seeks to consolidate the operation of multiple sewage facilities in its jurisdiction into a single, coherent and fiscally-responsible system has three regional management options. The county can: (1) form a County Sewer District; (2) establish a County Sewer Authority; or (3) cooperate with other municipal corporations to jointly provide sewer services pursuant to an inter-municipal agreement. The following is an overview of the structure of each of these options, a summary of the procedures necessary to implement each option and an outline of the powers of the governmental entity established by each option.

5.1 COUNTY SEWER DISTRICT

The County may establish a county sewer district pursuant to Article 5A of the New York State County Law to remove sewage from municipalities and provide for its treatment and disposal. Section 251 of the County Law authorizes the board of supervisors (or county legislature, as applicable) to establish an officer, board or body to act "as a county water, water quality treatment, sewer, wastewater disposal, drainage, [or] refuse . . . agency."^{1, 2} A sewer district is therefore an agency of the County and is not an independent political entity. Section 251 also authorizes the board of supervisors to determine all matters relating to the membership of such an agency, including, but not limited to, the number of members, method by which members are selected, as well as the tenure, qualifications and compensation of members.

The County Law provides that the boundaries of a county sewer district may be established by the presentation of a petition to the board of supervisors requesting that a certain area of the county be included as part of the district. The petition must be executed and acknowledged by

¹ See Section 252(1), subsections 4 and 5.

² Section 150-a(2) of the County Law provides that, "Whenever the board of supervisors of a county is referred to or designated in any law, contract or document pertaining to any of the functions, powers, obligations and duties of such board, such reference or designation shall be deemed to include the elected county legislative body, by whatsoever name designated which, pursuant to law, or order or judgment of a court of competent jurisdiction, shall have been established in place of the board of supervisors." Therefore, for purposes of the County Law, the board of supervisors shall be deemed to include the Broome County Legislature.

the chief executive officer of any municipality that is included as part of the proposed district or by at least 25 owners of taxable realty property within the proposed district.³ Upon the receipt of a petition or on its own motion, the county board of supervisors may direct the sewer district to prepare maps and plans of the project requested by or for the areas of the county designated in the petition.⁴ Once prepared, the sewer district must transmit the maps, and plans as well as a report setting forth the district's recommendations to the board of supervisors.⁵

Upon receipt of the report and the maps and plans, the board of supervisors is required to hold a public hearing regarding the creation of the sewer district, including the proposed area encompassing the district.⁶ After the public hearing, the board of supervisors must determine whether the proposed sewer district and its facilities are satisfactory and sufficient. If the board finds that the proposed facilities are adequate and appropriate, and addresses certain other issues, including whether the creation of the district is in the public interest and whether the allocation of the costs of the facilities are proportionally assessed, the board of supervisors may adopt a resolution approving the establishment of the district, which resolution is subject to permissive referendum.⁷ It should also be noted that if the resolution approving the establishment of the sewer district proposes that the County finance its costs by the issuance of bonds or other types of debt, and if the average costs for similar types of districts and the cost of the proposed district to the typical property is higher than that estimated by the State Comptroller, the County must file an application to the State Department of Audit and Control and the State Comptroller must approve the creation of the district.⁸

³ Section 253 of the County Law.

⁴ Id.

⁵ Section 254(1) of the County Law.

⁶ Section 101 of the County Law provides that a resolution of the board of supervisors which is subject to a permissive referendum shall not take effect until forty-five days after its adoption; nor unless it is approved by the affirmative vote of a majority of the qualified electors of the county voting on a proposition therefor, if within forty-five days after its adoption there be filed with the clerk of the board of supervisors a petition signed by qualified electors of the county in number of not less than ten per centum of the total vote cast for governor in said county at the last general election held for the election of state officers. ("Qualified electors" generally means a person who has the qualifications prescribed for electors by the state constitution and law, and who is registered as may be required by law. In this case, the qualified electors would include all registered voters in the county.) Within thirty days after the adoption of a resolution which is subject to a permissive referendum, the board of supervisors may of its own motion by resolution provide that such resolution be submitted to a vote of the qualified electors of the county to be held at a general or special election held not less than sixty days after the adoption of the resolution providing for such special or general election. Such a proposition shall be submitted at the next general election of state or county government officers held in such county not less than sixty days after the filing of the petition requesting the referendum unless otherwise indicated.

⁷ Id.

⁸ Section 258(1) of the County Law.

A county sewer district is statutorily authorized to assemble data relating to the sewage collection, conveyance, treatment, and disposal problems of the County, and the problems of collection, conveyance, and disposal of storm water and other waters. The County Law further provides that such a district, when authorized by the board of supervisors, may also obtain state aid for comprehensive studies and reports. In addition, with the approval of the board of supervisors, the sewer district may render engineering and technical services for municipalities located within the County.

5.2 COUNTY SEWER AUTHORITY

A local sewer authority may be established pursuant to Title 8-A of the Public Authorities Law (New York State Local Water and Sewer Authorities Act)⁹. As with all public authorities, a special act of the New York State Legislature is required in order to create a sewer authority. The legislation contains the location and boundaries of the area or areas covered by the authority, the number of board of directors as well as the process by which board members will be appointed by certain specified municipal entities involved in the creation of the authority, and the powers and responsibilities of the authority. The powers of a local sewer authority include:

1. Borrow money and issue negotiable or non-negotiable notes, bonds, or other obligations;
2. Enter into contracts and to execute all instruments necessary or convenient or desirable for the purposes of the authority to carry out any powers expressly given it;
3. Acquire real or personal property by purchase, gift, grant, transfer, contract or lease or by condemnation pursuant to the eminent domain procedure law;
4. Construct, improve or rehabilitate sewerage facilities required for the maintenance, development or expansion of sewerage facilities;
5. Construct, improve or rehabilitate distribution, transmission, and sewerage facilities;

⁹ Section 1196-a, et. seq. of the Public Authorities Law.

6. Operate and manage and to contract for the operation and management of facilities constructed by the authority;
7. Enter into contracts, with municipalities for the collection, treatment and disposal of sewage;
8. Apply to the appropriate agencies and officials of the federal, state and local governments for licenses, permits or approvals of its plans or projects;
9. Appoint officers and employees and fix and determine their qualifications, duties and compensation, and to retain or employ counsel, auditors, engineers and private consultants on a contract basis or otherwise for rendering professional or technical services and advice;
10. Enter upon such lands, waters, or premises for the purpose of making surveys, soundings, borings and examinations;
11. Apply for federal and state gifts or grants or loans of funds or property or financial or other aid;
12. Fix rates and collect charges for the use of the authority sewerage facilities;
13. Enter into cooperative agreements with other authorities, municipalities, counties, towns, villages, water districts, utility companies, individuals, firms or corporations, for the interconnection of facilities, the exchange or interchange of services and commodities, and within the territorial limits of the district to enter into a contract for the construction and operation and maintenance of a sewerage system by the authority for any municipality having power to construct and develop a sewerage system;
14. Provide for the discontinuance or disconnection of the provision of sewerage service for non-payment of fees, rates, rents or other charges imposed by the authority; and
15. Do all things necessary, convenient or desirable to carry out its purposes and for the exercise of its powers.¹⁰

¹⁰ 1196-d of the Public Authorities Law.

The State of New York currently has the following eight local sewer authorities in existence:

1. Alfred, Almond, Hornellsville Sewer Authority.
2. Buffalo Sewer Authority.
3. Cayuga County Water and Sewer Authority.
4. Livingston County Water and Sewer Authority.
5. Nassau County Sewer and Storm Water Finance Authority.
6. Rensselaer County Water and Sewer Authority
7. Wayne County Water and Sewer Authority
8. Wilton (Town of) Water and Sewer Authority.

5.3 INTERMUNICIPAL AGREEMENTS

The County may also enter into agreements with other municipal corporations or districts to perform their respective functions, powers or duties on a cooperative, joint, or contract basis for the completion of any sewage project pursuant to Article 5-G of the General Municipal Law.¹¹ Such an agreement would contain provisions concerning the voting power of the parties, the manner in which the rates are established and debt is incurred, the allocation of revenues and financing the capital and operating costs, and the ownership of the facilities. The municipal corporations or districts must be able to independently perform any of the services or projects included in any intermunicipal cooperation agreement in order to perform them on a cooperative basis. In addition, any agreement entered into pursuant to Article 5-G must be independently approved by each of the participating municipalities.

5.4 FINANCING OF CITY-ACQUIRED MUNICIPAL SYSTEMS

The County, on behalf of a county sewer district or a local sewer authority, has the power to issue bonds to acquire municipal sewer systems. Such bonds may be issued in any amounts such entity determines to be necessary to pay the cost of any sewer project or projects, including the acquisition of municipal sewer assets. Any debt issued by the County on behalf of a county sewer district will be the debt of the County. Any debt issued by an authority will be considered to be authority debt and not the debt of any other municipal entity.

¹¹ Section 119-o of the General Municipal Law.

Bonds issued by the County will be general obligations secured by the faith and credit of the County. Bonds issued by an authority, however, may be general obligations secured by the faith and credit of the authority or may be special obligations payable solely out of particular revenues or other moneys of the authority. In the event the County or an authority issues debt to finance the cost of the acquisition of municipal sewer assets and the municipalities use such payment to retire existing debt, the municipal ratepayers may receive certain financial benefits. Such benefits include any debt issued by the County or authority having a longer term than the current outstanding debt which may lower the annual debt service cost, as well as prevailing interest rates which may be lower than the interest rates on the outstanding bonds. This could result in an overall cost savings to the municipal ratepayers.

5.5 ENTERPRISE FUND

A municipality, sewer district or public authority may choose to establish an enterprise fund in order to separate the revenues and expenditures of the service provided into a separate fund with its own financial statements, rather than to commingle it with the revenues and expenses of other governmental activities. An enterprise fund establishes a separate accounting and financial reporting mechanism for municipal services for which a fee is charged in exchange for goods or services.¹²

Enterprise accounting allows a municipal entity to demonstrate to the public the portion of total costs of a service that is recovered through user charges and the portion that is subsidized by the tax levy or other available funds, if any.¹³ A municipal entity may choose to recover total service costs through user charges, but it is not required. Enterprise funds frequently are used to account for services whose costs are only partially funded by fees and charges.¹⁴

Establishing an enterprise does not create a separate or autonomous entity from the municipal government operation, and a municipal department or district operating an enterprise service is required to continue to fulfill financial and managerial reporting requirements like every other department or district.

¹² See Sections 2 and 70 of the State Finance Law.

¹³ Massachusetts Department of Revenue Division of Local Services, Enterprise Funds, June 2002.

¹⁴ Id.

5.6 FEDERAL APPROPRIATIONS – FINANCIAL ASSISTANCE

Through the federal appropriations process, Congress directs funding to numerous county and local governments for a wide variety of water and wastewater projects. One account in the EPA budget is of particular interest to many communities planning or building regional wastewater facilities. Each year, the Interior Appropriations bill has included funding for wastewater and stormwater infrastructure needs in the USEPA State and Tribal Assistance Grant account. Generally, these earmarks are in the \$1 million to \$3 million range and have a 45 percent local contribution requirement.

Examples include the attainment of over \$50 million to be used in the planning and design of a regional water supply for a water planning district located in the southeast. In addition, over \$5 million in USEPA grants were recently secured for planning and environmental review of a subregional, modern wastewater treatment project where seven older facilities were abandoned and three modern facilities will be constructed and/or upgraded. The County may wish to explore the federal appropriations process to offset the cost of the development of this project.

5.7 REVIEW OF WATER AND SEWER DISTRICT AND AUTHORITIES IN NEW YORK STATE

Appendix F is a review and summary of typical water and sewer districts and authorities in New York State. It is intended to provide an overview of the size and make-up of the boards of the existing districts and authorities in New York State and the various purposes served by each of those entities.

CHAPTER 6

RISK BENEFIT ANALYSIS

There are many positive and negative aspects to County acquisition of wastewater infrastructure. To reach a decision on what course of action the County should take, a risk benefit analysis needs to be performed to evaluate the significance of these positive and negative aspects. The following is a list of risk benefit analysis criteria and associated impacts that each item would have on the County.

6.1 CAPITAL COSTS

Capital costs represent the financial impact on the County associated with the acquisition of the WWTPs and collection systems in Broome County.

A. No Action.

Benefits:

- The County will incur no costs associated with the acquisition of wastewater infrastructure within the County. Therefore no capital will be needed and there will be no impact on the County's ability to borrow money for other potential County projects.

B. County Acquisition of the BJCJSTP.

Risks:

- The County will be required to pay an agreed-upon sum of money based on the assessed value of the BJCJSTP facilities, or they will take over payment of the current debt associated with these facilities to obtain ownership of them. This will impact the County's ability to borrow additional money for other projects that may require bonding to secure project funding.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Risks:

- The risks are the same as for acquisition of the BJCJSTP, plus the added risk associated with the additional cost of acquiring the Endicott WWTP.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Risks:

- The risks are the same as for acquisition of the BJCJSTP and Endicott WWTP, plus the added risk associated with the additional cost of acquiring the Northgate WWTP.

The “No Action” option will provide the least amount of risk for the County for this risk benefit criteria, as the County will incur no cost or debt related to the acquisition of wastewater infrastructure.

6.2 USER COSTS

User costs represent the amount of money required as payment from each user to repay debt associated with wastewater collection and treatment and annual operation and maintenance costs of the system.

A. No Action.

Risks:

- Current sewer users within the Greater Binghamton Area would continue to pay widely varying user costs based on their local municipality and the wastewater treatment facility to which they are connected.

B. County Acquisition of the BJCJSTP.

Risks:

- There would be minimal change to the existing user costs, and the risk here would be similar to the “No Action” option above.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Benefits:

- User fees for all of the wastewater users in the BJCJSTP and Endicott WWTP service areas would become more consistent and stable due to the larger user base of the new combined system. New projects at the two wastewater treatment facilities would have a smaller impact on the overall user fees as the cost of each project would be spread out over all of the users.
- Based on the current user cost data, the BJCJSTP users would experience a reduction in user rates by combining the BJCJSTP and Endicott WWTP under the County as one entity. The costs of operating both facilities together would be distributed over the entire user base for the two facilities, thus lowering the user costs for the BJCJSTP users.
- Future user costs for Endicott WWTP users would be lower as the costs for future improvements would be shared among the BJCJSTP users.

Risks:

- Endicott wastewater facility users would experience an increase in user fees as they would be sharing the costs associated with BJCJSTP. By combining these two facilities together under County control, the Endicott WWTP user costs would increase when the capital and operation and maintenance cost for both facilities is combined and distributed among the Endicott and BJCJSTP users.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- User fees for all of the wastewater users in the Greater Binghamton Area would become more consistent and stable due to the larger user base of the new system. New projects at the three wastewater treatment facilities would have a smaller impact on the overall user fees as the cost of each project would be spread out over all of the users.

- Based on the current user cost data, the BJCJSTP users would experience a reduction in user rates by combining the BJCJSTP, Endicott WWTP, and the Northgate WWTP under the County as one entity. The costs of operating all three facilities together would be distributed over the entire user base of the Greater Binghamton Area, thus lowering the user costs for the BJCJSTP users.
- Future user costs for Endicott and Northgate WWTP users would be lower as the costs for future improvements would be distributed among all users, including BJCJSTP users.

Risks:

- The Endicott and Northgate WWTP users would experience an increase in user fees as they would be sharing in the costs associated with the BJCJSTP. By combining all three facilities under County control, the Endicott and Northgate user costs would increase when capital and operation and maintenance costs for all facilities is combined and distributed among all users in the Greater Binghamton area.

The greatest benefit would be achieved through County acquisition of all three of the wastewater treatment plants in the Greater Binghamton Area.

6.3 OPERATION AND MANAGEMENT

Operation and management represents the financial and administrative impacts that would result from County ownership of the various wastewater facilities. Management costs are associated with the labor cost for oversight of the owned treatment and collection systems. Operation costs include the labor, materials, and equipment costs associated with maintaining the owned treatment and collection systems

A. No Action.

Benefits:

- The County would not be required to bear the cost of operation and management of the acquire wastewater infrastructure. Operation and management of this infrastructure would add to the overall size of the county-level government. The

actual cost of this management system would be covered by the system users, but would require additional coordination at the county level.

Risks:

- Continued redundancy of effort and management tasks at each facility.

B. County Acquisition of the BJCJSTP.

Risks:

- The County would be required to take on the management and operation of the BJCJSTP. This would result in an increase in overall County staff, as it is anticipated that the existing operational staff for the BJCJSTP would become County employees. The actual cost of this management system would be covered by the system users, but would require additional coordination at the county level.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Benefits:

- The County would be able to improve the overall managerial and operational efficiencies of the two wastewater treatment facilities by gaining an economy of scale, especially at the upper management level. Additional examples of the economies that may be obtained through the management and operation of the two facilities would be the use of a single vehicle fleet (trucks and other heavy equipment could be shared among the facilities), one source of equipment purchasing as opposed to one for each wastewater treatment facility, as well as management and operation of a single inventory management system covering all of the facilities.
- The County would experience improved operational flexibility with the ability to transfer and shift available staff from one facility to the other, as necessary. This would also provide improved staff redundancy in the event that certain staff members were unavailable.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP, plus the added risk of additional staff and coordination required by the Endicott WWTP.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- The benefits are the same as for the County acquisition of the BJCJSTP and Endicott WWTP, except that even more economy and flexibility would be gained with the inclusion of the Northgate WWTP.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP and the Endicott WWTP, plus the added risk of additional staff and coordination required for the Northgate WWTP.

Acquisition of all three of the wastewater treatment plants in the Greater Binghamton Area would provide the greatest benefit for the County.

6.4 FUTURE COSTS

Future costs represent the costs the County could incur through ownership of the various wastewater facilities in the County. The current foreseeable costs associated with the wastewater facilities in Broome County are for the Chesapeake Bay Initiative upgrades. Other possible future costs could be associated with future WWTP, pumping station, CSO, or sewer work to improve, upgrade, or expand the existing facilities.

A. No Action.

Benefits:

- The County will incur no additional costs associated with the future costs of the Chesapeake Bay Initiative upgrades or any other wastewater infrastructure improvements required. Therefore, there will be no impact on the County's ability to borrow money for other potential County projects.

Risks:

- Each individual municipality will be responsible for the future cost to upgrade their facilities to meet the new permit limits.

B. County Acquisition of the BJCJSTP.

Risks:

- The County would need to pay for the expected wastewater treatment facility upgrades associated with the Chesapeake Bay Initiative at the Binghamton-Johnson City, Northgate, and Endicott wastewater facilities. This will potentially impact the County's ability to borrow additional money for other County projects.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Benefits:

- The County would be able to distribute the costs for the Chesapeake Bay Initiative upgrades at the BJCJSTP and Endicott WWTP among the larger user base being served by the two plants.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP, plus the added risk of paying for future costs to upgrade the Endicott WWTP to meet the new permit limits.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs

Benefits:

- The benefits are the same as for the County acquisition of the BJCJSTP and Endicott WWTP, except that the County would have an even larger user base to distribute the cost for the Chesapeake Bay Initiative.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP and the Endicott WWTP, plus the added risk of paying for future costs to upgrade the Northgate WWTP to meet the new permit limits.

The “No Action” option will provide the least amount of risk for the County, as no future costs or debt would be incurred related to wastewater infrastructure upgrades or improvements.

6.5 ENVIRONMENTAL BENEFITS

Environmental benefits represent the positive environmental impacts resulting from County operation and management of the wastewater facilities in Broome County.

A. No Action.

Risks:

- Potential sewer users that are currently unable to connect to a wastewater treatment facility would continue to use on-site subsurface treatment systems, which are susceptible to failure and poor treatment performance.

B. County Acquisition of the BJCJSTP.

Benefits:

- The County will have the opportunity to provide new sewer connections to potential users not currently connected to the BJCJSTP. These new connections would replace existing individual on-site subsurface treatment systems (septic systems) that are susceptible to failure and poor treatment performance.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Benefits:

- Similar to the benefit of acquiring the BJCJSTP, acquisition of the Endicott WWTP will further improve the County’s ability to provide new sewer connections to potential users in the BJCJSTP and Endicott WWTP Service Areas not currently connected to a wastewater treatment facility.
- Consolidating the BJCJSTP and the Endicott WWTP under the County's control will improve the consistency and continuity of overall facilities’ operations and management, which could subsequently improve the overall treatment performance at these facilities through increase depth of operation and maintenance experience.

- A County controlled system in the BJCJSTP and Endicott WWTP service areas will provide a greater user base to shoulder the costs of future environmentally beneficial improvements.
- A County controlled system in the BJCJSTP and Endicott WWTP service areas will assume greater environmental responsibility and be more likely to act consistently on environmental needs in the new wastewater district.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- The benefits are the same as were stated for the County acquisition of the BJCJSTP and Endicott WWTP, except that the County-controlled wastewater system would cover the entire Greater Binghamton Area.

The greatest benefit would be achieved through County acquisition of all three of the wastewater treatment plants in the Greater Binghamton Area.

6.6 GROWTH POTENTIAL

Growth potential represents the potential impacts that the County's ownership of wastewater facilities in Broome County will have on the marketability of the County, and the County's ability to attract potential growth.

A. No Action.

Risks:

- The County will continue to be impeded in promoting economic growth in Broome County through a lack of flexibility in the County's wastewater infrastructure. The County would continue to operate under the current situation, in which the County is unable to offer new sewer connections to attract potential growth without getting approval for the connections from the owner of the wastewater treatment facility that services that area.

B. County Acquisition of the BJCJSTP.

Benefits:

- The County will have the ability to offer sewer connections for potential development in the BJCJSTP service area. This would provide the County with improved flexibility for their planning and development goals within the County, and remove the need for sewer connections as a potential obstacle for attracting new development.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Benefits:

- The benefits are the same as for the County acquisition of the BJCJSTP with the added planning and development flexibility associated with ownership and operation of the Endicott WWTP. This would give the County a greater area for potential growth opportunities.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- The benefits are the same as for the County acquisition of the BJCJSTP and Endicott WWTP with the added planning and development flexibility associated with ownership and operation of the Northgate WWTP. This would give the County the ability to promote and control potential growth throughout the entire Greater Binghamton Area.
- This option provides the County with the greatest opportunity and flexibility for growth potential.

The County's growth potential will receive the greatest benefit from the acquisition of all three of the Greater Binghamton Area wastewater treatment plants.

6.7 FLOW SHARING

Flow sharing represents the impacts on improved wastewater capacity and flexibility by providing the ability to transfer wastewater within the County among the three Greater Binghamton Area WWTPs.

A. **No Action.**

Risks:

- The County would continue to be limited in their options for potential growth based on the available capacity at the existing wastewater treatment facilities, and the ability to come to an agreement with the municipality that owns that facility.

B. **County Acquisition of the BJCJSTP.**

Risks:

- The County would be required to reach an agreement with the Village of Endicott or the Town of Chenango in order to develop any flow sharing system between the BJCJSTP and another treatment facility. This agreement would need to address the sharing of financial responsibilities as well as the operational and managerial responsibilities of such a system between that municipality and the County.

C. **County Acquisition of the BJCJSTP and Endicott WWTP.**

Benefits:

- The County would have a system capable of transferring or diverting wastewater flows from one wastewater facility to another in order to provide capacity for potential developments. This would provide the County with flexibility to offer a wide range of development projects within the BJCJSTP and Endicott WWTP service areas. The County would be able to offer wastewater treatment capacity for a location that currently could not support such a project by diverting flows from that system to an adjacent plant to allocate the necessary capacity.

Risks:

- The County would bear the financial burden associated with the installation and operation of a system for sharing flow between the BJCJSTP and the Endicott WWTP. This may require a significant construction project or multiple projects that could further impact the County's financial situation through bonding for such projects.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- The County would have a system capable of transferring or diverting wastewater flows from one wastewater facility to another in order to provide capacity for potential developments. This would provide the County with flexibility to offer a wide range of development projects within the Greater Binghamton Area. The County would be able to offer wastewater treatment capacity for a location that currently could not support such a project by diverting flows from that system to an adjacent plant to allocate the necessary capacity.

Risks:

- The County would bear the financial and logistical burdens associated with the installation and operation of a system for sharing flow between the Greater Binghamton Area wastewater treatment facilities. This may require a significant construction project or multiple projects that could further impact the County's financial situation through bonding for such projects.

Acquisition of all three of the Greater Binghamton Area wastewater treatment plants would provide the County with the most flexibility in terms of flow sharing options.

6.8 RATE STANDARDIZATION

Rate standardization represents the impacts that County ownership of wastewater facilities will have on standardization of wastewater treatment user fees charged to the individual end users within Broome County.

A. No Action.

Risks:

- No change. The current range of user fees being levied against the system users would remain in place, aside from any modifications to these fees as implemented by the municipality in charge of that system.

B. County Acquisition of the BJCJSTP.

Benefits:

- Rates could be standardized throughout the BJCJSTP service area, thus eliminating the existing discrepancy between user rates paid by the different users from the various municipalities.

C. County Acquisition of the BJCJSTP and Endicott WWTP

Benefits:

- The benefits are the same as were stated for the County acquisition of the BJCJSTP in addition to the ability to standardize rates throughout the BJCJSTP and the Endicott WWTP service areas, thus eliminating the existing discrepancy between user rates paid by the different users from the various municipalities serviced by these facilities.

Risks:

- The Endicott WWTP users would pay higher user rates than they are currently required to pay. This is due to the fact that the BJCJSTP users currently pay higher user rates, and under the combined billing system, the standardized user rate would be higher than those currently paid by the Endicott WWTP users.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- The benefits are the same as stated for the County acquisition of the BJCJSTP and Endicott WWTP, except with the addition of the Northgate WWTP; the County will have the ability to standardize rates throughout the Greater Binghamton Area. This

will eliminate the existing discrepancy between user rates paid by the different users from the various municipalities serviced by these facilities.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP and the Endicott WWTP, except with the addition of the Northgate WWTP, whose users would also experience a rate increase.

Acquisition of all three of the Greater Binghamton Area wastewater treatment plants would provide the County with the greatest capacity for rate standardization, and would also provide the wastewater system users with the most stable user fees possible, as the County's system-wide wastewater expenses could be spread out among the largest number of users.

6.9 PLANT CAPACITY

Plant capacity represents the available capacity for new sewer connections at the various wastewater treatment facilities being considered by the County for acquisition. This factor directly impacts growth potential and flow sharing options.

- A. **No Action.** No change.
- B. **County Acquisition of the BJCJSTP.**

Benefits:

- Based on information available from the BJCJSTP Discharge Monitoring Reports (DMRs), the treatment plant appears to have hydraulic capacity. This would allow the County to accept new flows, and therefore, promote development within this service area.

Risks:

- Given the current construction being completed at the BJCJSTP it is not clear what the treatment capacity will be for this facility, or whether any additional plant capacity is available here. This information will need to be obtained through the Joint Sewage Board from their Engineer.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Benefits:

- The benefits are the same as stated for the County acquisition of the BJCJSTP.

Risks:

- The same risks apply here as for the acquisition of the BJCJSTP. In addition, the Endicott WWTP is very close to its NYSDEC permitted capacity on a flow basis and does not appear to have significant capacity for new users.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- The benefits are the same as stated for the County acquisition of the BJCJSTP.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP and the Endicott WWTP. In addition, the Northgate WWTP is very close to its NYSDEC permitted capacity on a flow basis and does not appear to have significant capacity for new users.

Based on the available information, the BJCJSTP appears to be the only wastewater treatment plant of the three that were evaluated that has any appreciable capacity. Therefore, the County would receive the greatest benefit in terms of plant capacity by acquiring only the BJCJSTP.

6.10 PLANT EXPANDABILITY

Plant expandability represents the ease by which each wastewater treatment facility could be expanded to handle additional wastewater flows given the footprint of the existing wastewater treatment facility, the available free space on the site to construct new structures, and the current treatment process employed at each facility.

A. No Action. No change.

B. County Acquisition of the BJCJSTP.

Risks:

- The BJCJSTP has limited site space available, and the County would need to acquire additional land adjacent to the plant or adjust current operations to free up existing site space for new construction.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP. In addition, the Endicott WWTP has limited undeveloped space available on the site. What space is currently available will potentially be utilized for an upgrade related to the Chesapeake Bay Initiative.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- Currently, a significant portion of the Northgate WWTP site is taken up by onsite composting operations for solids handling at the plant. If the County chose to modify their current method of solids handling, the space occupied by the composting facility could be cleared and used to expand the treatment capacity of the plant.

Risks:

- The risks are the same as for the acquisition of the BJCJSTP and the Endicott WWTP. In addition, the Northgate WWTP has limited site space available, and the County would need to acquire additional land adjacent to the plant, or adjust operations to free up existing site space for new construction.

The Endicott WWTP has some limited site space available for new construction, while the other two Greater Binghamton Area plants are essentially built out. Modification of the existing solids handling process at the Northgate WWTP would free up a significant portion of the existing site for potential plant expansion.

6.11 VALUE TO MUNICIPALITIES

Value to municipalities represents the impacts of County ownership of wastewater facilities on the municipalities themselves in terms of the responsibilities in the ownership, management, and operation of wastewater facilities.

A. No Action.

Risks:

- No change. The City of Binghamton, Village of Johnson City, Village of Endicott, and the Town of Chenango would be required to continue management and operation of their respective wastewater treatment facilities. There would be no value added to each of these municipalities in regards to a reduced level of municipal management and operation.

B. County Acquisition of the BJCJSTP.

Benefits:

- The City of Binghamton and the Village of Johnson City would be relieved of their obligations pertaining to the management and operation of the BJCJSTP, as well as selected sewer collection system components. This would reduce the level of management and operation needed from each municipality.

C. County Acquisition of the BJCJSTP and Endicott WWTP.

Benefits:

- The benefits are the same as were stated for the County acquisition of the BJCJSTP. In addition, the Village of Endicott would be relieved of their obligations pertaining to the management and operation of the Endicott WWTP, as well as selected sewer collection system components.

D. County Acquisition of the BJCJSTP, Endicott, and Northgate WWTPs.

Benefits:

- The benefits are the same as stated for the County acquisition of the BJCJSTP and the Endicott WWTP. In addition, the Town of Chenango would be relieved of their obligations pertaining to the management and operation of the Northgate WWTP, as well as selected sewer collection system components.

Acquisition of all three of the Greater Binghamton Area wastewater treatment plants would provide the most value to municipalities by relieving the most amount of obligation from the other municipalities in terms of operation and management of wastewater infrastructure.

6.12 SUMMARY

Based on the risk benefit criteria evaluated, the greatest overall benefit would be achieved for the County through the acquisition of all three existing Greater Binghamton Area WWTPs. This is evidenced by the fact that the majority of the risk benefit criteria showed the greatest value to the County by acquiring all three plants. In addition, the growth potential criteria, which is the basis for this report as defined by the County's Department of Planning and Economic Development, provides the most benefit to the County with the acquisition of all three plants, as this would allow the County to provide wastewater capacity for potential growth throughout the Greater Binghamton Area.

CHAPTER 7

SUMMARY AND CONCLUSIONS

The Broome County Department of Economic Planning and Development has identified potential growth areas in the Greater Binghamton Area. To further promote growth in these areas and consolidate municipal services, the County is evaluating obtaining ownership of wastewater treatment facilities and collection systems that service this area. The wastewater facilities include the BJCJSTP, Endicott WWTP, and the Northgate WWTP; and the collection systems include portions of the main interceptor sewers to each facility.

The BJCJSTP is the largest of the three facilities, followed by the Endicott WWTP, and the Northgate WWTP. Given the analysis of the three wastewater treatment facilities' current SPDES permits and their last three years of DMR data, the only plant that would be capable of accepting additional flow is the BJCJSTP. Based on the information gathered regarding current plant capacities, the County will need to consider increasing the capacity of the Endicott and Northgate WWTPs if they chose to acquire these facilities.

If the County chooses to acquire two or three of the WWTPs in the Greater Binghamton Area, consideration may be given to a flow sharing system between the facilities to provide the County with additional treatment flexibility. This would conceptually allow the County to promote growth in a larger area with the ability to transfer flow from the wastewater treatment facility servicing that growth area to another facility with greater treatment capacity. The flow sharing system would consist of new gravity sewers to connect the treatment facility service areas, or construction of bi-directional force mains connecting two different pumping stations, allowing flows to be transferred from one collection system to another. The County-wide and Greater Binghamton Area maps included in Appendix A contain a conceptual layout of proposed interceptor sewers and force mains that would be required to be owned or constructed by Broome County in order to develop flow sharing in this area.

There are three general options available to the County in terms of ownership structure if they proceed with acquisition of wastewater infrastructure: (1) establishment of a County Sewer District; (2) establishment of a County Sewer Authority; or (3) use of intermunicipal agreements. Selection of ownership structure must be determined by Broome County officials in

consideration of the financial borrowing power of the County and desired level of power and authority.

Based on the information gathered and presented during this study, it is recommended that the County proceed with the following implementation steps prior to ultimately deciding to proceed with ownership of the wastewater systems in the Greater Binghamton Area:

1. Discuss range of price to be paid to each municipality to determine willingness to sell, and starting point for purchase price negotiations.
2. Determine what ownership structure is preferred by County officials to take over the management, operation, and ownership of the wastewater systems in the Greater Binghamton Area.
3. Conduct a detailed evaluation and cost analysis for additional infrastructure and improvements required for flow sharing between treatment facilities.
4. Perform a plant capacity analysis for the Endicott and Northgate WWTPs to determine future plant expansion costs that are in addition to upgrade costs to meet the Chesapeake Bay Initiative.
5. Conduct a comprehensive financial analysis of Broome County to determine the borrowing power of the County and the payment terms for purchasing one or all three treatment systems.
6. Perform a user rate study based on the financial terms of actual monies to be borrowed for purchase of the wastewater systems.
7. Conduct a study to more accurately assess the options and costs for addressing wastewater expansion in the Town of Kirkwood and the Airport Corridor.

The findings of this report are summarized in Table 7-1.

**TABLE 7-1
COST SUMMARY ANALYSIS
YEAR CONSTRUCTED DOLLAR VALUE**

Capital Costs ¹	\$53,000,000	\$62,000,000	\$62,000,000	\$72,000,000	\$66,000,000	\$76,000,000	\$66,000,000	\$76,000,000
Debt ²	\$60,000,000	\$68,000,000	\$68,000,000	\$76,000,000	\$70,000,000	\$78,000,000	\$70,000,000	\$78,000,000
Future Costs ³	\$13,000,000	\$13,000,000	\$29,000,000	\$29,000,000	\$30,000,000	\$30,000,000	\$48,000,000	\$48,000,000
Management & Operation	-	-	-	-	-	-	-	-
- Current Costs	\$6,200,000	\$6,800,000	\$8,200,000	\$8,800,000	\$8,600,000	\$9,200,000	\$8,600,000	\$9,200,000
- Future Costs ⁴	\$6,900,000	\$7,500,000	\$9,800,000	\$10,400,000	\$10,300,000	\$10,900,000	\$11,000,000	\$11,600,000
Number of Users ⁵	27,405		44,775		47,175		47,175 ¹²	
Future User Costs (Capital Costs) ⁹	\$440	\$490	\$380	\$410	\$380	\$410	\$430	\$460
20-Year Financing ⁶	\$470	\$510	\$390	\$420	\$390	\$410	\$430	\$460
Future User Costs (Debt Takover) ¹⁰	\$390	\$430	\$340	\$360	\$340	\$360	\$370	\$400
30-Year Financing ⁷	\$410	\$440	\$340	\$370	\$340	\$360	\$380	\$400
Future User Costs (Debt Takover) ¹⁰	\$390	\$430	\$340	\$360	\$340	\$360	\$370	\$400
40-Year Financing ⁸	\$410	\$440	\$350	\$370	\$340	\$360	\$380	\$400
Future User Costs (Debt Takover) ¹⁰	\$410	\$440	\$350	\$370	\$340	\$360	\$380	\$400

Notes:

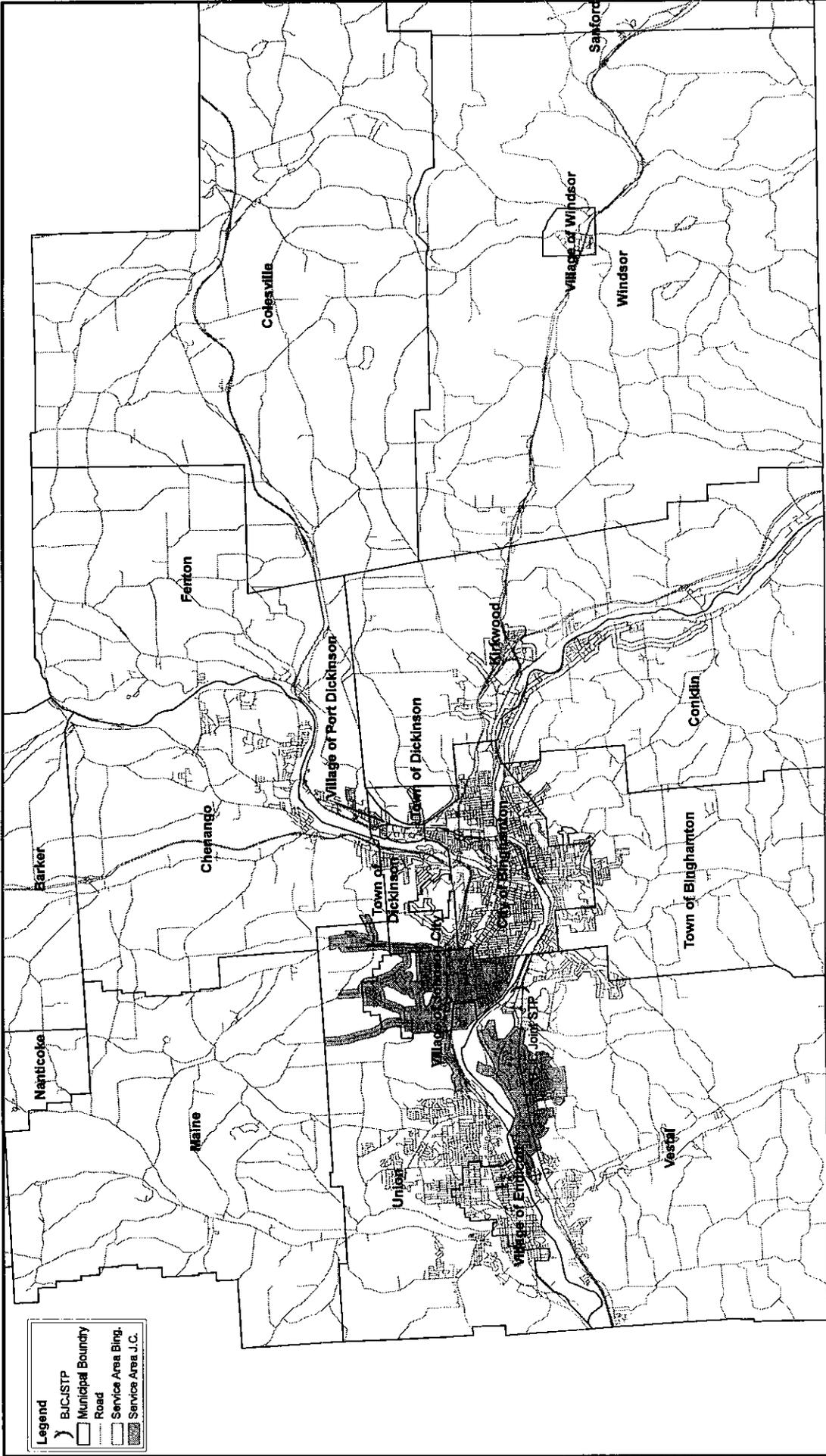
- Capital costs represent the estimated value of the existing wastewater infrastructure.
- It has been anticipated that any debt that may be outstanding for the Towns of Dickinson and Vestal sewer collection systems would be negligible as they pertain to the specific lines that have been identified for potential ownership and operation by the County under the "WWTPs, P&S, & Main Collector Sewers" scenario.
- "Future Costs" represent the estimated cost to upgrade the WWTPs to meet the effluent requirements of the upcoming Chesapeake Bay Initiative.
- "Future Costs" for the Management & Operation represents the estimated increase in the annual O&M costs based on the expected Chesapeake Bay Initiative upgrades. The value listed is the sum of the "Current Costs" value plus the future costs. The additional Endicott O&M costs are based on data from the "Nutrient Removal Assessment for the Village of Endicott Wastewater Treatment Plant" October 2005 Report completed by Sharma & Wheeler, LLC. The Binghamton-Johnson City Joint STP and the Northgate WWTTP future cost increases have been estimated using ratios of the 2006 annual average plant flows for these plants to that of the Endicott WWTTP.
- "Number of Users" represents the actual number of sewer users or connections that are billed by their respective municipality for use of the sewer system. Numbers were obtained from each municipality. Number of users does not include households that are not currently connected to the sewer system.
- 20-year financing is based on general bonding at an estimated interest rate of 5%.
- 30-year financing is based on bonding through NYS Environmental Facilities Corporation at an estimated interest rate of 4%.
- 40-year financing is based on federal bonding at an estimated interest rate of 5%.
- "User Costs" are based on stated Capital Costs, Management & Operation, and Future Costs. "User Costs" do not include other non-County owned infrastructure that continue to be operated & financed by the individual municipalities.
- "User Costs" are based on stated Debt, Management & Operation, and Future Costs. "User Costs" do not include other non-County owned infrastructure that continue to be operated & financed by the individual municipalities.
- This section does not include the Penicook Package WWTTP in the Town of Chenango.
- Additional users associated with the expansions in the Town of Kirkwood and the Airport Corridor have not been included with this number as there currently are no available estimates for the number of new users that may be added.

Note: Separate costs for each facility are presented in Chapters 2 and 3.

APPENDICES

APPENDIX A

FIGURES



Legend

- BJCSTP
- Municipal Boundary
- Road
- Service Area Biring
- Service Area J.C.

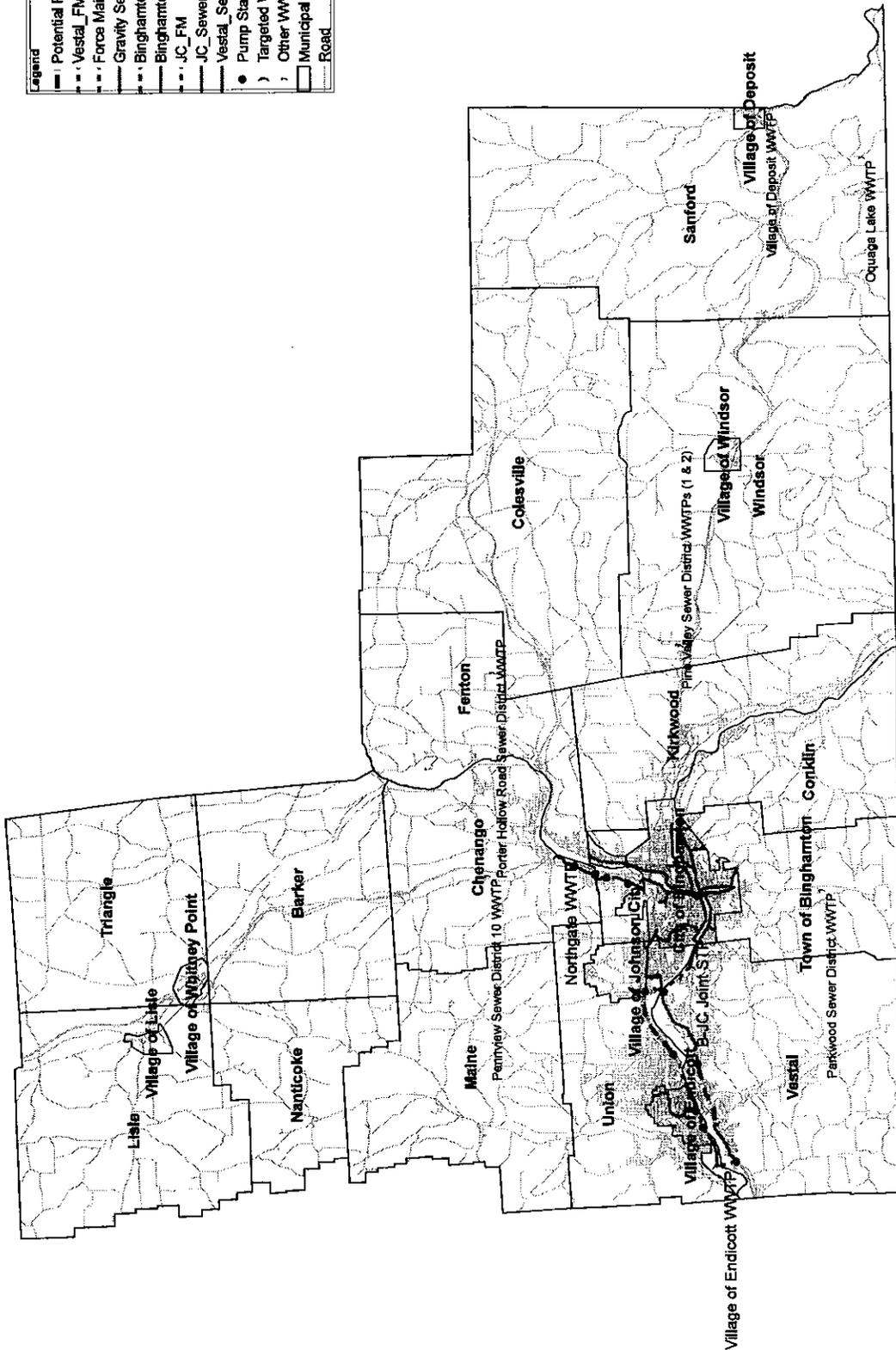
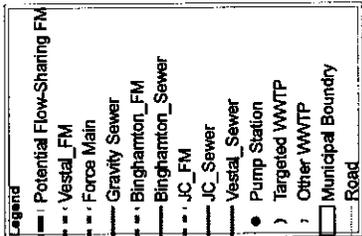
Department of Planning and Economic Development
Broome County Financial Feasibility Study
 BJCSTP SERVICE AREAS MAP



Stearns & Wheeler, LLC
 Environmental Engineers and Scientists
 October 2007

SAW Project No. 61009
 Civil Tech: NJR
 Proj. Mgr: JDC

Scale: 1 inch equals 2 miles
 0 0.5 1 2 3 Miles
 File Name & Path: J:\1998\100\Drawings\QCSMap\N.J.C. Binghamton - 11x17.mxd



Department of Planning and Economic Development
Broome County Financial Feasibility Study
COUNTY SEWER MAP

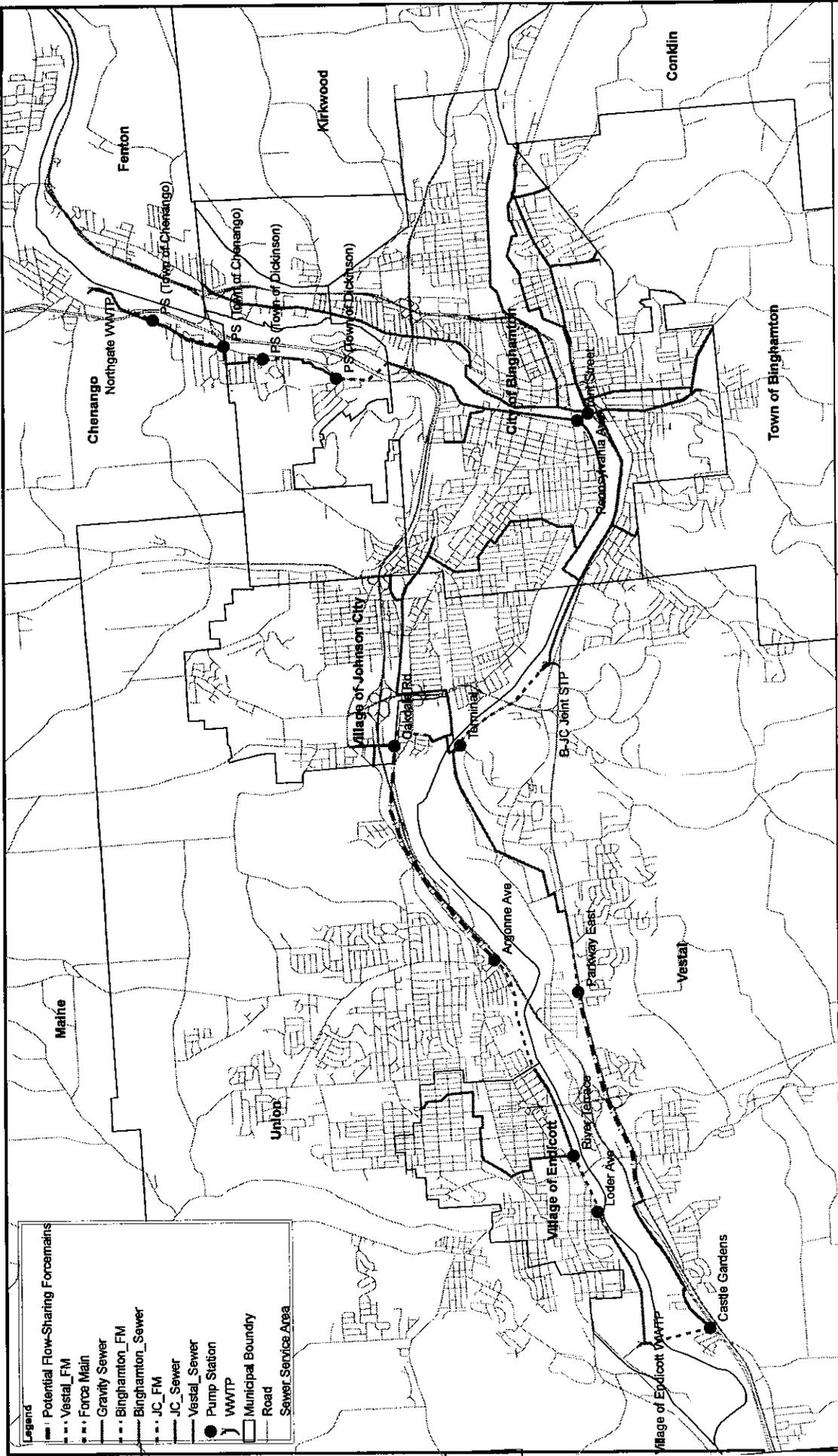


Stearns & Wheeler, LLC
 Environmental Engineers and Scientists
 May 2007



SAW Project No. 01099
 GIS Tech: NZH
 Proj. Mgr: JDC





Legend

- Potential Flow-Sharing Forcemains
- Vestal_FM
- Force Main
- Gravity Sewer
- Binghamton_FM
- Binghamton_Sewer
- JC_FM
- JC_Sewer
- Vestal_Sewer
- Pump Station
- WWTP
- Municipal Boundary
- Road
- Sewer Service Area

Scale: 1 inch equals 1 miles

0 0.25 0.5 1 1.5 Miles

File Name & Path: \\006\Broome County\Binghamton_Sewer_011717.mxd

SAW Project No. 6189
GIS Task: J2E
Proj. Mgr: JDC

 **Stearns & Wheeler, LLC**
Environmental Engineers and Scientists

May 2007

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Department of Planning and Economic Development
Broome County Financial Feasibility Study
GREATER BINGHAMTON AREA MAP

APPENDIX B
INVENTORY SHEETS

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
BING-JC JOINT SEWAGE TREATMENT PLANT**

Equipment & Criteria	Data
Bar Screens	
Type	Mechanical Climber
Number of units	2
Width, feet	4
Bar spacing, inches	0.75
Capacity (each), mgd	42
Location	Head House
Manufacturer	IDI
Year in service	2002
Influent Pumps	
Type	Centrifugal (Shaft Driven)
Number of units	4
Capacity, gpm	10,425
Head, feet	52
Motor horsepower	3 - 200 hp, 1 - 150 hp
Motor speed	700 (for 200 hp)
Manufacturer	Flowserve
Year in service	2003
	2007 (Slated for replacement)
Grit Channel	
Type	Chain collection
Number of units	2
Dimensions	
Length, feet	50
Width, feet	6
Depth, feet	-
Year placed in service	1958, 1968
Grit Separation	
Type	Cyclone/classifier
Number of units	2
Grit pump	
Manufacturer	-
Type	-
Capacity, gpm	-
Motor horsepower	10
Manufacturer	-
Year placed in service	1958, 1968
Grit Removal	
Type	Vortex separation
Number of units	2
Grit Pump	
Type	Centrifugal
Capacity, gpm	-
Motor horsepower	10
Manufacturer	Smith & Loveless
Year placed in service	2000

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
BING-JC JOINT SEWAGE TREATMENT PLANT**

Equipment & Criteria	Data
Primary Distribution	
Ferric Chloride System	
Tank Type	Vertical Cylindrical
Tank Size, gal	2 @ 5,300
Pumping System	Duplex Diaphragm
Flash Mixers	
Type	Propeller
Number of units	2
Motor horsepower	3
Manufacturer	Chemineer
Primary Clarifiers	
Type	Rectangular
Number of existing units	6
Total surface area, SF	18,270
Surface overflow rate (gal/day/SF)	
Average hydraulic loading	940 gpd/SF
Peak hydraulic loading	1,920 gpd/SF
Year placed in service	1969
Type	Rectangular
Number of new units	6
Total surface area, SF	18,216
Surface overflow rate (gal/day/SF)	
Average hydraulic loading	940 gpd/SF
Peak hydraulic loading	1,920 gpd/SF
Primary Sludge Pumps	
Type	Duplex Plunger
Number of units	2
Capacity, gpm	120
Head, feet	23
Motor horsepower	10
Year placed in service	1958
Manufacturer	-
Type	Centrifugal
Number of units	2
Capacity, gpm	400
Head, feet	23
Motor horsepower	10
Year placed in service	1958
Gravity Thickeners	
Type	Circular
Number of units	3
Tank dimensions	
Diameter, feet	1 @ 40, 2 @ 60
Year placed in service	1958, 1968

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
BING-JC JOINT SEWAGE TREATMENT PLANT**

Equipment & Criteria	Data
Thickened Sludge Pumps	
Type	Duplex Plunger
Number of units	2
Capacity, gpm	-
Motor horsepower	1 @ 10, 1 @ 20
Manufacturer	-
Year placed in service	-
Type	Rotary Lobe w/ Grinders
Number of units	2
Capacity, gpm	-
Motor horsepower	15
Manufacturer	Vogelsang
Year placed in service	2006
Digesters	
Type	Anaerobic
Number of tanks	3
Tank dimensions	
Diameter, feet	1 @ 75, 2 @ 45
Depth, feet	-
Volume, gallons	-
RAS Pumps	
Type	Centrifugal
Number of units	4
Capacity, gpm	100
Head, feet	36
Motor horsepower	7.5
Manufacturer	Wemco
Year placed in service	2002
Effluent Water Pumps	
Type	Centrifugal
Number of units	3
Capacity, gpm	1,000
Head, feet	34
Motor horsepower	15
Manufacturer	Fairbanks Morse
Year placed in service	-
BAF Influent Pump Station	
Type	Centrifugal
Number of units	4
Station capacity, mgd	70
Capacity (each), gpm	17,200
Head, feet	45
Motor horsepower	250

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
BING-JC JOINT SEWAGE TREATMENT PLANT**

Equipment & Offsets	Data
BAF System	
C-Filters	
Capacity, mgd	70
Number of units	8
Area, sf	1,389
Media depth, ft	12.5
Peak Design Loading	5 gpm/sf @ 70 mgd
N-Filters	
Capacity, mgd	70
Number of units	8
Area, sf	1,366
Media depth, ft	11
Peak Design Loading	5.1 gpm/sf @ 70 mgd
DN-Filters	
Capacity, mgd	49.5
Number of units	4
Area, sf	840
Media depth, ft	9.5
Peak Design Loading	10.2 gpm/sf @ 49.5 mgd
Odor Control	
Type	Scrubber
Number of units	2
Capacity, cfm	18,000
Capacity, gpm	200
Location	Scrubber Building
Year placed in service	1992
Caustic System	
Tank Type	Vertical Cylindrical
Tank Size, gal	3,000
Sodium Hypochlorite System	
Tank Type	Vertical Cylindrical
Tank Size, gal	1,000
 	
Type	Scrubber
Number of units	2
Capacity, cfm	45,000
Capacity, gpm	900
Location	East Scrubber Building
Year placed in service	1999
Caustic System	
Tank Type	Vertical Cylindrical
Tank Size, gal	4,200
Pumping System	
	Duplex Diaphragm
Sodium Hypochlorite System	
Tank Type	Vertical Cylindrical
Tank Size, gal	2 @ 4,200
Pumping System	
	Duplex Diaphragm
Sulfuric Acid System	
Tank Type	Vertical Cylindrical
Tank Size, gal	4,200
Pumping System	
	Duplex Diaphragm

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
BING-JC JOINT SEWAGE TREATMENT PLANT**

Equipment & Criteria	Data
Odor Control Collection System	
Odor Control Fans	
Grit Room	1 @ 5 hp
Screenings Room	2 @ 15 hp
Thickener #1	2 @ 3 hp
Thickener #2	2 @ 7.5 hp
Thickener #3	2 @ 7.5 hp
Composting Facility	2 @ 7.5 hp
Odor Control Piping	
Length, feet	1,500
Year placed in service	-
Disinfection	
Chlorination Tank Volume, gal	626,000
Chlorination Contact Time, min.	15
Sodium Hypochlorite System	
Tank Type	Vertical Cylindrical
Tank Size, gal	3 @ 7,000
Pumping System	Triplex Diaphragm
Capacity, gph (each pump)	105
Manufacturer	PulsaFeeder
Dechlorination Tank Volume, gal	22,000
Dechlorination Contact Time, min.	0.5
Sodium Thiosulfate System	
Tank Type	Vertical Cylindrical
Tank Size, gal	2 @ 4,000
Pumping System	Duplex Diaphragm
Capacity, gph (each pump)	16
Manufacturer	PulsaFeeder
Chlor/Dechlor Analyzer	
Manufacturer	USFilter
Year placed in service	2007 Replacement (FEMA)
Sludge Conveyance	
Type	Troughed Belt
Length, feet	340
Year placed in service	1991
Compost Facility	
Type	Bioreactor
Year placed in service	1991
Manufacturer	Taulman Weiss
Storage Tank	
Type	Vertical Cylindrical
Number of units	2
Product Stored	Coarse Saw Dust
Diameter, feet	21
Height, feet	40
Nominal Capacity, cf	12,050
Manufacturer	Peabody TecTank
Year place in service	1988

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
BING-JC JOINT SEWAGE TREATMENT PLANT
TERMINAL PUMPING STATION**

Equipment/Location	Data
Channel Grinder	
Number of units	2
Width, feet	-
Location	Influent Room
Manufacturer	JWC
Year in service	2002
Influent Pumps	
Type	Centrifugal (Shaft Driven)
Number of units	4
Capacity, gpm	4,635
Head, feet	75
Motor horsepower	125
Motor speed	1150
Manufacturer	Flowserve
Year in service	2003
	2007 (Slated for replacement)
Air Compressors	
Type	Reciprocating
Number of units	2
Motor horsepower	5, 15
Hoisting Equipment	
Type	Traveling Bridge Crane
Capacity, tons	5
Manufacturer	Dwight Foote, Inc.

BROOME COUNTY FINANCIAL FEASIBILITY STUDY
INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
ENDICOTT WASTEWATER TREATMENT PLANT

Equipment & Criteria	Data
Influent Pumps	
Type	Centrifugal (shaft driven)
Number of units	4
Capacity, gpm	6250
Head, feet	54
Motor horsepower	117
Manufacturer	-
Year placed in service	1966
Backup pump motors (generators)	
Number of units	2
Manufacturer	International Harvester
Year placed in service	1966
Bar Screen	
Type	Mechanical
Number of units	1
Width, feet	6
Location	Influent Screen Room
Opening, inches	-
Manufacturer	USFilter-Envirex (Rex)
Year placed in service	1990
Grit Removal	
Type	Aerated Grit Chamber
Number of units	1
Aeration Blower	
Type	Positive Displacement
Number of units	2
Motor horsepower	5
Manufacturer	Roots
Year placed in service	1966
Grit pump	
Type	Centrifugal
Capacity, gpm	-
Motor horsepower	10
Manufacturer	Smith & Loveless
Year placed in service	-
Grit conveyor	
Type	Shafted Screw
Manufacturer	Goodman Conveyors
Year placed in service	-
Primary Clarifiers	
Type	Rectangular
Number of units	3
Tank dimensions	
Length, feet	170
Width, feet	30
Sidewater depth, feet	8
Total surface area, SF	15,300
Surface overflow rate (gal/day/SF)	
Average hydraulic loading	529 gpd/SF @ 8.09 mgd
Peak hydraulic loading	2,288 gpd/SF @ 35 mgd
Year placed in service	1966

BROOME COUNTY FINANCIAL FEASIBILITY STUDY
INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
ENDICOTT WASTEWATER TREATMENT PLANT

Equipment & Criteria	Data
Trickling Filters	
Type	Circular
Number of units	2
Media	Plastic
Diameter, feet	120
Media depth, feet	18
Total surface area, SF	22,608
Total volume	406,944
Average hydraulic loading	.25 gpm/SF @ 8.09 MGD
Average BOD loading	29.9 lb/1,000 CF/day
Feed Pumps	
Type	Vertical Turbine
Number of units	2
Capacity, gpm	11,110
Head, feet	32.5
Motor horsepower	125
Manufacturer	Weir Floway
Year placed in service	2001
Solids Contact Tank	
No. of units	2
Dimensions	40 feet x 21.5 feet
Side water depth	16 feet
Average HRT	0.61 hrs @ 8.09 mgd
Feed Pumps	
Type	Vertical Turbine
Number of units	3
Capacity, gpm	6,600
Head, feet	30
Motor horsepower	75
Manufacturer	Weir Floway
Year placed in service	2001
Aeration Blowers	
Type	Multistage Centrifugal
Number of units	2
Motor horsepower	40
Stages	10
Manufacturer	Lamson
Year placed in service	2001
Secondary Clarifiers	
No. of units	2 rectangular / 2 circular
Dimensions	198 feet x 24 feet / 80 feet diameter
Side Water Depth	15 feet/8 feet
Ave Hydraulic Loading	414 gpd/SF @ 8.09 mgd
Peak Hydraulic Loading	818 gpd/SF @ 16 mgd
Year placed in service	2001 / 1966

BROOME COUNTY FINANCIAL FEASIBILITY STUDY
INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
ENDICOTT WASTEWATER TREATMENT PLANT

Equipment & Criteria	Data
Return Activated Sludge Pumps	
Type	Centrifugal
Number of units	4
Capacity, gpm	2,100
Head, feet	25
Motor horsepower	20
Manufacturer	Flowserve
Year placed in service	2001
Chlorination	
Tank dimensions	
Length, feet	135
Width, feet	44
Year placed in service	1966
Rapid Mixer	
Estimated Size, hp	7.5
Sodium Hypochlorite System	
Chemical storage	4 tanks @ 1550 gal each
Pump type	Diaphragm
Number of pumps	2
Year placed in service	2001
Sodium Bisulfite System	
Chemical storage	2 tanks @ 300 gal each
Pump type	Diaphragm
Number of pumps	2
Year placed in service	2001
Gravity Thickeners	
Type	Circular
Number of units	2
Tank dimensions	
Diameter, feet	40
Depth, feet	-
Capacity, lbs/day	-
Year placed in service	1966
Thickener Building	
Furnace	
Capacity, BTU/hr	168,000 - 188,000
Manufacturer	Dayton
Year placed in service	1980
Primary/Waste Sludge Pumps	
Type	Centrifugal
Number of units	4
Capacity, gpm	500
Head, feet	29
Motor horsepower	10
Manufacturer	Wemco
Year placed in service	3-1966 / 1-1985

BROOME COUNTY FINANCIAL FEASIBILITY STUDY
INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
ENDICOTT WASTEWATER TREATMENT PLANT

Equipment/Component	Data
Thickened Sludge Pumps	
Type	Diaphragm
Number of units	1
Capacity, gpm	90
Head, feet	115
Motor horsepower	7.5
Manufacturer	Abel
Year placed in service	2003
Type	Plunger (simplex)
Number of units	1
Capacity, gpm	-
Head, feet	-
Motor horsepower	10
Manufacturer	ITT Marlow
Year placed in service	1966
Inline Grinders (one per TSP)	
Number of units	2
Manufacturer	Muffin Monster
Year placed in service	-
Digesters	
Type	Anaerobic
Number of tanks	2
Tank dimensions	
Diameter, feet	50
Depth, feet	34
Volume, gallons	500,000
Sludge Recirc Pumps	
Type	Centrifugal
Number of units	2
Capacity, gpm	500
Head, feet	20
Motor horsepower	10
Motor speed	440
Manufacturer	Morris
Year placed in service	1966

BROOME COUNTY FINANCIAL FEASIBILITY STUDY
INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
ENDICOTT WASTEWATER TREATMENT PLANT

Equipment & Criteria	Data
Digester Building	
Sludge Pump	
Type	Chopper
Number of units	1
Capacity, gpm	300
Head, feet	22
Motor horsepower	10
Motor speed	1170
Manufacturer	Vaughn
Year placed in service	1994
Sludge Transfer Pump	
Type	Duplex plunger
Number of units	1
Capacity, gpm	-
Head, feet	-
Motor horsepower	5
Motor speed	-
Manufacturer	ITT Marlow
Year placed in service	1966
Boiler	
Number of units	2
Size, hp	34.2
Manufacturer	Iron Fireman
Year placed in service	1966
Heat Exchanger	
Type	Shell & Tube
Number of units	2
Year placed in service	1966
Sludge Dewatering	
Type	Belt Press
Location	Sludge Processing Building
Manufacturer	USFilter-Envirex (Rex)
Number of units	1
Size	2 meter
Year placed in service	1984
Feed Pumps	
Type	Simplex Plunger
Location	Sludge Processing Building
Number of units	3
Capacity, gpm	173
Stroke capacity	4-6 gal/stroke
Motor horsepower	10
Motor speed	1800
Manufacturer	ITT Marlow
Year placed in service	1966

BROOME COUNTY FINANCIAL FEASIBILITY STUDY
INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
ENDICOTT WASTEWATER TREATMENT PLANT

Equipment/Component	Data
Sludge Conveyance	
Type	Cleated Belt
Number of units	2
Length, ft	20 & 60
Year placed in service	1984
Effluent Water Pumps	
Type	Centrifugal
Number of units	2
Capacity, psi	290
Motor horsepower	10
Manufacturer	Ingersol Rand
Year placed in service	1966
Plant Generator	
Type	Diesel Engine Generator
Capacity, kW	400
Manufacturer	Katolight
Year placed in service	~1976
Control Building Furnaces	
Number of units	2
Manufacturer	Cleaver Brooks
Year placed in service	~1966
Compost Facility	
Type	Bioreactor
Year placed in service	1984
Manufacturer	Taulman Weiss

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
NORTHGATE WASTEWATER TREATMENT PLANT**

Equipment & Criteria	Data
Manual Bar Rack	
Type	Fixed
Number of units	1
Width, feet	1.5
Location	Main Feed Channel
Opening, inches	2
Year placed in service	1993
Parshall Flume	
Number of units	2
Throat width, inches	6
Capacity, mgd	4
Location	Pretreatment tank
Year placed in service	1993 and 1997
Activated Sludge Pump	
Number of pumps	3
Type	Non Clog Recessed Impeller
Motor horsepower, each pump	1.5 - 3 Phase 460 V
Capacity, gpm	200
Pump manufacturer	Hydromatic S4NRC
Year placed in service	1997; 10/2005; 10/2006
Aeration Tank	
Number of tanks	3
Type	Rectangular
Tank dimensions	
Length, feet	2 - 64; 1 - 30
Width, feet	2 - 20; 1 - 10
Sidewater depth, feet	19
Total surface area, SF	3160
Total aeration volume, CF	60040
Year placed in service	2-1993; 1-1997
Aeration Blowers	
Number of units	8
Type	Positive Displacement
Horsepower, HP	2-50HP; 2-40HP; 2-15HP; 2-10HP;
Manufacturer	Beldor
Year placed in service	1993 (50&10 HP); 1997 (40&15HP)
Waste Activated Sludge Pump	
Number of pumps	2
Type	Air Lift
Motor horsepower, each pump	-
Capacity, gpm	200
Pump manufacturer	Cass
Year placed in service	1993

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
NORTHGATE WASTEWATER TREATMENT PLANT**

Equipment & Criteria	Data
Gravity Belt Thickener	
Type	Belt - 1 meter
Number of units	1
Size	1-meter
Capacity, gpm	75 GPM
Year placed in service	1997
Digester	
Number of tanks	1 Stainless Steel
Cover type	Aerobic
Tank dimensions	
Diameter, feet	30
Sidewater depth, feet	20
Total volume, gallons	100,000
Year placed in service	1996
Sludge Dewatering	
Type	Belt Press
Location	Sludge building
Manufacturer and model	Belt Dewatering Press MFD, Inc.
Number of units	1
Motor horsepower	3
Capacity, gpm	100
Solids Content	Up to 17%
Year placed in service	1993
Feed pumps	
Type	Progressive cavity
Location	Sludge building
Number of units	1
Drive, HP	3
Manufacturer	Penn Valley Double Disk
Year placed in service	1997
Chemical conditioning, polymer	
Number of pumps	1
Type	Liquid Polymer
Location	Sludge building
Capacity, gpm	5
Loading, lbs/ton dry solids	-
Manufacturer	Wallace & Tieman
Number of mixing tanks	1
Power Screen	
Number of screens	1
Manufacturer and model	Power Screen, Series MK1
Motor horsepower	30
Year placed in service	1993

**INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
NORTHGATE WASTEWATER TREATMENT PLANT**

Equipment & Criteria	Data
Comptainer System	
Number of comploaders	1
Number of comptainers	8
Number of composting tanks	2
Manufacturer	Green Mountain Technologies
Year placed in service	2001

APPENDIX C
COST TABLES

APPENDIX C

YEAR CONSTRUCTED DOLLAR VALUE - SAMPLE CALCULATION

Item	Column Identification							Current Value
	1	2	3	4	5	6	7	
	Year Constructed	Quantity	Unit Measure	Percentage	Percentage	Percentage	Percentage	
Mechanical Bar Screen	1990	1	l.s.	\$116,000	-	\$116,000	\$5,800	\$17,400

1. The actual construction cost for the mechanical bar screen at the Endicott WWTP was \$116,000 in 1990.

2. Year of Construction Cost: $Column_7 = (Column_2) \times (Column_5) \Rightarrow \$116,000 = 1 \times \$116,000$

3. Depreciation Rate: $Column_8 = \left(\frac{Column_7}{Useful_Life} \right) \Rightarrow \$5,800 = \left(\frac{\$116,000}{20\text{years}} \right)$

4. Current Value:

$$Column_9 = Column_7 - (Column_8 \times (2007 - Column_2)) \Rightarrow \$17,400 = \$116,000 - (\$5,800 \times (2007 - 1990))$$

**Broome County Financial Feasibility Study
Binghamton-Johnson City Joint Sewage Board
Asset Valuation
Year Constructed Dollar Value**

Wastewater Treatment Plant Tankage									
	Year	Quantity	Unit	Value	Value	Value	Value	Value	Value
Primary Clarifiers #1-4	1958	4	ea	\$500,000	\$2,000,000	\$192,640	\$3,853	\$3,853	\$3,853
#5 & #6	1968	2	ea	\$600,000	\$1,200,000	\$175,888	\$3,518	\$3,518	\$38,695
#7 - #10	1972	4	ea	\$850,000	\$3,400,000	\$756,371	\$15,127	\$15,127	\$226,911
Digesters #1 & #2 (45' Dia.)	1958	2	ea	\$500,000	\$1,000,000	\$96,320	\$1,926	\$1,926	\$1,926
Digester #3 (75' Dia.)	1968	1	ea	\$1,000,000	\$1,000,000	\$146,574	\$2,931	\$2,931	\$32,246
Thickeners (40' Dia.)	1958	1	ea	\$140,000	-	\$140,000	\$2,800	\$2,800	\$2,800
(60' Dia.)	1968	2	ea	\$180,000	-	\$360,000	\$7,200	\$7,200	\$79,200
Chlorine Contact Tanks	1968	1	l.s.	\$1,500,000	\$1,500,000	\$219,860	\$4,397	\$4,397	\$48,369
Total									\$434,001
Wastewater Treatment Plant Equipment									
Plant Influent Pumps	2007	4	ea	\$125,000	-	\$500,000	\$25,000	\$25,000	\$500,000
Head House Sump Pumps	2007	1	l.s.	\$1,400	-	\$1,400	\$70	\$70	\$1,400
Bar Screen Motor	2007	1	ea	\$600	-	\$600	\$30	\$30	\$600
Grit Removal Equipment									
- 10 hp Vortex Grit System	2000	1	l.s.	\$850,000	\$850,000	\$671,065	\$33,553	\$33,553	\$436,192
Primary Sludge Pumps									
(10 hp plunger)	1958	2	ea	-	-	-	-	-	\$0
(10 hp centrifugal)	1958	2	ea	-	-	-	-	-	\$0
East Primary Clarifier Building									
- Motors									
- Control Panels									
- PLCs	2007	1	l.s.	\$53,000	-	\$53,000	\$2,650	\$2,650	\$53,000
East Primary Clarifier Building									
- Pumps									
- Motors									
- Electrical Equipment									
- Misc. Equipment	2007	1	l.s.	\$54,000	-	\$54,000	\$2,700	\$2,700	\$54,000
Primary Settling Tanks #1-6									
- Motors									
- Chains & Flights	2007	1	l.s.	\$66,500	-	\$66,500	\$3,325	\$3,325	\$66,500
Primary Settling Tanks #7-10									
- Motors									
- Chains & Flights	2007	1	l.s.	\$243,000	-	\$243,000	\$12,150	\$12,150	\$243,000
Sodium Hypochlorite Tanks									
- 7,000 gal.	2000	3	l.s.	\$15,000	\$45,000	\$35,527	\$1,776	\$1,776	\$23,093
Sodium Thiosulfate Tanks									
- 4,000 gal.	2000	2	l.s.	\$11,000	\$22,000	\$17,369	\$868	\$868	\$11,290

**Broome County Financial Feasibility Study
Binghamton-Johnson City Joint Sewage Board
Asset Valuation
Year Constructed Dollar Value**

Collection System	1960	3400	I.f.	\$200	\$680,000	\$71,107	\$948	\$26,546
30" Forcemain (?)							Total	\$26,546
Miscellaneous Equipment								
Pickup Truck	2002	1	ea.	-	-	-	-	\$8,000
Pickup Truck	2003	1	ea.	-	-	-	-	\$8,500
Lugger Truck	1983	2	ea.	-	-	-	-	\$10,000
Dump Truck	1999	1	ea.	-	-	-	-	\$19,000
Dump Truck	2006	1	ea.	-	-	-	-	\$40,000
Scissor Lift	2006	1	ea.	-	-	-	-	\$13,000
Hand Fork Lift	1990	1	ea.	-	-	-	-	\$2,500
Skid Steer	2005	1	ea.	-	-	-	-	\$20,000
							Total	\$121,000
							Grand Total	\$55,000,000

Abbreviations	
ea.	Each
I.f.	Linear Foot
I.S.	Lump Sum
sq. ft.	Square Foot

Notes:

- Straight Line Depreciation: $D_j = (C-Sn)/n$
 n = 20 years (Equipment)
 n = 50 years (Buildings & Structures)
 n = 75 years (Piping)
 * Items beyond their useful life were assigned a value of zero.
- Based on information provided in the Solids Handling Feasibility Study by Stearns & Wheeler for the Binghamton-Johnson City Sewage Board dated October 05' an amount of \$1,000,000 has been subtracted from the "Current Value" for the Compost Facility in order to bring the facility back up to operational status.

Broome County Financial Feasibility Study
Village of Endicott
Asset Valuation
Year Constructed Dollar Value

Asset Description	Year Constructed	Quantity	Unit	Unit Cost	Total Cost	Current Value	Depreciation	Net Value
Wastewater Treatment Plant Buildings								
Admin. Building	1966	7800	sq. ft.	\$250	\$1,950,000	\$252,164	\$5,043	\$45,389
Digester Complex	1971	1	l.s.	\$570,000	-	\$570,000	\$11,400	\$159,600
RAS Pump Station	2001	1	l.s.	\$375,000	-	\$375,000	\$7,500	\$330,000
Blower Building	2001	1	ea.	\$430,000	-	\$430,000	\$8,600	\$378,400
Recirculation Pump Station	2001	1	ea.	\$450,000	-	\$450,000	\$9,000	\$396,000
	1971	1	ea.	\$310,000	-	\$310,000	\$6,200	\$86,800
Sludge Process Building	1966	8500	sq. ft.	\$250	\$2,125,000	\$274,794	\$5,496	\$49,463
Thickener Building	1966	1350	sq. ft.	\$250	\$337,500	\$43,644	\$873	\$7,856
Grit Building	1990	1100	sq. ft.	\$250	\$275,000	\$165,137	\$3,303	\$108,990
Compost Facility	1986	1	l.s.	\$1,911,000	-	\$1,911,000	\$38,220	\$1,108,380
Garage	1966	1300	sq. ft.	\$250	\$325,000	\$42,027	\$841	\$7,565
Total								\$2,680,000
Wastewater Treatment Plant Tankage								
Aerated Grit Chamber	1966	1	l.s.	\$150,000	\$150,000	\$19,397	\$388	\$3,491
Primary Clarifiers ²	2001	1	l.s.	\$12,000	-	\$12,000	\$240	\$10,560
	1966	1	l.s.	\$2,300,000	\$2,300,000	\$297,424	\$5,948	\$53,536
Secondary Clarifiers ³	2001	1	l.s.	\$50,000	-	\$50,000	\$1,000	\$44,000
	1971	1	l.s.	\$280,000	-	\$280,000	\$5,600	\$78,400
Solids Contact Tank & Secondary Clarifiers ⁴	2001	1	l.s.	\$2,300,000	-	\$2,300,000	\$46,000	\$2,024,000
Biotowers	2001	1	l.s.	\$3,350,000	-	\$3,350,000	\$67,000	\$2,948,000
Thickeners ⁵	1966	1	l.s.	\$140,000	-	\$140,000	\$2,800	\$25,200
Waste Sludge Line	2001	1	l.s.	\$30,000	-	\$30,000	\$600	\$26,400
Chlorine Contact Tank	1966	1	l.s.	\$1,200,000	\$1,200,000	\$155,178	\$3,104	\$27,932
Total								\$5,240,000
Wastewater Treatment Plant Equipment								
Influent Pumps	1966	2	ea.	-	-	-	-	\$0
Influent Pumps	2007	2	ea.	\$25,000	-	\$50,000	\$2,500	\$50,000
125 hp Engine Drives	2007	2	ea.	\$10,000	-	\$20,000	\$1,000	\$20,000
Flow Meters	2007	3	ea.	\$10,000	-	\$30,000	\$1,500	\$30,000
Mechanical Bar Screen	1990	1	l.s.	\$116,000	-	\$116,000	\$5,800	\$17,400
Aerated Grit Chamber Blowers	1966	2	ea.	-	-	-	-	\$0
Grit Pump	2001	1	ea.	\$20,000	\$20,000	\$16,097	\$805	\$11,268
Grit Screw Conveyor (Classifier)	2001	1	ea.	\$30,000	\$30,000	\$24,145	\$1,207	\$16,901
Furnace (Thickener Building)	1980	1	ea.	-	-	-	-	\$0
Primary Sludge Pumps (10 hp, centrifugal)	1966	3	ea.	-	-	-	-	\$0

**Broome County Financial Feasibility Study
Village of Endicott
Asset Valuation
Year Constructed Dollar Value**

Primary Sludge Pumps (10 hp, centrifugal)	1985	1	ea.	-	-	-	-	\$0
Thickened Sludge Pump (7.5 hp, 90 gpm, diaphragm)	1997	1	ea.	\$8,200	-	\$8,200	\$410	\$4,100
	2003	1	ea.	\$4,400	-	\$4,400	\$220	\$3,520
(10 hp, plunger)	1966	1	ea.	-	-	-	-	\$0
Pipe Grinders	2001	2	ea.	\$10,000	\$20,000	\$16,097	\$805	\$11,268
Sludge Recirculation Pumps (10 hp, 500 gpm)	1966	2	ea.	-	-	-	-	\$0
Chopper Pump (10 hp, 300 gpm)	1994	1	ea.	\$20,000	\$20,000	\$13,725	\$686	\$4,804
Sludge Transfer Pump	1966	1	ea.	-	-	-	-	\$0
Digester Boiler	1966	1	ea.	-	-	-	-	\$0
Digester Heat Exchangers	1966	2	ea.	-	-	-	-	\$0
Belt Filter Press (2-meter)	1984	1	ea.	-	-	-	-	\$0
Belt Filter Press Feed Pumps (10 hp, 173 gpm)	1966	3	ea.	-	-	-	-	\$0
Sludge Conveyor (60' cleated)	1984	1	ea.	-	-	-	-	\$0
Sludge Conveyor (20' cleated)	1984	1	ea.	-	-	-	-	\$0
Affluent Water Pumps (10 hp)	1966	2	ea.	-	-	-	-	\$0
Plant Backup Generator (400 hp)	1976	1	ea.	-	-	-	-	\$0
Hypochlorite & Bisulfite System Admin. Building FEMA Repairs	2001	1	I.S.	\$160,000	-	\$160,000	\$8,000	\$112,000
Garage FEMA Repairs	2007	1	I.S.	\$82,000	-	\$82,000	\$4,100	\$82,000
Sludge Process Building FEMA Repairs	2007	1	I.S.	\$13,000	-	\$13,000	\$650	\$13,000
Digester Building FEMA Repairs	2007	1	I.S.	\$32,000	-	\$32,000	\$1,600	\$32,000
	2007	1	I.S.	\$5,000	-	\$5,000	\$250	\$5,000
RAS Pump Station FEMA Repairs	2007	1	I.S.	\$2,600	-	\$2,600	\$130	\$2,600
Biofilter FEMA Repairs	2007	1	I.S.	\$14,000	-	\$14,000	\$700	\$14,000
Grit Building FEMA Repairs	2007	1	I.S.	\$3,000	-	\$3,000	\$150	\$3,000
Thickener Building FEMA Repairs	2007	1	I.S.	\$20,000	-	\$20,000	\$1,000	\$20,000
Samplers	2007	2	ea.	\$4,600	-	\$9,200	\$460	\$9,200
Total								\$460,000
Wastewater Treatment Plant Miscellaneous								
Misc Earthwork ⁶	2001	1	I.S.	\$316,000	-	\$316,000	-	\$0
Electrical Upgrades	2001	1	I.S.	\$161,500	-	\$161,500	\$3,230	\$142,120
Electrical Site Work	2001	1	I.S.	\$153,400	-	\$153,400	\$3,068	\$134,992
HVAC Work	2001	1	I.S.	\$126,500	-	\$126,500	\$2,530	\$111,320
FEMA Repairs	2007	1	I.S.	\$44,800	-	\$44,800	\$896	\$44,800
Total								\$430,000

Broome County Financial Feasibility Study
Village of Endicott
Asset Valuation
Year Constructed Dollar Value

Pump Stations										
Loder Ave										
Loder Ave (General)	1957	1	I.S.	\$112,000	-	-	\$112,000	-	-	\$0
Loder Ave (Plumbing)	1957	1	I.S.	\$8,000	-	-	\$8,000	-	-	\$0
Loder Ave (Electrical)	1957	1	I.S.	\$12,500	-	-	\$12,500	-	-	\$0
Loder Ave (HVAC)	1957	1	I.S.	\$2,800	-	-	\$2,800	-	-	\$0
Loder Ave Pumps (30 hp)	1975	3	ea.	-	-	-	-	-	-	\$0
River Terrace										
General	1958	1	I.S.	\$282,000	-	-	\$282,000	-	-	\$5,640
Plumbing	1958	1	I.S.	\$13,000	-	-	\$13,000	-	-	\$260
Electrical	1958	1	I.S.	\$19,000	-	-	\$19,000	-	-	\$380
Additional Work	1959	1	I.S.	\$84,500	-	-	\$84,500	-	-	\$3,380
Modifications	1971	1	I.S.	\$68,000	-	-	\$68,000	-	-	\$1,360
Pumps (200 hp)	1971	2	ea.	-	-	-	-	-	-	\$0
Pump (125/87 hp)	1971	1	ea.	-	-	-	-	-	-	\$0
Argonne Ave										
Structure	1970	1	I.S.	\$600,000	\$600,000	-	\$105,152	-	-	\$2,103
Pumps (3000 gpm)	1970	2	ea.	-	-	-	-	-	-	\$0
Argonne Ave Backup Generator	2004	1	ea.	\$200,000	\$200,000	-	\$180,581	-	-	\$9,029
FEMA Repairs	2007	1	I.S.	\$210,000	-	-	\$210,000	-	-	\$10,500
Total										\$420,000
Collection System										
10" Gravity	Prior to 1932	130	I.F.	-	-	-	-	-	-	\$0
12" Gravity	Prior to 1932	1995	I.F.	-	-	-	-	-	-	\$0
15" Gravity	Prior to 1932	1566	I.F.	-	-	-	-	-	-	\$0
16" Gravity	Prior to 1932	219	I.F.	-	-	-	-	-	-	\$0
18" Gravity	Prior to 1932	570	I.F.	-	-	-	-	-	-	\$0
24" Gravity	Prior to 1932	579	I.F.	-	-	-	-	-	-	\$0
24" Gravity (C.I.)	Prior to 1932	3687	I.F.	-	-	-	-	-	-	\$0
24" Gravity (R.C.P.)	Prior to 1932	1636	I.F.	-	-	-	-	-	-	\$0
30" Gravity	Prior to 1932	1400	I.F.	-	-	-	-	-	-	\$0
	1959	2155	I.F.	\$67	-	-	\$144,385	-	-	\$1,925
30" Gravity (C.I.)	Prior to 1932	920	I.F.	-	-	-	-	-	-	\$0
36" Gravity	1959	2813	I.F.	\$81	-	-	\$227,853	-	-	\$3,038
36" Gravity (R.C.P.)	1959	4699	I.F.	\$81	-	-	\$380,619	-	-	\$5,075
48" Gravity	Prior to 1932	660	I.F.	-	-	-	-	-	-	\$0
30" Forcemain (C.I.)	1959	4665	I.F.	\$46	-	-	\$212,957	-	-	\$2,839
Total										\$350,000

Broome County Financial Feasibility Study
Village of Endicott
Asset Valuation
Year Constructed Dollar Value

Miscellaneous Equipment													
Pickup Truck		2002	1	ea.	-	-	-	-	-	-	-	-	\$8,700
Pickup Truck		1996	1	ea.	-	-	-	-	-	-	-	-	\$4,500
Pickup Truck		2006	2	ea.	-	-	-	-	-	-	-	-	\$38,000
Dump Truck		1985	1	ea.	-	-	-	-	-	-	-	-	\$5,000
Dump Truck		1989	1	ea.	-	-	-	-	-	-	-	-	\$8,000
Dump Truck		1991	1	ea.	-	-	-	-	-	-	-	-	\$10,000
Front End Loader		1988	1	ea.	-	-	-	-	-	-	-	-	\$16,000
Front End Loader		2003	1	ea.	-	-	-	-	-	-	-	-	\$88,500
Front End Loader		2003	1	ea.	-	-	-	-	-	-	-	-	\$20,000
Spreader		1990	1	ea.	-	-	-	-	-	-	-	-	\$12,000
Utility Vehicle		1995	1	ea.	-	-	-	-	-	-	-	-	\$1,000
Forklift		1983	1	ea.	-	-	-	-	-	-	-	-	\$5,500
Lawn Mower		2002	1	ea.	-	-	-	-	-	-	-	-	\$6,500
Total												\$220,000	

Grand Total \$9,800,000

Abbreviations	
ea.	Each
l.f.	Linear Foot
l.s.	Lump Sum
sq. ft.	Square Foot

Notes:

1. Straight Line Depreciation: $D_j = (C-S)/n$
 $n = 20$ years (Equipment)
 $n = 50$ years (Buildings & Structures)
 $n = 75$ years (Piping)
 * Items beyond their useful life were assigned a value of zero.
2. Primary Clarifiers estimated based on cost of Secondary Clarifiers due to similarity in size.
3. Circular secondary clarifiers.
4. Rectangular secondary clarifiers.
5. Thickener cost based on secondary clarifier cost from 1971 multiplied by ratio of thickener size to clarifiers
6. Item is considered a lost cost (no value).

**Broome County Financial Feasibility Study
Town of Chenango
Asset Valuation
Year Constructed Dollar Value**

Wastewater Treatment Plant Buildings						
	Year	Quantity	sq. ft.	Unit Cost	Total Cost	Current Value
Control Building	1991	3330	sq. ft.	\$250	\$832,500	\$510,813
Composting Building	1993	14400	sq. ft.	\$250	\$3,600,000	\$2,380,393
1997 Facility Upgrades						
- Composting Facility Addition						
- Blower Room						
- Control Room						
- Belt Filter Press Room	1997	1	l.s.	\$853,000	-	\$853,000
						\$17,060
						Total
						\$2,743,636
Wastewater Treatment Plant Tankage						
Parshall Flume (6", 4 MGD)	1993	1	ea	\$8,000	\$8,000	\$5,290
Aeration Tanks (64'x20'x19')	1993	2	ea	\$500,000	\$1,000,000	\$661,220
Sludge Holding Tanks (30' x 10')	1990	2	ea	\$80,000	\$160,000	\$96,080
Comptainer System (Comploder)	2001	1	l.s.	\$200,000	-	\$200,000
						\$4,000
						Total
						\$719,300
Wastewater Treatment Plant Equipment						
Channel Monster	2007	1	ea	\$130,000	-	\$130,000
RAS Pumps (1.5 hp, 200 gpm)	2005	1	ea	\$20,000	\$20,000	\$18,898
- Recessed Impeller	2006	1	ea	\$20,000	\$20,000	\$19,673
Aeration Blowers (2-50 hp)	1993	2	ea	\$40,000	\$80,000	\$52,898
(2-10 hp)	1993	2	ea	\$20,000	\$40,000	\$26,449
Aeration Equipment (blowers & accessories)	1997	1	l.s.	\$210,000		\$210,000
WAS Pumps (Air Lift, 200 gpm)	1993	2	ea	\$10,000	\$20,000	\$13,224
Belt Filter Press						\$661
(100 gpm, 17% solids)	1993	1	ea	\$225,000	\$225,000	\$148,775
Polymer Pump (5 gpm)	1993	1	ea	\$5,000	\$5,000	\$3,306
Power Screen (30 hp)	1993	1	ea	\$50,000	\$50,000	\$33,061
						\$10,500
						\$661
						\$7,439
						\$165
						\$1,653
						Total
						\$354,012

**Broome County Financial Feasibility Study
Town of Chenango
Asset Valuation
Year Constructed Dollar Value**

Wastewater Treatment Plant		Miscellaneous		1997	1	i.s.	\$92,500	-	\$92,500	\$74,000
Electrical Upgrades										\$74,000
Total										
Pump Stations										
Unknown (6" FM)		1992	1	i.s.			\$40,000	-	\$40,000	\$32,000
Unknown (6" FM)		1992	1	i.s.			\$40,000	-	\$40,000	\$32,000
WWTP Lift Station (6" FM, 0.8 MGD)		1997	1	i.s.			\$600,000	\$600,000	\$443,533	\$221,767
Total										
Collection System										
12" Gravity		1988	7200	i.f.			\$30	-	\$216,000	\$161,280
6" Force Main		1988	3300	i.f.			\$21	-	\$69,300	\$924
Total										
Miscellaneous Equipment										
Pickup Truck		2005	1	ea.			-	-	-	\$17,000
Pickup Truck		2002	1	ea.			-	-	-	\$8,500
Pickup Truck		2000	1	ea.			-	-	-	\$6,000
Front End Loader		-	1	ea.			-	-	-	\$58,500
Mack Roll-Off Truck		1984	1	ea.			-	-	-	\$19,500
Total										
									Total	\$109,500

Grand Total \$4,500,000

Abbreviations	
ea.	Each
i.f.	Linear Foot
i.s.	Lump Sum
sq. ft.	Square Foot

Notes:
 1. Straight Line Depreciation: $D_j = (C-S_n)/n$
 n = 20 years (Equipment)
 n = 50 years (Buildings & Structures)
 n = 75 years (Piping)
 * Items beyond their useful life were assigned a value of zero.

**Broome County Financial Feasibility Study
City of Binghamton
Asset Valuation
Year Constructed Dollar Value**

Pump Stations									
Pennsylvania Ave									
General	2004	1	I.S.	\$990,000	-	\$990,000	\$19,800	\$930,600	
Electrical	2004	1	I.S.	\$490,000	-	\$490,000	\$9,800	\$460,600	
HVAC	2004	1	I.S.	\$155,000	-	\$155,000	\$3,100	\$145,700	
Front Street									
General	2006	1	I.S.	\$490,000	-	\$490,000	\$9,800	\$480,200	
Electrical	2006	1	I.S.	\$182,000	-	\$182,000	\$3,640	\$178,360	
HVAC	2006	1	I.S.	\$60,000	-	\$60,000	\$1,200	\$58,800	
Total									\$2,254,260
Collection System									
CSO 1									
General	2004	1	I.S.	\$170,000	-	\$170,000	\$3,400	\$159,800	
Electrical	2004	1	I.S.	\$80,000	-	\$80,000	\$1,600	\$75,200	
CSO 2									
General	2004	1	I.S.	\$315,000	-	\$315,000	\$6,300	\$296,100	
Electrical	2004	1	I.S.	\$97,000	-	\$97,000	\$1,940	\$91,180	
CSO 3									
General	2004	1	I.S.	\$180,000	-	\$180,000	\$3,600	\$169,200	
Electrical	2004	1	I.S.	\$63,000	-	\$63,000	\$1,260	\$59,220	
CSO 4									
General	2004	1	I.S.	\$380,000	-	\$380,000	\$7,600	\$357,200	
Electrical	2004	1	I.S.	\$102,000	-	\$102,000	\$2,040	\$95,880	
CSO 5									
General	2004	1	I.S.	\$330,000	-	\$330,000	\$6,600	\$310,200	
CSO 6									
General	2004	1	I.S.	\$20,000	-	\$20,000	\$400	\$18,800	
CSO 7									
General	2004	1	I.S.	\$25,000	-	\$25,000	\$500	\$23,500	
CSO 9									
General	2004	1	I.S.	\$23,000	-	\$23,000	\$460	\$21,620	
Electrical	2004	1	I.S.	\$20,000	-	\$20,000	\$400	\$18,800	
CSO 13									
General	2004	1	I.S.	\$93,000	-	\$93,000	\$1,860	\$87,420	
Electrical	2004	1	I.S.	\$45,000	-	\$45,000	\$900	\$42,300	

**Broome County Financial Feasibility Study
City of Binghamton
Asset Valuation
Year Constructed Dollar Value**

8" V.T. Sewer	Prior to 1932	6400	I.f.	-	-	-	-	-	-	\$0
8" Sewer	Prior to 1932	4935	I.f.	-	-	-	-	-	-	\$0
10" V.T. Sewer	1958	3000	I.f.	\$70	\$210,000	\$20,227	\$270	\$7,012	\$0	\$0
10" Sewer	Prior to 1932	7250	I.f.	-	-	-	-	-	-	\$0
12" Sewer	Prior to 1932	5800	I.f.	-	-	-	-	-	-	\$0
15" V.T. Sewer	1958	1175	I.f.	\$80	\$94,000	\$9,054	\$121	\$3,139	\$0	\$0
15" Sewer	Prior to 1932	2850	I.f.	-	-	-	-	-	-	\$0
	1958	3400	I.f.	\$80	\$272,000	\$26,199	\$349	\$9,082	\$0	\$0
	1983	2150	I.f.	\$80	\$172,000	\$88,758	\$1,183	\$60,355	\$0	\$0
16" Sewer	Prior to 1932	250	I.f.	-	-	-	-	-	-	\$0
18" V.T. Sewer	1958	1100	I.f.	\$100	\$110,000	\$10,595	\$141	\$3,673	\$0	\$0
18" Sewer	Prior to 1932	5700	I.f.	-	-	-	-	-	-	\$0
	1983	4400	I.f.	\$100	\$440,000	\$227,054	\$3,027	\$154,397	\$0	\$0
20" Sewer	Prior to 1932	1000	I.f.	-	-	-	-	-	-	\$0
24" C.I.P. Sewer	1958	4050	I.f.	\$150	\$607,500	\$58,514	\$780	\$20,285	\$0	\$0
24" Sewer	Prior to 1932	2225	I.f.	-	-	-	-	-	-	\$0
28" Sewer	Prior to 1932	550	I.f.	-	-	-	-	-	-	\$0
30" R.C.P. Sewer	Prior to 1932	4700	I.f.	-	-	-	-	-	-	\$0
30" Sewer	1958	1500	I.f.	\$200	\$300,000	\$28,896	\$385	\$10,017	\$0	\$0
	1983	2055	I.f.	\$200	\$411,000	\$212,089	\$2,828	\$144,221	\$0	\$0
30" River Crossing	1958	3000	I.f.	\$200	\$600,000	\$57,792	\$771	\$20,035	\$0	\$0
33" Sewer	1958	6275	I.f.	\$200	\$1,255,000	\$120,881	\$1,612	\$41,906	\$0	\$0
34" Sewer	1958	550	I.f.	\$200	\$110,000	\$10,595	\$141	\$3,673	\$0	\$0
36" C.I.P. Sewer	1958	2000	I.f.	\$200	\$400,000	\$38,528	\$514	\$13,356	\$0	\$0
36" R.C.P. Sewer	1958	4650	I.f.	\$200	\$930,000	\$89,577	\$1,194	\$31,054	\$0	\$0
38" Sewer	1958	2075	I.f.	\$200	\$415,000	\$39,973	\$533	\$13,857	\$0	\$0
42" Sewer	1958	3400	I.f.	\$250	\$850,000	\$81,872	\$1,092	\$28,382	\$0	\$0
45" R.C.P. Sewer	1958	9750	I.f.	\$250	\$2,437,500	\$234,780	\$3,130	\$81,390	\$0	\$0
48" R.C.P. Sewer	1958	300	I.f.	\$250	\$75,000	\$7,224	\$96	\$2,504	\$0	\$0
54" Sewer	1958	4350	I.f.	\$300	\$1,305,000	\$125,697	\$1,676	\$43,575	\$0	\$0

**Broome County Financial Feasibility Study
City of Binghamton
Asset Valuation
Year Constructed Dollar Value**

Asset Description	Year Constructed	Quantity	Unit Cost	Total Value
2"x3' Sewer	Prior to 1932	1.f.	2,470	\$0
18"x27" Sewer	Prior to 1932	1.f.	1,450	\$0
20"x30" Sewer	Prior to 1932	1.f.	2,800	\$0
16"x33" Sewer	Prior to 1932	1.f.	800	\$0
24"x26" Sewer	Prior to 1932	1.f.	1,875	\$0
28"x42" Sewer	Prior to 1932	1.f.	4,800	\$0
36"x42" Sewer	Prior to 1932	1.f.	1,000	\$0
3'x4' Sewer	Prior to 1932	1.f.	6,500	\$0
4'x6' Sewer	Prior to 1932	1.f.	5,650	\$0
Total				\$2,518,333

Grand Total \$4,800,000

Abbreviations	
ea.	Each
l.f.	Linear Foot
l.s.	Lump Sum
sq. ft.	Square Foot

Notes:
 1. Straight Line Depreciation: $D_j = (C - S_n) / n$
 n = 20 years (Equipment)
 n = 50 years (Buildings & Structures)
 n = 75 years (Piping)
 * Items beyond their useful life were assigned a value of zero.

**Broome County Financial Feasibility Study
 Village of Johnson City
 Asset Valuation
 Year Constructed Dollar Value**

Pump Stations	1986	1	I.s.	\$680,000	-	\$680,000	\$13,600	\$394,400
Oakdale Rd							Total	\$394,400
Collection System								
CSO #1 & #2								
General	2003	1	I.s.	\$650,000	-	\$650,000	\$13,000	\$598,000
Electrical	2003	1	I.s.	\$150,000	-	\$150,000	\$3,000	\$138,000
12" R.C.P. Sewer	1960	640	I.f.	\$70	\$44,800	\$4,685	\$62	\$1,749
12" Force Main	1990	2610	I.f.	\$25	-	\$65,250	\$870	\$50,460
15" R.C.P. Sewer	1990	1120	I.f.	\$80	\$89,600	\$53,805	\$717	\$41,609
24" R.C.P. Sewer	Prior to 1932	3640	I.f.	-	-	-	-	\$0
24" Sewer	1990	1000	I.f.	\$150	\$150,000	\$90,075	\$1,201	\$69,658
27" R.C.P. Sewer	Prior to 1932	9300	I.f.	-	-	-	-	\$0
30" Force Main	1960	3400	I.f.	\$150	\$510,000	\$53,330	\$711	\$19,910
48" R.C.P. Sewer	1950	1280	I.f.	\$250	\$320,000	\$20,711	\$276	\$4,971
							Total	\$924,356

Grand Total \$1,300,000

Abbreviations	
ea.	Each
I.f.	Linear Foot
I.s.	Lump Sum
sq. ft.	Square Foot

Notes:
 1. Straight Line Depreciation: $D_j = (C-S)/n$
 n = 20 years (Equipment)
 n = 50 years (Buildings & Structures)
 n = 75 years (Piping)
 * Items beyond their useful life were assigned a value of zero.

**Broome County Financial Feasibility Study
Town of Vestal
Asset Valuation
Year Constructed Dollar Value**

Pump Stations		1975	1	I.S.	\$1,500,000	\$1,500,000	\$421,034	\$8,421	\$151,572
Castle Gardens		1960	1	I.S.	\$600,000	\$600,000	\$62,741	\$1,255	\$3,764
Total									\$155,337
Collection System									
8" Force Main		1961	2500	I.F.	\$50	\$125,000	\$13,436	\$179	\$5,195
15" Sewer		1957	3200	I.F.	\$80	\$256,000	\$23,521	\$314	\$7,840
16" Force Main		1961	3400	I.F.	\$100	\$340,000	\$36,546	\$487	\$14,131
24" Sewer		1957	9500	I.F.	\$150	\$1,425,000	\$130,926	\$1,746	\$43,642
30" Sewer		1960	7500	I.F.	\$200	\$1,500,000	\$156,853	\$2,091	\$58,558
Total									\$129,367
Grand Total									\$280,000

Notes:

1. Straight Line Depreciation: $D_j = (C-Sn)/n$
 $n = 20$ years (Equipment)
 $n = 50$ years (Buildings & Structures)
 $n = 75$ years (Piping)
 * Items beyond their useful life were assigned a value of zero.

Abbreviations	
ea.	Each
I.F.	Linear Foot
I.S.	Lump Sum
sq. ft.	Square Foot

**Broome County Financial Feasibility Study
Town of Dickinson
Asset Valuation
Year Constructed Dollar Value**

	1975	1	I.S.	\$600,000	\$600,000	\$168,414	\$3,368	\$60,629
Pump Stations							Total	\$60,629
Unknown PS								
Collection System								
8" Sewer	1975	5100	I.f.	\$60	\$306,000	\$85,891	\$1,145	\$49,244
8" Force Main	1975	1000	I.f.	\$50	\$50,000	\$14,034	\$187	\$8,046
10" Force Main	1975	2900	I.f.	\$60	\$174,000	\$48,840	\$651	\$28,002
							Total	\$85,292
							Grand Total	\$150,000

Notes:

1. Straight Line Depreciation: $D_j = (C-S)n/n$
 $n = 20$ years (Equipment)
 $n = 50$ years (Buildings & Structures)
 $n = 75$ years (Piping)
 * Items beyond their useful life were assigned a value of zero.
2. The year constructed is an estimate. Dates require verification.

Broome County Financial Feasibility Study
Asset Valuation
ENR Construction Cost Index

Year	ENRCCI	Annual Change, %/year				
		1-Year	5-Year	10-Year	15-Year	20-Year
1908	97					
1909	91	-6.2%				
1910	96	5.5%				
1911	93	-3.1%				
1912	91	-2.2%				
1913	100	9.9%	0.6%			
1914	89	-11.0%	-0.4%			
1915	93	4.5%	-0.6%			
1916	130	39.8%	6.9%			
1917	181	39.2%	14.7%			
1918	189	4.4%	13.6%	6.9%		
1919	198	4.8%	17.3%	8.1%		
1920	251	26.8%	22.0%	10.1%		
1921	202	-19.5%	9.2%	8.1%		
1922	174	-13.9%	-0.8%	6.7%		
1923	214	23.0%	2.5%	7.9%	5.4%	
1924	215	0.5%	1.7%	9.2%	5.9%	
1925	207	-3.7%	-3.8%	8.3%	5.3%	
1926	208	0.5%	0.6%	4.8%	5.5%	
1927	206	-1.0%	3.4%	1.3%	5.6%	
1928	207	0.5%	-0.7%	0.9%	5.0%	3.9%
1929	207	0.0%	-0.8%	0.4%	5.8%	4.2%
1930	203	-1.9%	-0.4%	-2.1%	5.3%	3.8%
1931	181	-10.8%	-2.7%	-1.1%	2.2%	3.4%
1932	157	-13.3%	-5.3%	-1.0%	-0.9%	2.8%
1933	170	8.3%	-3.9%	-2.3%	-0.7%	2.7%
1934	198	16.5%	-0.9%	-0.8%	0.0%	4.1%
1935	196	-1.0%	-0.7%	-0.5%	-1.6%	3.8%
1936	206	5.1%	2.6%	-0.1%	0.1%	2.3%
1937	235	14.1%	8.4%	1.3%	2.0%	1.3%
1938	236	0.4%	6.8%	1.3%	0.7%	1.1%
1939	236	0.0%	3.6%	1.3%	0.6%	0.9%
1940	242	2.5%	4.3%	1.8%	1.0%	-0.2%
1941	258	6.6%	4.6%	3.6%	1.4%	1.2%
1942	276	7.0%	3.3%	5.8%	2.0%	2.3%
1943	290	5.1%	4.2%	5.5%	2.3%	1.5%
1944	299	3.1%	4.8%	4.2%	2.5%	1.7%
1945	308	3.0%	4.9%	4.6%	2.8%	2.0%
1946	346	12.3%	6.0%	5.3%	4.4%	2.6%
1947	413	19.4%	8.4%	5.8%	6.7%	3.5%
1948	461	11.6%	9.7%	6.9%	6.9%	4.1%
1949	477	3.5%	9.8%	7.3%	6.0%	4.3%

Broome County Financial Feasibility Study
Asset Valuation
ENR Construction Cost Index

Year	ENRCCI	Annual Change, %/year				
		1-Year	5-Year	10-Year	15-Year	20-Year
1950	510	6.9%	10.6%	7.7%	6.6%	4.7%
1951	543	6.5%	9.4%	7.7%	6.7%	5.6%
1952	569	4.8%	6.6%	7.5%	6.1%	6.6%
1953	600	5.4%	5.4%	7.5%	6.4%	6.5%
1954	628	4.7%	5.7%	7.7%	6.7%	5.9%
1955	660	5.1%	5.3%	7.9%	6.9%	6.3%
1956	692	4.8%	5.0%	7.2%	6.8%	6.2%
1957	724	4.6%	4.9%	5.8%	6.6%	5.8%
1958	759	4.8%	4.8%	5.1%	6.6%	6.0%
1959	797	5.0%	4.9%	5.3%	6.8%	6.3%
1960	824	3.4%	4.5%	4.9%	6.8%	6.3%
1961	847	2.8%	4.1%	4.5%	6.2%	6.1%
1962	872	3.0%	3.8%	4.4%	5.1%	5.9%
1963	901	3.3%	3.5%	4.1%	4.6%	5.8%
1964	936	3.9%	3.3%	4.1%	4.6%	5.9%
1965	971	3.7%	3.3%	3.9%	4.4%	5.9%
1966	1019	4.9%	3.8%	3.9%	4.3%	5.5%
1967	1074	5.4%	4.3%	4.0%	4.3%	4.9%
1968	1155	7.5%	5.1%	4.3%	4.5%	4.7%
1969	1269	9.9%	6.3%	4.8%	4.8%	5.0%
1970	1381	8.8%	7.3%	5.3%	5.0%	5.1%
1971	1581	14.5%	9.2%	6.4%	5.7%	5.5%
1972	1753	10.9%	10.3%	7.2%	6.1%	5.8%
1973	1895	8.1%	10.4%	7.7%	6.3%	5.9%
1974	2020	6.6%	9.7%	8.0%	6.4%	6.0%
1975	2212	9.5%	9.9%	8.6%	6.8%	6.2%
1976	2401	8.6%	8.7%	8.9%	7.2%	6.4%
1977	2576	7.3%	8.0%	9.1%	7.5%	6.6%
1978	2768	7.5%	7.9%	9.1%	7.8%	6.7%
1979	3003	8.5%	8.2%	9.0%	8.1%	6.9%
1980	3237	7.8%	7.9%	8.9%	8.4%	7.1%
1981	3452	6.6%	7.5%	8.1%	8.5%	7.3%
1982	3742	8.4%	7.8%	7.9%	8.7%	7.6%
1983	4066	8.7%	8.0%	7.9%	8.8%	7.8%
1984	4146	2.0%	6.7%	7.5%	8.2%	7.7%
1985	4195	1.2%	5.3%	6.6%	7.7%	7.6%
1986	4295	2.4%	4.5%	6.0%	6.9%	7.5%
1987	4406	2.6%	3.3%	5.5%	6.3%	7.3%
1988	4519	2.6%	2.1%	5.0%	6.0%	7.1%
1989	4615	2.1%	2.2%	4.4%	5.7%	6.7%

Broome County Financial Feasibility Study
Asset Valuation
ENR Construction Cost Index

Year	ENRCCI	Annual Change, %/year				
		1-Year	5-Year	10-Year	15-Year	20-Year
1990	4732	2.5%	2.4%	3.9%	5.2%	6.4%
1991	4835	2.2%	2.4%	3.4%	4.8%	5.7%
1992	4985	3.1%	2.5%	2.9%	4.5%	5.4%
1993	5210	4.5%	2.9%	2.5%	4.3%	5.2%
1994	5408	3.8%	3.2%	2.7%	4.0%	5.0%
1995	5471	1.2%	2.9%	2.7%	3.6%	4.6%
1996	5618	2.7%	3.0%	2.7%	3.3%	4.3%
1997	5825	3.7%	3.2%	2.8%	3.0%	4.2%
1998	5920	1.6%	2.6%	2.7%	2.5%	3.9%
1999	6059	2.3%	2.3%	2.8%	2.6%	3.6%
2000	6221	2.7%	2.6%	2.8%	2.7%	3.3%
2001	6342	1.9%	2.5%	2.8%	2.6%	3.1%
2002	6538	3.1%	2.3%	2.7%	2.7%	2.8%
2003	6695	2.4%	2.5%	2.5%	2.7%	2.5%
2004	7115	6.3%	3.3%	2.8%	2.9%	2.7%
2005	7446	4.7%	3.7%	3.1%	3.1%	2.9%
2006	7751	4.1%	4.1%	3.3%	3.2%	3.0%
2007	7880	January 07'				
2008						
2009						

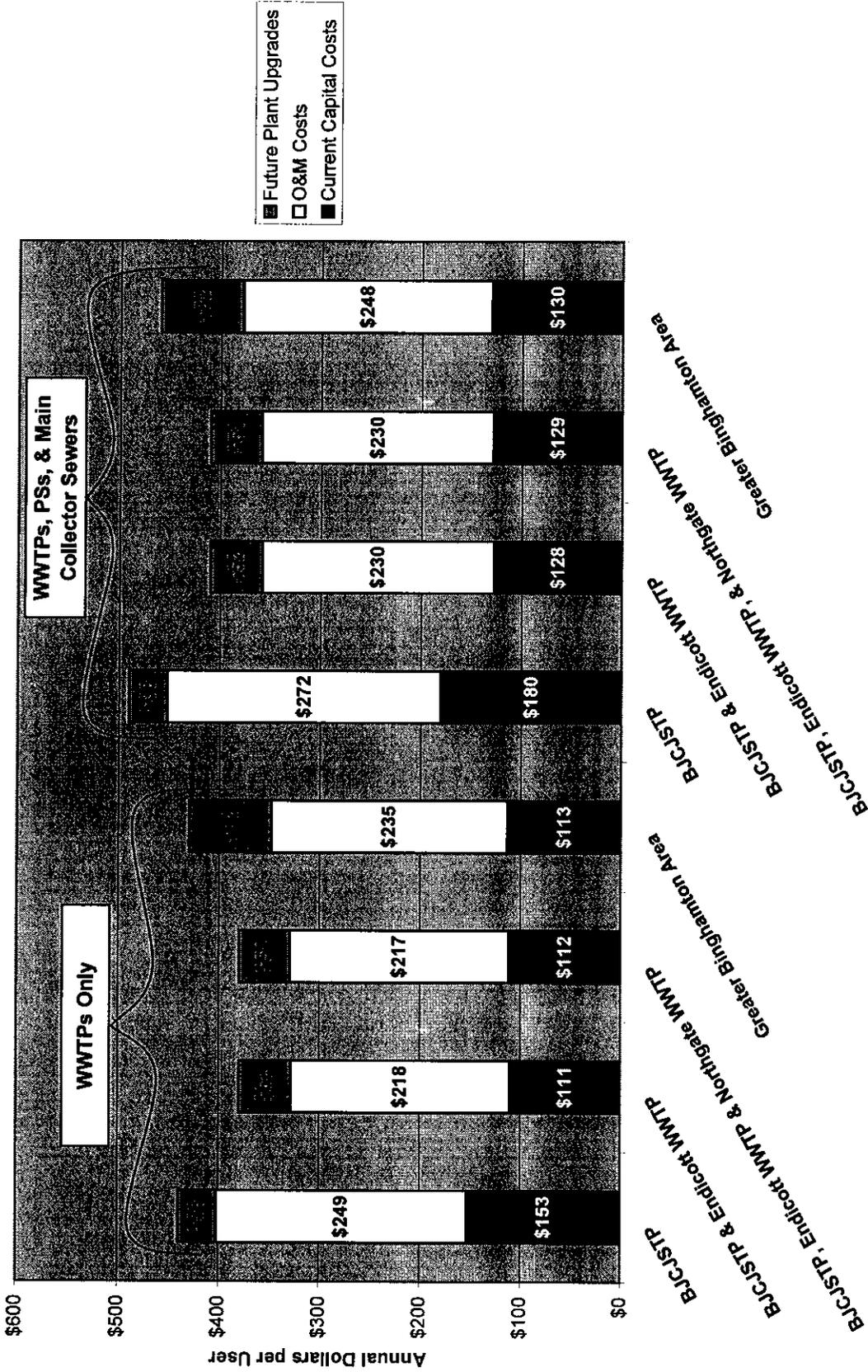
APPENDIX D

USER COST GRAPHS

20-Year Financing at 5% Interest

Estimated Future User Fees for County Owned Wastewater Infrastructure

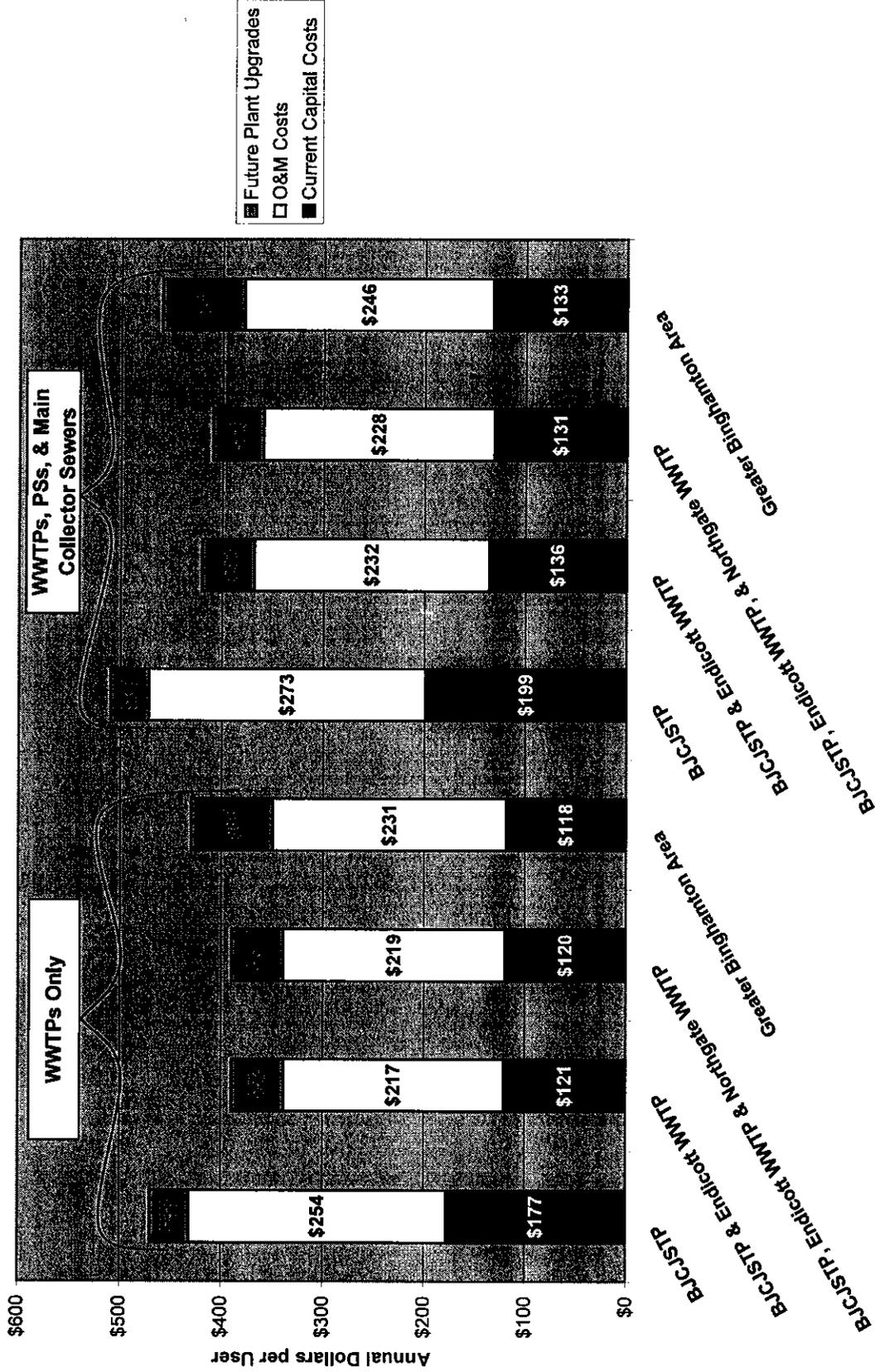
(Based on "Year Constructed" Dollar Values for Acquisition)



20-Year Financing at 5% Interest

Estimated Future User Fees for County Owned Wastewater Infrastructure

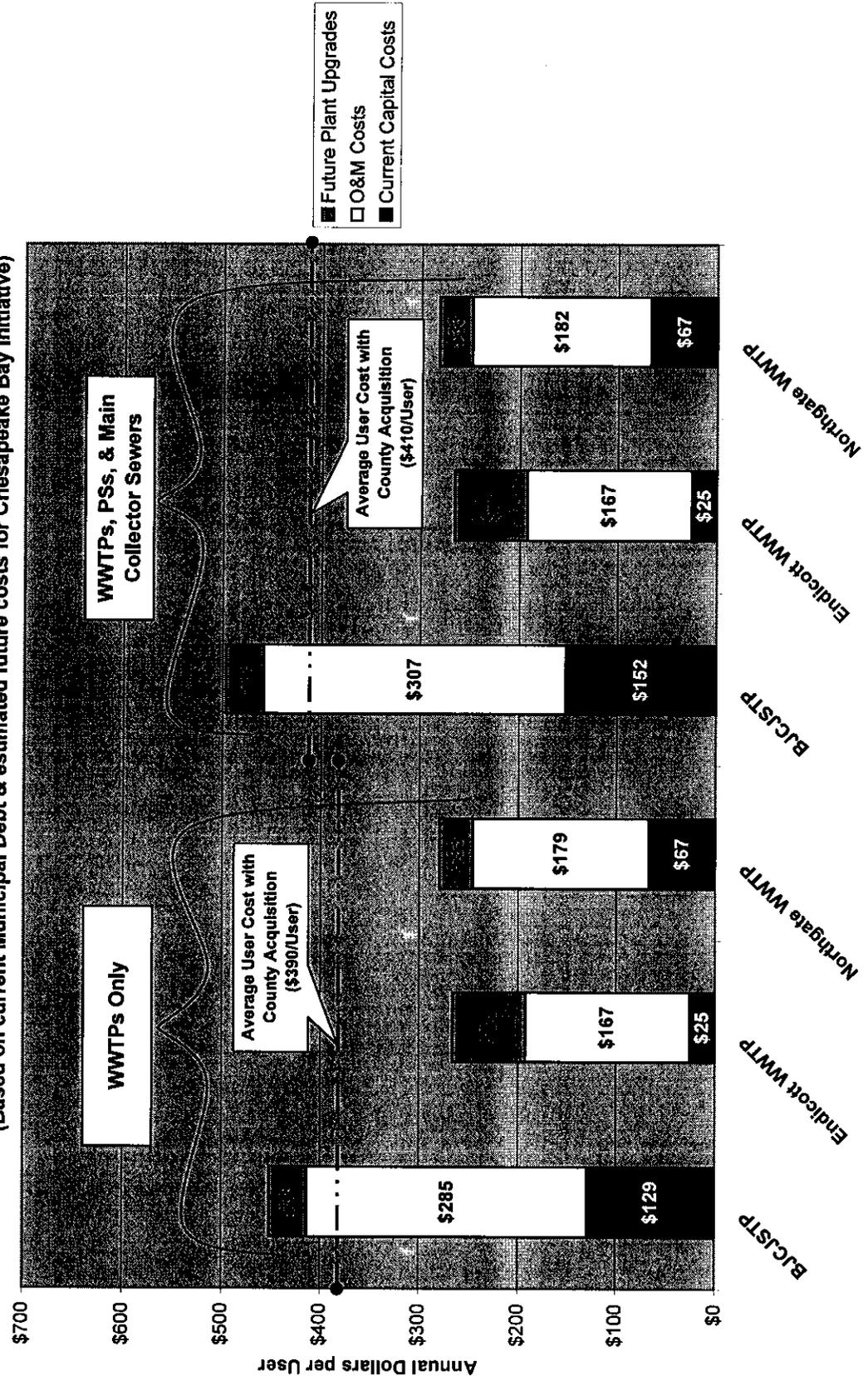
(Based on County Acquisition of Municipal Debt)



20-Year Financing at 5% Interest

Estimated Future User Fees for Chesapeake Bay Initiative Improvements without County Acquisition of Wastewater Infrastructure

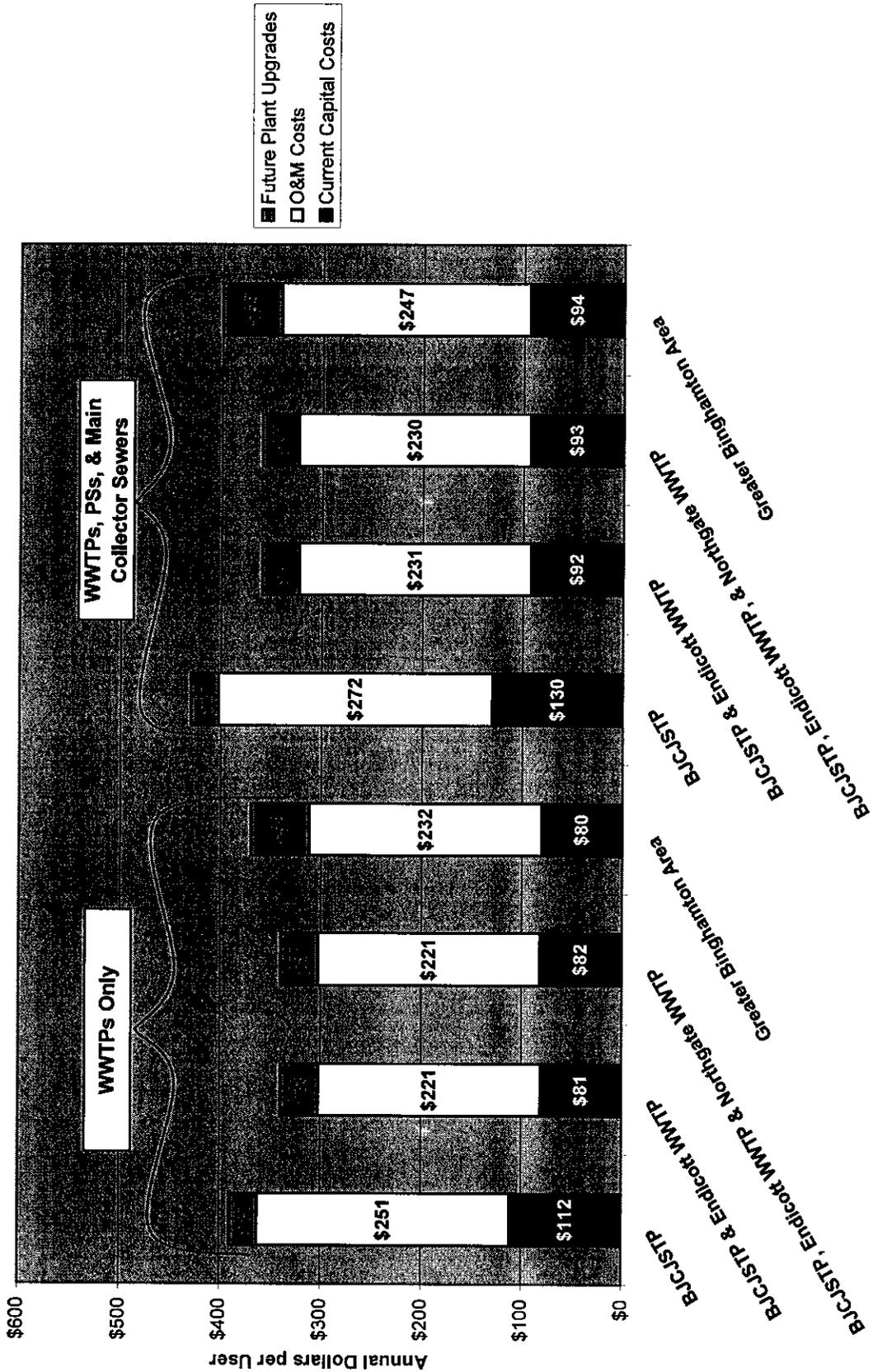
(Based on current Municipal Debt & estimated future costs for Chesapeake Bay Initiative)



30-Year Financing at 4% Interest

Estimated Future User Fees for County Owned Wastewater Infrastructure

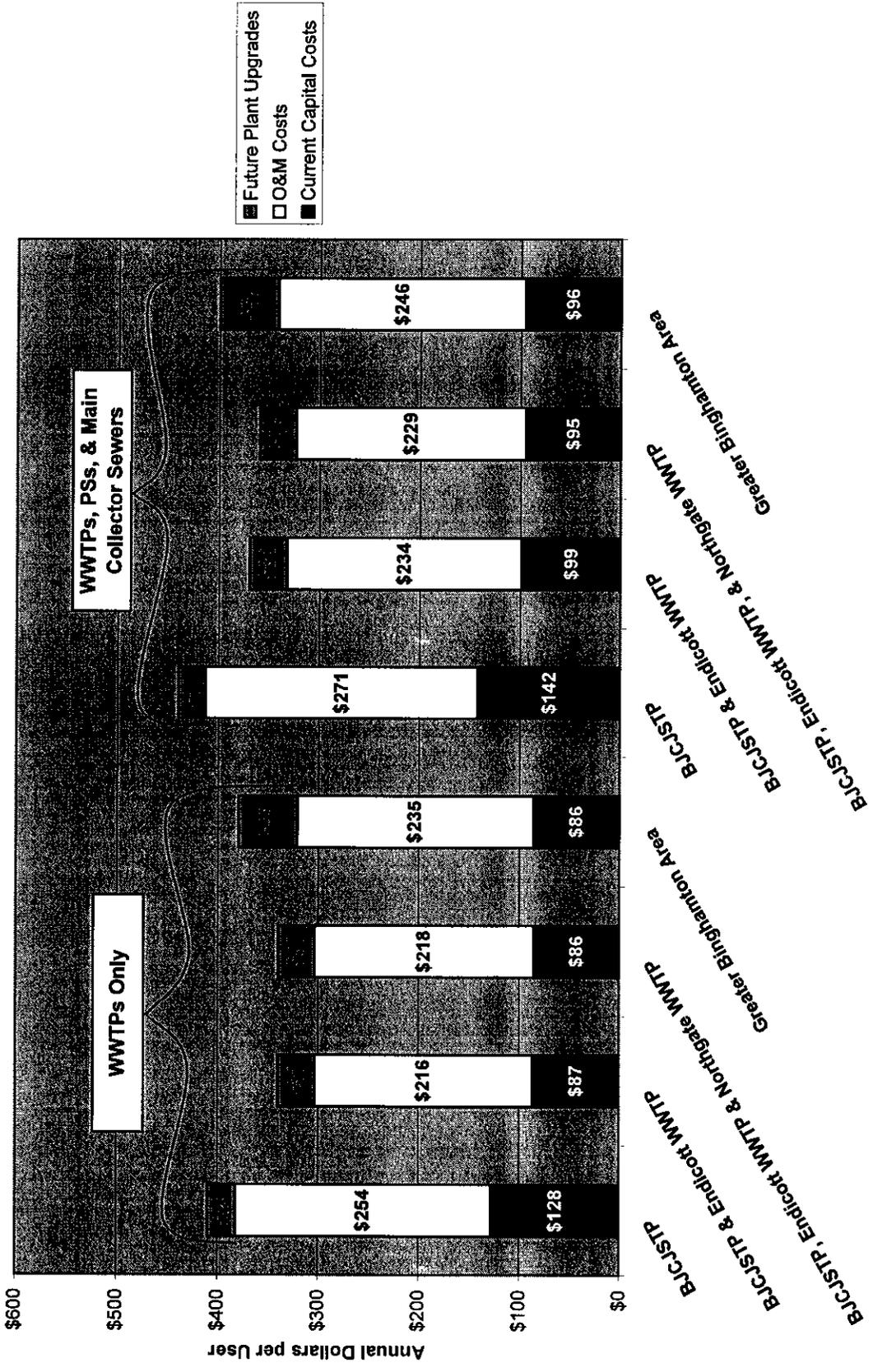
(Based on "Year Constructed" Dollar Values for Acquisition)



30-Year Financing at 4% Interest

Estimated Future User Fees for County Owned Wastewater Infrastructure

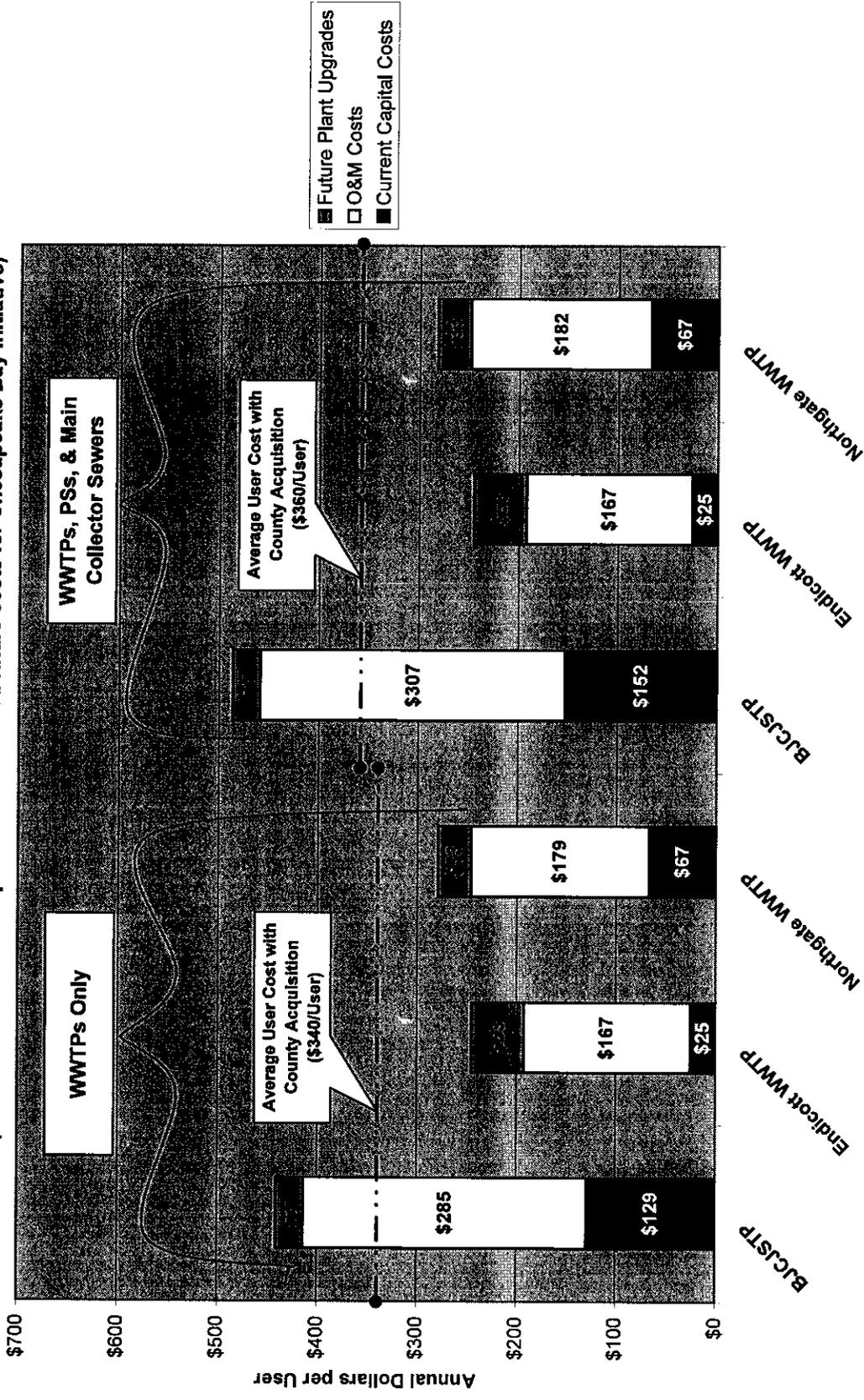
(Based on County Acquisition of Municipal Debt)



30-Year Financing at 4% Interest

Estimated Future User Fees for Chesapeake Bay Initiative Improvements without County Acquisition of Wastewater Infrastructure

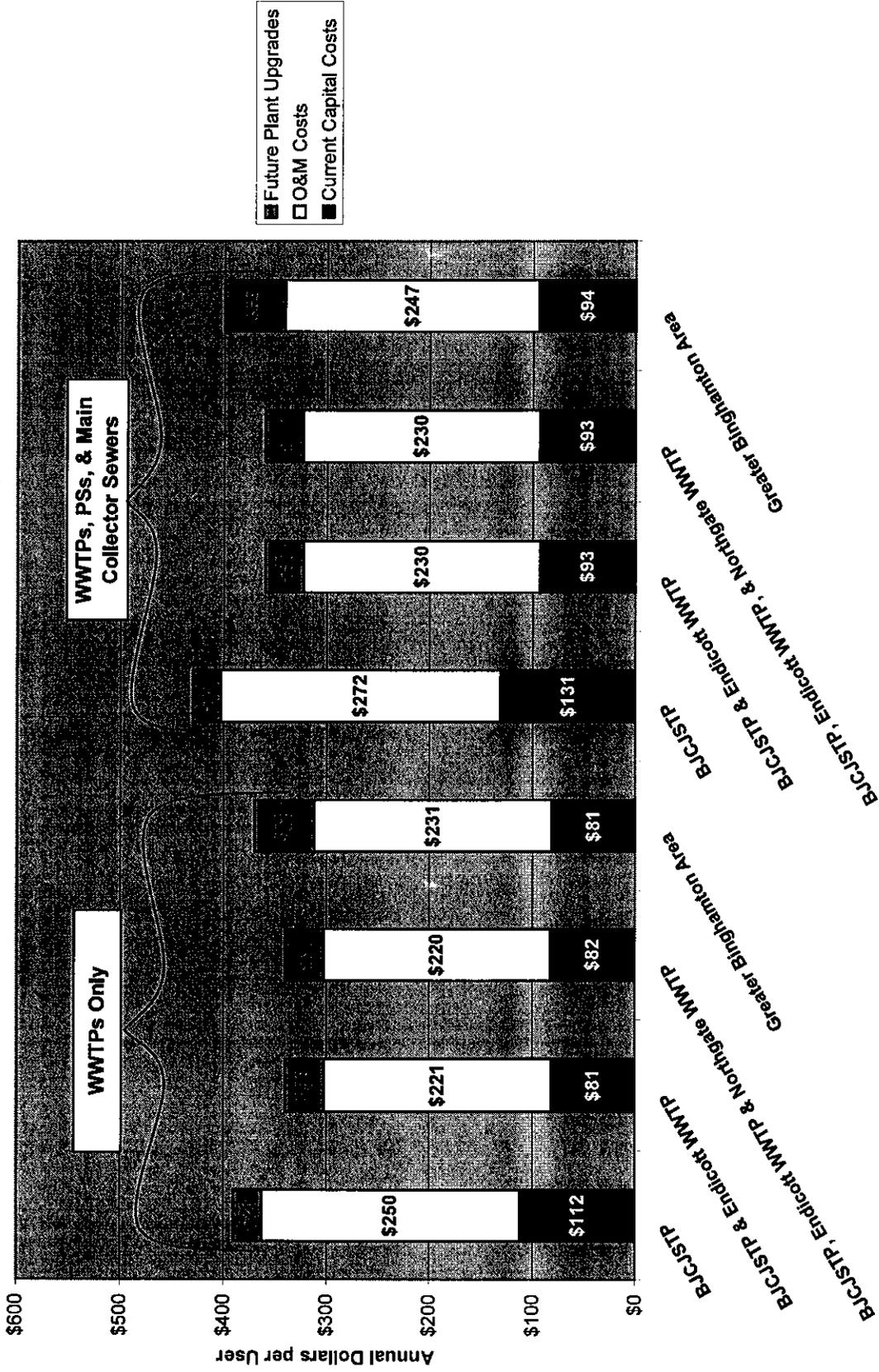
(Based on current Municipal Debt & estimated future costs for Chesapeake Bay Initiative)



40-Year Financing at 5% Interest

Estimated Future User Fees for County Owned Wastewater Infrastructure

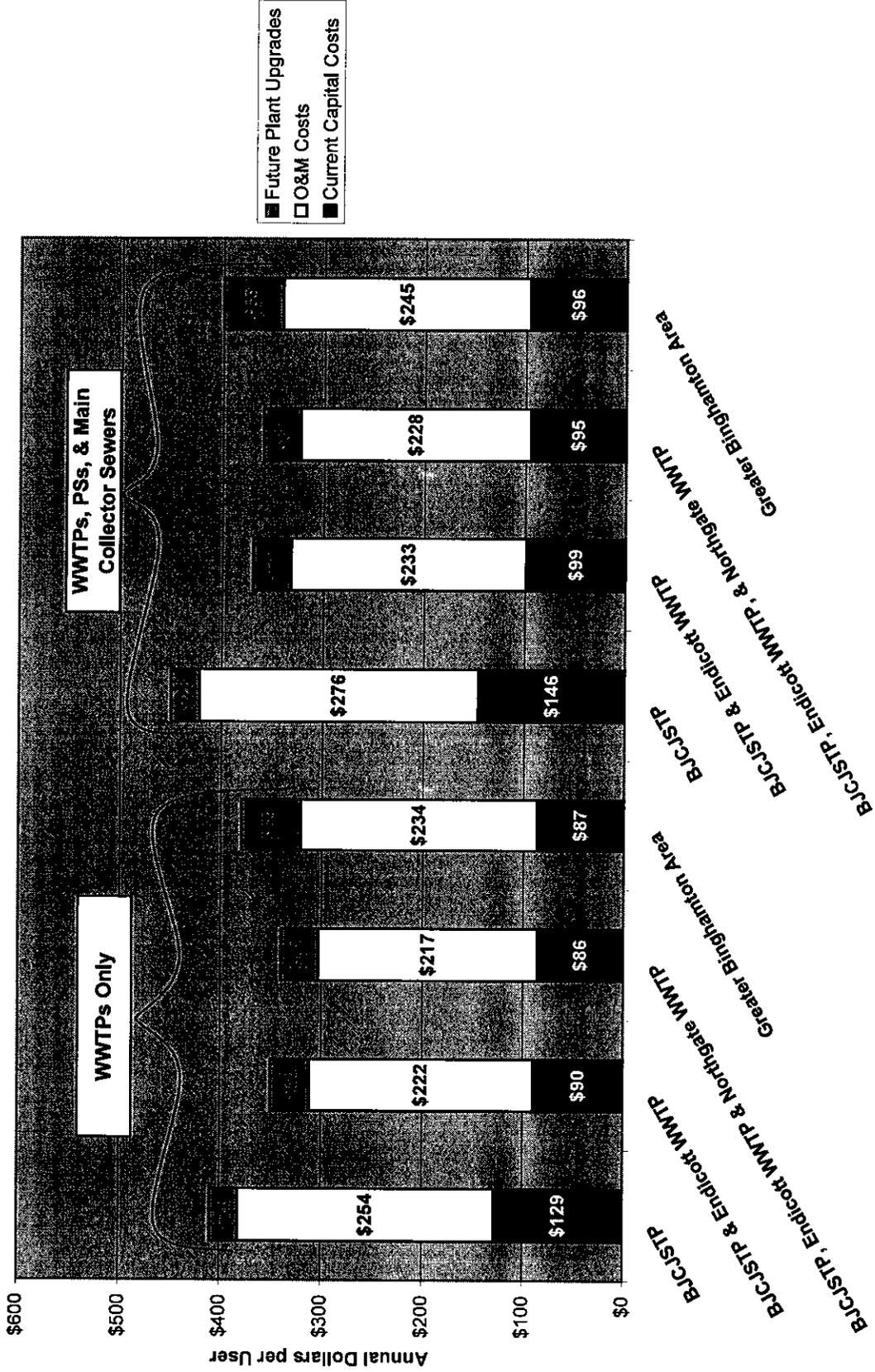
(Based on "Year Constructed" Dollar Values for Acquisition)



40-Year Financing at 5% Interest

Estimated Future User Fees for County Owned Wastewater Infrastructure

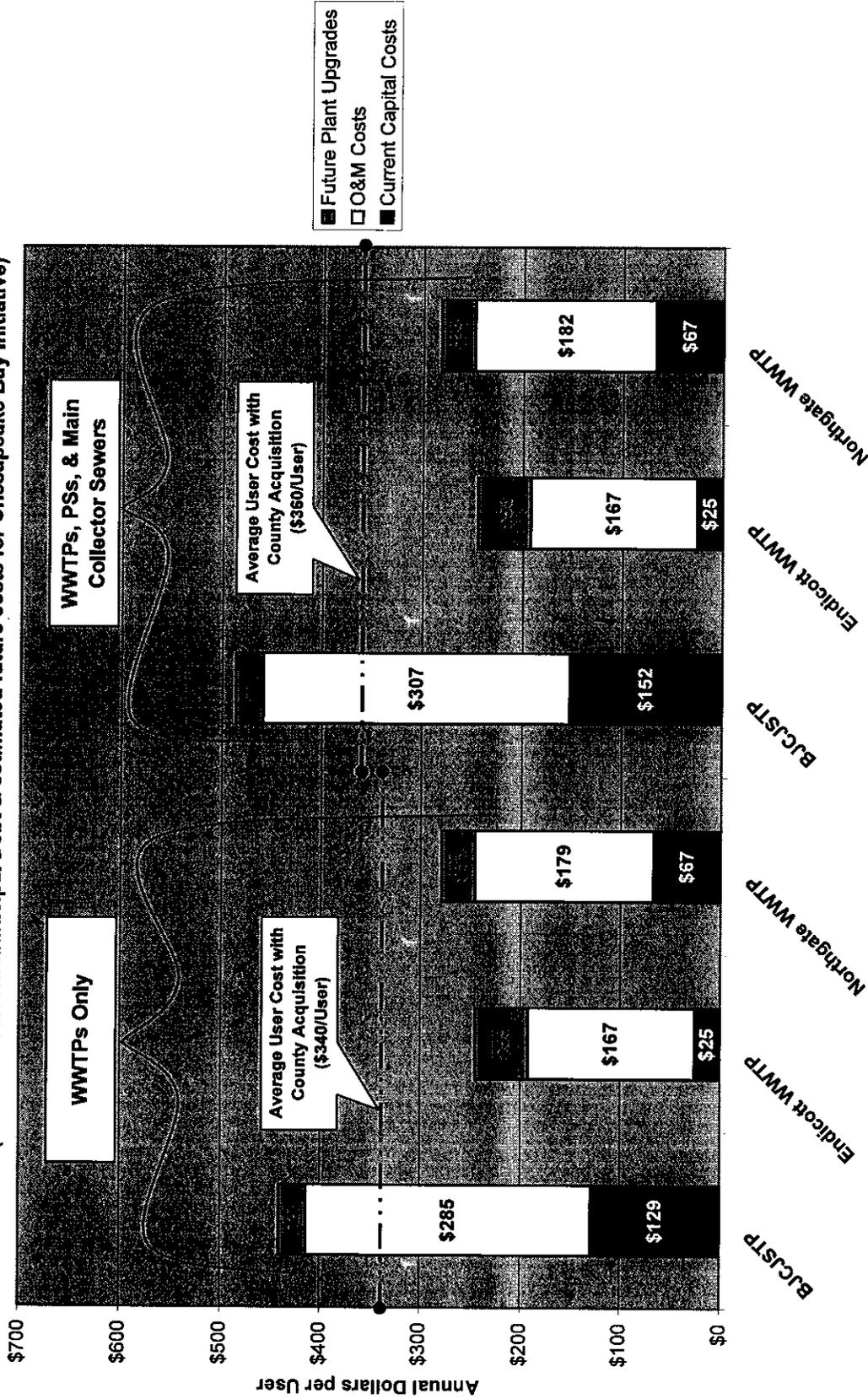
(Based on County Acquisition of Municipal Debt)



40-Year Financing at 5% Interest

Estimated Future User Fees for Chesapeake Bay Initiative Improvements without County Acquisition of Wastewater Infrastructure

(Based on current Municipal Debt & estimated future costs for Chesapeake Bay Initiative)



APPENDIX E

WWTP FLOWS AND LOADS

Broome County - Financial Feasibility Study

Wastewater Treatment Plant Data - Flows & Loads

Treatment Facility	Binghamton-Johnson City Joint STP											
	Plant Flow, S.D.	23.1	-	35	157	105	172	18	141	44	84	20
Endicott WWTP ⁶	14.0	10	166	8	19	25	231	12	24	30		
Northgate (Chenango) WWTP ⁷	0.94	0.8	274	8	13	30	349	6	11	30		

Notes:

1. The Binghamton-Johnson City Joint STP and the Endicott WWTP are permitted for CBOD₅, while the Northgate WWTP is permitted for BOD₅, but the Binghamton-Johnson City Joint STP data presented is for BOD₅ as this facility has recently modified their permit from BOD₅ to CBOD₅.
2. Binghamton-JC Joint STP has a 12-month rolling average permitted flow while the Endicott and Northgate (Chenango) treatment plants each have a maximum monthly permitted flow.
3. All three wastewater treatment plants are permitted for BOD/CBOD and TSS on a maximum month basis.
4. Treatment plant is presently upgrading and is only performing primary treatment at this time. The permit limits presented are for the upgraded Binghamton-Johnson City Joint STP (after completion of the current upgrades).
5. Plant flow, BOD₅, and TSS data for the Binghamton-Johnson City Joint STP is as reported on facility DMRs for the time period of November 2003 thru October 2006.
6. Plant flow, BOD₅, and TSS data for the Endicott WWTP is as reported on facility DMRs for the time period of December 2003 thru September 2006.
7. Plant flow, CBOD₅, and TSS data for the Northgate WWTP is as reported on facility DMRs for the time period of December 2003 thru November 2006.

Broome County - Financial Feasibility Study
BINGHAMTON-JOHNSON CITY JOINT SEWAGE TREATMENT PLANT
Wastewater Treatment Plant Data - Flows & Loads

Nov-03	21.2	-	NA	145	NA	NA	135	18	87%	NA	9.1	NA
Dec-03	21.6	-	NA	143	NA	NA	128	19	85%	NA	7.6	NA
Jan-04	22.2	-	NA	143	NA	NA	125	20	84%	NA	12.1	NA
Feb-04	22.3	-	NA	145	NA	NA	120	18	85%	NA	14.6	NA
Mar-04	23.1	-	NA	141	NA	NA	117	19	84%	NA	9.4	NA
Apr-04	23.6	-	NA	139	NA	NA	121	17	86%	NA	10.0	NA
May-04	23.3	-	NA	142	NA	NA	127	18	88%	NA	11.8	NA
Jun-04	22.1	-	NA	150	NA	NA	135	17	87%	NA	13.7	NA
Jul-04	20.1	-	NA	187	NA	54	68%	149	82%	16.0	13.0	2.5
Aug-04	21.5	-	NA	112	91	91	106	50	53%	13.0	9.4	1.4
Sep-04	24.3	-	NA	110	82	82	105	52	50%	14.2	9.0	2.0
Oct-04	19.5	22.0	NA	170	112	112	163	54	67%	18.5	12.1	2.9
Nov-04	19.3	21.9	NA	170	121	121	147	57	81%	19.3	11.7	2.5
Dec-04	25.5	22.2	NA	117	93	93	108	53	51%	14.0	7.0	1.8
Jan-05	28.1	22.5	NA	117	87	87	112	56	50%	7.4	7.4	1.9
Feb-05	22.9	22.6	NA	158	96	96	144	55	39%	16.0	9.0	1.8
Mar-05	23.1	22.6	NA	149	94	94	134	56	37%	14.0	9.2	2.0
Apr-05	29.5	23.1	NA	126	81	81	167	70	36%	13.0	7.0	1.9
May-05	16.4	22.5	NA	230	137	137	187	61	40%	19.0	12.0	2.6
Jun-05	14.4	21.9	NA	266	172	172	201	70	33%	23.0	14.0	3.0
Jul-05	14.2	21.4	NA	215	140	140	192	64	35%	22.0	12.9	3.0
Aug-05	13.1	20.7	NA	226	149	149	222	84	34%	20.0	14.8	3.0
Sep-05	13.5	19.8	NA	205	141	141	169	81	31%	24.0	15.1	3.5
Oct-05	21.4	20.0	NA	139	98	98	128	68	29%	17.2	11.0	2.3
Nov-05	22.4	20.2	NA	117	76	76	103	44	35%	15.1	8.4	2.0
Dec-05	22.7	20.0	NA	119	87	87	103	47	27%	15.9	8.5	2.1
Jan-06	26.9	20.0	NA	92	70	70	84	46	24%	12.1	7.0	2.0
Feb-06	21.3	19.9	34.5	121	78	78	114	48	36%	16.0	9.7	2.0
Mar-06	17.0	19.4	23.3	176	108	108	163	56	39%	19.0	13.0	3.0
Apr-06	18.3	18.5	31.1	182	107	107	175	36	41%	19.2	12.6	2.2
May-06	16.2	18.5	22.8	200	126	126	147	37	37%	22.7	13.2	2.7
Jun-06	18.8	18.9	34.3	174	108	108	143	33	38%	16.0	9.7	2.2
Jul-06	20.5	19.4	33.0	147	102	102	159	41	31%	12.9	7.1	2.2
Aug-06	19.4	19.9	42.6	183	125	125	148	37	32%	16.0	9.6	2.0
Sep-06	19.3	20.4	35.0	181	106	106	173	37	41%	15.8	10.7	2.1
Oct-06	21.4	20.4	39.6	161	86	86	139	32	47%	17.1	10.3	1.9
Average	20.8	20.8	34.9	157.4	104.9	104.9	141.5	44.3	0.7	16.7	10.6	2.3
Maximum	29.5	23.1	52.7	256.0	172.0	172.0	222.0	84.0	0.9	24.0	15.1	3.5

Broome County - Financial Feasibility Study
ENDICOTT SEWAGE TREATMENT PLANT
Wastewater Treatment Plant Data - Flows & Loads

Dec-03	9.4	NA	150	6	97%	220	9	95%	NA	NA	NA	NA	NA	NA
Jan-04	6.5	NA	120	11	91%	160	16	90%	NA	NA	NA	NA	NA	NA
Feb-04	5.4	NA	180	5	97%	180	7	95%	NA	NA	NA	NA	NA	NA
Mar-04	14	NA	180	7	96%	230	13	94%	NA	NA	NA	NA	NA	NA
Apr-04	8.2	NA	210	6	97%	300	11	95%	NA	NA	NA	NA	NA	NA
May-04	8.1	NA	190	8	96%	230	19	92%	NA	NA	NA	NA	NA	NA
Jun-04	6.6	NA	230	10	96%	240	22	91%	NA	NA	NA	NA	NA	NA
Jul-04	7.8	NA	160	10	94%	200	24	89%	NA	1.1	NA	NA	NA	NA
Aug-04	8.3	NA	160	6	96%	140	8	94%	NA	0.6	NA	NA	NA	NA
Sep-04	11	NA	150	9	96%	230	7	97%	NA	0.7	NA	NA	NA	NA
Oct-04	6.5	NA	200	9	96%	230	7	97%	NA	0.6	NA	NA	NA	NA
Nov-04	7.2	NA	150	9	94%	240	13	95%	NA	NA	NA	NA	NA	NA
Dec-04	11	NA	110	7	94%	140	15	85%	NA	NA	NA	NA	NA	NA
Jan-05	11	NA	110	5	92%	150	12	92%	NA	NA	NA	NA	NA	NA
Feb-05	9.1	NA	130	5	96%	140	5	96%	NA	NA	NA	NA	NA	NA
Mar-05	10	NA	140	9	94%	360	11	97%	NA	NA	NA	NA	NA	NA
Apr-05	12	NA	140	10	93%	400	14	97%	NA	NA	NA	NA	NA	NA
May-05	5.6	NA	230	15	93%	400	22	95%	NA	NA	NA	NA	2.6	NA
Jun-05	6.2	NA	220	8	96%	320	10	97%	2.4	0.8	13.0	13.0	2.8	2.8
Jul-05	6.2	NA	270	7	97%	300	10	97%	1.9	0.5	16.0	16.0	2.7	2.7
Aug-05	6.2	NA	230	6	97%	220	8	96%	2.5	1.0	13.0	13.0	2.3	2.3
Sep-05	5.3	NA	240	7	97%	200	6	97%	1.9	0.8	18.0	18.0	2.4	2.4
Oct-05	9.7	25.4	324	7	98%	299	13	96%	1.6	0.9	13.0	13.0	2.0	2.0
Nov-05	9.8	25.0	189	14	93%	327	11	97%	2.4	0.6	NA	NA	1.8	1.8
Dec-05	9.6	17.4	202	19	91%	160	13	92%	2.0	3.3	NA	NA	1.4	1.4
Jan-06	11.8	22.9	111	8	93%	181	11	94%	2.1	1.1	NA	NA	1.8	1.8
Feb-06	8.9	15.9	109	5	95%	179	11	94%	2.5	1.0	NA	NA	2.0	2.0
Mar-06	7.5	12.6	155	5	97%	187	11	94%	2.0	0.9	NA	NA	2.3	2.3
Apr-06	6.7	11.8	152	5	97%	153	10	93%	2.2	0.7	NA	NA	2.2	2.2
May-06	5.7	7.1	97	6	94%	231	10	96%	2.3	0.8	NA	NA	2.3	2.3
Jun-06	7.9	18.1	75	4	95%	186	14	93%	2.1	0.9	14.0	14.0	2.1	2.1
Jul-06	9.1	17.5	55	5	91%	147	11	93%	1.7	0.8	10.0	10.0	1.4	1.4
Aug-06	6.5	12.2	113	5	96%	320	9	97%	2.4	0.9	13.0	13.0	1.5	1.5
Sep-06	6.3	11.7	134	4	97%	249	9	96%	3.1	1.7	16.0	16.0	2.5	2.5
Average	8.3	16.5	166	8	95.1%	231	12	94.5%	2.2	1.0	14.0	14.0	2.1	2.1
Maximum	14.0	25.4	324	19	97.8%	400	24	97.2%	3.1	3.3	18.0	18.0	2.8	2.8

Broome County - Financial Feasibility Study
NORTHGATE (CHENANGO) WASTEWATER TREATMENT PLANT
Wastewater Treatment Plant Data - Flows & Loads

Dec-03	0.60	NA	208	9	96%	772	5	99%	NA	5.5	0.9	NA
Jan-04	0.52	NA	134	13	90%	165	5	97%	NA	6.1	4.7	NA
Feb-04	0.48	NA	203	13	94%	264	9	97%	NA	38.6	28.4	NA
Mar-04	0.57	NA	1721	6	100%	318	10	97%	NA	28.2	31.6	NA
Apr-04	0.52	NA	133	6	95%	429	11	97%	NA	20.4	12.7	NA
May-04	0.55	NA	113	6	95%	219	7	97%	NA	21.5	8.2	NA
Jun-04	0.53	NA	119	6	95%	312	5	98%	NA	5.2	0.7	NA
Jul-04	0.55	NA	68	6	91%	222	5	98%	NA	4.4	0.1	NA
Aug-04	0.54	NA	123	6	95%	187	5	97%	NA	2.7	0.1	NA
Sep-04	0.55	NA	98	6	94%	178	5	97%	NA	2.0	0.1	NA
Oct-04	0.37	NA	211	9	98%	255	6	98%	NA	3.1	0.1	NA
Nov-04	0.33	NA	79	8	90%	179	6	97%	NA	3.8	0.7	NA
Dec-04	0.68	NA	545	9	98%	194	7	96%	NA	5.2	2.1	NA
Jan-05	0.94	NA	136	10	93%	252	6	98%	NA	6.5	4.8	NA
Feb-05	0.78	NA	764	13	98%	351	6	98%	NA	17.1	14.2	NA
Mar-05	0.59	NA	204	11	96%	273	6	98%	NA	18.7	17.9	NA
Apr-05	0.71	NA	207	8	96%	159	5	97%	NA	14.8	12.5	NA
May-05	0.58	NA	171	6	96%	187	5	97%	NA	2.8	0.4	0.3
Jun-05	0.55	NA	945	6	99%	354	8	98%	7.4	3.2	0.4	1.6
Jul-05	0.55	NA	288	6	98%	217	5	98%	9.8	7.7	0.8	0.9
Aug-05	0.57	NA	182	6	97%	225	5	98%	0.2	6.4	0.2	4.0
Sep-05	0.67	NA	128	6	95%	254	6	98%	28.1	4.9	0.1	4.4
Oct-05	0.75	NA	172	8	95%	203	5	98%	NA	8.8	0.2	NA
Nov-05	0.67	NA	804	7	99%	178	11	94%	9.3	5.8	0.4	NA
Dec-05	0.66	2.45	229	9	96%	547	5	99%	9.8	5.6	2.8	0.8
Jan-06	0.71	2.84	291	6	98%	273	7	97%	0.2	4.6	3.0	0.3
Feb-06	0.61	2.56	153	7	95%	370	5	99%	1.8	24.1	23.3	0.4
Mar-06	0.54	2.88	86	8	91%	286	9	97%	0.3	43.6	27.3	0.8
Apr-06	0.54	2.48	189	6	97%	387	10	97%	0.7	24.6	22.8	0.5
May-06	0.58	2.48	161	5	97%	171	5	97%	2.0	19.0	21.0	0.3
Jun-06	0.79	2.88	145	6	96%	154	6	96%	8.6	3.4	0.4	1.3
Jul-06	0.75	2.88	192	6	97%	203	5	98%	3.2	2.4	0.1	0.4
Aug-06	0.62	2.88	144	6	96%	193	5	97%	5.0	3.4	0.2	3.0
Sep-06	0.60	2.84	89	6	93%	195	5	97%	NA	1.7	0.4	1.2
Oct-06	0.60	2.84	168	10	94%	1177	5	100%	18.3	3.4	0.8	2.3
Nov-06	0.70	2.88	295	11	96%	2285	5	100%	4.7	1.5	0.3	0.2
Average	0.61	2.74	274.36	7.64	0.95	349.11	6.18	0.98	6.71	10.51	6.74	1.32
Maximum	0.94	2.88	1721.00	13.00	1.00	2285.00	11.00	1.00	28.10	43.60	31.60	4.40

APPENDIX F
COST ESTIMATES
TOWN OF KIRKWOOD AND AIRPORT CORRIDOR

APPENDIX F

COST ESTIMATES – TOWN OF KIRKWOOD AND AIRPORT CORRIDOR

Town of Kirkwood - Wastewater Infrastructure

DESCRIPTION	PROJECT COST (\$100,000,000)
Option One - Sewer to BJCJSTP ⁽¹⁾	
Gravity sewer and force main	\$8,200,000
Pumping station	3,700,000
TOTAL PROJECT COST	\$11,900,000
Option Two - Package WWTP ⁽²⁾	
Wastewater treatment plant	\$9,700,000
TOTAL PROJECT COST	\$9,700,000

- (1) Length of gravity sewer estimated from City of Binghamton Sanitary Sewer Map (revised 2007) and NYS GIS Aerial Mapping System. Assumes sewer would be run from discharge point of existing force mains coming from the Town of Kirkwood (15- and 18-inch force mains).
- (2) Includes site work (excavation, backfill, etc.), WWTP foundation, Administration Building, influent pumping station, equipment, and interconnecting piping and wiring.

APPENDIX F (continued)

**Option One
Town of Kirkwood - New Sewer to BJCJSTP**

DESCRIPTION	GRAND TOTAL PROJECT COST (GRAND TOTAL PROJECT COST)	BIDDING SCHEDULE (GRAND TOTAL PROJECT COST)
Materials and equipment	\$5,400,000	\$1,920,000
SUBTOTAL CAPITAL COSTS	\$5,400,000	\$1,920,000
Site work (7%)	-	130,000
Electrical (15%)	-	290,000
Instrumentation (5%)	-	100,000
SUBTOTAL CAPITAL COSTS	\$5,400,000	\$2,440,000
Mobilization/Demobilization (5%)	270,000	120,000
SUBTOTAL CAPITAL COSTS	\$5,670,000	\$2,560,000
Contingency (25%)	1,400,000	640,000
TOTAL CAPITAL COSTS	\$7,100,000	\$3,200,000
Engineering/Legal/Administrative (15%)	1,100,000	480,000
TOTAL PROJECT COST	\$8,200,000	\$3,700,000
Combined Total Project Cost	\$11,900,000	

**Option Two
Town of Kirkwood - Packaged Wastewater Treatment Plant**

DESCRIPTION	TOTAL PROJECT COST (ESTIMATED)
Package WWTP	\$5,050,000
SUBTOTAL CAPITAL COSTS	\$5,050,000
Site work (7%)	350,000
Electrical (15%)	760,000
Instrumentation (5%)	250,000
SUBTOTAL CAPITAL COSTS	\$6,410,000
Mobilization/Demobilization (5%)	320,000
SUBTOTAL CAPITAL COSTS	\$6,730,000
Contingency (25%)	1,700,000
TOTAL CAPITAL COSTS	\$8,400,000
Engineering/Legal/Administrative (15%)	1,300,000
TOTAL PROJECT COST	\$9,700,000

APPENDIX F (continued)

Airport Corridor - Packaged Wastewater Treatment Plant

DESCRIPTION	CONSTRUCTION COSTS	AVAIL
Materials, equipment, and tankage	\$3,400,000	\$1,500,000
SUBTOTAL CAPITAL COSTS	\$3,400,000	\$1,500,000
Site work (7%)	-	110,000
Electrical (15%)	-	230,000
Instrumentation (5%)	-	80,000
SUBTOTAL CAPITAL COSTS	\$3,400,000	\$1,920,000
Mobilization/Demobilization (5%)	170,000	100,000
SUBTOTAL CAPITAL COSTS	\$3,570,000	\$2,020,000
Contingency (25%)	890,000	510,000
TOTAL CAPITAL COSTS	\$4,460,000	\$2,530,000
Engineering/Legal/Administrative (15%)	670,000	380,000
TOTAL PROJECT COST	\$5,100,000	\$2,900,000
Combined Total Project Cost	\$8,000,000	

APPENDIX G

**SUMMARY OF SELECTED SEWER AND WATER DISTRICTS
OR AUTHORITIES IN NEW YORK STATE**

APPENDIX G

SUMMARY OF SELECTED SEWER AND WATER DISTRICTS OR AUTHORITIES IN NEW YORK STATE

I. Rockland

A. Rockland County Sewer District #1

a. Board of Commissioners – 13 members

1. Commissioner Kevin P. Connell
2. Commissioner Ted DeGuzman
3. Mayor George O. Darden - Village of Spring Valley
4. Supervisor Alex Gromack (Assist. Chairman) - Town of Clarkstown
5. Supervisor Thom Kleiner - Town of Orangetown
6. Commissioner Seth Lehman
7. Commissioner Brendel Logan
8. Councilman John Maloney - Town of Clarkstown
9. Mayor Brian Miele - Village of Hillburn
10. Trustee Dennis Rose - Village of Sloatsburg
11. Supervisor Christopher P. St. Lawrence - Town of Ramapo
12. Legislator VJ Pradhan - Town of Clarkstown - Leg. Chairman - Budget and Finance Committee
13. Chairman Julius Graifman

b. Relevant Law

Rockland County Sewer Use Law

A local law establishing rules and regulations governing the discharge of sewage, industrial waste, and other waste, into the Rockland County Sewer District No.1, and sewers tributary thereto, providing for the establishment and collection of charges for use of such sewer system and sewers, and prescribing penalties for the violation of such rules and regulations, and does hereby supersede local law number 19 of nineteen hundred and ninety-seven, as amended by local law number three of nineteen hundred seventy-seven, local law number nine of nineteen hundred seventy seven, local law number five of nineteen hundred seventy-eight, local law number two of nineteen hundred eighty-four and local law three of nineteen hundred ninety-three.

II. Onondaga County

A. Metropolitan Water Board

1. Members

- a) 7 members of which not more than 5 shall be from the same political party. Chairman of Onondaga County Water Authority is a member; 3 must be City residents (with advice of Mayor) and 2 County residents living outside the City. The Legislature Chairman appoints the Chairperson. Members serve for a 3-year terms.

APPENDIX G (continued)

2. Purpose

- a) the Board shall act as the administrative body of the Onondaga County Water District.

B. Onondaga County Water District

1. Board Members

1. Stephen Rogers, Chairman
2. Ferdinand L. Picardi, Vice Chairman
3. David E. Fitch, Administrative Director
4. Robert A. Terrinoni, Asst. Administrative Director
5. Justine P. Bush, Member
6. Terence A.J. Mannion, Member
7. Fernando Ortiz, Member
8. Harold E. Rook, Member
9. Robert F. Tomeny, Member

2. Mission

To purify, store and deliver the required amount of drinking water from Lake Ontario to meet the demands of residential, commercial, institutional and industrial consumers in Onondaga County, the City of Syracuse and Central New York. The Onondaga County Water District, which is administered by the Metropolitan Water Board, serves the role of supplementing the area's primary upland water sources of Skaneateles and Otisco Lakes, which have limited capacities. The Lake Ontario system has the capacity to produce up to 50 million gallons/day and store in excess of 165 million gallons of water for emergencies, including fire protection and periods of drought. The County Water District also provides the community with a means to finance large water system improvements through an ad valorem assessment on real property (when this method is needed).

C. Onondaga County Water Authority

1. Members

- a) 5 members appointed for 3-year terms by the Chairman of the County Legislature, with Legislative confirmation.

2. Purpose

- a) OCWA is organized as a public benefit corporation and was created in 1951 to engage in the construction, maintenance and operation of a water supply and distribution system for the benefit of the people of Onondaga County.

3. Board members

- 1) Robert Tomeny Chairman
- 2) Thomas Pasqua, Attorney
- 3) Holly Rosenthal, Treasurer
- 4) Wayne Simmons, Secretary

APPENDIX G (continued)

- 5) Claude Incaudo, Board Member
- 6) Anthony J. Geiss, Jr., PE, Deputy Executive Director
- 7) Michael E. Hooker, Executive Director
- 8) Fred Picardi, Vice Chairman

III. Erie County

A. Division of Sewerage Management (DSM)

- 1. 7 Erie County Sewer Districts
 - a. Responsible for the construction and maintenance of sanitary sewer systems and wastewater treatment facilities
 - b. The ECSD are governed by Boards of Managers appointed by the County Executive and confirmed by the Erie County Legislature.
 - c. The ECSD are self-supporting entities with the power to assess appropriate service fees and levy local sewer charges. Capital construction is eligible for both federal and state aid when available. At present, only low interest loans are available.
 - d. Rules and Regulations of an Erie County Sewer District (27 page doc)
- 2. Member of Board of Managers for Erie County Sewer District #5
 - a. Daniel A. Herberger, Supervisor, Town of Clarence

IV. Orange County

A. Orange County Water Authority

- 1. Board of Directors
 - 1) Marcia Jacobowitz, Esq., Chairwoman
 - 2) Thomas DeBenedictus, Treasurer
 - a. Accountant, Chamber of Commerce of Orange County, Inc. Newburgh NY—Director Emeritus
 - 3) Jonah Mandelbaum
 - a. Real Estate Developer
 - 4) R Michael Worden
 - a. Former Mayor of Port Jervis, NY
 - 5) Daniel E. Patenaude, P.E.
 - a. Vice-President New York Bituminous Products Corp.
 - 6) David Church, AICP - Interim Executive Director, Commissioner of Planning, County of Orange
- 3. Purpose

OCWA was created to address the long-term water needs of Orange County, New York. OCWA and 38 other communities in the county are Groundwater Guardians.

APPENDIX G (continued)

V. Suffolk County

A. Suffolk County Water Authority

1. Board Members

- 1) Michael A. LoGrande, Chairman
 - a. Former Suffolk County Executive, and Supervisor of the Town of Islip
- 2) Bernard Brady, Secretary
 - a. high school business teacher
- 3) George Proios
 - a. Chief Environmental Analyst for Suffolk County and Chairman of the County's Soil and Water Conservation District
- 4) Patrick G. Halpin
 - a. Former Suffolk County Executive and NYS Assemblyman
- 5) Michael Deering
 - a. Vice President for Government Affairs of the Long Island Association, former Commissioner of Suffolk County's Department of Environment and Energy

2. History

- 1) New York State's first public benefit corporation for water service began operations on June 1, 1951
- 2) The new not-for-profit entity has since become the model for numerous other water authorities

B. Suffolk County Sewer Agency

C. Suffolk County Sewer Districts

VI. Nassau County

A. Nassau County Sewer and Storm Water Finance Authority (NCSSWFA)

B. Nassau County Sewer Districts

C. Long Island American Water

D. Water Authority of Western Nassau County

APPENDIX H
GLOSSARY OF TERMS

APPENDIX H

GLOSSARY OF TERMS

BAF – Biological aerated filter

Biochemical Oxygen Demand (BOD) – Measurement of the dissolved oxygen required by microorganisms in the biochemical oxidation of the organic matter contained in the wastewater.

BJCJSB – Binghamton-Johnson City Joint Sewage Board

BJCJSTP – Binghamton-Johnson City Joint Sewage Treatment Plant

Carbonaceous Biochemical Oxygen Demand (CBOD) – Measurement of the dissolved oxygen required by microorganisms in the biochemical oxidation of the carbon containing compounds in the wastewater.

County Sewer District - An area or areas of land located within a county which has been designated and established for the purpose of: (a) the conveyance from other municipalities and districts within the county of sewage, and treatment and disposal thereof; (b) collection; or (c) both such conveyance and such collection.

County Sewer Authority - A public benefit corporation, created by an Act of the Legislature, authorized to, among other powers, borrow money and issue bonds or other obligations and to enter into contracts and to execute all instruments necessary or convenient or desirable for the purposes of the authority to carry out any powers expressly given it, including the power to purchase any sewage facility and any improvements, extensions and betterments situated wholly within the district; to construct, improve, maintain, develop, expand or rehabilitate sewage facilities; and to construct, improve or rehabilitate distribution and transmission facilities.

Fecal Coliform – Group of bacteria that inhabit the intestines of humans and animals. Presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

Flow – The movement of a fluid from place to place

mgd – Million gallons per day

mg/L – Milligrams per liter, industry standard unit of measurement used for expressing the concentration of a given wastewater constituent.

1 mg/L = 1 part per million (ppm)

1 pound per gallon = 120,000 mg/L

Nutrient Removal – Removal of nitrogen, phosphorus, or both from the wastewater.

NYSDEC – New York State Department of Environmental Protection

pH – A measure of the acidity of a solution (7 is neutral)

APPENDIX H (continued)

Primary Treatment – Removal of a portion of the suspended solids and organic matter from the wastewater.

SCADA – Supervisory Control and Data Acquisition

Secondary Treatment – Removal of biodegradable organic matter (in solution or suspension) and suspended solids. Disinfection is also typically included in the definition of conventional secondary treatment.

Settable Solids – Substance in wastewater that will not stay suspended in a sample, but settle to the bottom.

SPDES – State Pollutant Discharge Elimination System

Total Kjeldahl Nitrogen (TKN) – The combined amount of organic and ammonia nitrogen.

Total Cyanide – Concentration of cyanide in a solution

Total Mercury - Concentration of mercury in a solution

Total Nitrogen – Concentration of nitrogen in a solution

Total Residual Chlorine – Amount of chlorine remaining in the environment after natural or technological processes.

Total Suspended Solids (TSS) – The residue remaining after a filtered wastewater sample has been evaporated and dried at a specified temperature.

USEPA – United States Environmental Protection Agency

WWTP – Wastewater treatment plant