EXETER / STRATHAM INTERMUNICIPAL WATER AND WASTEWATER SYSTEMS EVALUATION STUDY FINAL REPORT

ROCKINGHAM PLANNING COMMISSION

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KLEINFELDER
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TABLE OF CONTENTS

LIST OF TABLES ..... **IV**

LIST OF FIGURES ..... **IV**

LIST OF APPENDICES ..... **V**

1. INTRODUCTION AND BACKGROUND **1-1**

1.1 INTRODUCTION 1-1
1.2 BACKGROUND 1-1

2. SYSTEM DESCRIPTIONS **2-1**

2.1 EXETER WATER SYSTEM 2-1
2.1.1 Existing Water System *2-1*
2.1.2 Proposed Future Water System Modifications *2-1*
2.2 EXETER WASTEWATER SYSTEM 2-1
2.2.1 Existing Wastewater System *2-1*
2.2.2 Proposed Future Wastewater System Modifications *2-2*
2.3 STRATHAM WATER SYSTEM 2-2
2.3.1 Existing Water System *2-2*
2.3.2 Proposed Future Water System *2-3*
2.4 STRATHAM WASTEWATER SYSTEM 2-3
2.4.1 Existing Wastewater System *2-3*
2.4.2 Proposed Future Wastewater System *2-3*

3. TECHNICAL FEASIBILITY AND COSTS **3-1**

3.1 FEASIBILITY OF WATER SYSTEM COLLABORATION 3-1
3.1.1 Exeter System Available Capacity *3-1*
3.1.2 Stratham Demand Projections *3-2*
3.1.3 Water System Interconnection Feasibility *3-4*
3.1.4 Summary of the Water Collaboration Feasibility Assessment *3-4*
3.2 FEASIBILITY OF WASTEWATER SYSTEM COLLABORATION 3-4
3.2.1 Exeter WWTF Available Capacity *3-5*
3.2.2 Stratham Wastewater Flow Projections *3-6*
3.2.3 Wastewater System Interconnection Feasibility *3-8*
3.2.4 Summary of the Wastewater Collaboration Feasibility Assessment *3-9*
3.3 OPINIONS OF PROBABLE COSTS 3-10
3.3.1 Water System Costs *3-10*
3.3.2 Wastewater System Costs *3-11*

4. ECONOMIC MODEL **4-1**

4.1 MODEL DEVELOPMENT 4-1
4.2 WATER ECONOMIC MODEL FRAMEWORK 4-3
4.3 WASTEWATER ECONOMIC MODEL FRAMEWORK 4-5

5. ANALYSIS OF INTERMUNICIPAL AGREEMENT OPTIONS **5-1**

5.1 INTRODUCTION 5-1
5.2 COLLABORATIVE OPTION 5-1
5.2.1 Legal Authority and Framework *5-2*
5.2.2 Enactment process *5-2*
5.2.3 Required agreement elements and other necessary provisions *5-3*
5.2.4 Other relevant laws *5-4*
5.2.5 Pending Legislation *5-5*
5.3 DISTRICT OPTION 5-5
5.3.1 Legal Authority and Framework *5-6*

5.3.2 Enactment process *5-6*
5.3.3 Agreement Elements/Key provisions *5-6*
5.4 CASE STUDIES OF INTERMUNICIPAL AGREEMENTS FOR WASTEWATER/WATER 5-7

6. SUMMARY AND RECOMMENDATIONS 6-1

6.1 SUMMARY OF FINDINGS 6-1
6.2 RECOMMENDATIONS 6-3

LIST OF TABLES

TABLE 3.1 EXETER POTABLE WATER CAPACITY AND DEMAND SUMMARY 3-1
TABLE 3.2 STRATHAM REPORTED POTABLE WATER DEMAND SUMMARY 3-2
TABLE 3.3 STRATHAM ASSUMED POTABLE WATER DEMAND 3-3
FIGURE 3-1: STRATHAM'S POTABLE WATER SYSTEM, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE PROPOSED EXTENT AND PHASING OF THE POTABLE WATER SYSTEM IN STRATHAM. 3-4
FIGURE 3-2: POTABLE WATER INTERCONNECTION, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE POTABLE WATER INTERCONNECTION. 3-4
TABLE 3.4 EXETER WWTF SUMMARY OF CURRENT FLOWS 3-5
TABLE 3.5 STRATHAM REPORTED WASTEWATER FLOW SUMMARY 3-6
TABLE 3.6 STRATHAM ASSUMED WASTEWATER FLOW PROJECTIONS 3-6
FIGURE 3-3: STRATHAM'S WASTEWATER SYSTEM, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE EXTENT AND PHASING OF THE PROPOSED WASTEWATER SYSTEM IN STRATHAM. 3-7
TABLE 3.7 EXETER WWTF PLANT CAPACITY ASSESSMENT – STRATHAM PHASE 1 INITIAL SEWER EXPANSION 3-7
TABLE 3.8 EXETER WWTF PLANT CAPACITY ASSESSMENT – STRATHAM PHASE 1 SEWER EXPANSION BUILD-OUT 3-8
FIGURE 3-4: WASTEWATER INTERCONNECTION, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE PROPOSED WASTEWATER INTERCONNECTION. 3-9
TABLE 3.9 OPINION OF PROBABLE CONSTRUCTION COSTS FOR POTABLE WATER INFRASTRUCTURE 3-11
TABLE 3.10 OPINION OF PROBABLE CONSTRUCTION COSTS FOR WASTEWATER INFRASTRUCTURE 3-12
TABLE 6.1 SUMMARY OF ECONOMIC MODEL RESULTS 6-2

LIST OF FIGURES

FIGURE 3-1: STRATHAM'S POTABLE WATER SYSTEM, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE PROPOSED EXTENT AND PHASING OF THE POTABLE WATER SYSTEM IN STRATHAM. 3-4
FIGURE 3-2: POTABLE WATER INTERCONNECTION, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE POTABLE WATER INTERCONNECTION. 3-4
FIGURE 3-3: STRATHAM'S WASTEWATER SYSTEM, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE EXTENT AND PHASING OF THE PROPOSED WASTEWATER SYSTEM IN STRATHAM. 3-7
FIGURE 3-4: WASTEWATER INTERCONNECTION, WHICH IS INCLUDED WITH THE FIGURES AT THE END OF THIS REPORT, PRESENTS A VIEW OF THE PROPOSED WASTEWATER INTERCONNECTION. 3-9

All Figures are Located in a separate section at the end of this report.

LIST OF APPENDICES

APPENDIX 1 .....List of References
APPENDIX 2 .....Cost Analysis Tables
APPENDIX 3 ..... Detailed Economic Model Results
APPENDIX 4 (Separate Volume).....Agendas and Minutes from the Meetings and Workshops

1. INTRODUCTION AND BACKGROUND

1.1 *Introduction*

This Intermunicipal Water and Wastewater Systems Evaluation Study between Exeter and Stratham has been conducted to provide an objective and impartial analysis of the costs and benefits of a cooperative approach to meet the future water and wastewater needs of the two towns. Both Towns have significant water and wastewater needs to meet their desired goals and obligations, and many key decisions on how the towns will meet these needs will be made in the next one to two years. Exeter is facing up to $60 million in infrastructure investment and Stratham is facing over $30 million. If there is untapped water or wastewater capacity that can be shared, cooperation between the two towns could benefit both. The intent of this project is to determine the feasibility, costs and benefits of cooperation between the towns to meet their water and wastewater infrastructure needs.

1.2 *Background*

The Town of Stratham has no centralized water or wastewater infrastructure. Almost all of the homes and commercial facilities in Town use wells for their potable water supply, with the exception of three locations in Stratham where the Town of Exeter supplies water, including the business park housing Lindt and Timberland. Fire suppression, with the exception of four commercial developments, is provided by dry hydrants tied into local ponds and cisterns. Wastewater management is provided with individual on-site subsurface disposal systems.

In 2010, the Town of Stratham passed a new zoning ordinance establishing the Gateway Commercial Business District overlay district. The Gateway District had been discussed within the Town of Stratham for over five years, and was established to “enhance the economic vitality, business diversity, accessibility, and visual appeal of Stratham’s built environment, in a manner that is consistent with the landscape and architecture of the Town’s agricultural tradition.”

The new zoning encourages greater density development within the Gateway District using a village-style developed environment comprised of closely spaced structures housing a mix of retail, commercial, and residential uses. In order for the Gateway District to succeed, it is acknowledged that centralized water, fire suppression, and wastewater services are required.

The Town of Exeter, on the other hand, has well established water and wastewater infrastructure. The Town’s water system is largely built out and serves a large portion of the Town’s population. Exeter’s wastewater infrastructure includes a lagoon-based wastewater treatment facility, nine pump stations, and approximately 49 miles of collection system piping. However, the Town of Exeter is facing significant infrastructure upgrade needs for both its water and wastewater infrastructure; primarily associated with its treatment plants.

Both Towns have significant water and wastewater needs and are facing millions of dollars in capital investment to meet these needs. The Rockingham Planning Commission, together with the two Towns, decided to undertake this study to explore options for moving forward in a cooperative manner and determine if a collaborative approach is technically feasible and more cost effective than acting separately.

2. SYSTEM DESCRIPTIONS

2.1 *Exeter Water System*

2.1.1 Existing Water System

The Town of Exeter's water infrastructure includes a surface water treatment plant which draws water from the Exeter River, three wells (two of which are inactive), three water storage tanks as well as approximately 30 miles of distribution piping. Town-wide water use averages approximately 1.1 million gallons per day (MGD).

The Town's existing surface water plant is in poor condition and in need of refurbishment. The reservoir and original water plant was constructed in 1886. The treatment plant has been upgraded and modified many times over the ensuing years, the most recent renovations occurred in 1974 and 1994. Since that time, periodic upgrades and improvements have been made to continue to operate the plant and meet the necessary water quality standards.

The Town recently completed construction of the new Epping Road water tank and associated water main improvements. Further, water main improvements are currently under construction in the Jady Hill Area.

2.1.2 Proposed Future Water System Modifications

The Town of Exeter recently received Town Meeting Approval to design and construct a new $6.35 million dollar 1.44 MGD groundwater treatment plant. The new plant is intended to decrease reliance on the Exeter River water (in case the Great Dam is removed in the future), diversify the Town's water sources, and improve water quality.

Exeter also recently received Town Meeting Approval to undertake a $285,000 waste-stream reduction upgrade at the Town's surface water treatment plant. In addition, the need for a number of additional infrastructure and process and control improvements have been identified at this plant, including a new roof, boilers, and other maintenance tasks which are scheduled to be implemented over the next several years.

Upgrades and modifications are also expected in the distribution system. At this year's Town Meeting, $2.85 million dollars were appropriated to complete water and wastewater infrastructure work in the Jady Hill neighborhood as well as $750,000 for new water meters. Exeter's Capital Improvement Plan also sets aside money ($1.4 million every other year) for ongoing water distribution upgrades.

2.2 *Exeter Wastewater System*

2.2.1 Existing Wastewater System

The Town of Exeter's wastewater infrastructure consists of a wastewater treatment facility, nine pump stations, and approximately 49 miles of collection system piping. Approximately 2.0 MGD are treated at the Exeter WWTF on an annual average daily basis.

The Town's wastewater treatment facility is a lagoon based facility. The WWTF is in fair condition, and was last upgraded in the 1990s. The facility is not currently designed to meet stringent nutrient permit limits, and a plant-wide upgrade will be required in the near future (see below).

The Town's wastewater collection system and pump stations are all operating well. Infiltration and Inflow (I/I) is a significant issue in Exeter. This results in extraneous flows being treated at the WWTF on an average basis, as well as significant peak flows after rain events that must be managed by the pump stations and WWTF. Under certain storms, it also results in a Combined Sewer Overflow at Clemson's Holding Pond. The Town is currently constructing pipe replacement, pipe rehabilitation, service line replacement, and drainage improvements in the Jady Hill area to reduce I/I. Upgrades are also occurring to remedy hydraulic bottlenecks in the collection system.

2.2.2 Proposed Future Wastewater System Modifications

The Town recently received a draft NPDES discharge permit with a stringent total nitrogen permit limit of 3.0 mg/L. This permit limit represents the limit of technology for total nitrogen removal. While this permit limit is still being negotiated and may become slightly less stringent, Exeter is still faced with upgrading its current aerated lagoon wastewater treatment facility to a newer technology capable of total nitrogen removal. Cost estimates to upgrade the Town's 3.0 MGD WWTF could exceed $50 million dollars to meet the proposed stringent nitrogen permit limit. The first step in this project is to undertake a Wastewater Facilities Plan. At this year's Town Meeting, $375,000 dollars were appropriated for this Plan.

In addition, a number of small plant improvements and maintenance projects have been identified at the WWTF, which are scheduled to be implemented over the next several years.

Ongoing upgrades and modifications are also expected in the collection system. Currently, the Town is completing a project to upgrade the interceptor sewer on Water Street. At this year's Town Meeting, $2.85 million dollars were appropriated to complete water and wastewater infrastructure work in the Jady Hill neighborhood. Exeter's Capital Improvement Plan also sets aside money ($1.7 million every other year) for ongoing collection system upgrades.

2.3 ***Stratham Water System***

2.3.1 Existing Water System

The Town of Stratham does not have a centralized potable water distribution system. Almost all of the homes and commercial facilities in Town use private wells for their potable water supply, with the exception of three locations in Stratham where the Town of Exeter supplies water, including the business park housing Lindt and Timberland. Several of the commercial

establishments on Route 108 near the Exeter town line do have fire suppression systems, including Shaw's, Market Basket, King's High Plaza, and the Staples Plaza.[1]

2.3.2 Proposed Future Water System

In 2010, the Town of Stratham completed a preliminary plan for a water distribution and supply system.[1,2] This plan was prepared in order to assess the feasibility and costs for installing a water system to serve, in part, the new Gateway Commercial Business District. The plan includes a stepwise approach to:

1) Interconnecting the Town's existing fire suppression systems;
2) Expanding the fire protection system throughout the Lower Gateway District;
3) Expanding the system to Bunker Hill Avenue;
4) Converting the fire suppression system to a potable water system; and
5) Expanding the System to the Town Center.

The Plan includes a new 1,000,000 gallon water tank off of Bunker Hill Avenue as well as a new groundwater well and groundwater treatment system for potable water supply. The plan also described proposed project phasing to allow incremental construction of the system as well as demand projections.

2.4 ***Stratham Wastewater System***

2.4.1 Existing Wastewater System

The Town of Stratham does not have any centralized wastewater infrastructure. Wastewater management is provided with on-site subsurface disposal systems.

2.4.2 Proposed Future Wastewater System

In 2010, the Town of Stratham completed a preliminary plan for a wastewater collection system and a wastewater treatment and disposal facility.[7] This plan was prepared in order to assess the feasibility and costs for installing a wastewater collection and treatment system to serve, in part, the new Gateway Commercial Business District. The plan includes a stepwise approach to:

1) Install sewers up to Frying Pan Lane and construct a new forcemain and wastewater treatment plant with a groundwater discharge disposal field;
2) Expand sewers up to Bunker Hill Avenue;
3) When flows dictate, expand the groundwater discharge disposal field;
4) Expand sewers to the Town Center.

The extent of Stratham's planning on the wastewater collection and treatment system to date consists of a Conceptual Design Report. Kleinfelder notes that significant challenges remain to complete the detailed design and permitting of Stratham's wastewater collection system, treatment plant, and groundwater infiltration beds. Further, capital costs to construct this system are difficult to accurately predict at this stage given the many project challenges and unknowns.

3. TECHNICAL FEASIBILITY AND COSTS

3.1 *Feasibility of Water System Collaboration*

There are several factors that impact the feasibility of the two towns collaborating on potable water supply and distribution. These include:

- Available capacity in Exeter to supply Stratham with the water it needs.
- Stratham water demand forecasts and project phasing.
- Location and constructability of the physical interconnection.

3.1.1 Exeter System Available Capacity

The first step in determining if a potable water interconnection is technically feasible is to determine how much available capacity Exeter has. This includes the capacity of Exeter's water sources, treatment plants, distribution storage, and distribution pipes. Kleinfelder reviewed a series of recent documents and reports prepared for the Town of Exeter[4,6] and interviewed operational staff to research this information.[5]

Information collected on the potable water and demand and potable water capacity for the Town of Exeter are summarized in Table 3.1.

Table 3.1
Exeter Potable Water Capacity and Demand Summary

Water Source Information	
Reservoir and River Safe Yield	2.6 MGD[4]
Lary Lane Well: Projected Future Capacity	0.32 MGD[6]
Stadium Well: Projected Future Capacity	0.72 MGD[6]
Gilman Well: Projected Future Capacity	0.36 MGD[6]
Combined Water Source Capacity	4.0 MGD
Water Plant Capacity Information	
Surface Water Plant Nominal Capacity	2.3 MGD[4]
Surface Water Plant Actual Capacity: Summer	2.0 MGD[5]
Surface Water Plant Actual Capacity: Winter	2.3 MGD[5]
Groundwater Plant Nominal Capacity	1.4 MGD[6]
Combined Treatment Plant Capacity (summer)	3.4 MGD
Exeter Demand Information	
Current Stratham Industrial Park Demand	0.029 MGD[6]
Current Total System Average Day Demand	1.1 MGD[6]
Current Total System Max Day Flow Rate	1.7 MGD[6]
Committed Additional Stratham Industrial Park Demand	0.046 MGD
Projected Total System Future Average Day Demand	1.25 MGD*
Projected Total System Future Max Day Flow Rate	2.0 MGD

* For the purposes of this study, this rate of growth in system water demand through the planning period is assumed to include increases in demand from all residential, commercial and industrial sources, including any future additional flows from the Stratham Industrial Park. The Town of Exeter made a commitment to provide up to

75,000 gpd of total capacity to the Stratham Industrial Park in 1984, of which approximately 29,000 has been actually used to date.

The projected future average day water demand of 1.25 MGD for Exeter is based on a prior demand projections study referenced in the 2010 Exeter Water Supply Alternatives Study by Weston and Sampson[6]. This represents an increase of approximately 15% in water demands from current conditions to projected future conditions (i.e. 20 year planning period). This rate of demand growth is lower than growth rates assumed in prior studies that did not materialize, but higher than the historical rate of demand growth in Exeter over the last fifteen years, which has remained relatively flat.

Based on this table, it appears that once Exeter's existing wells are rebuilt and the groundwater treatment plant is on line, Exeter will have available capacity of approximately 1.4 MGD on a maximum day basis (3.4 MGD combined plant capacity – 2.0 MGD projected future max-day demand).

Kleinfelder also met with representatives of the Town of Exeter to talk about the existing distribution infrastructure. They stated that they thought that they had adequate capacity in the distribution piping to provide a potential Stratham interconnection on Portsmouth Avenue up to approximately 1.0 MGD.

The Exeter representatives also stated that they do not have sufficient distribution system capacity or water tank storage capacity to provide peak instantaneous flows or fire flows to Stratham in excess of 700 gpm (1.0 MGD). In their opinion, if potable water were to be supplied to Stratham, a new storage tank, likely located in Stratham, would be required.

3.1.2 Stratham Demand Projections

The second factor in determining the feasibility of collaboration is to determine how much water Stratham requires. The town of Stratham hired a consultant to assess its water needs and prepare water use forecasts.[1,2] The reports recommended a phased growth approach to expanding the water system, which is a valid assumption for Stratham since the current population / customer base in the areas to be developed is insufficient to support full-implementation. The phased potable water demand forecasts presented in these reports are summarized in Table 3.2. Numbering in the table is based on the referenced reports and does not correspond with the project phasing presented later in this report.

Table 3.2
Stratham Reported Potable Water Demand Summary

Phase	Description	Initial Flow Projection	Flow Projection at Build-Out
Phase 1	Provide interconnected fire protection system for existing commercial developments including Shaw's, King Plaza, Staples, and Market Basket.	N/A (Fire Flow Only)	N/A (Fire Flow Only)
Phase 2	Expansion of the system to the south to the Exeter Town Line.	N/A (Fire Flow Only)	N/A (Fire Flow Only)

Phase	Description	Initial Flow Projection	Flow Projection at Build-Out
Phase 1 + 2 Conv. to Pot. Water	Convert Fire Protection System to Potable Water System.	33,120 GPD[1] Avg Day 3,500 GPM Fire Flow	518,350 GPD[1] Avg Day 3,500 GPM Fire Flow
Phase 3	Expansion of System to Bunker Hill Avenue.	20,900 GPD[1] Avg Day 3,500 GPM Fire Flow	188,860 GPD[1] Avg Day 3,500 GPM Fire Flow
Phase 4	Expansion of System to Winnicut Road and the Town Center.	43,080 GPD[1] Avg Day 3,500 GPM Fire Flow	70,070 GPD[1] Avg Day 3,500 GPM Fire Flow
At Build-Out	Total System – Phases 1 through 4	97,100 GPD[1] Avg Day	777,280 GPD[1] Avg Day

These flow projections were discussed during the Technical Workshop, conducted on March 15, 2012. A copy of the minutes from this Workshop is included in Appendix 4 (bound separately). During that workshop, a number of modifications to the flow data were discussed, including:

- Assuming a new water storage tank will be required to provide fire flows in the Town of Stratham, the team decided to simplify the project staging into two stages:
    - Stage 1 - Water distribution system up to Bunker Hill venue, and
    - Stage 2 – Expansion of the water distribution system to the Town Center
- The projected future flow of 777,280 GPD noted in the report is very high and will likely not occur. A revised average day total system demand of 600,000 GPD will be used instead for future build out conditions.[3]

Based on the workshop, revised flow projections were determined. In addition to the average day data, peaking factors were incorporated to estimate maximum daily and peak hourly flow rates based on the average daily flow. Hydraulic grade line (HGL) data was also incorporated. Table 3.3 summarizes the revised flow projections that will serve the basis of the assumptions.

Table 3.3
Stratham Assumed Potable Water Demand

Phase	Description	Design Assumption
Phase 1 Initial Flow	Provide potable water system from Exeter Town Line to Bunker Hill Avenue	150,000 GPD Avg Day @ HGL of 230 ft 270,000 GPD Max Day (PF = 1.8 x ADF)[1] 281 GPM Peak Hour (PF = 1.5 x MDF)[1] 3,500 GPM Fire Flow @ HGL of 185 ft
Phase 1 at Build-Out	Flow Projection at build-out of potable water system from Bunker Hill Avenue to the Exeter Town Line	350,000 GPD Avg Day @ HGL of 230 ft 630,000 GPD Max Day (PF = 1.8 x ADF)[1] 655 GPM Peak Hour (PF = 1.5 x MDF)[1] 3,500 GPM Fire Flow @ HGL of 185 ft
Phase 2	Expansion of System to Winnicut Road and the Town Center	43,000 GPD Avg Day @ HGL of 230 ft 77,000 GPD Max Day (PF = 1.8 x ADF)[1] 80 GPM Peak Hour (PF = 1.5 x MDF)[1] 3,500 GPM Fire Flow @ HGL of 185 ft
Total System at Build-Out	Total System at Build-Out	600,000 GPD Avg Day @ HGL of 230 ft 1,080,000 GPD Max Day (PF = 1.8xADF)[1] 1,125 GPM Peak Hour (PF = 1.5 x MDF)[1] 3,500 GPM Fire Flow @ HGL of 185 ft

Figure 3-1: Stratham's Potable Water System, which is included with the figures at the end of this report, presents a view of the proposed extent and phasing of the potable water system in Stratham**.**

3.1.3 Water System Interconnection Feasibility

The final technical feasibility factor is the physical interconnection between the Exeter potable water distribution system and the proposed Stratham distribution system. The physical interconnection will be facilitated by the presence of two 24-inch steel pipe sleeves along the east and west shoulders or Route 108 where it goes under Route 101. Record drawings of these pipe sleeves were reviewed and the sleeve beneath Route 101 on the east side of Route 108 was selected for water main installation.

Figure 3-2: Potable Water Interconnection, which is included with the figures at the end of this report, presents a view of the potable water interconnection**.**

3.1.4 Summary of the Water Collaboration Feasibility Assessment

The bullets below summarize the findings of the water collaboration feasibility assessment and serve as a basis for a water system collaboration plan.

- **Potable Water Interconnection** – Existing 24" steel sleeves are installed under Route 101 which will facilitate connection to the Exeter system.

- **Potable Water Supply** – Upon completion of the Groundwater Plant, Exeter will have approximately 1.4 MGD of available potable water supply (average daily flow) it could provide to Stratham.

- **Fire Water Supply** – Exeter does not have sufficient distribution system capacity or storage volumes to provide peak flows and fire flows to Stratham without implementing significant distribution system upgrades and making operational changes. Stratham could provide a separate fire control system or construct a water storage tank to provide peak flows and fire protection.

- **Distribution Study** – Exeter's distribution system has sufficient capacity to provide maximum day potable water needs to Stratham at build-out provided fire flow and peak hour flow needs are met with a storage tank in Stratham.

- **Water Storage** – Stratham will need to construct a water storage tank to provide fire protection in initial project phases to provide peak hour flows and fire flows.

3.2 ***Feasibility of Wastewater System Collaboration***

There are several factors that impact the feasibility of the two towns collaborating on wastewater collection and treatment. These include:

- Available permitted capacity at the Exeter WWTF to treat Stratham's wastewater.

- Stratham wastewater generation forecasts and project phasing.
- Location and constructability of the physical interconnection.

3.2.1 Exeter WWTF Available Capacity

Exeter's wastewater plant discharge is permitted by an NPDES permit. The Town of Exeter is facing a new permit limit of total nitrogen, which is expected to be finalized within the next year. This permit limit may range from 8 mg/L to 3 mg/L for total nitrogen. It is expected that the existing treatment facility in Exeter will need to be significantly upgraded over the next five to ten years in order to meet this new permit limit.

Exeter's NPDES permit also includes a flow limit for average daily flow of 3.0 MGD. If Exeter wants to increase its permitted flow rate above 3.0 MGD, it would have to get a revised permit from the EPA. An increase in flow would potentially result in an increase in nutrients being discharged in the effluent, which EPA would likely not approve. Given this background, the assumption of this study is that the capacity of Exeter's WWTF will not be increased beyond 3.0 MGD. Although EPA is unlikely to approve of an increase in the average daily flow limit of 3.0 MGD, EPA may be less critical of WWTF modifications to accept peak flows above 7.5 MGD, as peak flow rates are typically not regulated by NPDES permits.

Kleinfelder reviewed data from Exeter's WWTF as well as historic information on infiltration and inflow to the Exeter WWTF[11,12] and compiled the following plant flow information presented in Table 3.4. This Table includes an allowance of 20% or 400,000 GPD for future growth or expansion of the wastewater system within Exeter.

Table 3.4
Exeter WWTF Summary of Current Flows

Phase	Average Daily Flow Rate (MGD)	Peak Flow Rate (MGD)
Current WW Flow	1.0	1.8
Current I/I Flow	1.0	4.2
Total Current Flow Rate	2.0	6.0
Projected Future WW Flow (Reserved for Expansion in Exeter)	0.4	1.4
Total WWTF Capacity	3.0	7.5
Available Capacity	0.6	0.1

Exeter's NPDES permit does have a provision that if discharge flow rate exceeds 80 percent of the permitted average daily flow, the Town will need to complete a study to assess how to limit future increases in flows to the permitted flow rate. As Table 3.4 indicates, there is limited available plant capacity for Stratham unless this 80% "trigger" is exceeded. The requirement to complete the capacity study could essentially be met by the forthcoming Wastewater Facilities Plan, which should take into account potential wastewater flows from Stratham. There is no other EPA requirement that prevents the Town from exceeding the 80% threshold, or 2.4 MGD, provided it does not exceed the permitted limit of 3.0 MGD.

3.2.2 Stratham Wastewater Flow Projections

The second factor in looking at the technical feasibility of collaboration is to determine how much wastewater Stratham will generate. The Town of Stratham has also hired a consultant to assess its wastewater needs and prepare wastewater flow projections.[7] The report presented a phased plan to expanding the wastewater system, similar to the water system. The phased wastewater flow projections presented in this report is summarized in Table 3.5. Numbering in the table is based on the referenced report and does not correspond with the project phasing presented later in this report.

Table 3.5
Stratham Reported Wastewater Flow Summary

Phase	Description	Current Flow Projection	Flow Projection at Build-Out
Phase 1	Provide sanitary sewer for existing commercial developments from Frying Pan Lane to the Exeter Town Line.	96,000 GPD[7] Avg Day 10,000 GPD[7] Indus. Park 4,500 GPD[7] I/I	395,000 GPD[7] Avg Day) 50,000 GPD[7] Indus. Park 4,500 GPD[7] I/I
Phase 2	Expansion of Sewer System to Bunker Hill Avenue.	32,000 GPD[7] Avg Day	132,000 GPD[7] Avg Day)
Phase 3	Expansion of Sewer System to Winnicut Road and the Town Center.	44,000 GPD[7] Avg Day 3,500 GPD[7] I/I	53,000 GPD[7] Avg Day 3,500 GPD[7] I/I
At Build-Out	Total System – Phases 1 through 3	190,000 GPD[7] Avg Day	638,000 GPD3[7] Avg Day

These wastewater flow projections were discussed during the Technical Workshop, conducted on March 15, 2012 (see Appendix 4, bound separately). During that workshop, a number of modifications to the flow data were discussed, including:

- The wastewater generation projections were not prepared in a manner as detailed as the water demand projections, and are not tied to water use projections. Instead, they are based on a per acre wastewater generation estimates.
- The flow projections only account for a very low level of infiltration and inflow. Typically, a higher amount of I/I is seen, even in newly installed systems.

Based on the workshop, revised wastewater generation estimates were prepared. In addition to the average day data, peaking factors were incorporated to estimate maximum daily and peak hourly flow rates based on the average daily flow. Table 3.6 summarizes Stratham's revised wastewater generation estimates that will serve as the basis of the assumptions.

Table 3.6
Stratham Assumed Wastewater Flow Projections

Phase	Description	Design Assumption
Phase 1 Initial Flow	Provide wastewater collection system from Bunker Hill Avenue to the Exeter Town Line	165,000 GPD Avg Day 450,000 GPD Max Day (PF = 2.7xADF)[9] 560 GPM Peak Hour (PF = 4.9xADF)[9]
Phase 1 at Build-Out	Flow Projection at build-out of wastewater collection system from Bunker Hill Avenue to the Exeter Town Line	390,000 GPD Avg Day 940,000 GPD Max Day (PF = 2.4xADF)[9] 1,140 GPM Peak Hour (PF = 4.2xADF)[9]

Phase	Description	Design Assumption
Phase 2	Expansion of collection system to Winnicut Road and the Town Center	56,500 GPD Avg Day 155,000 GPD Max Day (PF = 2.7xADF)[9] 190 GPM Peak Hour (PF = 4.9xADF)[9]
Total System at Build-Out	Total System at Build-Out	660,000 GPD Avg Day 1,520,000 GPD Max Day (PF = 2.3xADF)[9] 1,830 GPM Peak Hour (PF = 4.0xADF)[9]

Figure 3-3: Stratham's Wastewater System, which is included with the figures at the end of this report, presents a view of the extent and phasing of the proposed wastewater system in Stratham**.**

The following tables present a revised assessment of the capacity of the Exeter WWTF assuming that Exeter and Stratham collaborate. The tables were developed based on the following assumptions:

- 0.4 MGD of plant capacity on an average daily basis was set aside for future development in Exeter.
- The Jady Hill project will remove a volume of 44 million gallons on an annual basis. This is equivalent to an average flow rate of 120,000 GPD.[18] Kleinfelder further assumed that the Jady Hill Project will also reduce the peak flows to the treatment plant by 360,000 GPD during rain events (this was calculated by assuming a "peaking factor" for I/I of 3.0).
- A future I/I removal project will be required to reduce wet weather flows to the Exeter WWTF in order to provide sufficient plant capacity for Statham's Phase 1 build-out wastewater flows. Kleinfelder assumed that this future I/I reduction project would reduce the average daily flow to the WWTF by 160,000 GPD and peak flows to the plant by 480,000 GPD during rain events.

Table 3.7
Exeter WWTF Plant Capacity Assessment – Stratham Phase 1 Initial Sewer Expansion

Phase	Average Daily Flow Rate (MGD)	Peak Flow Rate (MGD)	Comment
Exeter's Current WW Flow	1.0	1.8	Peaking Factor = 3.0
Exeter's Current I/I Flow	1.0	4.2	
Reduced I/I From Jady Hill Project[18]	(0.12)	(0.36)	Peaking Factor = 3.0
Exeter's Reserved WW Flow	0.4	1.4	Peaking Factor = 3.5
Stratham's Phase 1 Initial Flow (with I/I)	0.17	0.45	
Total Flow Rate	2.45	7.49	
Total WWTF Capacity	3.0	7.5	
Available Capacity	0.55	0.01	

Table 3.8
Exeter WWTF Plant Capacity Assessment – Stratham Phase 1 Sewer Expansion Build-Out

Phase	Average Daily Flow Rate (MGD)	Peak Flow Rate (MGD)	Comment
Exeter's Current WW Flow	1.0	1.8	Peaking Factor = 3.0
Exeter's Current I/I Flow	1.0	4.2	
Reduced I/I From Jady Hill Project[18]	(0.12)	(0.36)	Peaking Factor = 3.0
Exeter's Reserved WW Flow	0.4	1.4	Peaking Factor = 3.5
Stratham's Phase 1 Build-Out Flow (with I/I)	0.39	0.94	
Additional I/I Removal Required	(0.16)	(0.48)	Peaking Factor = 3.0
Total Flow Rate	2.51	7.49	
Total WWTF Capacity	3.0	7.5	
Available Capacity	0.49	0.0	

These two tables indicate that average daily flow capacity at the Exeter WWTF does not seem to be a significant issue. However, peak flow capacity to the Exeter WWTF may be exceeded if the Town's collaborate and will need to be controlled through I/I removal.

- Table 3.7 illustrates that the Exeter WWTF has sufficient capacity to accept the projected flows from the first phase of the Stratham sewer extension (with average daily flows up to 165,000 GPD) if the Jady Hill project reduces peak flows to the WWTF by 360,000 GPD.
- Table 3.8 illustrates that the Exeter WWTF has sufficient capacity to accept the projected flows from the build-out of the Phase 1 Stratham sewer system (with average daily flows up to 390,000 GPD) if the Jady Hill project reduces peak flows to the WWTF by 360,000 GPD and if a second I/I removal project is undertaken to further reduce peak flows to the WWTF by an additional 480,000 GPD. Should it be determined that these levels of I/I reduction are not cost effective, then a potential modification to the wastewater treatment facility to accommodate peak flows in excess of 7.5 MG may be necessary.
- I/I removal assumptions for these conditions should be revisited following completion of the Jady Hill project as well as Exeter's current I/I study.

3.2.3 Wastewater System Interconnection Feasibility

The final technical is the feasibility of installing a physical interconnection between Stratham's proposed wastewater collection system and Exeter's existing collection system. For wastewater, the interconnection is somewhat more difficult than the potable water interconnection.

Two different potential methods of interconnection were identified. These included:

1. Gravity or Forcemain Connecting to Exeter's Gravity System on Route 108.
2. Forcemain directly to the Exeter WWTF.

These two connection alternatives were discussed at the Technical Feasibility Workshop conducted on March 15, 2012 as well as with representatives from the Exeter Department of Public Works. According to Exeter Personnel, the option of using Exeter's existing gravity pipes to convey Stratham's wastewater to the WWTF is not feasible. Wastewater from Portsmouth Avenue flows through two different pump stations, as well as a siphon across the Exeter River. Capacity of this collection system infrastructure is limited, and could not handle additional flows from Stratham. Therefore, Option 2, a direct forcemain connection to the Exeter WWTF is the more technically feasible method of interconnection.

After assessing potential routing, an interconnection plan encompassing a dedicated pump station in Stratham and a forcemain discharging to the Exeter WWTF was developed. The proposed forcemain will need to be installed using directional drilling or another trenchless technology, as the forcemain must go under Route 101 as well as the Exeter River, and must avoid two cross-country natural gas pipe lines. This alternative will not introduce additional flows to the Exeter collection system, will not impact capacity of any of Exeter's pumping stations, and will not impact Exeter's Combined Sewer Overflow elimination program.

Figure 3-4: Wastewater Interconnection, which is included with the figures at the end of this report, presents a view of the proposed wastewater interconnection**.**

3.2.4 Summary of the Wastewater Collaboration Feasibility Assessment

The bullets below summarize the findings of the wastewater collaboration feasibility assessment and serve as the basis for a wastewater system collaboration plan.

- **Wastewater Collection System** - Exeter's collection system, at the northern part of Route 108, has capacity limitations at the Webster Ave pump station, the Squamscott River crossing, and at the Main Pump Station.

- **Wastewater Interconnection** – Due to capacity limitations in the Exeter's existing collection system, the wastewater interconnection will need to consist of a pump station and dedicated forcemain directly to the WWTF.

- **Current Wastewater Plant Capacity** – Exeter currently has approximately 600,000 GPD of available wastewater capacity (average daily flow) it could provide to Stratham. However, ongoing I/I removal is expected to free up sufficient capacity at the Exeter WWTF for Stratham's first phase of sewer expansion, up to 165,000 GPD. **(**For this assessment, 0.4 MGD of plant capacity was set aside for future development in Exeter). Exeter may need to complete a study to assess how to limit future increases in flows to since it will be exceeding the 80% capacity trigger included in its NPDES permit. This requirement could essentially be met by the forthcoming Wastewater Facilities Plan, which should take into account potential wastewater flows from Stratham. There is no other EPA requirement that prevents the Town from exceeding the 80% threshold, or 2.4 MGD, provided it does not exceed the permitted limit of 3.0 MGD

- **Future Wastewater Plant Capacity** - There does appear to be sufficient available WWTF capacity to allow an initial interconnection with Stratham. If Stratham requires more plant capacity in the future, additional I/I may need to be removed to free up peak flow capacity during rain events. Should it prove unfeasible to free up additional peak

flow capacity through I/I reduction, then a potential modification to the wastewater treatment facility to accommodate peak flows in excess of 7.5 MGD may be necessary. Further, additional sewer connections, development, and increased flows in Stratham will be occurring in an incremental manner. As Stratham's proposed Phase 1 wastewater system expansion approaches build-out during the planning period, the effectiveness of on-going and future I/I removal projects and internal growth within Exeter can be monitored to assess the feasibility and allowable magnitude of additional wastewater connections.

3.3 *Opinions of Probable Costs*

In order to fully evaluate the life cycle cost savings of a collaborative approach, cost estimates for capital and operating costs were prepared. Kleinfelder's approach to preparing these costs was to review and update already published costs prepared by other consultants and available in a series of design reports. The following sections present our cost data for potable water and wastewater collaboration. These costs, and the costs approach, were reviewed in detail at the Cost Workshop conducted on April 19, 2012. A copy of the minutes from this Workshop is included in Appendix 4 (bound separately).

3.3.1 Water System Costs

The following assumptions were used to develop Kleinfelder's opinion of Probable Project Costs for Potable Water Collaboration.

- Construct a potable water distribution system in Stratham from the Exeter Town line to Bunker Hill.
- Construct a 1,000,000 gallon ground storage tank in Stratham on Bunker Hill.
- Construct a water interconnection and meter station with a total capacity of 750 GPM (to meet the projected maximum daily flow at total system build-out of 1,080,000 GPD). Use one of the existing 24 inch sleeves for the water main where it passes beneath Route 101.
- Costs are not included to expand the distribution system to the Town Center. That will occur in the future.
- Where possible, previously prepared costs were evaluated and used. Where needed, costs were adjusted to include contingency factors.
- All costs from past reports were updated to April 2012 costs with Engineering News Records Construction Cost Index. All costs presented at an ENR Index of 9273.

Table 3.9 presents Kleinfelder's opinion of probable construction costs for the required potable water infrastructure.

Table 3.9
Opinion of Probable Construction Costs for Potable Water Infrastructure[13]

	Stratham Works Independently	Exeter Works Independently	Town's Collaborate
Stratham's Costs			
Statham Water Supply – New Well Pump Station[1]	$4,230,000		
Stratham Water Distribution – New Distribution System[1]	$3,840,000		$3,840,000
Stratham Water Storage Tank – Located on Bunker Hill[2]	$1,640,000		$1,640,000
Exeter's Costs			
Exeter Water Supply – Surface Water Plant Improvements[15]		$285,000	$285,000
Exeter Water Supply – New Groundwater Plant[15]		$6,350,000	$6,350,000
Interconnection Costs			
Stratham / Exeter Interconnection			$590,000

For additional detail on the costs, see Appendix 2.

3.3.2 Wastewater System Costs

The following assumptions were used to develop Kleinfelder's opinion of Probable Project Costs for Wastewater Collaboration.

- Construct a wastewater collection system in Stratham from Bunker Hill Avenue to the Exeter Town line.

- Construct a wastewater interconnection with a total capacity of 1,830 GPM (to meet the projected peak hourly flow at total system build-out). Assume the interconnection is comprised of a pump station with dedicated forcemain pumping directly to the Exeter WWTF. Forcemain to be installed using directional drilling or micro-tunneling approaches.

- Construct an upgraded Wastewater treatment facility in Exeter. Include in the cost analysis costs for an upgrade to meet an 8 mg/L Total Nitrogen (TN) permit limit and, alternatively, a 3 m/L TN permit limit.

- Costs are not included to expand the Stratham collection system to the Town Center nor to add the pump station that will be required for that extension. That will occur in the future.

- Where possible, previously prepared costs were evaluated and used. Where needed, costs were adjusted to include contingency factors.

- All costs from past reports were updated to April 2012 costs with Engineering News Records Construction Cost Index. All costs presented at an ENR Index of 9273.

Table 3.10 presents Kleinfelder's opinion of probable construction costs for the required wastewater infrastructure.

Table 3.10
Opinion of Probable Construction Costs for Wastewater Infrastructure[13]

	Stratham Works Independently	Exeter Works Independently	Town's Collaborate
Stratham's Costs			
Statham Collection System – New Collection System[7]	$1,740,000		$1,740,000
Statham Collection System - Pump Station to new WWTF[7]	$2,970,000		
Stratham Treatment – New WWTF and Groundwater Discharge Facility[7]	$10,190,000		
Exeter's Costs			
Exeter Collection System – Jady Hill and Other Improvement Projects[15]		$4,700,000	$4,700,000
Exeter Treatment – Conceptual Design[15]		$375,000	$375,000
Exeter Treatment – Exeter WWTF Upgrade to 8 mg/L TN Permit[16]		$37,580,000	$37,580,000
Exeter Treatment – Exeter WWTF Upgrade to 3 mg/L TN Permit[16]		$54,070,000	$54,070,000
Interconnection Costs			
Stratham / Exeter Interconnection			$3,730,000
Future I/I Reduction Costs			
Future I/I Reduction Project			$5,180,000

For additional detail on the costs, see Appendix 2.

4. ECONOMIC MODEL

Based on the feasible technical alternatives and their costs identified in Section 3, an economic model was developed to assess the financial impacts to each town by collaborating on water and wastewater service. The purpose of the model is to:

- Identify total capital costs, debt service, operating costs, management and administrative costs for both towns
- Evaluate the financial impacts to each town under alternative cost-sharing principles – or ownership options - to water and wastewater collaboration, including a baseline option in which both towns develop and pay for their own independent water and wastewater infrastructure
- For each ownership option, allocate capital and O&M costs to each town using appropriate rationale (e.g. allocating capital costs based on reserved capacity and O&M costs based on demands, etc.)
- Determine relative impacts to water and wastewater users in each town on a cost per gallon rate of usage for the various ownership options to gauge what cost savings, if any, would be realized by a collaborative approach

Section 4.1 describes the process whereby the economic model was developed.

4.1 *Model Development*

Following the development of feasible technical alternatives and costs, a third workshop to discuss financial collaboration was held on May 17, 2012. The Financial Collaboration Workshop was again attended by representatives from Exeter, Stratham, and the Rockingham Planning Commission to achieve the following objectives: evaluate the non-cost and qualitative factors associated with a collaborative approach to water and wastewater service in the two towns; review, discuss and rank the various ownership options under consideration and to identify those ownership options worth investigating further in the form of the model; and develop key assumptions for the economic model. The minutes from this workshop are included in Appendix 4.

The Financial Collaboration Workshop included a facilitated brainstorming session to solicit feedback from workshop participants regarding the other qualitative, non-technical and non-cost factors potentially affecting the feasibility of collaborating on water and wastewater service. The following summarizes the common themes that emerged from the brainstorming session:

- If a collaborative approach is implemented, it should lessen the financial burden on rate payers in both towns - compared to each town moving forward independently – and overall costs savings should be allocated equitably.

- A collaborative approach should be implemented incrementally in a way that meets the actual needs of both towns. Over-reaching inter-municipal agreements that expose one town to more risk than the other and which are not structured to be mutually beneficial throughout the terms of the agreement should be avoided.

- Maintain transparency during the planning and implementation stages in order to keep stakeholders and the public properly informed and to gauge acceptance.

- A collaborative approach should be structured in a way that balances preserving local control while also minimizing disparate utility management practices across the two towns that could lead to inefficiencies.

Four (4) potential ownership options were identified at the on-set of the study, including:

A) Stratham purchases water/wastewater services from Exeter on a retail basis (i.e. Stratham is essentially treated as a wholesale customer)

B) Stratham invests in water/wastewater systems operated by Exeter in exchange for lower purchase rates and guaranteed access

C) Stratham pays a capital buy-in based on reserved capacity while paying O&M costs based on a volumetric demand basis

D) Develop a jointly-owned water/wastewater district

At the conclusion of the Workshop, each of these four ownership options were discussed and ranked according to the common themes that emerged from the brainstorming session, listed above. The ensuing group discussion led to the following findings:

- Option A was unlikely to gain widespread support. Under this option Exeter would essentially treat Stratham like any other utility customer, with little opportunity to distinguish the impacts such service would have on infrastructure capacity and operations in Exeter, leading to potential inequities in how cost savings would be allocated between the two communities. As a result, this option was given a lower-priority ranking by the group.

- It was recognized that both Option B and Option C involve Stratham paying Exeter a capital payment(s) in some form in order to reserve/enhance infrastructure capacity while paying for operating and maintenance costs on a volumetric demand basis. It was determined that both of these options would be merged into one to represent these particular cost-sharing principles, hereinafter referred to as the collaborative option (or capital investment approach) and modeled accordingly.

- Option D (District Approach) would provide for centralized management of a regional water and/or wastewater utility. The disadvantage is the potential sensitivity to relinquishing local control. However, due to the success of other collaborative endeavors between the two towns (e.g. school district), it was agreed by the group that this option holds merit. Therefore, it was agreed that Kleinfelder would develop an economic model for this option as well.

Therefore, the Financial Collaboration Workshop resulted in identifying the following options to evaluate further with an economic model:

- Independent Option – each town moves forward *without* collaborating on water and/or wastewater service
- Collaborative/Capital Investment Option – share water and/or wastewater infrastructure and service; share capital payment(s) between both towns on a reserved capacity basis; and share operating and maintenance costs on a volumetric demand basis.
- District Option – Develop jointly-owned water and/or wastewater district

Sections 4.2 and 4.3 describe the results of the water and wastewater economic model results, respectively.

4.2 ***Water Economic Model Framework***

Detailed economic model output results for water are provided in Appendix 3, on the tabular form titled 'Water Rate Impact Assessment Due to Collaborative Options'. The model output results include a series of columns that are divided into four main option categories: Existing, which applies only to Exeter as Stratham has not current water or wastewater system; Independent Option; Collaborative – Capital Investment Option; and District Option. Under each of these category headings, further breakdown is provided to represent 'Initial' Conditions versus 'Future' conditions for each town. The purpose of including these categories is to acknowledge the changing capacity requirements and demands in both towns over time, and how those differences will similarly impact the allocation of capital costs and operating and maintenance costs, respectively, over time.

For the purpose of the modeling exercise, 'Initial' is defined as conditions soon following the implementation of Stratham's Phase 1 water system improvements, as described in Table 3.3. 'Future' condition is defined as additional build-out of that portion of the water system leading to higher demands, which is assumed to occur approximately 20 years further in the future than 'Initial' conditions. The 'Future' condition does *not* assume implementation of Stratham's Phase 2 water system improvements (i.e. extension of water distribution system to Winnicut Road and Town Center) as it is assumed those additional improvements will not be constructed within the 20 year planning period.

For each combination of option/time-frame/town shown in the columns, detailed projected annual expense data is listed in the rows below. Descriptions for the various types of expenses are listed in the far left rows of the form and are divided between operations and maintenance expenses, capital outlays, and debt service (on capital projects).

The operations and maintenance expenses include administrative, billing and collection expenses, Exeter water distribution expenses, Exeter surface water treatment expenses (fixed and demand-dependent), and Exeter groundwater treatment expenses (fixed and demand-

dependent). Projected Stratham water supply, water distribution, and water storage tank O&M expenses are also shown, as are projected expenses for the new interconnection valve chamber that would be required to facilitate the transfer of water from Exeter to Stratham. Debt service costs include the known or projected principal and interest payments on debt for capital improvements. All known existing and future debt service is listed for Exeter and all future debt service that may be issued in Stratham is also listed.

Estimated annual expenses are totaled at the bottom of each column. The total expenses are then divided by the total annual demand, which varies for each town according to the general time frame) to develop an overall unit cost of operation ($/1000 gallons). Translating the data to a unit cost of operation provides an effective means of comparison between the different ownership options and between the towns for each ownership option.

Review of the water economic model output reveals the following influencing factors regarding the results of the main ownership options:

- Independent Option – For both towns, the cost variations between Initial and Future conditions for this option are generally associated with higher operating costs of the water treatment facilities in the future due to higher demands. However, total debt service for Exeter is lower under the 'Future' condition as much of the existing debt for Exeter will be retired by that time.

- Collaborative/Capital Investment Option – Under this option, the O&M costs for the Exeter surface water treatment plant and groundwater treatment plants are apportioned to Exeter and Stratham based on the town's respective average day demands. The relevant debt service for the treatment plants is apportioned to Exeter and Stratham based on Stratham's maximum day demand as a percentage of total Exeter supply capacity (water treatment plants are typically designed to provide water sufficient to meet the maximum day demand).

- District Option – Under this option, the O&M expenses under the 'District Wide' column (i.e. users in both Exeter and Stratham) are generally determined by adding the expenses for both towns shown under the Collaborative/Capital Investment Option. However, administrative, billing and collection expenses are further reduced to account for economy-of-scale savings associated with a single administrative team in lieu of two separate administrative teams that would otherwise exist. Furthermore, under this option it is assumed that the debt service associated with establishing a new water system in Stratham would *not* be spread across all users in the District, but rather would be paid solely by Stratham users, which is represented under the column 'Capital Surcharge'. Therefore, the unit cost of operation for Exeter users under the District Option is shown in the 'District-Wide' column and the unit cost of operation for Stratham users is equal to the sum of the 'District-Wide' and 'Capital Surcharge' unit cost of operations.

The general findings resulting from the water economic model are described in further detail in Section 6.

4.3 *Wastewater Economic Model Framework*

For the wastewater model, the basic description of the framework described in Section 4.2 for water also applies to the wastewater model, except that the O&M expenses and debt service costs shown in the wastewater economic model output form are related entirely to wastewater. Moreover, due to the uncertainty associated with the level of nitrogen removal that will be required at the Exeter wastewater treatment plant in the future (i.e. 8 mg/l or a more stringent requirement of 3 mg/l), and the considerable cost differences associated with those varying removal requirements, two separate wastewater economic models were developed: one model assuming wastewater treatment plant upgrades to achieve 8 mg/l total nitrogen removal; and one model assuming plant upgrades to achieve 3 mg/l total nitrogen removal.

Review of the wastewater economic model output reveals the following influencing factors regarding the results of the main ownership options:

- Independent Option – For both towns, the cost variations between Initial and Future conditions for this option are generally associated with higher operating costs of the wastewater treatment facilities in the future due to higher demands. Total debt service for Exeter is lower under the 'Future' condition as much of the existing debt for Exeter will be retired by that time. Debt service for Stratham is actually higher under the 'Future' condition as it is assumed that the additional effluent disposal system capacity will be required and thus constructed by that time.

- Collaborative/Capital Investment Option – Under this option, the O&M costs for the Exeter wastewater treatment plant are apportioned to Exeter and Stratham based on the town's respective average day demands. The debt service for the Exeter wastewater treatment plant upgrade is apportioned to Exeter and Stratham based on Stratham's average daily flow capacity as a percentage of total Exeter wastewater treatment plant capacity.

- District Option – Under this option, the O&M expenses under the 'District Wide' column (i.e. users in both Exeter and Stratham) are generally determined by adding the expenses for both towns shown under the Collaborative/Capital Investment Option. However, administrative, billing and collection expenses are further reduced to account for economy-of-scale savings associated with a single administrative team in lieu of two separate administrative teams that would otherwise exist. Furthermore, under this option it is assumed that the debt service associated with establishing a new wastewater system in Stratham would *not* be spread across all users in the District, but rather would be paid solely by Stratham users, which is represented under the column 'Capital Surcharge'. Therefore, the unit cost of operation for Exeter users under the District Option is shown in the 'District-Wide' column and the unit cost of operation for Stratham users is equal to the sum of the 'District-Wide' and 'Capital Surcharge' unit cost of operations.

The general findings resulting from the wastewater economic model are described in further detail in Section 6.

5. Analysis of Intermunicipal Agreement Options[1]

5.1 *Introduction*

The technical and economic feasibility analyses undertaken in this study identify two basic methods for Exeter and Stratham to collaborate on sharing sewer and water services. The Financial Collaboration assessment (Section 4) carried through an analysis of two options in addition to the no-collaboration or Independent Option. The first is referred to as the "Collaborative/Capital Investment Option" approach whereby the Towns would enter into an intermunicipal agreement for sharing the capital, maintenance and operating cost of developing and maintaining those services. The second option is referred to as the "District Option" approach whereby a new entity is established with a separate governance structure that would own, operate and finance water and sewer services. With the first (Collaborative) option, the assumption is that Exeter would continue to own and operate its facilities and infrastructure and Stratham would own its infrastructure (water storage and distribution system). Stratham would gain access to water supply and sewage disposal services through a combination of capital and operating payments made to Exeter. Capital payments would be commensurate with an amount of water and sewer capacity reserved for Stratham, the details of which would be worked out in an intermunicipal agreement. With the second option, Exeter and Stratham would establish a new governmental entity, a Sewer and/or Water District, which would jointly own, operate and finance the facilities.

The purpose of this section is to examine these two alternatives in more detail, especially with regard to legal authority, enactment, and the necessary components of an agreement. In addition, examples are presented of where and how these approaches have been used in other communities in New Hampshire and New England. Finally, we assess which approach appears to be the most appropriate option to pursue if the Town's elect to go forward in their collaboration. Finally, where evident, comparisons are made about the relative advantages and disadvantages of each approach.

5.2 *Collaborative Option*

A collaborative approach can be generally described as two or more municipalities or other political subdivisions working cooperatively to achieve some common purpose under the terms of an agreement. Such agreements known generically as Intermunicipal Agreements (IMAs) are, comparatively common in New Hampshire, when compared to the district approach (except in the special case of school districts). According to NHDES Wastewater Management Division, there are 35 such agreements in place, including 2 that are wastewater management districts, 5 that involve entities in another state (See side bar). An IMA is an important tool for establishing and formalizing shared use of capital facilities and services, and represents a simpler alternative to the establishment of a district. They typically involve the sharing of infrastructure like sewer, water and solid waste or services such as emergency services or shared municipal staff or function. In the RPC region alone, there are at least six such agreements in place today relative to sewer and/or water services (Salem-Windham, Portsmouth-New Castle, Portsmouth-Rye, Rye-Hampton, Portsmouth-Greenland [pending]). The trend statewide and elsewhere in New

[1] Section prepared by Rockingham Planning Commission

England suggests they are likely to become much more common as towns seek to share certain resources and services where cost efficiencies can be achieved.

5.2.1 Legal Authority and Framework

Intermunicipal collaboration in New Hampshire is authorized under RSA 53-A, "Agreements Between Government Units," which provides municipalities broad general authority to carry out jointly what they can do individually. While the purpose section of the law suggests that the intent of such cooperative efforts enabled are for the provision of "services and facilities" in fact the scope of cooperative actions in not restricted. As is stated in RSA 53-A:3: *"Any power or powers, privileges or authority exercised or capable of exercise by a public agency of this state may be exercised jointly with any other public agency of this state."* Note that this authorization extends to any public agency which is defined to include any political subdivision of the state or an adjoining state and any quasi-municipal corporation, including but not limited to school districts, village districts, regional water districts, and special districts. The law was amended in 2003 to explicitly extend the authority of public agencies to share tax revenues resulting from local economic development efforts. (As a historical note, this amendment was proposed by then Rep. Warren Henderson in anticipation of potential future collaborations between Exeter, Stratham and Hampton.)

A 53-A agreement may establish a separate legal entity to conduct the joint undertaking, but, if it does not, it must include a provision for an administrator or a joint board responsible for administering the agreement.

Existing NH Agreements For Wastewater Services (2012)
(*bold indicates host community)*

Allenstown / Pembroke
Antrim / Bennington
Claremont / Sullivan County Complex
Concord (Penacook) / Boscawen
Concord / Bow
Dalton (NH) / Gilman (Lunenburg, VT)
Greenville / Greenville Estates VD
Hampton / Rye
Hanover / Lebanon
Keene / Swanzey
Lebanon / Enfield
Lisbon / Landaff
Londonderry / Derry
Manchester / Bedford
Manchester / Goffstown
Manchester / Londonderry
Merrimack / Bedford
Milford / Wilton
Nashua / Hudson
North Conway Water Precinct / Conway Village Fire District
North Hampton / Rye
Plymouth VD / Holderness
Portsmouth / New Castle
Portsmouth / PDA
Portsmouth / Rye
Portsmouth / Adams MHP (Rye)
Portsmouth / Travelports of America (Greenland)
Salem / GLSD (Lawrence, MA)
Stewartstown – Canaan (VT)
Sunapee / New London
Walpole / Bellows Falls (VT)
Woodsville FD / Haverhill
Woodsville FD / Grafton County Complex
Woodsville FD / Wells River (VT)
WRBP / Bay District

5.2.2 Enactment process

The enactment process for cooperative agreements as prescribed in 53-A are contextual and non-specific. Because the law is intended for use by any political subdivision, including school, village and other service districts, it defers specific enactment procedure to whatever is "appropriate" to the political subdivision undertaking the agreement. In the case of a municipality with town meeting form of government most inter-municipal agreements require a legislative body (town meeting) vote to authorize the agreement because money will need to be appropriated for its implementation. The proposed agreement itself however, is initially reached through the governing bodies – the boards of selectmen of the towns, often working through a negotiating work group they establish to develop the draft agreement.

A second requirement applicable to every intermunicipal agreement made pursuant to 53-A is that, prior to enactment, it must be submitted to the state Attorney General for review and approval. The Attorney General determines if the agreement is in proper form and compatible with the laws of the state. If the agreement does not comply, the AG must give a written statement of the legal flaws in the proposed agreement. Finally, any approved agreement must be filed with the clerk of each municipality and with the Secretary of State before it takes effect.

5.2.3 Required agreement elements and other necessary provisions

An intergovernmental agreement under RSA 53-A must deal with the following issues, per 53-A:3 II., - purpose; duration; organization, composition and nature of any separate legal or administrative agency created and powers delegated to that entity; manner of financing and establishing and maintaining a budget; method of terminating the agreement and for disposal of property upon termination; and "any other necessary and proper matters."

RSA 53-A provides the enabling authority and a minimum framework of an IMA. While it provides a broad outline of content, it is more like a blank slate than a detailed template. Many other elements are "necessary and proper" in an agreement as complex as one governing the sharing of sewer and water facilities and services. The specific provisions governing the rules and mechanics of a potential intermunicipal collaboration must established in the details of each agreement. Fortunately, total reinvention is unnecessary. There are many comparable examples to use as a starting point.

In the May 2000 edition of the Journal of the New England Water Environment Association (NEWEA) a survey of IMAs for wastewater cooperation was published which provides a thorough review of the provisions and elements that should be considered and addressed in the IMA.[2] The paper discusses IMAs primarily in Massachusetts (which has an IMA enabling statute, Chapter 40-4A, similar to 53-A) and outlines three important areas in the negotiation and preparation of an IMA - legal, engineering and cost - and discusses factors to consider within each area. The issues and recommendations discussed in the paper also apply to the sharing other municipal services and assets, such as water and septage infrastructure. Many of the considerations identified would be common to both types of agreements; a few are redundant to the framework requirements of 53-A.

In addition to requirements imposed by state and local laws, the paper recommends IMAs should (some paraphrased):

- Identify wastewater treatment capacity available.
- Identify flow allocation and specify the capacity of the host plant that is to be reserved for the guest community, and any provision for the return of unused allocations. Specify basis as average flow, peak flow or a combination.
- Identify the allocation of capital charges and user fees (or wholesale rate), and a

[2] "Intermunicipal Agreements for Regional Wastewater Cooperation", Stanley Elkerton and Richard Bowen, NEWEA Journal, May 2000

mechanism for adjusting fees over time.

- Identify ownership of sewer lines and interceptors and outline the parties' respective maintenance obligations.
- Identify and allocate fiscal responsibility for future treatment plant or collection system expansion.
- Identify geographic limits, if any, to the area served in the guest community.
- Require that the wastewater discharge from the guest community meet discharge standards (i.e. define acceptable sewage).
- Identify duration of IMA and renewal provisions (typically 20 years or longer).
- Require the guest community to adopt sewer ordinance no less stringent than the host community's.
- Specify any requirements for minimum infrastructure design standards in the guest community.
- Specify that the guest community is responsible for the collection and enforcement of user fees in its jurisdiction.
- Require all parties to give one another access to all sewer-related records.
- Provide an enforcement mechanism if either community is in breach of the agreement.
- Require indemnification against claims that arise from activities in the other community, or from breach by the other community.
- Allow the host community to inspect facilities in the guest community and take samples.
- Require the guest community to abide by any state and federal regulatory provisions that apply to the host's system and that are applicable to the guest community
- Require the guest community to share in any costs that result from regulatory changes.

This is not intended to be a comprehensive list of all of the provisions that an IMA for water and sewer may need to contain or consider, but is useful in understanding the scope of an IMA for sewer and water services. In all cases it is important that the language contained in the agreement be as specific as possible, be well documented and contain a minimum of ambiguity.

5.2.4 Other relevant laws

At least three other sections of New Hampshire statues specifically address the sharing of water and sewer services:

- 149-I:4 Contracts; Sewage or Waste Treatment Facilities. RSA 149-I is the primary statue that governs sewers and stormwater. 149-I:4 enables municipalities to enter contracts with other municipalities to provide, lease, sell or

purchase sewage or waste treatment facilities. The statute was amended in 2008 to add stormwater treatment, conveyance, and discharge systems. One caution is that language appears to limit this authority to "cities." This authority appears to be redundant to what is already authorized by intermunicipal agreement.

- RSA 38 Municipal Electric, Gas, or Water Systems RSA 38:2-a authorizes establishment of regional water districts to provide adequate and sustainable supplies of clean water. Regional water districts are formed under the provisions of RSA Chapter 53-A and enjoy the powers of municipal water utilities under RSA Chapter 38, except for eminent domain.

- RSA 31:120-125 Central Business Service Districts This enables municipalities to establish central business service districts in subareas within their communities of high development density where a higher level of utility services are required than in the balance of the community. The law authorizes charges to owners of properties within those districts.

5.2.5 Pending Legislation

While RSA 53-A has the advantage of providing a broad and flexible framework for establishing intermunicipal agreements, it presents the disadvantage of providing scant requirements and few contingencies for governing the formation of such agreements. While RSA 31:120 establishes the ability to charge properties in a sewer or water district an assessment for establishing those services, it does not specifically address such districts established between two or more communities.

Such uncertainty puts greater burden on the parties to an intermunicipal agreement to ensure all the necessary elements are in place and on sound legal footing. This is particularly true with respect to financing elements. If the legal authority for financing the agreement is questionable or ill-defined, it may become difficult to raise capital for infrastructure through the municipal bond market.

To address these concerns Stratham officials have worked with legislators to sponsor specific legislation, SB353 which would expand and elaborate on RSA 31 to more clearly lay out the ability to finance utility improvements within defined districts, both within one community and between communities. SB353 was introduced in 2012 and referred to interim study. It will be reintroduced in the 2012-2013 session and be more narrowly focused on water and wastewater utility districts. The revised version will also more specifically address provision to enable regional approaches to providing utility services to multiple municipalities entering into agreements to finance and operate such services.

5.3 ***District Option***

The "district" approach at intermunicpal cooperation would establish a separate and distinct governmental entity for the purpose of carrying out the defined service or function. Typically that entity would have its own governing body (a board or commission) and may, depending on the specific powers and duties established in its enabling authority, have the ability to raise

funds through tax assessments or fees, to incur debt and issue bonds, to construct, own and operate facilities and to take land or easement for facilities by eminent domain. The most familiar examples in New Hampshire are regional school districts (RSA 194), regional transit districts (RSA 38-B) and regional solid waste districts (RSA 53-B), each with their own specific and detailed enabling legislation. In the case of solid waste management districts, the most analogous to a district for water and sewer services, districts are established by vote of municipal legislative bodies to approve the terms of a proposed agreement drafted by a planning committee. A solid waste management district is a separate political subdivision of the state with all powers necessary to establish and operate solid waste management programs and facilities and to assess the member municipalities annually for their proportional shares of operating costs. This includes the ability own property, to use eminent domain authority to acquire property, to incur debt and issue bonds and to apportion and assess expenses to its members.

5.3.1 Legal Authority and Framework

New Hampshire does not have specific enabling law for the establishment of regional wastewater (sewer) districts. The regional wastewater districts that do exist (Winnipesaukee and Greater Lawrence) appear to be the result of by special legislation or, in the case of Greater Lawrence, created in another state. While RSA 53-A can be used for that purpose and does allow for the creation of a separate legal entity, it is not clear whether such an entity would have sufficient authority to function as a separate governmental entity with sufficient powers necessary to implement the functions of a self-governing wastewater district.

Both single municipal and regional water districts are specifically enabled in RSA 38 (Municipal Electric, Gas or Water Systems). Specific authority regarding the regional form of the water district is similar to the municipal form, except eminent domain authority is specifically excluded. As indicated in the previous section, RSA 38 does not specifically address the formation of the district, and rather, defines “regional water district” as any regional water district formed pursuant to RSA 53-A.

5.3.2 Enactment process

In the absence of specific water/wastewater district enabling legislation, the enactment process would follow the procedure for 53-A. See section 5.2.2 above. In the case of 53-B, the most analogous district enabling law for water and wastewater services, the enactment process is lengthy. First, the legislative bodies of the towns agree to establish a planning committee to determine the advisability of establishing a district, and if so to develop the district agreement. After this is accomplished, the legislative bodies in each of the prospective district member communities must approve the agreement (charter). It is typically a multi-year process.

5.3.3 Agreement Elements/Key provisions

The key areas of agreement regarding sewer and /or water services, costs, standards, etc. would be as for an IMA (5.2.3). Many additional provisions would need to be

included regarding governance of the district entity. These are complex and lengthy. RSA 53-B provides a reasonable template for the provisions that would be needed to establish a district as a distinct governmental entity. Key provisions in 53-B include: district planning and formation; development of district agreement and enactment; powers and obligations; governance; financing and apportioning expenses. A third general area that would need to be addressed is the 'sale' of Exeter's existing water and wastewater collection/distribution and treatment assets to the newly established district.

Additional legal research will be necessary if the decision is to pursue the creation of a regional water and/or sewer district in that the authority to do so is found in several different statutes which are not fully consistent with one another. Special legislation might be required to sufficiently clarify the establishment and financing of a regional water/sewer district

Based on the adequacy of an IMA to reach the objectives of the collaboration and on higher level of commitment and complexity required for the district option, the district option appears to be less suitable to pursue, at least as the first step in water and or sewer service collaboration between Exeter and Stratham. Over time, however, as new capital investments are made jointly, and if other communities become involved, then the benefits in governance, financing and potential cost-savings using the district approach may make this option worth pursuing in the long term.

5.4 *Case Studies of Intermunicipal Agreements for Wastewater/Water*

The Rockingham Planning Commission reviewed several Intermunicipal Agreements (IMA) used by neighboring municipalities for the purpose of sharing wastewater services. The agreements are included in the resources section of this report. Key features of each IMA are highlighted in the following table. Not surprisingly, the IMAs developed in recent years provide more specific language detailing the operation, management, planning and costs associated with shared services than IMAs developed longer ago.

Municipalities	Collaborative or District	Key Features of IMA
Rockland, MA Abington, MA 1983	Collaborative	• Abington sends wastewater to Rockland • IMA sets capacity limits • Abington owns, operates and maintains all connection facilities • Abington responsible for flow measurement from Abington • Septage from Abington not permitted • IMA details character of wastewater • IMA sets buy-in fee paid by Abington • IMA defines operation and maintenance costs • Abington makes semi-annual payments to Rockland based on "quantity and strength of waste" • Costs associated with plant repair or expansion based on respective allocations • IMA includes map of Abington service area
Dudley, MA Webster, MA	Collaborative	• Dudley sends wastewater to Webster

Municipalities	Collaborative or District	Key Features of IMA
1987, updated 2007 to revise methodology used to calculate Dudley's share of costs		• Dudley reserved future capacity • Dudley responsible for construction and maintenance of infrastructure in Dudley • Webster responsible for construction and maintenance of infrastructure in Webster • Webster invoices Dudley monthly based on metering station flows • IMA details character and sampling of wastewater • Dudley pays annual net share of capital and operating costs to Webster on a monthly basis
Templeton, MA Gardner, MA 2002	Collaborative	• Templeton sends wastewater to Gardner • Term of agreement 20 years • Limited discussion on wastewater characteristics • Templeton responsible for flow measurement from Templeton • IMA sets capacity limits • Templeton owns, operates and maintains all connection facilities • Gardner owns and maintains WWTP in Gardner • Templeton charged based on ratio of Templeton flow vs total flow • IMA defines operation and maintenance costs • Costs above $100,000 apportioned between two communities • Templeton billed by Gardner quarterly
Kittery, ME Eliot, ME Draft 2010	Collaborative	• Eliot sends wastewater to Kittery • Eliot reserved future capacity • Eliot has an existing wastewater collection system, including a force main system in Kittery • IMA sets capacity limits • IMA details character and sampling of wastewater • Eliot responsible for flow measurement from Eliot • IMA has formulas for buy-in costs for 1) increase in capacity allocation for treatment and disposal, 2) increase in capacity allocation for conveyance, 3) annual operation and maintenance for treatment and disposal, 4) annual operation and maintenance for conveyance, 5) capital updgrades and expansions
Northhampton, MA Williamsburg, MA 2012	Collaborative	• Williamsburg sends wastewater to Northhampton • Northhampton has existing wastewater collection systems • IMA sets capacity limits • IMA details character and sampling of wastewater • Williamsburg responsible for flow measurement from Williamsburg • IMA has formulas for buy-in costs for 1)increase in capacity allocation for treatment and disposal, 2) increase in capacity allocation for conveyance, 3) annual operation and maintenance for conveyance, treatment and disposal, 4) capital upgrades and expansions, 5)future capital upgrades and expansions

Municipalities	Collaborative or District	Key Features of IMA
Hanover, NH Lebanon, NH 2012	Collaborative	• Lebanon sends wastewater to Hanover • IMA term is 10 years with 5 year renewal options • IMA requires Lebanon to complete a wastewater feasibility study which determines requirements for termination of IMA • IMA details quantity and character of wastewater • IMA requires Lebanon to enact a Municipal Sewer Use Ordinance similar to Hanover's • New or increased existing industrial use from Lebanon must be approved by Hanover • Septage from Lebanon not permitted • Sampling and measurement locations identified on map included in IMA • Lebanon required to survey sewer users annually to establish type of user (resid, comm., ind.) • City of Lebanon is the sole customer and Hanover's Rate and Fee schedule applies • Lebanon submit meter readings, flow and strength categories and sampling for all accounts to Hanover quarterly • IMA details meter testing requirements • Meetings with two towns held June and December to review operation and maintenance, etc. • Map of Lebanon service area included in IMA • Maps with points of connection in Lebanon included in IMA • Allocated loadings for metals and cyanide and industrial user screening levels included in IMA
Keene, NH Swansey, NH IMA pending	IMA	• Keene and Swansey have draft IMA to extend sewer and water services from Keens to a subsection of Swansey. • Pending approval
Portsmouth, NH Greenland, NH IMA pending	District	• Portsmouth and Greenland discussing establishing sewer district to cover Greenland's future connections to Portsmouth's sewer • IMA delineates boundaries of service area

6. Summary and Recommendations

This section summarizes the results of the study, with an emphasis on assessing the results of the water and wastewater economic models described in Section 4.

6.1 *Summary of Findings*

Table 6.1 on the next page includes a summary of the water and wastewater economic models.

Table 6.1 includes a summary of the annual unit cost of operation ($/1,000 gallons) for all water and wastewater ownership option scenarios. The table also includes an estimate of the cumulative savings over 20 years associated with both the Collaborative Option and District Option in comparison to the Independent Option.

With respect to water, Exeter realizes a progressive benefit in terms of reduced annual unit cost of operation in going from the Independent Option to the Collaborative Option and finally to the District Option, both under Initial Conditions and Future Conditions. Stratham realizes a similar progressive benefit under Initial Conditions. However, under Future Conditions, the District Option results in lower cost savings to Stratham than the Collaborative Option (although still a net savings compared to the Independent Option). The 20 year cost savings to Exeter are higher under the District Option than for the Collaborative Option. This is due to the fact that certain operating expenses and debt service costs paid completely by Exeter under the Collaborative Option become shared across the wider District Users under the District Approach (e.g. Exeter water distribution O&M, Exeter waterline replacement program debt service, etc.). This also explains why Stratham experiences a lower cost savings under the District Approach.

The table clearly shows that both towns would benefit financially by pursuing either the Collaborative Option or District Option over the Independent Option for water.

As an example of the financial benefits to Exeter, consider operation and maintenance costs for the existing surface water treatment plant and the new groundwater treatment plant. Total operating costs for the two plants will be slightly higher under the collaborative approach than the independent approach due to the added demand from Stratham. However, the economic model suggests that apportioning O&M costs to Exeter and Stratham based on actual demand will result in Exeter paying less for overall treatment plant O&M under the collaborative option than it would under the independent option, even with the added Stratham demand. Although the amount Exeter would pay for demand-dependent costs (i.e. chemicals, electricity) would remain the same for both the independent option and collaborative option, its share of the larger fixed costs would be reduced due to the financial contribution of Stratham. Refer to the first worksheet in Appendix 3.

Table 6.1
Summary of Economic Model Results

EXETER/STRATHAM WATER AND WASTEWATER STUDY

SUMMARY OF ECONOMIC MODEL RESULTS

	Annual Unit Cost of Operation ($/1000 gallons)				Approx. 20 Year Savings Over Independent Approach ($)		Approx. 20 Year Savings Over Independent Approach (%)	
	Initial		Future					
Description of Approach	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**
Water:								
Independent Option	$8.97	$20.91	$6.41	$10.11	-	-		
Collaborative - Capital Investment Option[1]	$8.60	$17.26	$5.81	$8.47	$4,113,887	$4,090,240	6.6%	16.8%
District Option[2]	$8.51	$16.57	$5.69	$9.15	$4,965,614	$3,601,650	8.0%	14.8%
Wastewater (8 mg/l Assumption):								
Independent Option	$7.41	$29.59	$5.83	$13.38	-	-		
Collaborative - Capital Investment Option[1]	$7.13	$13.31	$5.22	$7.77	$7,344,691	$17,790,379	7.0%	48.3%
District Option[2]	$7.05	$13.65	$5.20	$8.00	$8,157,484	$17,261,570	7.8%	46.8%
Wastewater (3 mg/l Assumption):								
Independent Option	$10.18	$29.59	$8.40	$13.38	-	-		
Collaborative - Capital Investment Option[1]	$9.72	$15.44	$7.42	$9.87	$11,864,477	$13,514,970	8.0%	36.7%
District Option[2]	$9.60	$16.21	$7.41	$10.20	$12,838,747	$12,580,306	8.7%	34.1%

1 20 year savings calculated by applying difference in 'Total Expenses' between Indepdent Approach and Collaborative - Capital Investment Approach. Difference is based on an average of the difference in Initial Conditions and the difference in Future Conditions.

2 20 year savings calculated by applying difference in 'Unit Cost of Operation' between Independent Approach and District Approach and applying to respective system demands. Difference is based on an average of the difference in Initial Conditions and the difference in Future Conditions.

With respect to wastewater, the general pattern discussed above for water holds true for wastewater as well (for both 8 mg/l and 3 mg/l assumptions). The only exception is that for Stratham the District Option results in lower cost savings compared to the Collaborative Option for *both* the Initial Conditions and Future Conditions. As described above for the water, the reason Stratham realizes less savings under the District Option is due to the fact that Stratham users pay for certain Exeter O&M costs and debt service costs under the District Option that they would otherwise not pay for under the Collaborative Option.

The table shows again that both towns would benefit financially by pursuing either the Collaborative Option or District Option over the Independent Option for wastewater, regardless of the level of treatment that would be required at the upgraded Exeter wastewater treatment plant.

It should be noted the cost differential between the Collaborative Option and District Option in all cases is relatively insignificant, so non-cost factors should be heavily considered in the final comparison.

6.2 ***Recommendations***

Based on the results of the study and economic models that were developed to evaluate the potential financial benefits of sharing water and/or wastewater infrastructure and service between both towns, Kleinfelder offers the following recommendations:

1) Based on the assumptions presented in this report and the data relied upon, there is an apparent mutual financial benefit in pursuing a shared approach to water and/or wastewater infrastructure and service; Exeter and Stratham should consider progressing discussions toward possible implementation of such an approach. Kleinfelder recommends that a Working Group be formed to: determine consensus among both towns regarding either the Collaborative Option or the District Option; confirm the O&M and capital cost sharing principles currently outlined in the economic models; agree to any modifications to the cost sharing principles currently outlined in the model that may be necessary to create the incentive to encourage both towns to participate in a shared approach, including any additional buy-in charges for partial use of Exeter's existing infrastructure; and initiate discussion regarding the framework for an inter-municipal agreement, or IMA. Prospective membership of the Working Group may include from each community: town manager/administrator; public works director/public works commissioner; member of sewer and water commission or equivalent; town planner; Board of Selectmen representative; citizens-at-large appointed by the Board of Selectmen.

2) Initiate discussions with NHDES and USEPA regarding the potential shared approach to water and/or wastewater service. The purpose of discussions with USEPA would center primarily on gaining concurrence with the possible introduction of additional Stratham wastewater flows to the Exeter wastewater treatment plant. Discussions with the NHDES and USEPA should also address potential options regarding how best to handle peak flows from Stratham under future build out conditions of the proposed Phase 1 wastewater system expansion in Stratham, including 1) the currently assumed option of reducing I/I to free up additional spare peak capacity and 2) physical modifications to allow an increase in peak flows to the plant. While receiving an increase in the permitted

average daily flow of the Exeter WWTF will be challenging, the NHDES and USEPA may have more flexibility in allowing an increase in the peak flow capacity at the facility since peak flows are not typically regulated by NPDES permits.

3) Pending the outcome of discussions with NHDES and USEPA and I/I reduction realized at the completion of the Jady Hill project, explore potential alternatives to enhance peak flow capacity at the Exeter WWTF during development of the Exeter Wastewater Facilities Plan. Enhancing peak flow capacity at the Exeter WWTF through physical modifications may require further investigation if I/I reduction is unable to free up sufficient peak flow capacity to allow build out of Stratham's Phase 1 wastewater system expansion.

4) Investigate potential avenues for funding the design and construction of water and/or wastewater interconnections between both Exeter and Stratham. Possible funding alternatives that should be explored include, but are not limited to: Clean Water SRF; Drinking Water SRF; NHDES State-Aid-Grant (SAG) funds; and NHDES interconnection grant funds.

If Exeter and Stratham determine that a cooperative effort should be pursued for water and wastewater services, it is recommended that the communities focus on the Collaborative Option, with implementation in the form of an inter-municipal agreement (IMA) under RSA 53-A. The Collaborative Option allows for a more incremental approach to implementation than the District Option, at least initially. In general, the District Option was perceived as a less attractive alternative in the near term due to administrative challenges and the challenges of merging established water and wastewater systems in Exeter with yet-to-be-built water and wastewater systems in Stratham that will require significant up-front capital investment. Over time, as new capital infrastructure is constructed and paid for by Stratham, the District Option can be examined further.

The following additional recommendations apply to the potential development of an IMA(s) between Exeter and Stratham and are based on the analysis conducted by the Rockingham Planning Commission presented in Section 5:

5) Develop cost sharing principles for the IMA that will ensure an equitable sharing of the cost savings gained by working cooperatively.

6) Obtain technical and legal assistance from consultant(s) experienced in developing water and wastewater IMAs, as well as facilitation assistance in developing such agreements. The communities should include appropriations for such assistance in their 2013 Town Budgets if they intend to pursue an inter-municipal agreement in the near term.

7) Consult DES Wastewater Engineering Bureau regarding the development of the IMA(s).

8) Support modification to RSA 31 and other laws as appropriate to facilitate the establishment of water and wastewater IMAs.

Figures
List of Figures

FIGURE 3-1
STRATHAM POTABLE WATER STAGING

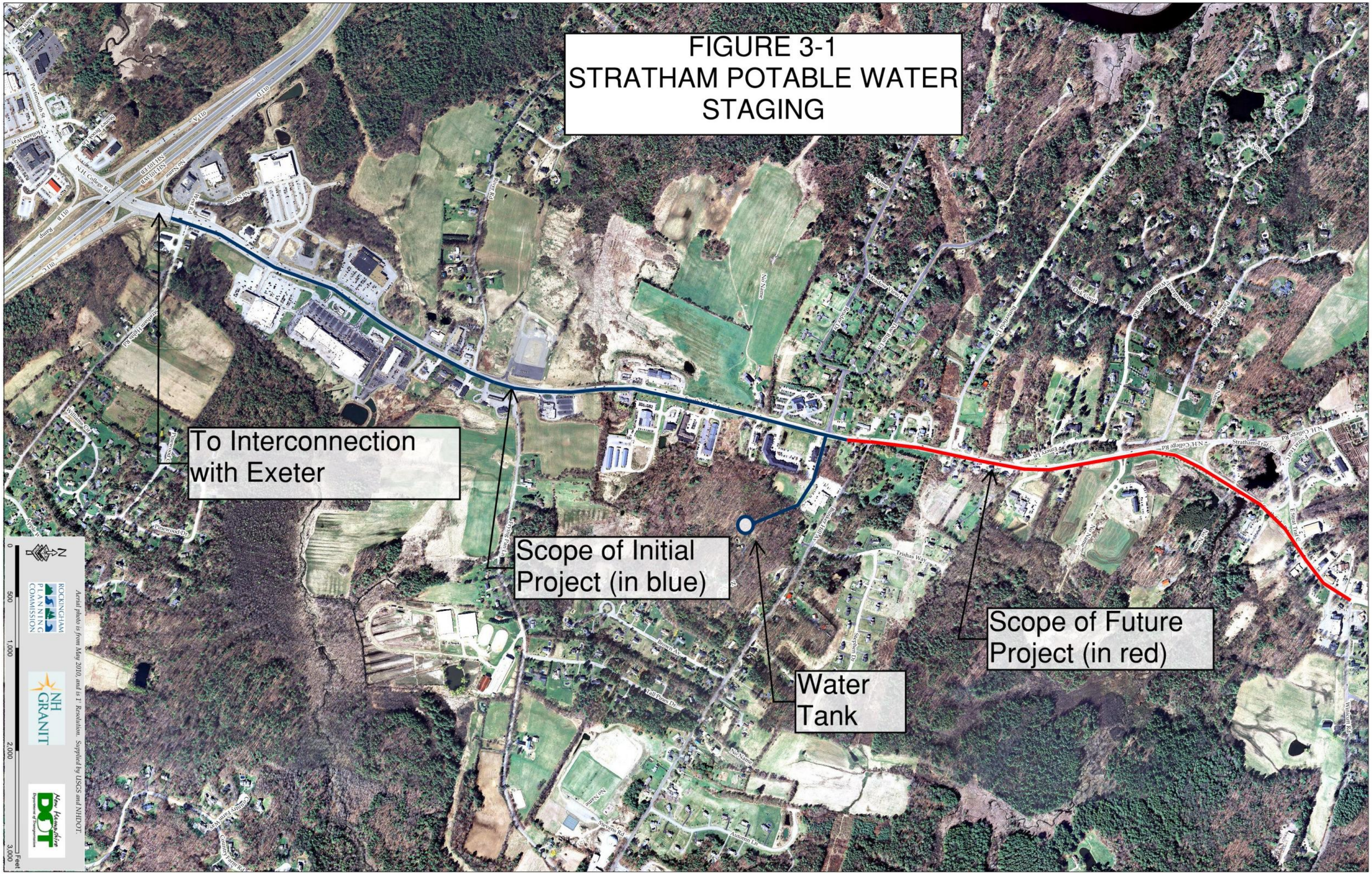

FIGURE 3-2
POTABLE WATER INTERCONNECTION

Aerial photo is from May 2010, and is 1' Resolution. Supplied by USGS and NHDOT.

ROCKINGHAM PLANNING COMMISSION

NH GRANIT

New Hampshire DOT Department of Transportation

Feet
0 250 500 1,000 1,500

Water Line Under Route 101, Use 24" Sleeves

To Stratham's Distribution System

Above Ground Meter and Valve Vault

To Exeter's Distribution System

011 A
011 D
No Name
West Rd
South
No Name
NH 101 WB
NH 101 EB
Stratham Hghts Rd
Stoney Brook Ln
N.H. College Rd
Ramp
011 C
011 B
Portsmouth St
Williams Cir

FIGURE 3-3
STRATHAM WASTEWATER STAGING

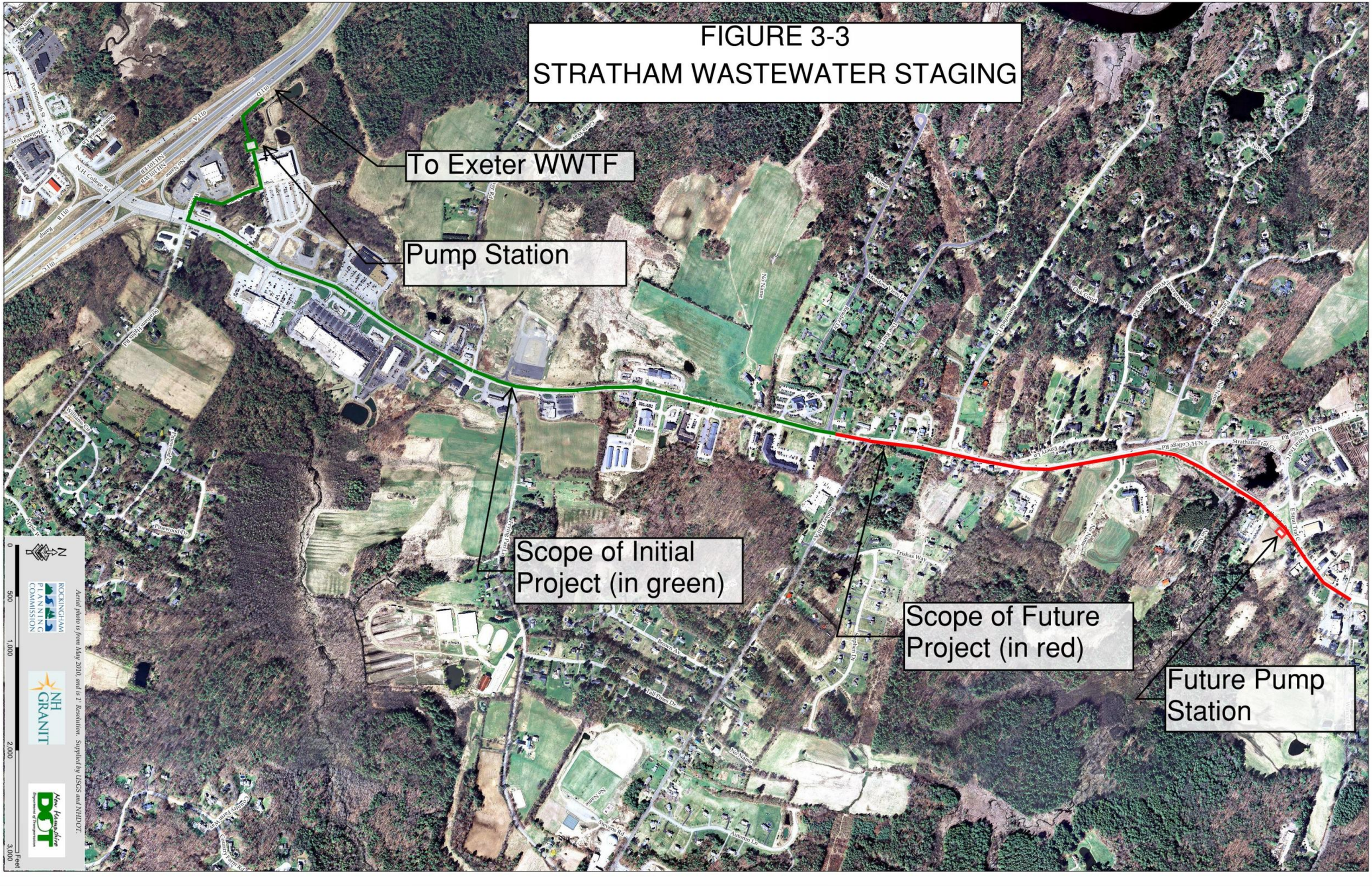

FIGURE 3-4
WASTEWATER INTERCONNECTION

Aerial photo is from May 2010, and is 1' Resolution. Supplied by USGS and NHDOT.

ROCKINGHAM PLANNING COMMISSION

NH GRANIT

New Hampshire DOT Department of Transportation

0 250 500 1,000 1,500 Feet

1 inch = 250 feet

Dedicated Force Main

Existing Gas Main

Discharge to Exeter's WWTF

Pump Station

Directional Drill 2

Directional Drill 1

To Stratham's WW Collection System

Gravity Sewer

Walter Scott

Oxbow Farm Rd

Green Way

No Name

Frying Pan Ln

River Rd

010 Wb-On

Newfields Rd

010 Eb-Off

010 Eb-On

NH 101 EB

NH 101 WB

010 Wb-Off

DPW Drive

010 D

010 A

South Side Rd

Pinewood Cir

Stratham Hobbs Rd

Stones Brook Ln

Melody Ln

College Rd

Appendix 1
List of References

[1] As provided in the Town of Stratham Fire Suppression and Potable Water Study Report by Wright Pierce, dated May 2010.

[2] As provided in the Stratham Water System Investigations Memorandum by Wright Pierce, dated March 15, 2011.

[3] Flow projections at Build Out are very aggressive and assume 100% buildout. Per recommendations in the Wright Pierce Report and based on data in Stratham's Wastewater System Concept Plan Report, the ultimate potable water at buildout was limited at 600,000 GPD for this study.

[4] Exeter Water System Evaluation Study by CDM Smith, dated January 2002.

[5] Discussions with representatives from Town of Exeter

[6] Exeter Water Supply Alternatives Study by Weston and Sampson, dated January 2010.

[7] As provided in the Town of Stratham Wastewater Management Concept Plan Report by Wright Pierce, dated March 2011.

[8] Sum of potable water use + Industrial Zone Sanitary Projection + I/I (An I/I allowance of 10% over potable water flow was assumed).

[9] TR-16 – Guide for the Design of Wastewater Treatment Works, NEIWPCC, 1998 Edition.

[10] WWTF Capital Improvement Program Report by Underwood Engineers, February 2002

[11] 2010 and 2011 WWTF Operating Data

[12] Exeter Phase 1 Infiltration / Inflow Stud by CDM Smith, dated October 1997.

[13] Costs updated to April 2012 costs with Engineering News Records Construction Cost Index. All costs presented at an ENR Index of 9273.

[14] Town of Exeter FY 2012 Water and Wastewater Budget

[15] Town of Exeter Capital Improvement Plan 2012 - 2017

[16] Analysis of Nitrogen Loading Reductions for Wastewater Treatment Facilities and Non-Point Sources in the Great Bay Estuary Watershed, Appendix E, NH Department of Environmental Services, 2010

[17] Town of Exeter Warrants, 2010 and 2012.

[18] Jady Hill Utility Replacement Presentation on Private I/I Removal Costs, dated January 23, 2012.

Appendix 2
Cost Analysis Tables

Cost Analysis For Potable Water Cooperation – Stratham Works Independently

Summary of Work for Potable Water System in Stratham:

- Construct a potable water distribution system from Route 101 north to Bunker Hill Avenue.
- Build 1,000,000 gallon Storage Tank at 28 Bunker Hill Avenue.
- Construct a well to supply potable water.
- Construct a water treatment plant to treat well water, pending water quality.
- In the future, expand distribution system to Town Center and add additional potable water supply (such as an additional well).

	Assumed Infrastructure Improvements	Comments or Assumptions	Capital Costs
Interconnection With Exeter	None	N/A	$0.0
Potable Water Supply	Construct a well with required capacity. Likely sites include the Scamman and Goodrich sites.[2] Construct a water treatment plant to treat well water, pending water quality.		$4,230,000[1,13]
Potable Water Distribution	Construct a 16" water main from Route 101 to Bunker Hill Avenue. Include a 16" extension to new water storage tank and to new well and treatment plant.		$3,840,000[1,13]
Potable Water Storage	Construct a 1,000,000 gallon Storage Tank at 28 Bunker Hill.	1,000,000 gallons	$1,640,000[2,13]
Summation of Capital Costs			$9,710,000

Cost Analysis For Potable Water Cooperation – Exeter Works Independently

Summary of Work for Potable Water System in Exeter:

- Water Supply Upgrades:
- Water Distribution Upgrades

	Assumed Infrastructure Improvements	Comments or Assumptions	Capital Costs
Interconnection With Stratham	None	N/A	$0.0
Potable Water Supply Operating Costs	Operating costs associated with Surface Water Treatment Plant		N/A
Potable Water Supply Upgrades - Project 1	Repairs and optimization of existing WTP and associated infrastructure.	Exeter CIP includes a line item for ongoing maintenance[15]	$285,000
Potable Water Supply Upgrades - Project 2	Construct Groundwater WTP to diversify water supply		$6,350,000
Potable Water Distribution Upgrades	None currently foreseen that will be impacted by collaboration with Stratham.		N/A
Water Storage Upgrades	None, recently completed tank provides sufficient storage for for-seeable future.	N/A	$0.0
Summation of Costs			$6,635,000

Cost Analysis For Potable Water Cooperation - Exeter Supplies Water to Stratham

Summary of Work for Potable Water System for Potable Water Cooperation:

- Construct a Potable Water Interconnection.
- Construct a potable water distribution system in Stratham from the Town Line north to Bunker Hill Avenue.
- Build 1,000,000 gallon Storage Tank in Stratham at 28 Bunker Hill Avenue.
- Construct a Groundwater Treatment Plant in Exeter (required to have excess capacity for supplying Stratham).
- In the future, expand distribution system to Statham Town Center.

	Assumed Infrastructure Improvements	Comments or Assumptions	Capital Costs
Interconnection with Exeter	Above-grade valve station with a flow meter along Route 108 at the Town line as well as piping below Route 101 in Pipe Sleeve		$590,000
Water Supply Operating Costs in Exeter	Operating costs associated with Surface Water Treatment Plant in Exeter		N/A
Water Supply Upgrades in Exeter	Repairs and optimization of existing WTP and associated infrastructure.	Includes indentified projects and costs for ongoing maintenance in CIP[14,15]	$285,000
Potable Water Supply	Construct Groundwater WTP in Exeter as recently approved in Town Elections.		$6,350,000
Water Distribution Upgrades in Exeter	None currently foreseen that will be impacted by collaboration with Stratham.		N/A
Water Distribution in Stratham	Construct a 16” water main from Route 101 to Bunker Hill Avenue. Include a 16” extension to new water storage tank.		$3,840,000[1,13]
Potable Water Storage in Stratham	Construct a 1,000,000 gallon Storage Tank at 28 Bunker Hill.		$1,640,000[2,13]
Summation of Costs			$12,705,000

Cost Analysis For Wastewater Cooperation – Stratham Works Independently

Summary of Work for Wastewater Management System in Stratham:

- Construct a sanitary sewer collection system from Bunker Hill Avenue south to Route 101.
- Construct a pump station and force main pumping to Stratham's new Wastewater Treatment Facility.
- Construct a wastewater treatment facility and groundwater disposal field with initial capacity of 150,000 GPD.
- Construct an additional groundwater disposal field and expand plant as necessary to a total capacity of 400,000 GPD in future.
- In the future, expand collection system to Town Center, construct an additional pump station, and further increase capacity of the WWTF.

	Assumed Infrastructure Improvements	Comments or Assumptions	Capital Costs
Interconnection With Exeter	None	N/A	$0.0
Collection System Upgrades	Install collection system from Route 101 to Bunker Hill Avenue.		$1,740,000[7,13]
Collection System Upgrades	Construct a pump station pumping and force main to the new Stratham WWTF.		$2,970,000[7,13]
Wastewater Treatment Upgrades	Construct a Wastewater Treatment Facility at the Site of the Industrial Park as well as groundwater discharge with initial average day capacity of 150,000 GPD.		$10,190,000[7,13]
Wastewater Treatment Upgrades Future Phases	Expand Wastewater Treatment Facility and construct an additional groundwater disposal fee for a total average day capacity of 400,000 GPD.	Not included in Analysis. Beyond planning horizon.	N/A
Summation of Costs			$14,900,000

Cost Analysis For Wastewater Cooperation – Exeter Works Independently

Summary of Work for Wastewater System in Exeter:

- Collection System Upgrades
- Wastewater Treatment Facility Upgrades

	Assumed Infrastructure Improvements	Comments or Assumptions	Capital Costs
Interconnection With Stratham	None	N/A	$0.0
Collection Systems Costs	Other Budgeted Collection System and Pump Station Improvements	Based on Items in Exeter's Collection System Budget[14]	$100,000
Collection System Upgrades – Project 1	Replacement of pipe and I/I reduction in Jady Hill neighborhood (ongoing).	Included in approved warrant article.[17]	$3,900,000
Collection System Upgrades – Project 2	Water Street Interceptor Project to help remedy CSO issues (ongoing).	Included in approved warrant article.[17]	$700,000
Short-Term Wastewater Treatment Costs	Facility Plan for Upgraded WWTF	Based on Exeter's approved warrant article.[17]	$375,000
Wastewater Treatment Upgrade	New 3.0 MGD WWTF to meet 8 mg/L nitrogen permit limit.	Construction Costs for 8 mg/L TN permit[16]	$37,580,000
Wastewater Treatment Upgrade	New 3.0 MGD WWTF to meet 3 mg/L nitrogen permit limit.	Construction Costs for 3 mg/L TN permit[16]	$54,070,000
Summation of Costs to Meet 8 mg/L Total Nitrogen Permit Limit			$42,655,000
Summation of Costs to Meet 3 mg/L Total Nitrogen Permit Limit			$59,145,000

Cost Analysis For Wastewater Cooperation – Stratham and Exeter Collaborate

Summary of Work for Wastewater Systems for Wastewater Cooperation:

- Construct a sanitary sewer collection system in Stratham from Bunker Hill Avenue south to Route 101.
- Construct a pump station and force main in Stratham pumping to Exeter's new Wastewater Treatment Facility.
- Upgrade Exeter's wastewater treatment facility to meet the final total nitrogen permit limit, which will treat Stratham's initial flow of 165,000 gpd.
- Reduce infiltration and inflow in Exeter to create an additional WWTF capacity to accommodate growth in Stratham.
- In the future, expand collection system to Stratham Town Center, construct an additional pump station, and develop method to treat the additional flow.

	Assumed Infrastructure Improvements	Comments or Assumptions	Capital Costs
Interconnection With Exeter	Construct a dedicated pump station with flow meter and a forcemain to Exeter WWTF.[7]	Pump station operating costs includes pumping costs and $1,500 / month for O&M.	$3,730,000
Collection System Upgrades in Exeter	Other Budgeted Collection System and Pump Station Improvements Replacement of pipe and I/I reduction in Jady Hill neighborhood; Water Street Interceptor to remedy CSO issues	Based on Items in Exeter's Collection System Budget[14] and warrant articles.[17]	$100,000 $3,900,000 $700,000
Collection System Upgrades in Stratham	Install collection system from Route 101 to Bunker Hill Avenue.		$1,740,000[7,13]
Short-Term Wastewater Treatment Upgrades	Facility Plan for Upgraded WWTF	Based on Exeter's approved warrant article.[17]	$375,000
Wastewater Treatment Expansion & Upgrade	Upgrade WWTF to meet 8 mg/L nitrogen permit limit.	Construction Costs for 8 mg/L TN permit[16]	$37,580,000
Wastewater Treatment Expansion & Upgrade	Upgrade WWTF to meet 3 mg/L nitrogen permit limit.	Construction Costs for 3 mg/L TN permit[16]	$54,070,000
Reduce I/I in Exeter to Allow for Extra Capacity	Reduce Infiltration and Inflow from Exeter to create an additional WWTF treatment capacity.	Remove approximately 280,000 GPD system-wide infiltration.[18] Costs shown in 2012 dollars.	$5,180,000
Summation of Costs to Meet 8 mg/L Total Nitrogen Permit Limit			$53,305,000
Summation of Costs to Meet 3 mg/L Total Nitrogen Permit Limit			$69,795,000

Appendix 3
Detailed Economic Model Results

EXETER/STRATHAM WATER AND WASTEWATER STUDY

WATER RATE IMPACT ASSESSMENT DUE TO COLLABORATIVE OPTIONS

	Existing[1]		Independent Option				Collaborative - Capital Investment Option				District Option			
			Initial[7]		Future[7]		Initial[7]		Future[7]		Initial[7]		Future[7]	
Revenue/Expense Category	**Exeter (Actual)**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**District-Wide**	**Capital Surcharge (Stratham Users)**	**District-Wide**	**Capital Surcharge (Stratham Users)**
EXPENSES:														
Operations and Maintenance Expenses:														
Water Administration[2]	$305,936		$305,936	$107,078	$305,936	$107,078	$305,936	$107,078	$305,936	$107,078	$359,475		$359,475	
Water Billing and Collection[2]	$89,017		$89,017	$31,156	$89,017	$31,156	$89,017	$31,156	$89,017	$31,156	$104,595		$104,595	
Exeter Water Distribution	$503,124		$503,124		$503,124		$503,124		$503,124		$503,124		$503,124	
Exeter Surface Water Treatment:[3,5]														
Fixed Costs	$502,348		$502,348		$502,348		$436,824	$65,524	$392,459	$109,889	$502,348		$502,348	
Demand-dependent costs (chemicals+elec)[4]	$251,000		$62,750		$78,438		$62,750	$9,413	$78,438	$21,963	$72,163		$100,400	
Exeter Groundwater Treatment Plant:[3,5]														
Fixed Costs	$0		$232,688		$232,688		$202,337	$30,351	$181,787	$50,900	$232,688		$232,688	
Demand-dependent costs (chemicals+elec)[4]	$0		$109,500		$136,875		$109,500	$16,425	$136,875	$38,325	$125,925		$175,200	
Exeter Surface WTP (added O&M due to upgrade)[5]	$0		$75,000		$75,000		$65,217	$9,783	$58,594	$16,406	$75,000		$75,000	
Stratham Water Supply	$0			$109,714		$256,000		$0		$0	$0		$0	
Stratham Water Distribution	$0			$179,000		$179,000		$179,000		$179,000	$179,000		$179,000	
Stratham Water Storage Tank	$0			$12,000		$12,000		$12,000		$12,000	$12,000		$12,000	
Interconnection Valve Chamber	$0			$0		$0		$12,000		$12,000	$12,000		$12,000	
Subtotal O&M Expenses	*$1,651,425*		*$1,880,363*	*$438,948*	*$1,923,425*	*$585,234*	*$1,774,706*	*$472,728*	*$1,746,230*	*$578,716*	*$2,178,317*		*$2,255,829*	
Capital Outlays:	$207,750		$207,750	$0	$207,750	$0	$207,750	$0	$207,750	$0	$207,750		$207,750	
Debt Service (P&I):														
Exeter Waterline Replacement Program (existing)	$185,000		$185,000		$0		$185,000		$0		$185,000		$0	
Exeter Water Tank/Distribution Systems	$270,746		$270,746		$0		$270,746		$0		$270,746		$0	
Exeter Water Meter Replacement[6]	$0		$65,575		$0		$65,575	$0	$0	$0	$65,575		$0	
Exeter WTP Wastestream Reduction[6]	$0		$58,222		$0		$54,019	$4,203	$0	$0	$58,222		$0	
Exeter Groundwater Treatment Facility[6]	$0		$369,406		$369,406		$342,737	$26,668	$307,180	$62,226	$369,406		$369,406	
Exeter Fuller Lane Tank Rehabilitation[6]	$0		$54,672		$0		$54,672	$0	$0	$0	$54,672		$0	
Exeter Waterline Replacement (future)[6]	$0		$182,241		$0		$182,241	$0	$0	$0	$182,241		$0	
Stratham Water Supply Improvements	$0			$307,596		$307,596		$0		$0		$0		$0
Stratham Water Distribution Improvements	$0			$279,236		$279,236		$279,236		$279,236		$279,236		$279,236
Stratham Water Storage Tank	$0			$119,257		$119,257		$119,257		$119,257		$119,257		$119,257
Interconnection Valve Chamber	$0			$0		$0		$42,903		$42,903		$42,903		$42,903
Future Unknown Debt Service[9]	$0		$0	$0	$426,235	$0	$0	$0	$390,796	$0	$0	$0	$492,716	$0
Subtotal Debt Service (P&I)	*$455,746*		*$1,185,862*	*$706,088*	*$795,641*	*$706,088*	*$1,154,991*	*$472,268*	*$697,975*	*$503,622*	*$1,185,862*	*$441,396*	*$862,121*	*$441,396*
TOTAL EXPENSES	**$2,314,921**	**N/A**	**$3,273,975**	**$1,145,036**	**$2,926,816**	**$1,291,322**	**$3,137,446**	**$944,995**	**$2,651,955**	**$1,082,338**	**$3,571,929**	**$441,396**	**$3,325,701**	**$441,396**
REVENUES:														
Service Charges	$389,326													
Usage Revenue:	$2,004,719													
Other Fees and Charges	$50,000													
TOTAL REVENUE:	**$2,444,045**	**N/A**	**$3,273,975**	**$1,145,036**	**$2,926,816**	**$1,291,322**	**$3,137,446**	**$944,995**	**$2,651,955**	**$1,082,338**	**$3,571,929**	**$441,396**	**$3,325,701**	**$441,396**
REVENUES - EXPENSES	**$129,124**	**N/A**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Annual Unit Cost of Operation ($/1000 gallons)	**$6.34**	**N/A**	**$8.97**	**$20.91**	**$6.41**	**$10.11**	**$8.60**	**$17.26**	**$5.81**	**$8.47**	**$8.51**	**$8.06**[8]	**$5.69**	**$3.46**[8]

1 Existing revenue/expense information for Exeter based on 2011 budget data
2 Stratham administration and billing/collection costs are estimated by prorating flows and applying to actual Exeter costs
3 Exeter water treatment operating costs divided between fixed costs (i.e. salary, benefits, etc.) and demand-dependent costs (i.e. chemicals, electricity). Fixed operating costs do not change regardless of demand. Fixed costs for surface WTP are based on current fixed costs (i.e. 2011 budget data).
4 Water treatment operating costs are estimated by dividing combined Exeter and Stratham demands at 25% for Exeter surface water treatment plant and 75% for groundwater treatment plant as follows:
a) Independent Option (Initial) - 250,000 gpd at surface WTP/750,000 gpd at groundwater plant (1,000,000 total demand Exeter only)
b) Indpendent Option (Future) - 312,500 gpd at surface WTP/937,500 gpd at groundwater plant (1,250,000 gpd total demand Exeter only)
c) Collaborative Option (Initial) - 287,500 gpd at surface WTP/862,500 gpd at groundwater plant (1,150,000 gpd total demand Exeter and Stratham)
d) Collaborative Option (Future) - 400,000 gpd at surface WTP/1,200,000 gpd at groundwater plant (1,600,000 gpd total demand Exeter and Stratham)
5 Represents operating cost under Collaborative Option that is allocated to each town according to apportioned demand for the town
6 Represents capital cost under Collaborative Option that is allocated to each town according to apportioned capacity for the town
7 Initial Conditions assume conditions immediately following implementation of Stratham's water distribution system to Bunker Hill Road (i.e. Phase 1); Future Conditions assume conditions approximately 20 years after implementation of those same improvements.
8 Capital Surcharge to Stratham users for water distribution and storage tank infrastructure falls to $0 once the bonds for those improvements are retired.
9 Future Unknown Debt Service represents other possible debt that may be incurred in the future, but not specifically identified at this time, and is equal to 20% of the sum of O&M expenses and Capital Outlays.

EXETER/STRATHAM WATER AND WASTEWATER STUDY

SEWER RATE IMPACT ASSESSMENT DUE TO COLLABORATIVE OPTIONS - 8 mg/L Treatment Level

	Existing[1]		Independent Option				Collaborative - Capital Investment Option				District Option			
			Initial[7]		Future[7]		Initial[7]		Future[7]		Initial[7]		Future[7]	
Revenue/Expense Category	**Exeter (Actual)**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**District-Wide**	**Capital Surcharge (Stratham Users)**	**District-Wide**	**Capital Surcharge (Stratham Users)**
EXPENSES:														
Operations and Maintenance Expenses:														
Sewer Administration[2]	$328,336		$328,336	$64,026	$328,336	$64,026	$328,336	$64,026	$328,336	$64,026	$360,349		$360,349	
Sewer Billing and Collection[2]	$88,518		$88,518	$17,261	$88,518	$17,261	$88,518	$17,261	$88,518	$17,261	$97,149		$97,149	
Exeter Sewer Collection	$523,508		$523,508		$523,508		$523,508	$0	$523,508	$0	$523,508		$523,508	
Exeter Sewer Treatment[3,4]:											$0		$0	
Fixed Costs	$301,521		$475,700		$475,700		$439,446	$36,254	$409,204	$66,496	$475,700		$475,700	
Demand-dependent costs (chemicals, etc)	$160,000		$234,300		$281,160		$216,443	$17,857	$241,858	$39,302	$234,300		$281,160	
Stratham WWTF and Disposal	$0			$504,000		$504,000		$0		$0	$0		$0	
Stratham Collection System	$0			$96,000		$96,000		$96,000		$96,000	$96,000		$96,000	
Stratham Main Pumping Station	$0			$17,000		$17,000		$0		$0	$0		$0	
Interconnection PS and FM	$0			$0		$0		$22,000		$22,000	$22,000		$22,000	
Subtotal O&M Expenses	*$1,401,883*		*$1,650,362*	*$698,287*	*$1,697,222*	*$698,287*	*$1,596,251*	*$253,397*	*$1,591,424*	*$305,084*	*$1,809,005*		*$1,855,865*	
Capital Outlays:	$120,000		$120,000	$0	$120,000	$0	$120,000	$0	$120,000	$0	$120,000		$120,000	
Debt Service (P&I):														
Exeter Jady Hill Sewerline Replacement	$130,663		$130,663		$0		$130,663		$0		$130,663		$0	
Exeter Storm Sewer Separation Project	$33,048		$33,048		$0		$33,048		$0		$33,048		$0	
Exeter Langdon Ave Pump Station	$58,986		$58,986		$0		$58,986		$0		$58,986		$0	
Exeter Outfall	$31,083		$31,083		$0		$31,083		$0		$31,083		$0	
Exeter Water Street Interceptor	$0		$77,349		$0		$77,349		$0		$77,349		$0	
Exeter Jady Hill Improvements Phase 2	$0		$192,702		$192,702		$192,702		$192,702		$192,702		$192,702	
Exeter WWTF Plan	$0		$82,874		$0		$82,874		$0		$82,874		$0	
Exeter Portsmouth Ave. Improvements	$0		$117,129		$0		$117,129		$0		$117,129		$0	
Exeter Riverbend Pump Station	$0		$36,448		$0		$36,448		$0		$36,448		$0	
Exeter Sewer Line Rehabilitation	$0		$103,270		$0		$103,270		$0		$103,270		$0	
Exeter Lincoln Street Improvements	$0		$43,316		$0		$43,316		$0		$43,316		$0	
Exeter WWTF Upgrade to 8 mg/L[5]	$0		$2,732,729		$2,732,729		$2,582,429	$150,300	$2,377,474	$355,255	$2,732,729		$2,732,729	
Stratham WWTF and Disposal	$0			$740,993		$740,993		$0		$0		$0		$0
Stratham 2nd Disposal Facility	$0			$0		$122,893		$0		$0		$0		$0
Stratham Collection System Improvements	$0			$126,529		$126,529		$126,529		$126,529		$126,529		$126,529
Stratham Main Pumping Station	$0			$215,971		$215,971		$0		$0		$0		$0
Interconnection PS and FM	$0			$0		$0		$271,237		$271,237		$271,237		$271,237
Future Unknown Debt Service[8]	$0		$0	$0	$363,444	$0	$0	$0	$294,439	$47,846	$0	$0	$395,173	$0
Subtotal Debt Service (P&I)	*$253,780*		*$3,639,597*	*$1,083,493*	*$3,288,875*	*$1,206,386*	*$3,489,297*	*$548,066*	*$2,864,614*	*$800,867*	*$3,639,597*	*$397,765*	*$3,320,604*	*$397,765*
TOTAL EXPENSES	**$1,775,663**	**N/A**	**$5,409,959**	**$1,781,779**	**$5,106,097**	**$1,904,672**	**$5,205,548**	**$801,463**	**$4,576,039**	**$1,105,951**	**$5,568,603**	**$397,765**	**$5,296,469**	**$397,765**
REVENUES:														
Service Charges	$385,062													
Usage Revenue:	$1,786,031													
Other Fees and Charges	$50,000													
TOTAL REVENUE:	**$2,221,093**	**N/A**	**$5,409,959**	**$1,781,779**	**$5,106,097**	**$1,904,672**	**$5,205,548**	**$801,463**	**$4,576,039**	**$1,105,951**	**$5,568,603**	**$397,765**	**$5,296,469**	**$397,765**
REVENUES - EXPENSES	**$445,430**	**N/A**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Annual Unit Cost of Operation ($/1000 gallons)	**$2.43**	**N/A**	**$7.41**	**$29.59**	**$5.83**	**$13.38**	**$7.13**	**$13.31**	**$5.22**	**$7.77**	**$7.05**	**$6.60**[6]	**$5.20**	**$2.79**[6]

1 Existing revenue/expense information for Exeter based on 2011 budget data
2 Stratham administration and billing/collection costs are estimated by prorating flows and applying to actual Exeter costs
3 Exeter sewer treatment operating costs divided between fixed costs (i.e. salary, benefits, etc.) and demand-dependent costs (i.e. chemicals, electricity). Fixed operating costs do not change regardless of demand. Total operating costs for Exeter's new wastewater plant (8 mg/L) = $710,000
4 Represents operating cost under Collaborative Option that is allocated to each town according to apportioned demand for the town
5 Represents capital cost under Collaborative Option that is allocated to each town according to apportioned capacity for the town
6 Capital Surcharge to Stratham users for new sewer collection system infrastructure falls to $0 once the bonds for those improvements are retired.
7 Initial Conditions assume conditions immediately following implementation of Stratham's wastewater collection system to Bunker Hill Road (i.e. Phase 1); Future Conditions assume conditions approximately 20 years after implementation of those same improvements.
8 Future Unknown Debt Service represents other possible debt that may be incurred in the future (e.g. future I/I removal project, etc.), but not specifically identified at this time, and is equal to 20% of the sum of O&M expenses and Capital Outlays.

EXETER/STRATHAM WATER AND WASTEWATER STUDY

SEWER RATE IMPACT ASSESSMENT DUE TO COLLABORATIVE OPTIONS - 3 mg/L Treatment Level

	Existing[1]		Independent Option				Collaborative - Capital Investment Option				District Option			
			Initial[7]		Future[7]		Initial[7]		Future[7]		Initial		Future	
Revenue/Expense Category	**Exeter (Actual)**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**Exeter**	**Stratham**	**District-Wide**	**Capital Surcharge (Stratham Users)**	**District-Wide**	**Capital Surcharge (Stratham Users)**
EXPENSES:														
Operations and Maintenance Expenses:														
Sewer Administration[2]	$328,336		$328,336	$64,026	$328,336	$64,026	$328,336	$64,026	$328,336	$64,026	$360,349		$360,349	
Sewer Billing and Collection[2]	$88,518		$88,518	$17,261	$88,518	$17,261	$88,518	$17,261	$88,518	$17,261	$97,149		$97,149	
Exeter Sewer Collection	$523,508		$523,508		$523,508		$523,508	$0	$523,508	$0	$523,508		$523,508	
Exeter Sewer Treatment[3,4]:											$0		$0	
Fixed Costs	$301,521		$1,025,100		$1,025,100		$946,975	$78,125.40	$881,806	$143,293.55	$1,025,100		$1,025,100	
Demand-dependent costs (chemicals, etc)	$160,000		$504,900		$605,880		$466,420	$38,479.68	$521,187	$84,692.90	$504,900		$605,880	
Stratham WWTF and Disposal	$0			$504,000		$504,000		$0		$0	$0		$0	
Stratham Collection System	$0			$96,000		$96,000		$96,000		$96,000	$96,000		$96,000	
Stratham Main Pumping Station	$0			$17,000		$17,000		$0		$0	$0		$0	
Interconnection PS and FM	$0			$0		$0		$22,000		$22,000	$22,000		$22,000	
Subtotal O&M Expenses	*$1,401,883*		*$2,470,362*	*$698,287*	*$2,571,342*	*$698,287*	*$2,353,757*	*$315,892*	*$2,343,356*	*$427,273*	*$2,629,005*		*$2,729,985*	
Capital Outlays:	$120,000		$120,000	$0	$120,000	$0	$120,000	$0	$120,000	$0	$120,000		$120,000	
Debt Service (P&I):														
Exeter Jady Hill Sewer Line Replacement	$130,663		$130,663		$0		$130,663		$0		$130,663		$0	
Exeter Storm Sewer Separation Project	$33,048		$33,048		$0		$33,048		$0		$33,048		$0	
Exeter Langdon Ave Pump Station	$58,986		$58,986		$0		$58,986		$0		$58,986		$0	
Exeter Outfall	$31,083		$31,083		$0		$31,083		$0		$31,083		$0	
Exeter Water Street Interceptor	$0		$77,349		$0		$77,349		$0		$77,349		$0	
Exeter Jady Hill Improvements Phase 2	$0		$192,702		$192,702		$192,702		$192,702		$192,702		$192,702	
Exeter WWTF Plan	$0		$82,874		$0		$82,874		$0		$82,874		$0	
Exeter Portsmouth Ave. Improvements	$0		$117,129		$0		$117,129		$0		$117,129		$0	
Exeter Riverbend Pump Station	$0		$36,448		$0		$36,448		$0		$36,448		$0	
Exeter Sewer Line Rehabilitation	$0		$103,270		$0		$103,270		$0		$103,270		$0	
Exeter Lincoln Street Improvements	$0		$43,316		$0		$43,316		$0		$43,316		$0	
Exeter WWTF Upgrade to 3 mg/L[5]	$0		$3,931,843		$3,931,843		$3,715,591	$216,251	$3,420,703	$511,140	$3,931,843		$3,931,843	
Stratham WWTF and Disposal	$0			$740,993		$740,993		$0		$0		$0		$0
Stratham 2nd Disposal Facility	$0			$0		$122,893		$0		$0		$0		$0
Stratham Collection System Improvements	$0			$126,529		$126,529		$126,529		$126,529		$126,529		$126,529
Stratham Main Pumping Station	$0			$215,971		$215,971		$0		$0		$0		$0
Interconnection PS and FM	$0			$0		$0		$271,237		$271,237		$271,237		$271,237
Future Unknown Debt Service[8]	$0		$0	$0	$538,268	$0	$0	$0	$423,803	$68,868	$0	$0	$569,997	$0
Subtotal Debt Service (P&I)	*$253,780*		*$4,838,711*	*$1,083,493*	*$4,662,813*	*$1,206,386*	*$4,622,460*	*$614,017*	*$4,037,208*	*$977,773*	*$4,838,711*	*$397,765*	*$4,694,542*	*$397,765*
TOTAL EXPENSES	**$1,775,663**	**N/A**	**$7,429,073**	**$1,781,779**	**$7,354,155**	**$1,904,672**	**$7,096,217**	**$929,908**	**$6,500,564**	**$1,405,046**	**$7,587,717**	**$397,765**	**$7,544,527**	**$397,765**
REVENUES:														
Service Charges	$385,062													
Usage Revenue:	$1,786,031													
Other Fees and Charges	$50,000													
TOTAL REVENUE:	**$2,221,093**	**N/A**	**$7,429,073**	**$1,781,779**	**$7,354,155**	**$1,904,672**	**$7,096,217**	**$929,908**	**$6,500,564**	**$1,405,046**	**$7,587,717**	**$397,765**	**$7,544,527**	**$397,765**
REVENUES - EXPENSES	**$445,430**	**N/A**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Annual Unit Cost of Operation ($/1000 gallons)	**$2.43**	**N/A**	**$10.18**	**$29.59**	**$8.40**	**$13.38**	**$9.72**	**$15.44**	**$7.42**	**$9.87**	**$9.60**	**$6.60**[6]	**$7.41**	**$2.79**[6]

1 Existing revenue/expense information for Exeter based on 2011 budget data
2 Stratham administration and billing/collection costs are estimated by prorating flows and applying to actual Exeter costs
3 Exeter sewer treatment operating costs divided between fixed costs (i.e. salary, benefits, etc.) and demand-dependent costs (i.e. chemicals, electricity). Fixed operating costs do not change regardless of demand. Total operating costs for Exeter's new wastewater plant (3 mg/L) = $1,530,000
4 Represents operating cost under Collaborative Approach that is allocated to each town according to apportioned demand for the town
5 Represents capital cost under Collaborative Approach that is allocated to each town according to apportioned capacity for the town
6 Capital Surcharge to Stratham users for new sewer collection system infrastructure falls to $0 once the bonds for those improvements are retired.
7 Initial Conditions assume conditions immediately following implementation of Stratham's wastewater collection system to Bunker Hill Road (i.e. Phase 1); Future Conditions assume conditions approximately 20 years after implementation of those same improvements.
8 Future Unknown Debt Service represents other possible debt that may be incurred in the future (e.g. future I/I removal project, etc.), but not specifically identified at this time, and is equal to 20% of the sum of O&M expenses and Capital Outlays.

EXETER/STRATHAM WATER AND WASTEWATER STUDY

ANNUALIZED PAYMENTS FOR FUTURE CAPITAL WATER AND SEWER IMPROVEMENTS

Location	Project Description	Water/Sewer	Capital Cost	Bond Period	Interest Rate (%)	Annual Bond Payment
Exeter	Water Meter Replacement	Water	$600,000	10	1.79%	$65,575
Exeter	WTP Wastestream Reduction	Water	$284,625	5	0.89%	$58,222
Exeter	Groundwater Treatment Facility	Water	$5,080,000	20	4.00%	$369,406
Exeter	Fuller Lane Tank Rehabilitation	Water	$450,000	10	4.00%	$54,672
Exeter	Future Water Line Replacement[1]	Water	$1,500,000	10	4.00%	$182,241
Stratham	Water Supply Improvements	Water	$4,230,000	20	4.00%	$307,596
Stratham	Water Distribution Improvements	Water	$3,840,000	20	4.00%	$279,236
Stratham	Water Storage Tank	Water	$1,640,000	20	4.00%	$119,257
Exeter/Stratham	Water Interconnection	Water	$590,000	20	4.00%	$42,903
Exeter	Water Street Interceptor Project	Sewer	$350,000	5	4.00%	$77,349
Exeter	Jady Hill Improvements Phase 2	Sewer	$2,650,000	20	4.00%	$192,702
Exeter	WWTF Plan	Sewer	$375,000	5	4.00%	$82,874
Exeter	Portsmouth Ave. Improvements	Sewer	$530,000	5	4.00%	$117,129
Exeter	Riverbend Pump Station	Sewer	$300,000	10	4.00%	$36,448
Exeter	Sewer Line Rehabilitation	Sewer	$850,000	10	4.00%	$103,270
Exeter	Lincoln Street Improvements	Sewer	$196,000	5	4.00%	$43,316
Exeter	WWTF Upgrade to 8 mg/L	Sewer	$37,580,000	20	4.00%	$2,732,729
Exeter	WWTF Upgrade to 3 mg/L	Sewer	$54,070,000	20	4.00%	$3,931,843
Stratham	WWTF and Disposal	Sewer	$10,190,000	20	4.00%	$740,993
Stratham	2nd Disposal Facility (for higher future flows)	Sewer	$1,690,000	20	4.00%	$122,893
Stratham	Collection System Improvements	Sewer	$1,740,000	20	4.00%	$126,529
Stratham	Main Pumping Station	Sewer	$2,970,000	20	4.00%	$215,971
Exeter/Stratham	Sewer Interconnection PS and FM	Sewer	$3,730,000	20	4.00%	$271,237

1 Includes Portsmouth Avenue and Lincoln Street Water Line Replacement Projects and on-going Water Line Replacement Program

EXETER/STRATHAM WATER AND WASTEWATER STUDY

DEMANDS AND CAPACITY

	Demand (gpd)			Capacity (gpd)		Percent Allocation
	ADF	**MDD**	**Peak**	**ADF (applies to wastewater only)**	**Peak**	
WATER:						
Exeter Demands:						
Assumed Current System Demand	1,000,000	1,700,000				
Assumed Future System Demand	1,250,000	2,000,000				
Existing Water Treatment Plant					2,300,000	
Existing Lary Lane Well					0	
New Groundwater Treatment Plant					1,440,000	
Total Future Supply Capacity					3,740,000	
Stratham Demands:						
Assumed Initial System Demand	150,000	270,000				
Assumed Future System Demand	350,000	630,000				
Groundwater Treatment Plant					630,000	
Water Storage Tank					1,000,000	
Water Allocation Percents:						
Water O&M Costs:						
Stratham Initial						13.0%
Stratham Future						21.9%
Water Capital Costs:						
Stratham Initial (% total capacity)						7.2%
Stratham Future (% total capacity)						16.8%
WASTEWATER:						
Exeter:						
Assumed Current System Demand	2,000,000		6,000,000			
Assumed Future System Demand	2,400,000		7,500,000			
Existing Wastewater Plant				3,000,000	7,500,000	
80% Existing Wastewater Plant				2,400,000	6,000,000	
Stratham:						
Assumed Initial System Demand	165,000	450,000	810,000			
Assumed Future System Demand	390,000	1,060,000	1,843,200			
Sewer Allocation Ratios:						
Wastewater O&M Costs:						
Stratham Initial						7.6%
Stratham Future						14.0%
Wastewater Capital Costs:						
Stratham Initial (% total capacity)						5.5%
Stratham Future (% total capacity)						13.0%