# EXETER / STRATHAM INTERMUNICIPAL WATER AND WASTEWATER SYSTEMS EVALUATION STUDY DRAFT REPORT

## ROCKINGHAM PLANNING COMMISSION

**JULY 2012**

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# 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 approximately 80% 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.

# 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 Average Day Demand | 1.1 MGD[6] |
| Current Max Day Flow Rate | 1.7 MGD[6] |
| Projected Future Average Day Demand | 1.25 MGD |
| Projected Future Max Day Flow Rate | 2.0 MGD |

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.

**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 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 2. 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 | Provide potable water system from Exeter Town Line to Bunker Hill Avenue | 150,000 GPD Avg Day @ HGL of 230 ft<br>270,000 GPD Max Day (PF = 1.8xADF)[1]<br>281 GPM Peak Hour (PF = 1.5xADF)[1]<br>3,500 GPM Fire Flow @ HGL of 185 ft |
| Phase 2 | Expansion of System to Winnicut Road and the Town Center | 350,000 GPD Avg Day @ HGL of 230 ft<br>630,000 GPD Max Day (PF = 1.8xADF)[1]<br>655 GPM Peak Hour (PF = 1.5xADF)[1]<br>3,500 GPM Fire Flow @ HGL of 185 ft |
| Build-Out | Total System at Build-Out | 600,000 GPD Avg Day @ HGL of 230 ft<br>1,080,000 GPD Max Day (PF = 1.8xADF)[1]<br>1,125 GPM Peak Hour (PF = 1.5xADF)[1]<br>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.

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. Thus, this 80% "trigger" may need to be exceeded in order to provide capacity to Stratham.

### 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.

**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<br>10,000 GPD[7] Indus. Park<br>4,500 GPD[7] I/I | 395,000 GPD[7] Avg Day)<br>50,000 GPD[7] Indus. Park<br>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<br>3,500 GPD[7] I/I | 53,000 GPD[7] Avg Day<br>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 2). 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 | Provide wastewater collection system from Bunker Hill Avenue to the Exeter Town Line | 165,000 GPD Avg Day<br>450,000 GPD Max Day (PF = 2.7xADF)[9]<br>560 GPM Peak Hour (PF = 4.9xADF)[9] |
| Phase 2 | Expansion of collection system to Winnicut Road and the Town Center | 390,000 GPD Avg Day<br>940,000 GPD Max Day (PF = 2.4xADF)[9]<br>1,140 GPM Peak Hour (PF = 4.2xADF)[9] |
| Build-Out | Total System at Build-Out | 660,000 GPD Avg Day<br>1,520,000 GPD Max Day (PF = 2.3xADF)[9]<br>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 2 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 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 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 2 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 2 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 second phase of the Stratham sewer extension (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.

**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).

- **Future Wastewater Plant Capacity** - 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.

## *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 2.

### 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 peak hourly flow at 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 minutes from the Cost Workshop in 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 max day flow at 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 minutes from the Cost Workshop in 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 2.

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 5.

## *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 5.

# 5. 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.

## *5.1 Summary of Findings*

Table 5.1 includes a summary of the water and wastewater economic models.

**Table 5.11**
**Summary of Economic Model Results**

| Description of Approach | Annual Unit Cost of Operation ($/1000 gallons) | | | | Approx. 20 Year Savings Over Independent Approach ($) | |
|---|---|---|---|---|---|---|
| | Initial | | Future | | | |
| | Exeter | Stratham | Exeter | Stratham | Exeter | Stratham |
| **Water:** | | | | | | |
| Independent Option | $8.83 | $20.91 | $6.30 | $10.11 | - | - |
| Collaborative - Capital Investment Option[1] | $8.48 | $17.15 | $5.74 | $8.41 | $3,809,117 | $4,229,827 |
| District Option[2] | $8.40 | $16.46 | $5.62 | $9.08 | $4,660,844 | $3,756,795 |
| **Wastewater (8 mg/l Assumption):** | | | | | | |
| Independent Option | $7.41 | $29.59 | $5.83 | $13.38 | - | - |
| Collaborative - Capital Investment Option[1] | $7.13 | $13.31 | $5.28 | $7.43 | $6,866,229 | $18,268,842 |
| District Option[2] | $7.05 | $13.65 | $5.20 | $8.00 | $8,157,484 | $17,261,570 |
| **Wastewater (3 mg/l Assumption):** | | | | | | |
| Independent Option | $10.18 | $29.59 | $8.40 | $13.38 | - | - |
| Collaborative - Capital Investment Option[1] | $9.72 | $15.44 | $7.50 | $9.39 | $11,175,797 | $14,203,650 |
| District Option[2] | $9.60 | $16.21 | $7.41 | $10.20 | $12,838,747 | $12,580,306 |

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.

Table 5.1 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.

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.

## *5.2 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:

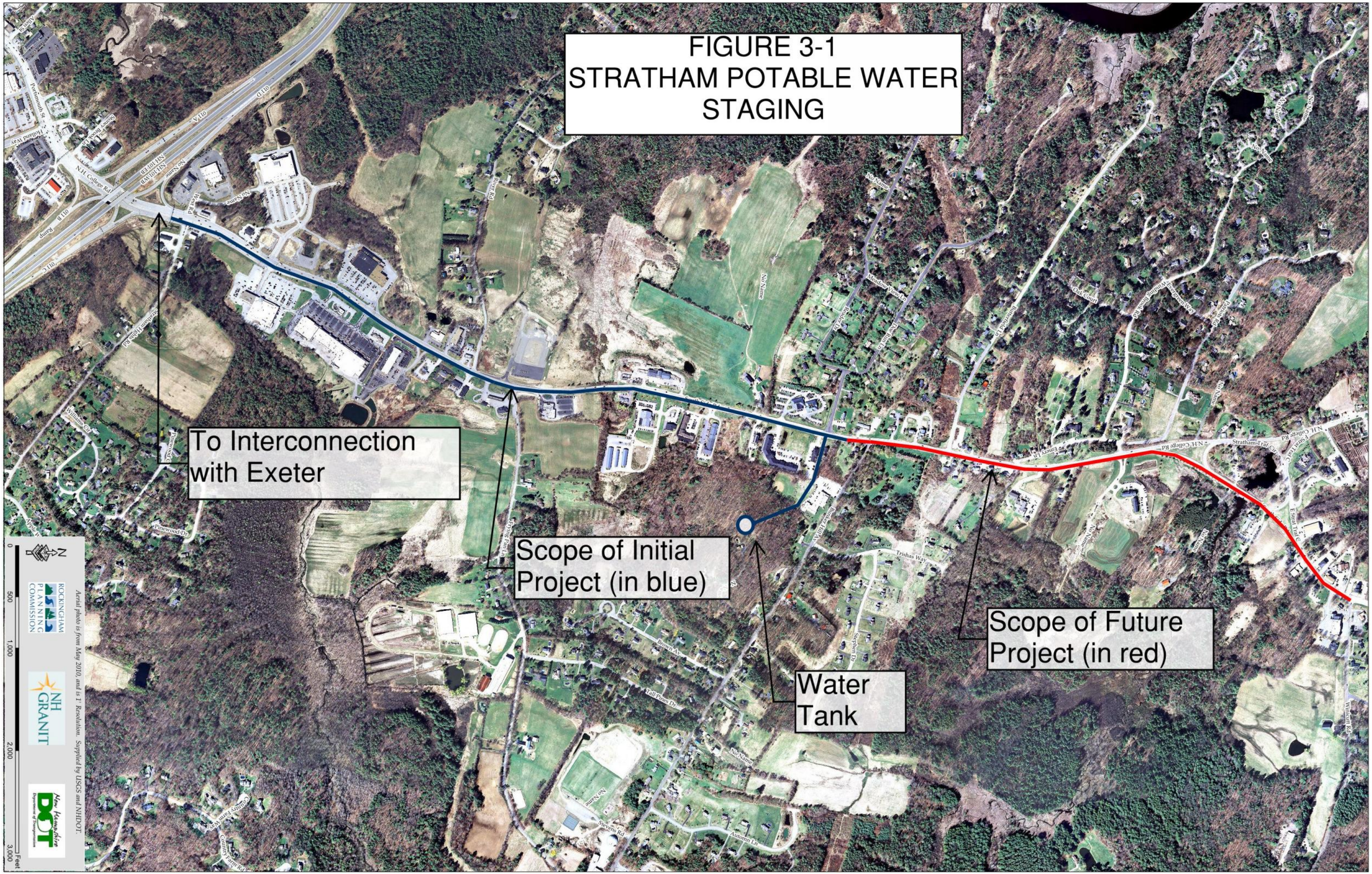
1) Given the apparent mutual financial benefit in pursuing a shared approach to water and/or wastewater infrastructure and service, Exeter and Stratham should consider progressing discussions toward possible implementation of such an approach. Kleinfelder recommends that a Working Group be formed to: 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; and initiate discussion regarding the framework for an inter-municipal agreement, or IMA.

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.

3) 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.

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

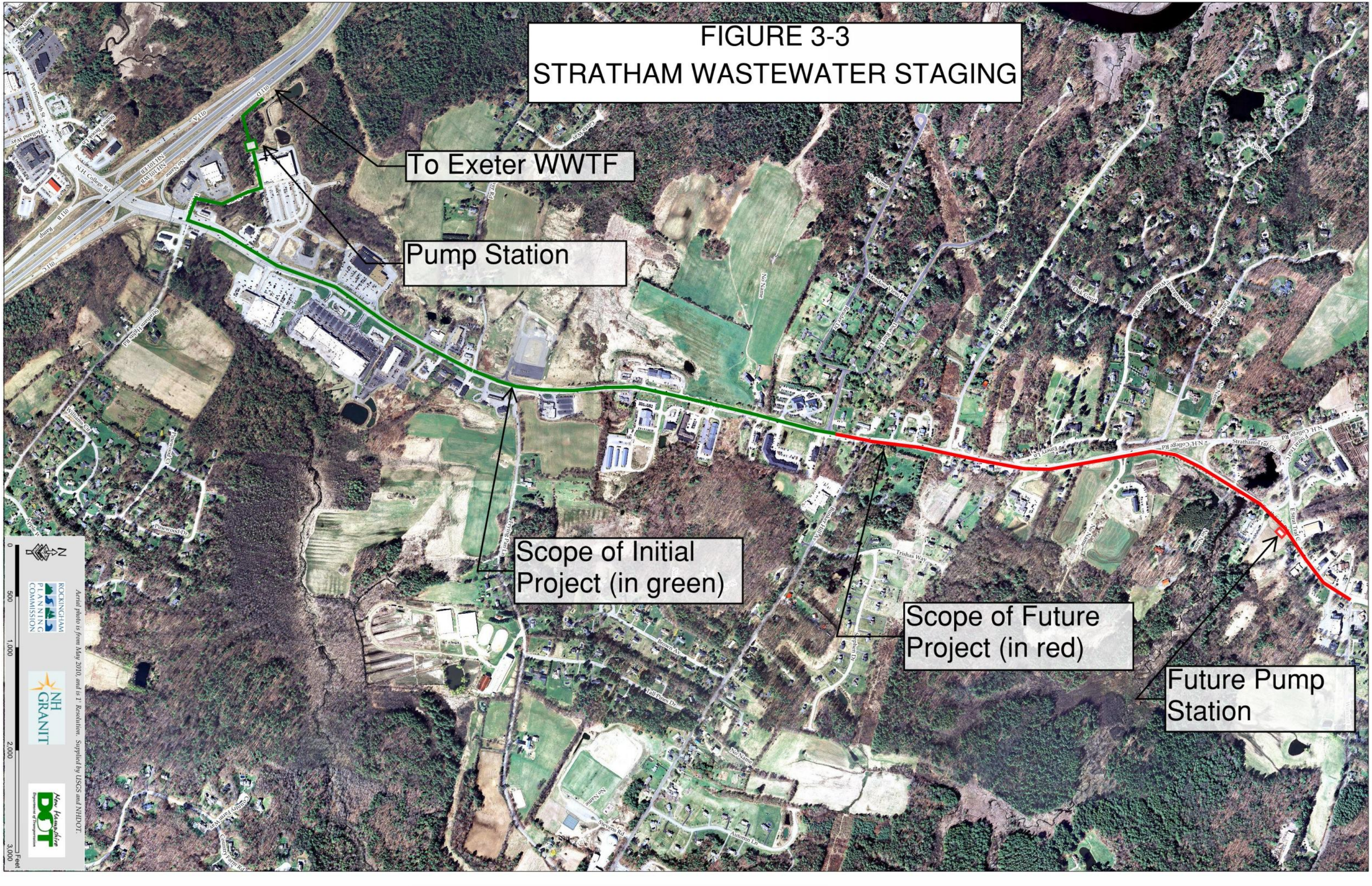
To Stratham's Distribution System

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
## *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

*Agendas and Minutes from the Meetings and Workshops*

# AGENDA – KICK OFF MEETING

**February 16, 2012**

EXETER/STRATHAM INTER-MUNICIPAL WATER AND WASTEWATER STUDY

---

**1. INTRODUCTIONS**

- ROCKINGHAM PLANNING COMMISSION (RPC) PROJECT TEAM MEMBERS
- KLEINFELDER PROJECT TEAM MEMBERS

**2. COMMUNICATIONS**

- RPC AND KLEINFELDER PRIMARY CONTACTS
- EXETER AND STRATHAM CONTACTS

**3. REVIEW SCOPE OF WORK**

- REFER TO ATTACHED SCOPE OF WORK

**4. REVIEW STUDY SCHEDULE**

**5. PRELIMINARY DISCUSSION OF TECHNICAL FEASIBILITY ANALYSIS**

**6. NEXT STEPS**

- SUMMARIZE MEETING AND APPLICABLE ACTION ITEMS
- SCHEDULE TECHNICAL WORKSHOP AND IDENTIFY REQUIRED ATTENDEES

SIGN-IN SHEET
KICK OFF MEETING
EXETER/STRATHAM INTER-MUNICIPAL WATER AND WASTEWATER STUDY

FEBRUARY 16, 2012

| Name | Company/Affiliation | Telephone | E-mail |
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# MEETING MINUTES

| | |
|---|---|
| DATE OF MEETING: | February 16, 2012 |
| ATTENDEES: | See Attached Sign-in Sheet |
| RECORDED BY: | Kleinfelder / SEA |
| CC: | Attendees; file |
| SUBJECT: | Rockingham Planning Commission<br>Exeter / Stratham Inter-Municipal Water and Wastewater Study<br>Kickoff Meeting Minutes |
| S E A No.: | 2005350.01-A |

Discussion Items:

1. Introductions

Team members present at the meeting introduced themselves and their roles.

2. Communications

Communications shall go through the following primary contacts.

- Kleinfelder / SEA – Rob McCoy
- Rockingham Planning Commission – Theresa Walker
- Town of Exeter – Technical – Michael Jeffers and Jennifer Perry
- Town of Exeter – Financial – Russell Dean
- Town of Stratham – Paul Deschaine

All communications with the press and the public shall go through the Rockingham Planning Commission.

3. Review of Scope of Work

The scope of work was reviewed. Based on the discussions at the meeting it was agreed that in addition to the approved scope of work, the study shall address the following:

- The study will include a comparison of baseline conditions where each town works independently in order to compare cost savings that may potentially result from a collaborative approach.
- References for all key technical data and costs referenced during the study should be noted during discussions and in the report.
- The study will consider a proposed staged expansion in the Town of Stratham. It is not expected that the all of the infrastructure in Stratham will be built at one time.
- The timing of the last meeting noted in line item 4 E of the Scope of Work will be adjusted to be held prior to writing the Final Report.
- The Final Report should include recommended Next Steps. Both Short Term and Long Term implementation steps should also be included.

4. Review of Study Schedule

The proposed study schedule was reviewed. The schedule is primarily contingent on the timing of the four proposed Workshops and Meetings, which are tentatively scheduled as noted:

1. Technical Feasibility Workshop – March 15, 2012
2. Infrastructure Costs Workshop – April 2012
3. Financial Collaboration Workshop – May 2012
4. Summary / Review of Findings Meeting – June 2012

5. Preliminary Discussion of Technical Feasibility Analysis

A preliminary discussion of the technical feasibility of sharing water and wastewater infrastructure was conducted. The questions and concerns noted in the attached Technical Feasibility Issues list, which was distributed at the meeting served as the basis of the discussions. The following bullets summarize the highlights of the preliminary discussions:

- The extent of Exeter's available potable water capacity will depend significantly on whether the proposed Groundwater Plant passes at the Town Meeting vote,

scheduled for March 13. It was agreed by those in attendance that the Technical Feasibility Workshop should be held after this vote.

- Sleeves were installed beneath Route 101 along Route 108 that will be useful for a water interconnection. The Town of Stratham has as-built plans showing the location of these sleeves.
- The Town of Exeter has a hydraulic model of its potable water distribution system. Kleinfelder suggested that several modeling runs be conducted to determine what volumes of water can be delivered to Stratham using the existing system. Underwood developed the water model and Wright Pierce has a copy as well. The model needs to be checked as to whether it includes the most recent updates including the Epping Road water tank.
- It is unlikely that the Town of Exeter has sufficient capacity to accept and treat all of Stratham's proposed wastewater flow at the Exeter WWTF based on Exeter's current permitted flow rate of 3.0 MGD. The ability to increase the permitted capacity of the Exeter WWTF is critical to assessing the feasibility of collaborating on wastewater. In addition, the total nitrogen permit limit in the final permit (whether it is 3 mg/L or 8 mg/L) will greatly impact costs. Due this fact, representatives from EPA and DES will be invited to attend the next meeting to take part in these discussions.
- The most likely approach for a wastewater interconnection in Stratham is to construct a pump station in Stratham with a dedicated force main that pumps directly to the Exeter WWTF. This is due in part to capacity issues on the sewer lines and pump stations that handle the wastewater on Route 108 in Exeter. A forcemain from Stratham to the Exeter WWTF may involve a directional drill or attaching to the Route 101 bridge over the Squamscott River.
- Exeter WWTF capacity is impacted by Infiltration and Inflow (I/I). It is possible that capacity at the WWTF will be freed up as I/I is removed in Exeter. I/I is being addressed in the Jady Hill project and Underwood Engineers is completing an updated I/I Study (due to be completed in July) that may highlight expected I/I removal. A previous study conducted by CDM and dating to 1998 will be supplied to Kleinfelder / SEA for review.
- Phasing of water and wastewater expansions in Stratham will need to be considered when looking at required capacity. All of the capacity noted in the reports will not be needed at one time.

6. Next Steps

Action Items:

- The Town of Exeter will reach out to EPA and DEP to see if they are willing to attend the upcoming Technical Feasibility Workshop.
- Kleinfelder / SEA will provide the RPC with an electronic copy of the PowerPoint handouts from this meeting for distribution.
- Kleinfelder / SEA will contact technical representatives from both Towns directly as it conducts the technical feasibility analysis.

Next Meeting:

The Technical Feasibility Workshop will be held on March 15 at 4:00 p.m. at the Stratham Municipal Complex. This meeting will focus on technical feasibility issues, so primarily project team members involved with the technical aspects need to attend.

7. Attachments

List of Attendees

Handouts distributed at meeting listing Technical Feasibility Issues

**SIGN-IN SHEET**
**KICK OFF MEETING**
EXETER/STRATHAM INTER-MUNICIPAL WATER AND WASTEWATER STUDY

FEBRUARY 16, 2012

| Name | Company/Affiliation | Telephone | E-mail |
|---|---|---|---|
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| David Michelsen | KLF/SEA | 227-2327 | dmichelsen@Kleinfelder.com |
| Jennifer Perry | Town of Exeter | 773-6157 | jperry@town.exeter.nh.us |
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# ROCKINHAM PLANNING COMMISSION
# TECHNICAL FEASIBILITY BRAINSTORMING SESSION
# FEBRUARY 17, 2012

## TASK 1 TECHINCAL FEASIBILITY ISSUES
## COLLABORATION ON POTABLE WATER

Question: Does Exeter have sufficient water to meet Stratham's needs with its existing Surface Water Plant?

Technical Resources:
Town of Exeter Water Supply Alternatives Study, Weston and Sampson, January 2010
Stratham Fire Suppression and Potable Water Supply Study, Wright Pierce, May 2010

Question: Would Exeter have sufficient water to meet Stratham's needs after the proposed Groundwater Plant gets built?

Technical Resources:
Town of Exeter Water Supply Alternatives Study, Weston and Sampson, January 2010
Stratham Fire Suppression and Potable Water Supply Study, Wright Pierce, May 2010

Question: Can an interconnection for potable water be built? Where would it be located? What would it include? (i.e., valve vault, meter vault, etc)

Technical Resources:
Meeting notes from Exeter / Stratham community meeting, October 7, 2010.
Information on the location and size of the pipe sleeves installed beneath Route 101 (This information is requested)

Question: Would the hydraulic grade lines required for the two towns be compatible?

Technical Resources:
Exeter water distribution pressure data and distribution model results (This data is requested)
Stratham Fire Suppression and Potable Water Supply Study, Wright Pierce, May 2010
Stratham Ground Water Supply Investigation Study, Wright Pierce, March 2011

Question: Are any distribution system or lift pump upgrades required in Exeter to convey the necessary water to Stratham?

Technical Resources:
Exeter water distribution hydraulic model results (This data is requested)

Question: Is additional distribution system storage required if Exeter supplies Stratham? Where would it be located?

Technical Resources:
Exeter water distribution hydraulic model results (This data is requested)
Stratham Fire Suppression and Potable Water Supply Study, Wright Pierce, May 2010
Stratham Ground Water Supply Investigation Study, Wright Pierce, March 2011

# ROCKINHAM PLANNING COMMISSION
# TECHNICAL FEASIBILITY BRAINSTORMING SESSION
# FEBRUARY 17, 2012

## TASK 1 TECHINCAL FEASIBILITY ISSUES
## COLLABORATION ON WASTEWATER

Question: Does Exeter have sufficient wastewater plant capacity to meet Stratham's needs?

Technical Resources:
Exeter wastewater current influent flow data (This data is requested)
Exeter WWTF flow projections (This data is requested)

Question: If not, would it be possible to amend the WWTF NPDES permit to increase the permitted capacity?

Technical Resources:
Feedback from DES and US EPA on the potential ramifications of this course of action (This data is requested)

Question: Can sufficient plant capacity be created through aggressive infiltration and inflow (I/I) Removal?

Technical Resources:
Results of Exeter's I/I Investigations (This data is requested)

Question: Can an interconnection wastewater be built? Where would it discharge? Where would it be located? What would it include? (i.e pump station, meter station, force main, inverted siphon?)

Technical Resources:
Limited investigation of alternatives to date.

Question: Are any collection system upgrades required in Exeter to convey Stratham's wastewater to the WWTF?

Technical Resources:
Exeter Collection System capacity information (This data is requested)
Sewer Map (This data is required)
Results of Exeter's I/I Investigations (This data is requested)

ROCKINHAM PLANNING COMMISSION
TECHNICAL FEASIBILITY BRAINSTORMING SESSION
FEBRUARY 17, 2012

# TASK 1 TECHINCAL FEASIBILITY ISSUES
# STRATHAM'S WATER AND WASTEWATER NEEDS

## POTABLE WATER

Question: Can a potable water source for Stratham be permitted and built?

Technical Resources:
Stratham Fire Suppression and Potable Water Supply Study, Wright Pierce, May 2010
Stratham Ground Water Supply Investigation Study, Wright Pierce, March 2011

Question: Can a potable water distribution system for Stratham be permitted and built?

Technical Resources:
Stratham Fire Suppression and Potable Water Supply Study, Wright Pierce, May 2010
Stratham Ground Water Supply Investigation Study, Wright Pierce, March 2011

Question: Will a storage tank be needed for the potable water system? Where will it be located?

Technical Resources:
Stratham Fire Suppression and Potable Water Supply Study, Wright Pierce, May 2010
Stratham Ground Water Supply Investigation Study, Wright Pierce, March 2011

## WASTEWATER

Question: Can a wastewater treatment plant for Stratham be permitted and built?

Technical Resources:
Stratham Wastewater Management Concept Plan Preliminary Report, Wright Pierce, May 2011

Question: Can a wastewater collection system for Stratham be permitted and built?

Technical Resources:
Stratham Wastewater Management Concept Plan Preliminary Report, Wright Pierce, May 2011

# ROCKINHAM PLANNING COMMISSION
# TECHNICAL FEASIBILITY BRAINSTORMING SESSION
# FEBRUARY 17, 2012

## TASK 1 TECHINCAL FEASIBILITY ISSUES
## EXETER'S WATER AND WASTEWATER NEEDS

## POTABLE WATER

Question: Does Exeter have sufficient potable water? Is additional water, such as that from the proposed Groundwater Plant, needed to supplement the existing water supplies?

Technical Resources:
Town of Exeter Water Supply Alternatives Study, Weston and Sampson, January 2010
Town of Exeter Water Efficiency and Management Plan Draft, Weston and Sampson, May 2011

Question: Is Exeter's water meeting required Water Quality Standards or are additional upgrades needed?

Technical Resources:
Town of Exeter Water Supply Alternatives Study, Weston and Sampson, January 2010
Town of Exeter Water Treatment Facility Desktop Study, Weston and Sampson, January 2011

Question: Is Exeter's potable water distribution system and existing water storage sufficient to deliver required water volumes to the Town?

Technical Resources:
Exeter water distribution hydraulic model results (This data is requested)

## WASTEWATER

Question: Does Exeter's wastewater treatment plant have sufficient capacity for the Town? Will it be upgraded to meet the proposed NPDES permit limits?

Technical Resources:
Exeter wastewater current influent flow data (This data is requested )
Exeter WWTF flow projections (This data is requested)

Question: Are ongoing improvements needed to Exeter's wastewater collection system to address I/I and Combined Sewer Overflow (CSO) issues?

Technical Resources:
Exeter Collection System capacity information (This data is requested)
Sewer Map (This data is requested)
Results of Exeter's I/I Investigations (This data is requested)

ROCKINGHAM PLANNING COMMISSION

156 Water Street, Exeter, NH 03833
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**Exeter-Stratham Intermunicipal Water and Wastewater Study**
**Technical Workshop**
**March 15, 2012**
**4:00 pm**
**Stratham Municipal Complex**
**Bunker Hill Avenue**
**Stratham, NH**

1. Review Key Discussion Items from Kick-off Meeting

2. Potable Water Infrastructure
    a. Stratham's Water System Improvements
        i. Proposed Phasing of Water System Expansion
        ii. Domestic Water Demands
        iii. Fire Flow Demands
    b. Exeter's water system demands and required infrastructure improvements
    c. Exeter's Available Potable Water Capacity
    d. Interconnection Options
    e. Impacts to Exeter's Water Distribution System
        i. Hydraulic modeling scenarios
        ii. Providing Fire Flows in Stratham
            1. Need for water storage tank
            2. Maintain separate Fire water system in initial phases
    f. Recommended Scenario for Evaluation

3. Wastewater Infrastructure
    a. Stratham's Wastewater System Improvements
        i. Proposed Phasing of wastewater system expansion
        ii. Wastewater system capacity needs
    b. Exeter's wastewater system demands and required infrastructure improvements
    c. Exeter's Available Wastewater Plant Capacity
        i. Feasibility of increased permitted capacity at the WWTF
            1. Effect of nitrogen removal permit limits
        ii. Feasibility of I/I removal to increase available capacity at the WWTF
    d. Interconnection Options
        i. Utilize existing Exeter Collection System/Main Sewage Pumping Station
        ii. Establish new interconnection directly to Exeter WWTP
    e. Impacts to Exeter's Wastewater Collection System
    f. Recommended Scenario for Evaluation

4. Next Steps

KLEINFELDER Bright People. Right Solutions. ▪ S E A S E A CONSULTANTS INC.

# MEETING MINUTES

| | |
|---|---|
| DATE OF MEETING: | March 15, 2012 |
| ATTENDEES: | See Attached Sign-in Sheet |
| RECORDED BY: | Kleinfelder / SEA |
| CC: | Attendees; file |
| SUBJECT: | Rockingham Planning Commission<br>Exeter / Stratham Inter-Municipal Water and Wastewater Study<br>Technical Workshop Meeting Minutes |
| S E A No.: | 2012063.01-A |

A Technical Workshop was held at 4:00 p.m. on March 15, 2012 at the Stratham Municipal Complex. The workshop was attended by representatives from Exeter, Stratham and the Rockingham Planning Commission to discuss the results of the capacity evaluation and to review and screen viable infrastructure alternatives developed by Kleinfelder (see attached Technical Workshop Agenda). Key items of discussion from the workshop are summarized below:

1. Review of Key Discussion Items from Kick-Off Meeting:

   - Since the kick-off meeting, Kleinfelder has been in contact with representatives from both Towns to gather additional information to assist with the capacity evaluation and development of infrastructure alternatives. Kleinfelder has also coordinated with the Town of Exeter's engineering consultant responsible for the current version of the water distribution system hydraulic model to perform simulations to assess the feasibility of sharing water service between the two towns.
   - The purpose of the Technical Workshop was reiterated. The objective of the workshop is to collectively discuss the feasibility of the infrastructure alternatives identified to date that have the potential to achieve a collaborative approach to water and wastewater service in both Towns, and to identify which infrastructure alternatives shall be evaluated further in preparation for the Infrastructure Cost Workshop in April. The infrastructure alternatives identified and developed as part of this study are not intended to represent the final recommended technical approach to establishing interconnections and sharing water and wastewater service between both towns. Rather, the alternatives are intended to provide

feasible technical options and realistic projections of capital costs that can be utilized during the financial analysis and modeling that will occur later in the study.

2. Potable Water Infrastructure

- Kleinfelder provided handouts of tables at the workshop identifying the assumptions and summarizing the feasibility analysis for potable water cooperation between both towns (refer to attached handouts).
- Demand projections and future system requirements for Stratham, assuming it moves forward independently, were reviewed. As outlined in the Town of Stratham's 2010 Fire Suppression and Potable Water Study Report, the potable water system in Stratham would expand in multiple phases. Initial phases would create an expanded fire protection system network to serve the larger commercial developments and extend to the Exeter Town Line. In the next phase, the system would be converted to potable water (including fire protection) by constructing a new well and groundwater treatment facility (if necessary), constructing a new water storage tank, and extending the 16-inch water main northward to Bunker Hill Avenue. A water demand of 150,000 gpd (average daily flow, ADF) is projected initially for this phase, increasing to approximately 350,000 gpd ADF at build-out conditions. In the final phase, the 16-inch water main would be extended from Bunker Hill Avenue to the Town Center at Winnicut Road. The Fire Suppression and Potable Water Study Report indicated higher flow capacities than those noted above. The projections in this report are based on very dense development and were noted to be quite aggressive. A revised flow of 600,000 GPD ADF for overall system design will be used for the purposes of this study.
- Future system upgrades for the Town of Exeter include a new groundwater treatment plant, which recently passed Town Meeting, and repairs and optimization of the water treatment plant, river pump station, reservoir, Skinner Wells, replacement of water pipe in Jady Hill neighborhood, and rehabilitation of the Hampton Road Tank. Water demand projections for Exeter range from 1.0 mgd ADF under existing conditions to 1.25 mgd ADF under future conditions. Maximum day demands (MDD) range from 1.7 mgd under existing conditions to 2.0 mgd under future conditions. Actual capacity of the water treatment plant ranges from 2.0 to 2.3 mgd. The capacity of the Lary Lane Well is approximately 0.25 mgd. Therefore, total capacity ranges from 2.25 mgd to 2.55 mgd, which is 0.55 mgd to 0.85 mgd above Exeter's current MDD, suggesting that spare capacity is available to accommodate the earlier phases of the Stratham water system development and expansion.

- The results of the technical evaluation performed thus far suggest that Exeter has surplus available potable water supply/treatment capacity it could provide to Stratham to meet the earlier phases of its water system development and expansion. Once Exeter constructs the new groundwater treatment plant, Exeter could provide water for the later phases of expansion of the Stratham water system, depending on the level of growth in Exeter.
- Recent hydraulic modeling performed by the Town of Exeter's engineering consultant confirmed that Exeter does not have sufficient distribution system capacity or storage volumes to provide reliable fire flows of 3,500 gpm to Stratham without making significant upgrades to its distribution system. Therefore, it is assumed that Stratham will require a water storage tank to meet its fire flow needs unless a separate fire protection system(s) is maintained.
- The recent hydraulic modeling suggests that Exeter could supply the maximum day demand to Stratham at the full build-out condition, meaning that Exeter could potentially serve as the primary water supply source to Stratham, provided that Stratham meets peak hour and fire flow needs through the construction of the water storage tank.
- The possible physical infrastructure to provide a water interconnection between Stratham and Exeter was discussed. The interconnection would consist of a meter vault located near the Route 101/108 interchange. The water line interconnection should be located on the east side of Route 108.
- It was agreed that Kleinfelder will prepare capital costs for the following potable water improvements in advance of the Infrastructure Cost Workshop:

  1) Costs to install water distribution system in Stratham from Exeter Town line to Bunker Hill Avenue, utilizing the existing 24-inch steel sleeves under Route 101 on the east side of Route 108. Costs to extend the water distribution system beyond Bunker Hill Avenue will not be prepared as those later phases are expected to occur beyond the 20 year planning period.

  2) Costs to construct a water interconnection and meter station with a total capacity of 1,080,000, or the projected maximum day demand for the full build-out condition (i.e. extension of water system to Winnicut Road). The water interconnection will likely occur on the eastern side of Route 108, not on the western side as shown on PowerPoint Slide shown at the Workshop.

  3) Costs to construct a 1,000,000 gallon storage tank on Bunker Hill.

3. Wastewater Infrastructure

- Kleinfelder provided handouts of tables at the workshop identifying the assumptions and summarizing the feasibility analysis for wastewater cooperation between both towns (refer to attached handouts).
- Wastewater flow projections and future system requirements for Stratham, assuming it moves forward independently, were reviewed. As outlined in the Town of Stratham's 2011 Wastewater Management Concept Plan Report, the wastewater system in Stratham would expand in multiple phases, similar to the proposed potable water system. The initial phase would create a wastewater collection system to serve the area along Route 108 between Route 101 and Frying Plan Lane, a wastewater treatment facility (WWTF) at the Industrial Park to treat only Stratham flows, an adjacent groundwater discharge system to handle treated flows, and a pump station to convey flows from the collection system to the wastewater treatment facility. For this initial phase, wastewater flows of 165,000 gpd ADF are projected (180,000 gpd including Industrial Park flows). In the next phase, the system would extend northerly to Bunker Hill Avenue and the WWTF would be expanded to handle projected flows of 390,000 gpd ADF (440,000 gpd including Industrial Park flows). And in the final phase, the collection system would extend northerly again to the Stratham Town Center at Winnicut Road, and the WWTF would be expanded to handle projected flows of 660,000 gpd ADF (715,000 gpd including Industrial Park flows). The flow projections noted above were determined by increasing the potable water use projections previously discussed by 10 percent to account for infiltration and inflow. The flow projections provided in the Wastewater Management Concept Plan Report are somewhat higher than those presented above and are thought to be somewhat aggressive. The reduced flows, based on estimated potable water use, will be used for this study.
- The key issue currently facing the Town of Exeter, irrespective of infrastructure sharing, is the need to upgrade its wastewater treatment facility (WWTF) to meet projected demands and to meet forthcoming U.S.E.P.A nutrient (i.e. total nitrogen) removal requirements. The current capacity of the WWTF is 3.0 mgd ADF, which equates to 2.4 mgd ADF permitted capacity based on the U.S.E.P.A. 80% rule. The peak flow capacity of the WWTF is currently 7.5 mgd. Currently, flows to the WWTF average approximately 2.0 mgd, with a peak flow of approximately 6.0 mgd. Therefore, there is approximately 400,000 gpd of spare capacity at the

Exeter WWTF (2.4 mgd – 2.0 mgd). During the Workshop it was discussed that if half of Exeter's spare capacity were made available to Stratham, then Stratham could discharge up to 200,000 gpd of wastewater to Exeter's WWTF, which corresponds approximately to projected flows during the initial phase of Stratham's sewer system expansion.

- In communications with the RPC and the Town of Exeter subsequent to the workshop, however, it was acknowledged that Exeter will need to reserve additional spare capacity to address potential growth in Town moving forward. Therefore, it should be assumed that there is limited available spare capacity at the Exeter WWTF to accommodate wastewater flows from Stratham. The Feasibility Summary Tables will be modified to show Exeter's reserved future wastewater plant capacity allocation, similar to the Table for potable water use.
- A key finding from the evaluation performed to date is that an expansion of the Exeter WWTF is likely necessary before any wastewater flows are received from Stratham. Alternatively, removal of some portion of the estimated 1,000,000 gpd in extraneous I/I flow from Exeter's wastewater collection system has the potential to free up sufficient capacity to allow Exeter to receive flows from Stratham without a plant expansion, at least for the initial phases of the Stratham sewer system expansion.
- Exeter's collection system at the northern part of Route 108 has capacity limitations at the Webster Avenue Pump Station, the Squamscott River crossing, and the Main Pump Station and does not have excess capacity to receive wastewater flows from Stratham.
- Due to the capacity limitations in Exeter's existing wastewater collection system cited above, interconnection between Stratham and Exeter would need to consist of a pump station in Stratham and a dedicated force main directly to the Exeter WWTF. A possible location for the new pump station and the alignment for the force main was presented (see attachments) and discussed. There was general consensus that the possible location of the pump station and the force main alignment as shown on the handout was sufficient for the purposes of this study. The route of the forcemain for the interconnection will need to be modified to account for the presence of several gas lines in immediate vicinity to the propsed force main.
- It was agreed that Kleinfelder will prepare capital costs for the following wastewater improvements in advance of the Infrastructure Cost Workshop:

1) Costs to install wastewater collection system in Stratham from Exeter Town line to Bunker Hill Avenue.

2) Costs to extend the wastewater collection system in Stratham from Bunker Hill Avenue to Town Center at Winnicut Road.

3) Costs to construct a wastewater interconnection with a total capacity of 2.64 mgd (projected peak hour flow at full build-out condition when extended to Winnicut Road). Interconnection infrastructure shall assume to consist of a pump station and a dedicated force main directly to the Exeter WWTF as shown on the handouts provided by Kleinfelder at the workshop. Directional drilling shall be assumed for installation of the new force main across Route 101 and the Swampscott River.

4) Costs to expand the Exeter WWTF to receive wastewater flows from Stratham. WWTF plant expansion will focus on the initial and secondary phases of the new wastewater collection system in Stratham (i.e. initial flows of 165,000 gpd increasing to potentially 390,000 gpd when the system is extended to Bunker Hill Avenue). Costs to expand the Exeter WWTF to reflect flows for the final phase (to Winnicut Road) will not be developed as this phase is expected to occur beyond the 20 year planning period. Costs will be developed assuming total nitrogen removal requirements of both 8 mg/L and 3 mg/L.

5) Costs to remove I/I from Exeter wastewater collection system in order to free up additional spare capacity at the Exeter WWTF wil also be assessed.

6) Determining the balance of WWTF expansion improvements and I/I removal improvements in order to accommodate the increased flows from Stratham was not determined at the workshop. Kleinfelder will continue to assess how best to balance these improvements and will develop costs accordingly in preparation for the April Infrastructure Cost Workshop.

Next Meeting:

The Infrastructure Cost Workshop will be held on April 19, 2012 at 4:00 p.m. at the Stratham Municipal Complex. This workshop will focus on the costs associated with the

screened technical alternatives summarized above, with the goal of selecting the most viable water and wastewater alternative(s) to include in the subsequent economic analysis and model.

Attachments

List of Attendees

Handouts distributed at meeting listing Technical Feasibility Issues

PowerPoint slides shown at Meeting

ROCKINGHAM PLANNING COMMISSION

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**Exeter-Stratham Intermunicipal Water and Wastewater Study**
**Technical Workshop**
**March 15, 2012**
**4:00 pm**
**Stratham Municipal Complex**
**Bunker Hill Avenue**
**Stratham, NH**

1. Review Key Discussion Items from Kick-off Meeting

2. Potable Water Infrastructure
    a. Stratham's Water System Improvements
        i. Proposed Phasing of Water System Expansion
        ii. Domestic Water Demands
        iii. Fire Flow Demands
    b. Exeter's water system demands and required infrastructure improvements
    c. Exeter's Available Potable Water Capacity
    d. Interconnection Options
    e. Impacts to Exeter's Water Distribution System
        i. Hydraulic modeling scenarios
        ii. Providing Fire Flows in Stratham
            1. Need for water storage tank
            2. Maintain separate Fire water system in initial phases
    f. Recommended Scenario for Evaluation

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        i. Proposed Phasing of wastewater system expansion
        ii. Wastewater system capacity needs
    b. Exeter's wastewater system demands and required infrastructure improvements
    c. Exeter's Available Wastewater Plant Capacity
        i. Feasibility of increased permitted capacity at the WWTF
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        ii. Establish new interconnection directly to Exeter WWTP
    e. Impacts to Exeter's Wastewater Collection System
    f. Recommended Scenario for Evaluation

4. Next Steps

S E A

S E A CONSULTANTS INC.
Scientists/Engineers/Architects

| CLIENT: | JOB NO: | PAGE: |
|---|---|---|
| PROJECT: | COMPTD BY: | DATE: |
| DETAIL: | OK'D BY: | DATE: |

# TECHNICAL WORKSHOP

## March 15, 2012

| Name | Organization | e-mail |
|---|---|---|
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| Cliff Sinnott | RPC | csinnott@rpc-nh.org |
| Paul Deschaine | Stratham | pdeschaine@strathamnh.gov |

| | Description | Potable Water Demand Projections | System Requirements |
|---|---|---|---|
| Phase 1 | Provide interconnected fire protection system for existing commercial developments including Shaws, King Plaza, Staples, and Market Basket | Fire Flow Only | Fire Flow Only |
| Phase 2 - Assume for Fire Protection Only | Expansion of the system to the south to the Town Line. | Fire Flow Only | Fire Flow Only |
| Phase 1 + 2 Conversion to Potable Water | Convert Fire Protection System to Potable Water. Requires Implementation of Phase 3. | 33,120 GPD estimated current demand[1]<br>518,350 GPD estimated at Build-out[1]<br>Assume a total system demand of 150,000 GPD (average daily flow rate). | Max Day Flow 270,000 GPD at HGL of ≈ 230 feet. (PF = 1.8xADF)[1]<br>Peak Hour Flow Rate = 281 GPM at HGL of ≈ 230 feet. (PF = 1.5xPDF)[1]<br>Peak Fire Flow Rate = 3,500 GPM[1] at HGL of ≈ 195 feet |
| Phase 3 | Expansion of System to Bunker Hill Avenue. | 20,900 GPD estimated current demand[1]<br>188,860 GPD estimated at Build-out[1]<br>Assume a total system demand of 350,000 GPD (average daily flow rate). | Max Day Flow 630,000 GPD at HGL of ≈ 230 feet. (PF = 1.8xADF)[1]<br>Peak Hour Flow Rate = 655 GPM at HGL of ≈ 230 feet. (PF = 1.5xPDF)[1]<br>Peak Fire Flow Rate = 3,500 GPM[1] at HGL of ≈ 195 feet |
| Phase 4 | Expansion of System to Winnicut Road and the Town Center. | 43,080 GPD estimated current demand[1]<br>70,070 GPD estimated at Build-out[1]<br>Total Phases 1-4 = 777,280 GPD[1]<br>Assume a total system demand of 600,000 GPD[3] (average daily flow rate). | Max Day Flow 1,080,000 GPD at HGL of ≈ 230 feet. (PF = 1.8xADF)[1]<br>Peak Hour Flow Rate = 1,125 GPM at HGL of ≈ 230 feet. (PF = 1.5xPDF)[1]<br>Peak Fire Flow Rate = 3,500 GPM[1] at HGL of ≈ 195 feet |

| | Assumed Infrastructure Improvements | Feasibility Assessment | Costs |
|---|---|---|---|
| Physical Interconnection With Exeter | None | N/A | |
| | | | |
| Potable Water Supply - Phase 1 | None, Fire Protection Only | Feasible | |
| Potable Water Supply - Phase 2 | None, Fire Protection Only | Feasible | |
| Potable Water Supply - Phase 3 | Construct a well with required capacity. Likely sites include the Scamman and Goodrich sites.[2]<br>Construct a water treatment plant to treat well water, pending water quality. | Groundwater supply for Stratham appears to be feasible based on hydrogeologic investigations to date. | |
| Potable Water Supply - Phase 4 | Construct additional well(s) if additional capacity is required. | Appears feasible based on hydrogeologic investigations to date. | |
| | | | |
| Water Distribution - Phase 1 | Interconnect existing fire water piping. | Feasible | |
| Water Distribution - Phase 2 | Extend a 16" water main on 108 from Town line south of Route 101 (use pipe sleeve) To North extends to Honda Barn.[1] | Feasible | |
| Water Distribution - Phase 3 | Extend a 16" water main from end of existing system to Bunker Hill Avenue. Include a 16" extension to new water storage tank and to new well and treatment plant.[1] | Feasible | |
| Water Distribution - Phase 4 | Extend a 16" water main from end of existing system to Winnicut Road and the Town Center.[1] | Feasible | |
| | | | |
| Water Storage Phase 1 | No potable water storage tank, use existing fire water ponds and reservoirs. | N/A | |
| Water Storage Phase 2 | No potable water storage tank, use existing fire water ponds and reservoirs. | N/A | |
| Water Storage Phase 3 | Build 1,000,000 gallon Storage Tank at 28 Bunker Hill.[2] | Feasible | |
| Water Storage Phase 4 | No Additional storage proposed. | N/A | |

Assumptions and Feasibility Analysis For Potable Water Cooperation – Exeter Works Independently

| Description | Existing Plant Capacity | Potable Water Demand Projections |
|---|---|---|
| Satisfy current and future demands | Plant Nominal Capacity ≈ 2.3 mgd[4]<br>Plant Actual Capacity:<br>Summer 2.0 MGD[5]<br>Winter 2.3 MGD2[5]<br>Reservoir and River Safe Yield ≈ 2.6 MGD[4]<br><br>Lary Lane Well: Current Estimated Capacity = 0.25 MGD[6]<br><br>Stadium and Gilman Park wells not in service<br><br>System HGL ≈ 230 feet | 1.0 MGD current average day demand[6]<br>1.7 MGD current max day flow rate[6]<br><br>1.25 MGD projected future average day demand (from unnamed 2007 study).<br>Assume 2.0 MGD projected future max day flow rate |

| | Assumed Infrastructure Improvements | Feasibility Assessment | Costs |
|---|---|---|---|
| Physical Interconnection With Stratham | None | N/A | |
| | | | |
| Potable Water Supply Upgrades - Project 1 | Construct Groundwater WTP to diversify water supply | Feasible | |
| Potable Water Supply Upgrades - Project 2 | Repairs and optimization of existing water supply infrastructure including WTP, river pump station, reservoir, and Skinner Wells. | Feasible | |
| | | | |
| Water Distribution Upgrades – Project 1 | Replacement water meters for improved billing and reduced unaccounted for water. | Feasible | |
| Water Distribution Upgrades – Project 2 | Replacement of water pipe in Jady Hill neighborhood. | On going | |
| Water Distribution Upgrades – Project 3 | Future or ongoing water line rehabilitation. | Feasible | |
| | | | |
| Water Storage Upgrades | None, recently completed tank provides sufficient storage for for-seeable future.[5] | N/A | |

Assumptions and Feasibility Analysis For Wastewater Cooperation – Stratham Works Independently

| | Description | Wastewater Generation Projections | System Requirements |
|---|---|---|---|
| Phase 1 | Provide sanitary sewer for existing commercial developments from Frying Pan Lane to the Stratham Town Line. | 96,000 GPD estimated current demand[7] (This is high compared to estimated potable water use and based on acerage instead of customer counts).<br>395,000 GPD estimated at Build-out[7]<br>10,000 GPD estimated current industrial flows<br>Potable water estimate = 150,000 GPD after Phase 1.<br>Assume a total system demand of 180,000 GPD with the Industrial Park and 165,000 GPD without it[2] (ADF). | Max Daily Flow = 490,000 GPD (MDF = 2.7xADF)[9]<br>Peak Hour Flow Rate = 610 GPM (PF = 4.9xADF)[9] |
| Phase 2 | Expansion of Sewer System to Bunker Hill Avenue. | 32,000 GPD estimated current demand[7]<br>132,000 GPD estimated at Build-out[7]<br>50,000 GPD estimated current industrial flows.<br>Potable water estimate = 350,000 GPD after Phase 2.<br>Assume a total system demand of 440,000 GPD with the Industrial Park and 390,000 GPD without it[8] (ADF). | Max Daily Flow = 1,060,000 GPD (MDF= 2.4xADF)[9]<br>Peak Hour Flow Rate = 1,280 GPM (PF = 4.2xADF)[9] |
| Phase 3 | Expansion of Sewer System to Winnicut Road and the Town Center. | 47,500 GPD estimated current demand[7]<br>56,500 GPD estimated at Build-out[7]<br>Potable water estimate = 600,000 GPD after Phase 2.<br>Assume a total system demand of 715,000 GPD with the Industrial Park and 660,000 GPD without it[8] (ADF). | Max Daily Flow = 1,640,000 GPD (MDF = 2.3xADF)[9]<br>Peak Hour Flow Rate = 1,990 GPM (PF = 4.0xADF)[9] |

| | Assumed Infrastructure Improvements | Feasibility Assessment | Costs |
|---|---|---|---|
| Physical Interconnection With Exeter | None | N/A | |
| | | | |
| Collection System - Phase 1 | Install collection system in Phase 1 area (from Frying Pan Lane to the Town line) with a pump station pumping to new Stratham WWTF.[7] | Feasible – Will require a long force main. | |
| Collection System - Phase 2 | Expand collection system from end of existing system to Bunker Hill Avenue.[7] | Feasible | |
| Collection System - Phase 3 | Expand collection system from end of existing system to Winnicut Road and the Town Center. Construct new Pump Station at Town Center.[7] | Feasible | |
| | | | |
| Wastewater Treatment Capacity - Phase 1 | Construct a Wastewater Treatment Facility at the Site of the Industrial Park as well as groundwater discharge with average day capacity of at least 180,000 GPD. | It will be challenging to permit this facility and expensive to construct. | |
| Wastewater Treatment Capacity - Phase 2 | Expand Stratham Wastewater Treatment Facility and groundwater discharge infrastructure to an increased capacity of at least 440,000 GPD. | May be difficult to construct a large enough infiltration bed at the WWTP site to discharge the required capacity. | |
| Wastewater Treatment Capacity - Phase 3 | Expand Stratham Wastewater Treatment Facility and groundwater discharge infrastructure to an increased capacity of approximately 715,000 GPD. | Likely not feasible to construct a large enough infiltration bed at the WWTP site to discharge the required capacity. Second site required. | |

Assumptions and Feasibility Analysis For Wastewater Cooperation – Exeter Works Independently

| Description | Existing Plant Capacity | Wastewater Generation Projections |
|---|---|---|
| Satisfy current and future demands | Plant Capacity:<br>Average Daily Flow = 3.0 MGD[10]<br>Allowable Flow per EPA = 2.4 MGD<br>(80% of ADF per permit condition)<br>Peak Flow = 7.5 MGD[10] | 2.0 MGD current average day demand[11]<br>6.0 MGD current peak demand[11]<br>(90th percentile of recent 2 years)<br><br>No recent projected flow information available. |

| | Assumed Infrastructure Improvements | Feasibility Assessment | Costs |
|---|---|---|---|
| Physical Interconnection With Stratham | None | N/A | |
| | | | |
| Collection System Upgrades – Project 1 | Replacement of pipe and I/I reduction in Jady Hill neighborhood. | On-going | |
| Collection System Upgrades – Project 2 | Collection system improvements to remedy CSO. | Feasible | |
| Collection System Upgrades – Project 3 | Ongoing sewer line rehabilitation and I/I removal. | Feasible | |
| Collection System Upgrades – Project 4 | Ongoing pump station improvements | Feasible | |
| | | | |
| Wastewater Treatment Upgrades - Project 1 | Facility Plan for Upgraded WWTF | Feasible | |
| Wastewater Treatment Upgrades - Project 2 | New WWTF to meet nitrogen permit limit. | Feasible | |

# POTABLE WATER COLLABORATION

## Key Findings of Feasibility Assessment

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

Potable Water Supply – Exeter currently has approximately 150,000 GPD of available potable water supply (average daily flow) it could provide to Stratham until the proposed Groundwater Plant is constructed and the additional wells are redeveloped. Exeter will have significant additional capacity it could provide to Stratham after the proposed Groundwater plant is constructed.

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

Distribution Study – Exeter's distribution system has sufficient capacity to provide maximum day potable water needs to Stratham at buildout 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. Alternatively, Stratham could provide a separate fire control system for fire protection during initial phases of the project by using or interconnecting existing fire protection systems (cisterns, ponds, etc).

## Recommended Technical Assumptions for Developing Costs for a Collaborative Approach

Determine the Following Capital Costs:

- Costs to install a distribution system in Stratham from the Exeter Town line to Bunker Hill (Phases 1-3). Use the existing 24 inch sleeves for the water line.
- Costs to construct a water interconnection and meter station with a total capacity of 750 GPM (to meet the projected peak hourly flow at build-out of 1,080,000 GPD).
- Costs to construct a 1,000,000 gallon ground storage tank on Bunker Hill.
- Costs to upgrade the infrastructure in Exeter to supply water at 150,000 GPD, 350,000 GPD, and 600,000 GPD.
- Costs to expand the distribution system to the Town Center in the future (Phase 4)

WASTEWATER COLLABORATION

## Key Findings of Feasibility Assessment

Wastewater Collection System - Exeter's collection system at the northern part of Route 108 has capacity limitations at the Webster Ave pump station, Squamscott River crossing and the Main Pump Station and does not have excess capacity to handle flows from Stratham.

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.

Wastewater Supply – Exeter currently has approximately 200,000 GPD of available wastewater supply (average daily flow) it could provide to Stratham. However, Exeter has no available peak capacity. Thus, even at initial stages, some amount of infiltration and inflow (I/I) will need to be removed from Exeter's system prior to accepting flow from Stratham.

- If Stratham requests more than 200,000 GPD of wastewater capacity on an average daily basis, either the WWTF will need to be expanded or additional I/I will need to be removed from Exeter's collection system.
- Estimates for I/I in Exeter are approximately 900,000 to 1,000,000 GPD on an annual average basis.[12] If Exeter could successfully remove 40% to 50% of the I/I, Exeter could provide up to 400,000 GPD of capacity to Stratham on an average day basis.
- Additional I/I removal above the 40 to 50% level above would likely be expensive and is not considered a viable approach. If Stratham requests more than 400,000 GPD of wastewater capacity on an average daily basis, the WWTF will need to be expanded.

## Recommended Technical Assumptions for Developing Costs for a Collaborative Approach

Determine the Following Capital Costs:

- Costs to install a wastewater collection system in Stratham from Route 101 to Bunker Hill (Phases 1&2).
- Costs to construct a wastewater interconnection with a total capacity of 1,830 GPM (to meet the projected max day flow at build-out).
    - Likely option is a pump station with dedicated forcemain pumping directly to the Exeter WWTF. Forcecmain to be installed using directional drilling or micro-tunneling approaches.
- Costs to upgrade the infrastructure in Exeter to manage the following additional wastewater flows from Stratham: 165,000 GPD, 390,000 GPD, and 660,000 GPD.
    - Two options are available; 1 – Reduce Infiltration and Inflow, and 2 – WWTF Expansion
- Costs to expand the wastewater collection system to the Town Center and construct an additional pump station at the Town Center in the future (Phase 3)

# 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.

ROCKINGHAM PLANNING COMMISSION

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**Exeter-Stratham Intermunicipal Water and Wastewater Study**
**Infrastructure Cost Workshop**
**April 19, 2012**
**4:00 pm**
**Stratham Municipal Complex**
**Bunker Hill Avenue**
**Stratham, NH**

1. Review Key Discussion Items from Technical Workshop
    a. Potable Water Infrastructure Alternatives
    b. Wastewater Infrastructure Alternatives

2. Review Options for Treating Stratham Wastewater Flows at Exeter WWTF
    a. Current Exeter WWTF Capacity and Flow Contribution
    b. Discuss Options for Creating Additional Spare WWTF Capacity
        i. WWTF Expansion
        ii. Removal of I/I from Exeter System
        iii. Tap into EPA "20% Set Aside"
        iv. Combined, Balanced Approach
    c. Review Proposed Approach

3. Cost Analysis for Potable Water Alternatives
    a. Stratham Works Independently
    b. Exeter Works Independently
    c. Exeter Supplies Water to Stratham
    d. Comparison of Water Options

4. Cost Analysis for Wastewater Alternatives
    a. Stratham Works Independently
    b. Exeter Works Independently
    c. Exeter Supplies Water to Stratham
    d. Comparison of Wastewater Options

5. Next Steps
    a. Schedule Financial Collaboration Workshop

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# MEETING MINUTES

| | |
|---|---|
| DATE OF MEETING: | April 19, 2012 |
| ATTENDEES: | See Attached Sign-in Sheet |
| RECORDED BY: | Kleinfelder / SEA |
| CC: | Attendees; file |
| SUBJECT: | Rockingham Planning Commission<br>Exeter / Stratham Inter-Municipal Water and Wastewater Study<br>Infrastructure Costs Workshop Meeting Minutes |
| S E A No.: | 2012063.01-A |

The Infrastructure Costs Workshop was held at 4:00 p.m. on April 19, 2012 at the Stratham Municipal Complex. The workshop was attended by representatives from Exeter, Stratham and the Rockingham Planning Commission to review the results of the Technical Alternatives Workshop and discuss costs for the feasible alternatives developed by Kleinfelder (see attached Infrastructure Cost Workshop Agenda, PowerPoint presentation, and Handouts). Key items of discussion from the workshop are summarized below:

1. Review of Key Discussion Items from Technical Workshop:

- Kleinfelder presented two PowerPoint slides at the workshop identifying the assumptions and summarizing the feasibility analysis for potable water and wastewater cooperation between both towns (refer to the attached PowerPoint presentation).
- Potable Water Infrastructure Alternatives: The proposed alternatives for water infrastructure were reviewed. This included the baseline alternative for Stratham working independently, the baseline alternative for Exeter working independently, and the most feasible collaborative approach agreed to at the Technical Workshop. The agreed upon collaborative approach consists of Stratham constructing a distribution system from Route 101 up to Bunker Hill Avenue, a new water tank on Bunker Hill, and a water interconnection under Route 101 using existing pipe sleeves on the east side of Route 108. Exeter would supply water from capacity that will be available after a new Groundwater Treatment Plant is constructed.

- Wastewater Infrastructure Alternatives: The proposed alternatives for wastewater infrastructure were reviewed. This included the baseline alternative for Stratham working independently, the baseline alternative for Exeter working independently, and the most feasible collaborative approach agreed to at the Technical Workshop. The agreed upon collaborative approach consists of Stratham constructing a wastewater collection system from Bunker Hill Avenue to Route 101 and a new pump station adjacent to Shaws pumping directly to the Exeter WWTF using a series of directional drills to cross Route 101 and the Squamscott River. Discussion of available capacity at the WWTF was deferred until the next agenda item.
- There was general consensus that the technical approaches presented represented a reasonable alternative for ongoing costs analysis and discussion.

2. Treating Stratham Wastewater Flows at the Exeter WWTF:

- Kleinfelder presented a series of PowerPoint slides at the workshop presenting available capacity at the Exeter WWTF (refer to attached PowerPoint presentation).
- Existing capacity at the Exeter WWTF was reviewed. Current wastewater flow is 1.0 MGD, and infiltration and inflow (I/I) is an additional 1.0 MGD. In addition, the Town of Exeter has expressed a preference to set aside up to 0.4 MGD for future development. Finally, Exeter's NPDES permit has an 80% threshold at which further evaluation is required. This EPA set aside, at 20% of the permitted flow rate, is equivalent to 0.6 MGD.
- Four ways of creating extra capacity at the existing Exeter WWTF were presented:
    1. Increase capacity of WWTF.
    2. Reduce Infiltration and Inflow.
    3. Tap into the 20% EPA set aside capacity.
    4. Combination of Items above.
- Increasing WWTF capacity is going to be very difficult to permit. Therefore, Kleinfelder proposed an approach for capacity sharing consisting of two phases. In Phase 1, Stratham would be provided with a plant capacity allotment of a certain flow (0.25 MGD was indicated). Plant capacity for this initial allotment would be provided by using the capacity in the EPA set aside and allowing flows at the WWTF to exceed the 80 percent threshold. In the future, as growth in Stratham

dictated, a second allotment would be provided (an additional 0.14 MGD at year 10 was assumed). Plant capacity for this second allotment would be provided by reducing I/I in the Exeter system. There was consensus among the attendees regarding this assumed phased approach.

- At the Technical Workshop, it was inferred that the plant capacity at the Exeter WWTF should be capped at 2.4 MGD, to preserve 0.6 MGD for the 20% set aside that EPA includes in all NPDES permits. However, that set aside is a threshold at which EPA may require a plant capacity study, and Exeter is not incumbent to cap plant flows to 2.4 MGD. Thus, it appears that Exeter does have some amount of available capacity for Stratham if it discharges wastewater to the Exeter WWTF.
- Discussion continued on growth in Exeter, current wastewater generation trends in Exeter, wastewater projections for Stratham, industry trends in water reduction and decreased per-capita wastewater generation. Based on the conversations, there was general agreement that a large change in per-capita wastewater flow is not anticipated.
- There was some concern that the I/I reduction needed to free up future capacity may be difficult to achieve. Several projects are on-going in Exeter, but to date there are no validated results. As I/I projects are undertaken and leaking pipes and structures are repaired, condition of other system infrastructure is getting worse. It is a continual process. Despite the uncertainty regarding the level of future I/I removal, there was agreement that the assumed phased approach to creating additional capacity at the Exeter WWTF was valid for the purposes of this study.
- An issue was raised whether Stratham, if it collaborated with Exeter, would fall under the proposed Adaptive Management Plan. This would require Stratham to actively engage in other projects to reduce nitrogen loading to the Great Bay from non-point sources. It was the general consensus that Stratham would be required to meet these other requirements if they collaborate. Representatives from Stratham did not think that such a requirement was a major impediment to a collaborative approach, particularly since other similar regulatory requirements could still be placed upon Stratham in the future.
- The workshop attendees then discussed the possibility of meeting with the EPA and DES to explore these WWTF permitting issues and the proposed collaboration in more detail. It was noted that the EPA may see it as an advantage for Stratham's wastewater infrastructure system to become regulated. It was agreed that a meeting with EPA should be planned before Exeter's final permit is issued.

- A related permitting issue was brought up regarding potable water supply and minimum stream flow requirements in the Exeter River. In general, with overall water use trending flat, this is not expected to be a significant hindrance to collaboration on potable water.

3. Costs Analysis for Potable Water Alternatives

- Kleinfelder provided handouts of tables at the workshop identifying the assumptions and summarizing the infrastructure capital and operating costs for the three potable water alternatives (Baseline Cost for Stratham to work alone, Baseline Cost for Exeter to work alone, and costs if the two towns collaborated). The handout also included a table that compared the costs of potable water options and calculated the savings of a collaborative approach (refer to attached handouts).
- There was general consensus that the capital and operating costs presented seem valid and sufficiently documented.
- Several attendees suggested that the costs as presented and summarized did not clearly demonstrate the costs and savings associated with a collaborative approach. A more granular presentation of the costs and savings of the collaborative approach was requested; one which eliminated all of the costs inherent to the two individual towns working alone and focusing on those costs specific to collaboration.
- Kleinfelder agreed to prepare an alternative method to present the costs for review and discussion.
- Several attendees asked how the benefits of the collaborative approach would be included in the analysis, such as the storage tank redundancy or mutual aid. It was noted that quantifying these items was not in the scope of the project, as addressing these issues typically involve additional technical analysis such as hydraulic computer modeling. However, these other potential benefits will be listed as non-financial benefits of collaboration in the report, but not included in the cost model.

4. Costs Analysis for Wastewater Alternatives

- Kleinfelder provided handouts of tables at the workshop identifying the assumptions and summarizing the infrastructure capital and operating costs for

the three wastewater alternatives (Baseline Cost for Stratham to work alone, Baseline Cost for Exeter to work alone, and costs if the two towns collaborated). The handout also included a table that compared the costs of wastewater options and calculated the savings of a collaborative approach (refer to attached handouts). Costs were presented assuming both a 8 mg/L and a 3 mg/L permit limit for Total Nitrogen at the Exeter WWTF.

- There was a question and concern that the assumed unit costs for future I/I removal were not accurate. The source of the assumed unit costs was the costs for the Jady Hill project. However, following additional discussion at the Workshop it was determined that it may not be fair or accurate to simply extrapolate those costs. Kleinfelder will further explore methods and prices for I/I reduction as the costs are finalized. Kleinfelder will also contact Paul Vlasich at the Town of Exeter to better understand the Jady Hill costs.
- Other than the I/I removal costs, the general consensus was that the capital and operating costs presented seem valid and sufficiently documented.
- As with the potable water costs, several attendees suggested that the wastewater alternative costs as presented and summarized did not clearly demonstrate the costs and savings associated with a collaborative approach. A more granular presentation of the costs and savings of the collaborative approach was requested; one which eliminated all of the costs inherent to the two individual towns working alone and focusing on those costs specific to collaboration.
- Kleinfelder agreed to prepare an alternative method to present the costs for review and discussion.

Next Meeting:

The Financial Collaboration Workshop will be held on May 17, 2012 at 4:00 p.m. at the Stratham Municipal Complex. This workshop will focus on reviewing non-cost qualitative factors associated with water and wastewater collaboration and a review of the various ownership alternatives to achieve collaboration.

Attachments:

List of Attendees
Meeting Agenda
PowerPoint slides shown at Meeting
Costs Analysis Handouts distributed at Meeting

S E A

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Scientists/Engineers/Architects

| CLIENT: | JOB NO: | PAGE: |
|---|---|---|
| PROJECT: | COMPTD BY: | DATE: |
| DETAIL: | OK'D BY: | DATE: |

# Infrastructure Cost Workshop

| Name | Organization | Phone |
|---|---|---|
| Rob McCoy | KLF/SEA | 227-2312 |
| David Canada | Stratham | 775-5778 |
| Jennifer Perry | Exeter | 773-6157 |
| Lincoln Daley | Stratham | 772-7391 |
| Paul Deschaine | Stratham | 772-7391 x181 |
| Theresa Walker | RPC | 778-0885 x112 |
| Donald Clement | Exeter | 778-0238 |
| Mark Thompson | SEA | |
| David Michelsen | KLF/SEA | 227-2327 |
| John Bosnert | Stratham | 913-2328 |
| Cliff Sinnott | RPC | |
| Russell Dean | Exeter | |

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5. Next Steps
    a. Schedule Financial Collaboration Workshop

# Exeter-Stratham Intermunicipal Water and Wastewater Study
# Infrastructure Costs Workshop
# April 19, 2012

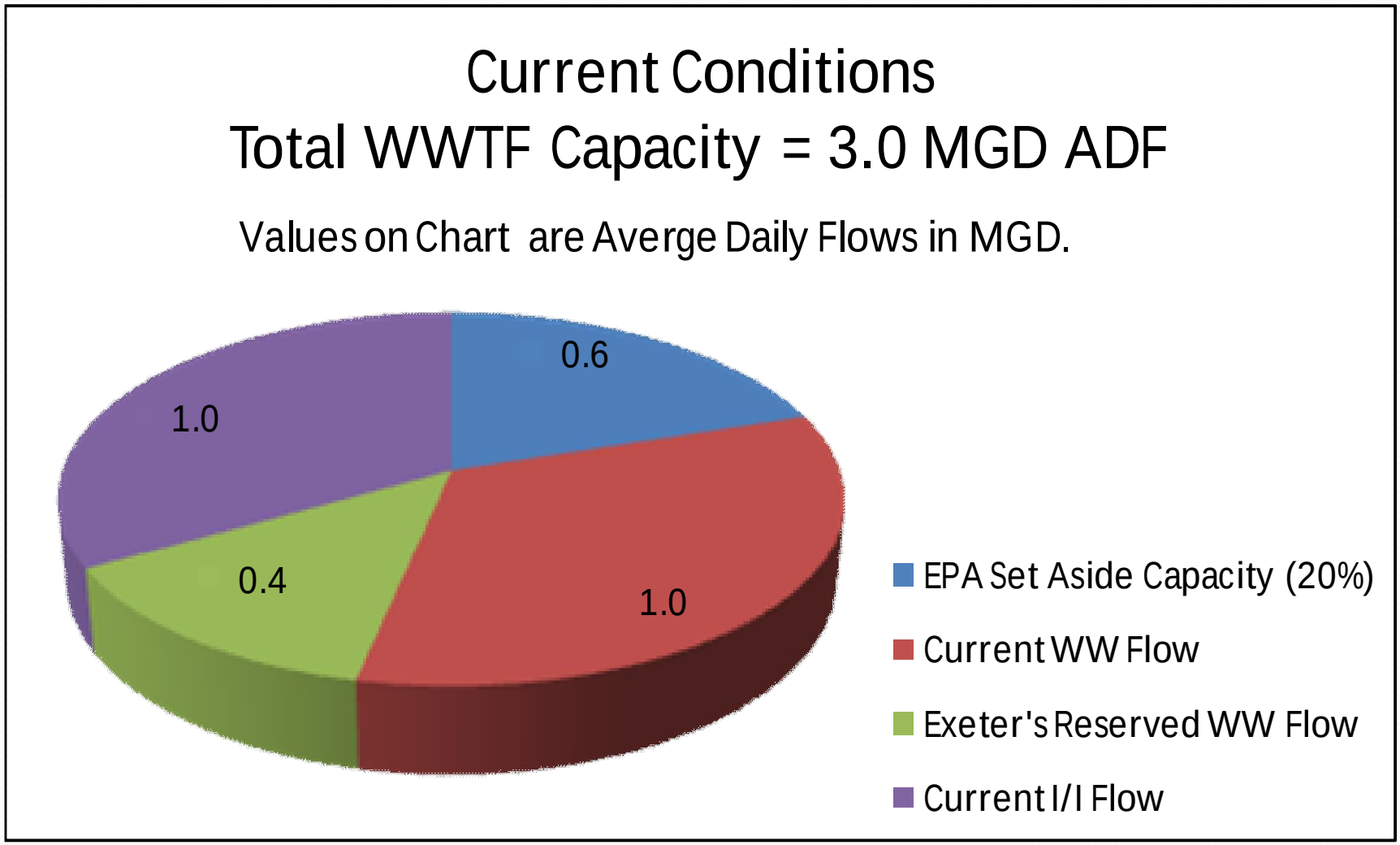
# Summary of Technical Workshop

- Potable Water:
  - Exeter has spare production capacity to meet initial phases of Stratham water system expansion to Bunker Hill Ave. (150,000 GPD ADF).
  - With new GW treatment plant, Exeter should have further spare production capacity to help meet later phases of Stratham expansion, depending upon growth.
  - Costs for expansion beyond Bunker Hill Ave. will not be considered during this study since this will likely occur beyond 20-year planning period
  - Exeter system does not have hydraulic capacity to provide necessary fire flows to Stratham – Stratham expansion requires new 1.0 MG tank at Bunker Hill for fire/peak flows
  - Water interconnection to consist of meter vault (1.08 MGD capacity, or Stratham future max day) on east side of Rte 108 at Rte 101

# Summary of Technical Workshop

- Wastewater:
  - Stratham initial wastewater system expansion in Rte 108 will generate 165,000 GPD ADF, increasing to 390,000 GPD when system is extended to Bunker Hill Ave.
  - Exeter WWTF currently has 400,000 GPD spare treatment capacity, which is assumed reserved for future growth in Exeter.
  - Exeter has I/I of approx. 1.0 MGD.
  - Exeter WWTF has available capacity to receive flow from Stratham for initial stage of its new collection system, but an increase in permitted plant capacity and/or removal of I/I from Exeter's system will be needed to receive further wastewater flow – the assumed approach not finalized at workshop.
  - Exeter facing forthcoming WWTF upgrade to achieve total nitrogen removal ranging from 3 mg/L to 8 mg/L.
  - Hydraulic capacity limitations in Exeter system will require a direct interconnection between Stratham and Exeter WWTF (pump station in Stratham and dedicated force main to WWTF).

# Exeter WWTF Capacity



# Exeter WWTF Capacity - Current

| | ADF (MGD) | Peak Flow (MGD) | Comments |
|---|---|---|---|
| Total Plant Capacity | 3.0 | 7.5 | |
| EPA Set Aside Capacity (20%) | 0.6 | N/A | |
| Current WW Flow | 1.0 | 1.8 | Peaking Factor = 1.8 |
| Exeter's Reserved WW Flow | 0.4 | 1.4 | Peaking Factor = 3.5 |
| Current I/I Flow | 1.0 | 4.2 | |
| Unaccounted For Capacity | 0.0 | 0.1 | |

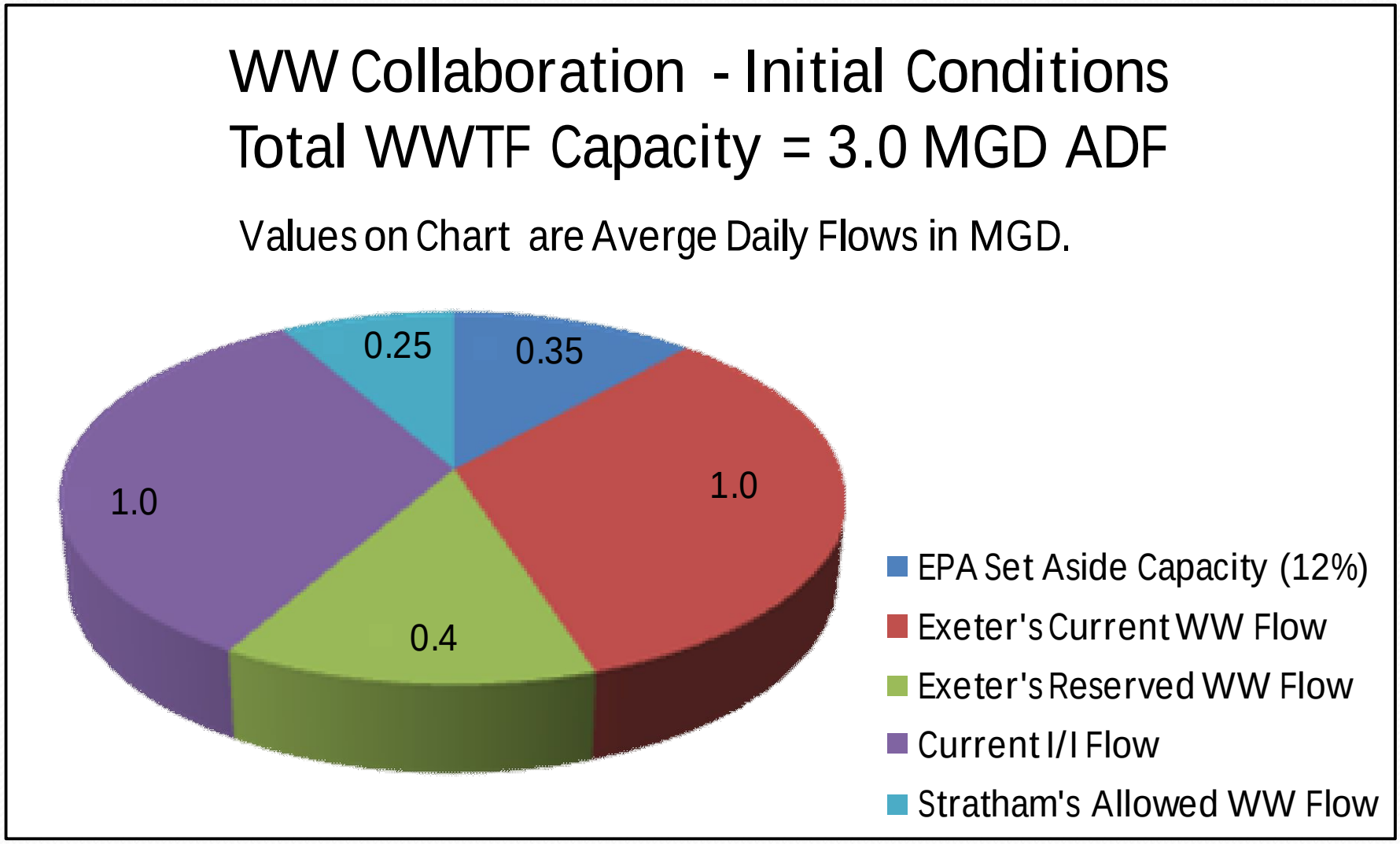
# Creating Extra Plant Capacity

1. Increase capacity of WWTF.
2. Reduce Infiltration and Inflow.
3. Tap into the 20% EPA set aside capacity.
4. Combination of Items above.

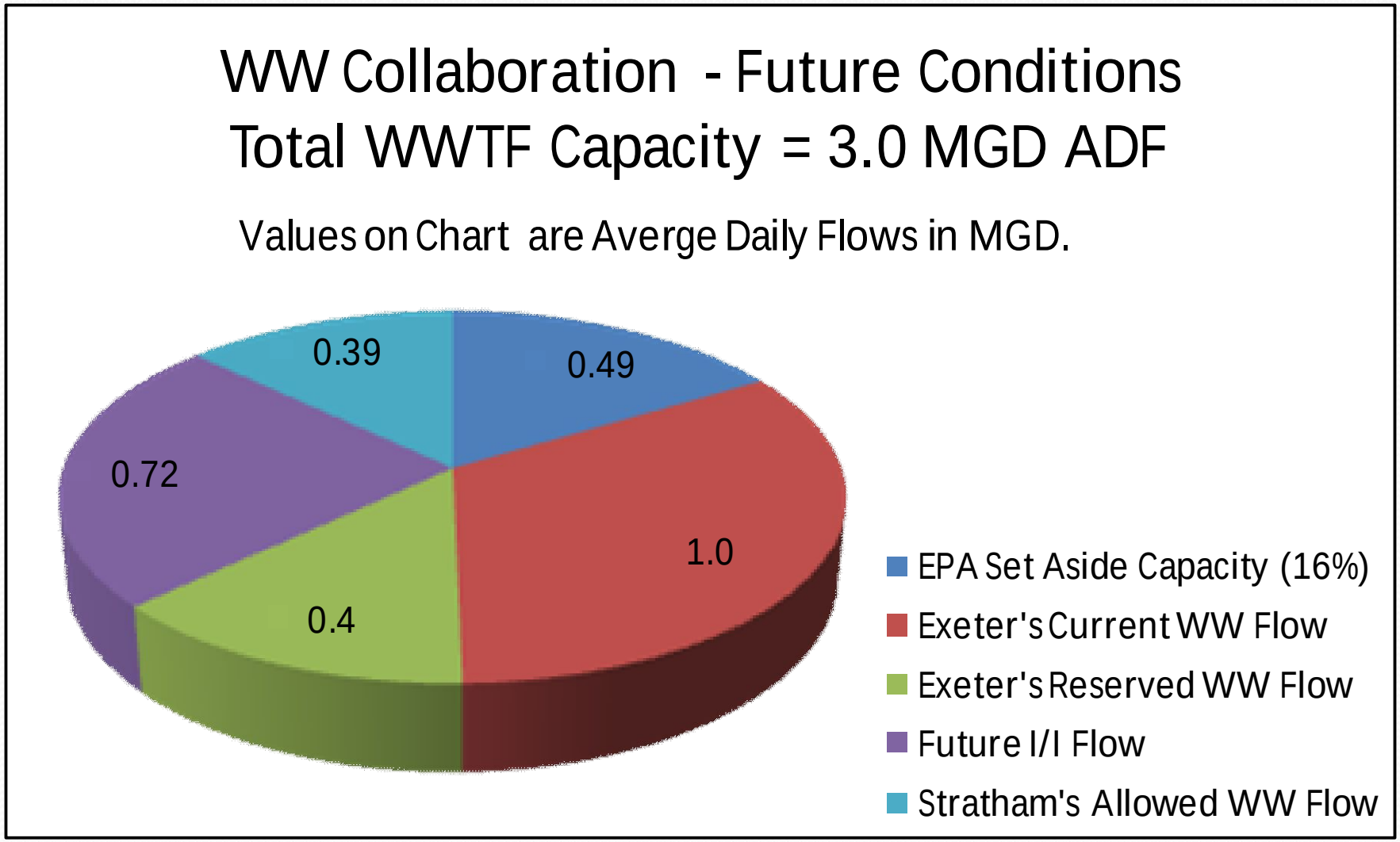
# Proposed Collaborative Approach

- Initial Plant Capacity Activities:
  - Allow Stratham to discharge up to 250,000 GPD of wastewater (average daily flow).
  - Decrease the "EPA's 20% Set Aside" by same amount to accommodate increased flow.
- Future Plant Capacity Activities (assume at Year 10):
  - Reduce I/I in Exeter by 280,000 GPD (average daily basis).
  - Increase Stratham's allowable flow to 390,000 GPD of wastewater (average daily flow).

# Collaborative Approach - Initial



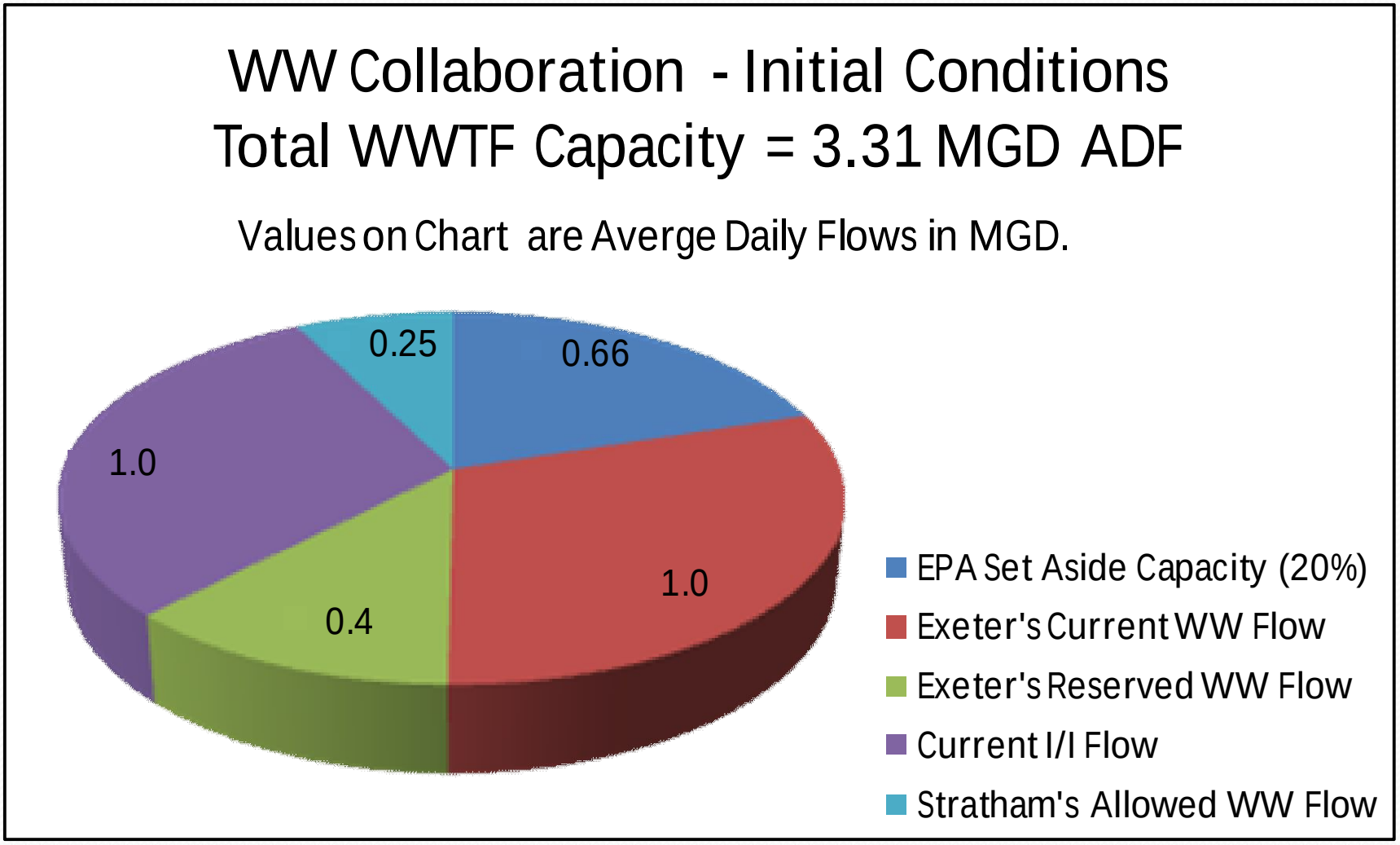
# Collaborative Approach - Future



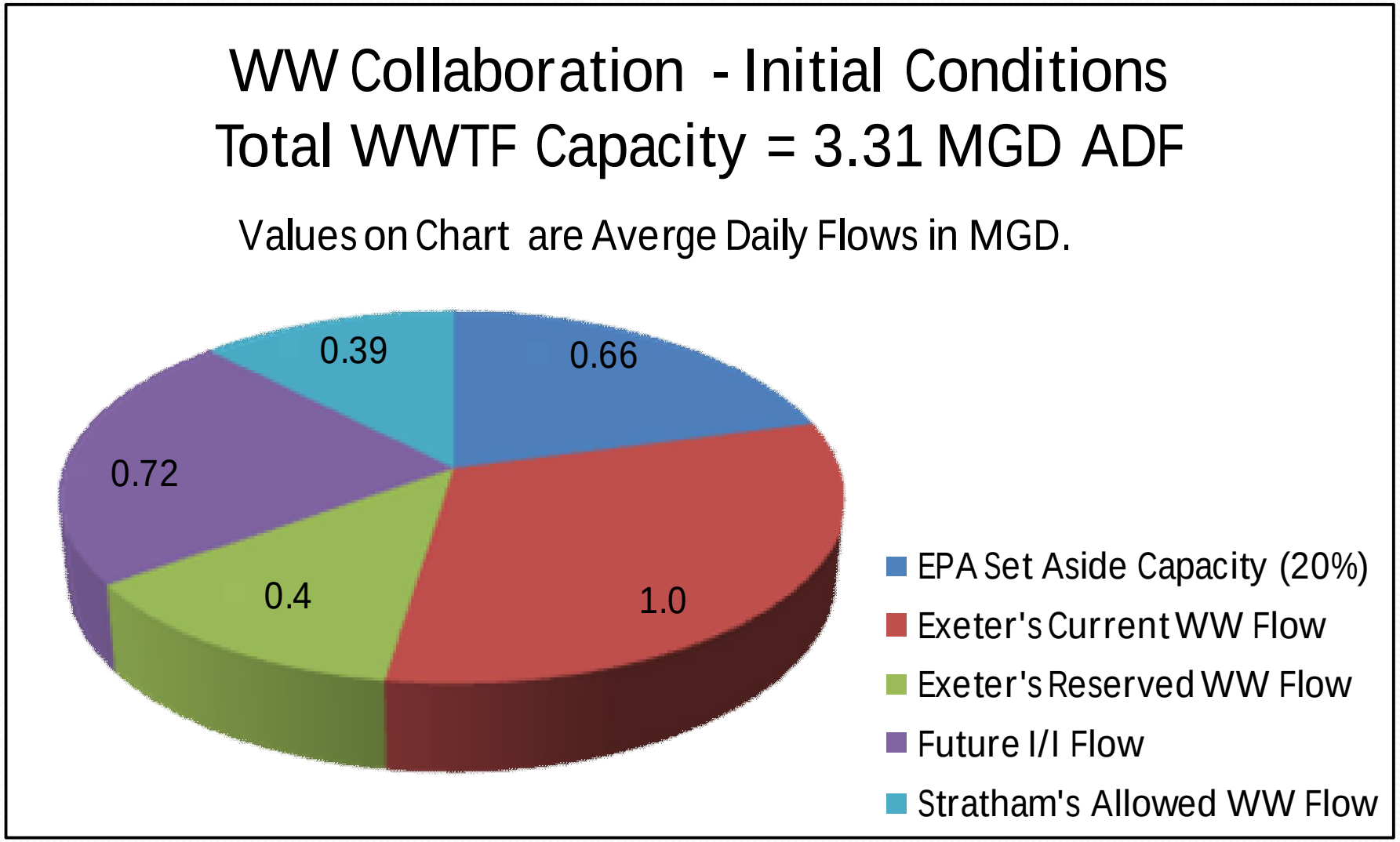
# Exeter WWTF Capacity - Future

| | ADF (MGD) | Peak Flow (MGD) | Comments |
|---|---|---|---|
| Plant Capacity | 3.00 | 8.6 | |
| EPA Set Aside Capacity (12%) | 0.49 | N/A | |
| Exeter's Current WW Flow | 1.0 | 1.8 | Peaking Factor = 1.8 |
| Exeter's Reserved WW Flow | 0.4 | 1.4 | Peaking Factor = 3.5 |
| Future Reduced I/I Flow | 0.72 | 3.9 | Reduce I/I 280,000 GPD |
| Stratham's Allowed WW Flow | 0.39 | 1.7 | Peaking Factor = 4.4 |

# Collaborative Approach - Initial With Plant Expansion



# Collaborative Approach – Future With Plant Expansion



# 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 with capacity of at least 350,000 GPD.
- 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 | Annual Operating Costs |
|---|---|---|---|---|
| Interconnection With Exeter | None | N/A | $0.0 | $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. | Operating Costs assumes 350,000 GPD at $2.0 / 1,000 gallons. | $4,230,000[1,13] | $256,000 |
| | | | | |
| 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. | Operating Costs assumes 350,000 GPD at $1.40 / 1,000 gallons. | $3,840,000[1,13] | $179,000 |
| | | | | |
| Potable Water Storage | Construct a 1,000,000 gallon Storage Tank at 28 Bunker Hill. | 1,000,000 gallons | $1,640,000[2,13] | $12,000 |
| | | | | |
| Summation of Costs | | | $9,710,000 | $447,000 |
| Net Present Value (Operating costs converted to present value assuming 20 years of costs at 4% rate) | | | | $15,780,000 |

# 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 | Annual Operating Costs |
|---|---|---|---|---|
| Interconnection With Stratham | None | N/A | $0.0 | $0.0 |
| | | | | |
| Potable Water Supply Operating Costs | Operating costs associated with Surface Water Treatment Plant | Operating Costs assumes 550,000 GPD at $1.85/1000 gal[14] | N/A | $371,000 |
| 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] | $492,000 | $75,000 |
| Potable Water Supply Upgrades - Project 2 | Construct Groundwater WTP to diversify water supply | Operating Costs assumes 550,000 GPD at $1.25/1000 gal | $6,350,000 | $251,000 |
| | | | | |
| Potable Water Distribution Operating Costs | Current, ongoing operating costs associated with Potable Water Distribution System. | Operating Costs assumes 1,100,000 GPD at $1.255/1000 gal[14] | N/A | $504,000 |
| Water Distribution Upgrades – Project 1 | Replacement water meters for improved billing and reduced unaccounted for water. | Included in approved warrant article.[17] | $750,000 | N/A |
| Water Distribution Upgrades – Project 2 | Replacement of water pipe in Jady Hill neighborhood. | Included in approved warrant article.[17] | $1,600,000 | N/A |
| Water Distribution Upgrades – Project 3 | Future or ongoing water line rehabilitation. | Exeter CIP maintains a line item for this at $1,400,000 / 2 years [15] | N/A | $700,000 |
| | | | | |
| Water Storage Upgrades | None, recently completed tank provides sufficient storage for for-seeable future. | N/A | $0.0 | $0.0 |
| | | | | |
| Summation of Costs | | | $9,190,000 | $1,901,000 |
| Net Present Value (Operating costs converted to present value assuming 20 years of costs at 4% rate) | | | | $35,030,000 |

# 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 | Annual Operating 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 | Assume $1,000 / month for operation, maintenance, heat, etc. | $590,000 | $12,000 |
| | | | | |
| Water Supply Operating Costs in Exeter | Operating costs associated with Surface Water Treatment Plant in Exeter | Operating Costs assumes 700,000 GPD at $1.85/1000 gal[14] | N/A | $473,000 |
| 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] | $492,000 | $75,000 |
| Potable Water Supply | Construct Groundwater WTP in Exeter as recently approved in Town Elections. | Operating Costs assumes 750,000 GPD at $1.25/1000 gal | $6,350,000 | $342,000 |
| | | | | |
| Water Distribution Operating Costs in Exeter | Current, ongoing operating costs associated with Potable Water Distribution System in Exeter | Operating Costs assumes 1,100,000 GPD at $1.255/1000 gal[14] | N/A | $504,000 |
| 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. | Operating Costs assumes 350,000 GPD at $1.40 / 1,000 gallons. | $3,840,000[1,13] | $179,000 |
| Water Distribution Upgrades in Exeter | Replacement water meters for improved billing and reduced unaccounted for water;<br>Replacement of water pipe in Jady Hill neighborhood;<br>Future ongoing water line rehabilitation. | Included in warrant article.[17]<br>Exeter CIP maintains a line item for water line rehab at $1,400,000 / 2 years [15] | $750,000<br>$1,600,000 | $700,000 |
| | | | | |
| Potable Water Storage in Stratham | Construct a 1,000,000 gallon Storage Tank at 28 Bunker Hill. | | $1,640,000[2,13] | $12,000 |
| | | | | |
| Summation of Costs | | | $15,260,000 | $2,297,000 |
| Net Present Value | | | | $46,480,000 |

Comparison of Potable Water Options

| Delivery Method | Capital Costs | Annual Operating Costs | Net Present Value |
|---|---|---|---|
| Stratham Working Independently | $9,710,000 | $447,000 | $15,780,000 |
| Exeter Working Independently | $9,190,000 | $1,901,000 | $35,030,000 |
| Combined for Both Towns Working Independently | $18,900,000 | $2,348,000 | $50,810,000 |
| Collaborative Approach | $15,260,000 | $2,297,000 | $46,480,000 |
| Savings with Collaborative Approach | $3,640,000 | $51,000 | $4,330,000 |
| Savings with Collaborative Approach | 19.3% | 2.2% | 8.5% |

# 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 capacity of at least 250,000 GPD.
- Construct an additional groundwater disposal field and expand plant as necessary to a total capacity of 390,000 GPD in Year 10.
- 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 | Annual Operating Costs |
|---|---|---|---|---|
| Interconnection With Exeter | None | N/A | $0.0 | $0.0 |
| | | | | |
| Collection System Upgrades | Install collection system from Route 101 to Bunker Hill Avenue. | Operating Costs assumes 250,000 GPD at $0.75 / 1,000 gallons. | $1,740,000[7,13] | $68,000 |
| Collection System Upgrades | Construct a pump station pumping and force main to the new Stratham WWTF. | Pump station operating costs includes pumping costs and $1,000 / month for O&M. | $2,050,000[7,13] | $17,000 |
| | | | | |
| Wastewater Treatment Upgrades | Construct a Wastewater Treatment Facility at the Site of the Industrial Park as well as groundwater discharge with average day capacity of at least 250,000 GPD. | | $10,190,000[7,13] | $504,000[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 390,000 GPD. | Assumed $2,500,000 cost in year 2022, which was brought back to 2012 dollars. | $1,689,000 | Not included |
| | | | | |
| Summation of Costs | | | $15,760,000 | $589,000 |
| Net Present Value (Operating costs converted to present value assuming 20 years of costs at 4% rate) | | | | $23,670,000 |

# 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 | Annual Operating Costs |
|---|---|---|---|---|
| Interconnection With Stratham | None | N/A | $0.0 | $0.0 |
| | | | | |
| Wastewater Collection System Operating Costs | Current, ongoing operating costs associated with Wastewater Collection System. | Operating Costs assumes 2,100,000 GPD at $0.685/ 1000 gal[14] | N/A | $525,000 |
| Collection Systems Costs | Other Budgeted Collection System and Pump Station Improvements | Based on Items in Exeter's Collection System Budget[14] | $95,000 | N/A |
| 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 | N/A |
| Collection System Upgrades – Project 2 | Water Street Interceptor Project to help remedy CSO issues (ongoing). | Unknown at this time. No money carried for this item. | $700,000 | N/A |
| Collection System Upgrades – Project 3 | Ongoing sewer line rehabilitation and I/I removal. | Exeter CIP maintains a line item for sewer line rehab at $850,000 / 2 years [15] | N/A | $425,000 |
| Collection System Upgrades – Project 4 | Future collection system improvements to meet the Long Term Control Plan and remedy CSO issues. | Unknown at this time. No money carried for this item. | N/A | N/A |
| | | | | |
| Short-Term Wastewater Treatment Upgrades | Facility Plan for Upgraded WWTF<br><br>Short Term WWTF Upgrades[15] | Based on Items in Exeter's WWTF Budget[14] | $375,000<br><br>$55,000 | N/A<br><br>N/A |
| Wastewater Treatment Upgrade | New 3.0 MGD WWTF to meet 8 mg/L nitrogen permit limit. | Construction and Operating Costs for 8 mg/L TN permit[16] | $37,580,000 | $1,015,000 |
| Wastewater Treatment Upgrade | New 3.0 MGD WWTF to meet 3 mg/L nitrogen permit limit. | Construction and Operating Costs for 3 mg/L TN permit[16] | $54,070,000 | $2,187,000 |
| | | | | |
| Summation of Costs to Meet 8 mg/L Total Nitrogen Permit Limit | | | $42,710,000 | $1,965,000 |
| Net Present Value | | | | $69,410,000 |
| | | | | |
| Summation of Costs to Meet 3 mg/L Total Nitrogen Permit Limit | | | $59,200,000 | $3,137,000 |
| Net Present Value | | | | $101,830,000 |

# 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. Stratham's initial flow of 250,000 gpd will tap into EPA's 20%.
- Reduce infiltration and inflow in Exeter to create an additional 140,000 GPD WWTF capacity to accommodate growth in Stratham (at year 10).
- 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 | Annual Operating 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 | $22,000 |
| | | | | |
| Wastewater Collection System Operating Costs | Current, ongoing operating costs associated with Wastewater Collection System. | Operating Costs assumes 2,100,000 GPD at $0.685/ 1000 gal[14] | N/A | $525,000 |
| Collection System Upgrades in Exeter | Other Budgeted Collection System and Pump Station Improvements<br>Replacement of pipe and I/I reduction in Jady Hill neighborhood;<br>Water Street Interceptor to remedy CSO issues;<br>Ongoing sewer line rehabilitation and I/I removal. | Based on Items in Exeter's Collection System Budget[14] and warrant articles.[17]<br>Exeter CIP maintains a line item for sewer line rehab at $850,000 / 2 years [15] | $95,000<br>$3,900,000<br>$700,000<br>N/A | N/A<br>N/A<br>N/A<br>$425,000 |
| Collection System Upgrades in Stratham | Install collection system from Route 101 to Bunker Hill Avenue. | Operating Costs assumes 350,000 GPD at $0.75 / 1,000 gallons. | $1,740,000[7,13] | $96,000 |
| | | | | |
| Short-Term Wastewater Treatment Upgrades | Facility Plan for Upgraded WWTF<br>Short Term WWTF Upgrades[15] | Based on Items in Exeter's WWTF Budget[14] | $375,000<br>$55,000 | N/A<br>N/A |
| Wastewater Treatment Expansion & Upgrade | Upgrade WWTF to meet 8 mg/L nitrogen permit limit. Initial 250,000 GPD Capacity for Stratham from EPA 20%. | Construction and Operating Costs for 8 mg/L TN permit[16] | $37,580,000 | $1,015,000 |
| Wastewater Treatment Expansion & Upgrade | Upgrade WWTF to meet 3 mg/L nitrogen permit limit. Initial 250,000 GPD Capacity for Stratham from EPA 20%. | Construction and Operating Costs for 3 mg/L TN permit[16] | $54,070,000 | $2,187,000 |
| Reduce I/I in Exeter to Allow for Extra Capacity | Reduce Infiltration and Inflow from Exeter to create an additional 140,000 GPD WWTF treatment capacity. | Remove approximately 280,000 GPD system-wide infiltration.[18] Costs shown in 2012 dollars. | $5,180,000 | N/A |
| | | | | |
| Summation of Costs to Meet 8 mg/L Total Nitrogen Permit Limit | | | $53,360,000 | $2,083,000 |
| Net Present Value | | | | $81,670,000 |
| Summation of Costs to Meet 3 mg/L Total Nitrogen Permit Limit | | | $69,850,000 | $3,255,000 |
| Net Present Value | | | | $114,090,000 |

# Comparison of Wastewater Options

Wastewater Collaboration Assuming Total Nitrogen Permit Limit of 8 mg/L

| Delivery Method | Capital Costs | Annual Operating Costs | Net Present Value |
|---|---|---|---|
| Stratham Working Independently | $15,670,000 | $589,000 | $23,670,000 |
| Exeter Working Independently | $42,710,000 | $1,965,000 | $69,410,000 |
| Combined for Both Towns Working Independently | $58,380,000 | $2,554,000 | $93,080,000 |
| Collaborative Approach | $53,360,000 | $2,083,000 | $81,670,000 |
| Savings with Collaborative Approach | $5,020,000 | $471,000 | $11,410,000 |
| Savings with Collaborative Approach | 8.6% | 18.4% | 12.3% |

Wastewater Collaboration Assuming Total Nitrogen Permit Limit of 3 mg/L

| Delivery Method | Capital Costs | Annual Operating Costs | Net Present Value |
|---|---|---|---|
| Stratham Working Independently | $15,670,000 | $589,000 | $23,670,000 |
| Exeter Working Independently | $59,200,000 | $3,137,000 | $101,830,000 |
| Combined for Both Towns Working Independently | $74,870,000 | $3,726,000 | $125,500,000 |
| Collaborative Approach | $69,850,000 | $3,255,000 | $114,090,000 |
| Savings with Collaborative Approach | $5,020,000 | $471,000 | $11,410,000 |
| Savings with Collaborative Approach | 6.7% | 12.6% | 9.1% |

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.

ROCKINGHAM PLANNING COMMISSION

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**Exeter-Stratham Intermunicipal Water and Wastewater Study**
**Financial Collaboration Workshop**
**May 17, 2012**
**4:00 pm**
**Stratham Municipal Complex**
**Bunker Hill Avenue**
**Stratham, NH**

1. Summary of Prior Workshops
    a. Technical Workshop
    b. Infrastructure Cost Workshop
        i. Updated Cost Analysis

2. Evaluation of Non-Cost/Qualitative Factors
    a. Identify Desired Outcomes of Collaborative Approach
    b. Identify Potential Concerns of Collaborative Approach
    c. Identify Other Factors
        i. Technical
        ii. Regulatory
        iii. Economic
        iv. Environmental
        v. Political
    d. Identify Emergent Themes

3. Review Ownership Alternatives
    a. Stratham purchases water/wastewater services from Exeter on a "retail" basis
    b. Stratham invests in water/wastewater systems operated by Exeter in exchange for lower purchase rates and guaranteed access
    c. Stratham pays capital buy-in based on reserved capacity; Stratham pays O&M costs based on volumetric flow rates
    d. Develop jointly-owned water/wastewater district

4. Develop Key Assumptions for Economic Model

5. Next Steps
    a. Develop Economic Model
    b. Schedule Next Meeting to Review Economic Model Results

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# MEETING MINUTES

| | |
|---|---|
| DATE OF MEETING: | May 17, 2012 |
| ATTENDEES: | See Attached Sign-in Sheet |
| RECORDED BY: | Kleinfelder / SEA |
| CC: | Attendees; file |
| SUBJECT: | Rockingham Planning Commission<br>Exeter / Stratham Inter-Municipal Water and Wastewater Study<br>Financial Collaboration Workshop |
| S E A No.: | 2012063.01-A |

The Financial Collaboration Workshop was held at 4:00 p.m. on May 17, 2012 at the Stratham Municipal Complex. The workshop was attended by representatives from Exeter, Stratham and the Rockingham Planning Commission to: review the results of the Technical Alternatives Workshop and Infrastructure Cost Workshop; evaluate 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 alternatives; and develop key assumptions for the economic model (see attached Financial Collaboration Workshop Agenda and Handouts). Key items of discussion from the workshop are summarized below:

1. Summary of Prior Workshops:

- Kleinfelder provided a brief summary of the two first workshops (Technical Workshop and Infrastructure Cost Workshop). Consensus regarding the technical alternatives to achieve collaboration presented in the Technical Workshop and the capital and O&M costs for each of those improvements presented in the Infrastructure Cost Workshop was reiterated by attendees.
- During the Infrastructure Cost Workshop, several attendees suggested that the manner in which the capital and O&M costs for the technical alternatives were presented did not clearly demonstrate the cost savings associated with a collaborative approach. During the current workshop, Kleinfelder presented alternative tables (attached) showing water and wastewater capital and O&M cost comparisons for both towns assuming either an independent approach or a collaborative approach. Kleinfelder noted that the capital and O&M cost comparisons shown in the tables are intended for preliminary informational

purposes only. Attendees commented that the costs to date do not present the revenue side of the analysis. A more thorough assessment of cost impacts to each community – in terms of $/gallon – will be presented at a later date once the economic model has been developed for the most viable ownership alternatives.

2. Evaluation of Non-Cost/Qualitative Factors:

- Kleinfelder facilitated a brain-storming session designed to solicit feedback from workshop participants concerning other non-cost and qualitative factors that have a bearing on the feasibility of adopting a collaborative approach to water and wastewater service in both towns. The purpose of the brain-storming session, which was based on employing scenario planning techniques, was to identify broader emergent themes and principles that could then be used to aid in prioritizing or ranking the list of ownership alternatives. Participants were asked to identify desired outcomes of a collaborative approach and were also asked to identify potential concerns associated with a collaborative approach. Responses to those questions were recorded and are noted below:
- When requested to identify desired outcomes of the collaborative approach, the following responses were noted:
  - *Least long-term costs for both towns*
  - *Provide an adequate and reliable water supply long-term*
  - *Reduce capital and O&M costs long-term for both towns*
  - *Maintain transparency and accountability throughout the process*
  - *Achieve a measurable economy-of-scale benefit to rate payers through a collaborative approach*
  - *Reduce rates*
  - *Minimize risk by avoiding an inter-municipal agreement that is over-reaching in terms of initial scope (i.e. don't assume 'build it and they will come')*
  - *Provide incremental approach to collaboration*
  - *Broad community buy-in*
  - *Opportunity for water quality benefit by minimizing septic systems*
  - *Potential diversification of overall rate base*

- *Become a model for other communities interested in regionalization*

- When requested to identify potential concerns with the collaborative approach, the following responses were noted:
  - *Uncertainty of future conditions (e.g. costs, regulations, etc.)*
  - *Sensitivity of assumptions used in the study*
  - *Disproportionate development opportunities (collaboration resulting in one town achieving a benefit over another town)*
  - *Impact that management of one utility might have on the other utility/lack of control/governance issues*
  - *Ramifications of management inequities between two different utilities*
  - *Loss of Local Control*
  - E*quitable allocation of cost of service*
  - *Overly complex inter-municipal agreement (keep it simple)*
  - *Equitable apportionment of total capital cost savings amongst the two towns*

- The following summarizes the emergent themes resulting from the brain-storming session:
  - Collaborative approach should result in reducing/minimizing total overall infrastructure costs for both towns, lessen the burden on rate payers for both towns, and allocate cost savings in a manner that is equitable.
  - Collaborative approach should be structured in a way that allows for incremental implementation according to actual need – avoid an over-reaching agreement that unnecessarily exposes one or both towns to risk.
  - Maintain transparency during the planning and implementation stages in order to keep stakeholders and the public properly informed and to gauge acceptance.
  - Collaborative approach should be structured in a way that balances preserving local control while also minimizing disparate utility management practices among partnering towns that could lead to cost inefficiencies.

3. Review Ownership Alternatives

- The following four (4) ownership alternatives were reviewed and discussed in the context of non-cost and qualitative factors discussed in the first portion of the workshop:
  a) Stratham purchases water/wastewater services from Exeter on a 'retail' basis
  b) Stratham invests in water/wastewater systems operated by Exeter in exchange for lower purchase rates and guaranteed access
  c) Stratham pays capital buy-in based on reserved capacity; Stratham pays O&M costs based on volumetric flow rates
  d) Develop jointly-owned water/wastewater district

- It was acknowledged by the attendees that 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. Further, it could trigger a review or oversight by the Public Utilities Commission (PUC). As a result, this ownership alternative was given a lower-priority ranking by the group.
- Discussion ensued regarding the differences between Options B and C. It was recognized that both options involve Stratham paying Exeter a capital payment(s) in some form in order to reserve/enhance infrastructure capacity and then paying on a volumetric basis for operating costs. Kleinfelder shall develop an economic model for such a framework that allocates capital costs to the two towns based on capacity and allocates operating costs based on flow.
- The advantage of Option D is that it 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 that this option holds merit. Further, it could allow for further spread of this cooperative approach to additional towns, such as to Newfields. Therefore, it was agreed that Kleinfelder shall develop an economic model for this option as well.

4. Develop Key Assumptions for Economic Model(s)

- It was noted that Exeter's water and wastewater policies require consideration of 'tax revenue sharing' when establishing a new inter-municipal water and/or wastewater connection. Workshop attendees acknowledged that the particulars of collaboration in this case did not lend itself to such an approach and it was agreed that the economic model(s) developed for this study will not address tax revenue sharing.
- Key assumptions for the economic model were discussed. The model for Option B/C shall allocate capital costs based on capacity and operating costs on a volumetric or flow basis. Allocating capital costs shall also consider alternatives to equitably allocate overall capital cost savings, either through economies-of-scale that may be realized through the construction of larger infrastructure necessary to accommodate both towns, or through other payment means that will create the necessary inducement for both towns to realize the economic benefits of collaboration.
- For Option B/C, it was suggested that Stratham could initially make payments for wastewater capacity to Exeter based on the depreciated value of the existing plant. In the future, those accumulated payments could then be applied toward future capital outlays, including a wastewater treatment plant upgrade. The basis and amount of any payments from Stratham to Exeter for capacity could be revisited and modified as future capital outlays are actually made.

Next Meeting:

The next meeting will be held on June 21, 2012 at 4:00 p.m. at the Stratham Municipal Complex. The purpose of the meeting will be to review the results of the economic model. Kleinfelder shall distribute a draft of the economic model findings approximately one week prior to the meeting.

Attachments:

List of Attendees
Meeting Agenda
Revised Costs Analysis Handouts distributed at Meeting

# Sign in Sheet

Exeter / Stratham Intermunicipal Water / Wastewater
Financial Collaboration Workshop
May 17, 2012

| Name | Affiliation |
|---|---|
| David Michelsen | Kleinfelder / SEA |
| Mark Thompson | Kleinfelder / SEA |
| Rob McCoy | Kleinfelder / SEA |
| Don Clement | Exeter |
| Theresa Walker | RPC |
| Russell Dean | Exeter |
| Jennifer Perry | Exeter |
| David Canada | Stratham |
| Paul Deschaine | Stratham |
| John Boisvert | Stratham |
| Lincoln Daley | Stratham |

ROCKINGHAM PLANNING COMMISSION

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**Exeter-Stratham Intermunicipal Water and Wastewater Study**
**Financial Collaboration Workshop**
**May 17, 2012**
**4:00 pm**
**Stratham Municipal Complex**
**Bunker Hill Avenue**
**Stratham, NH**

1. Summary of Prior Workshops
    a. Technical Workshop
    b. Infrastructure Cost Workshop
        i. Updated Cost Analysis

2. Evaluation of Non-Cost/Qualitative Factors
    a. Identify Desired Outcomes of Collaborative Approach
    b. Identify Potential Concerns of Collaborative Approach
    c. Identify Other Factors
        i. Technical
        ii. Regulatory
        iii. Economic
        iv. Environmental
        v. Political
    d. Identify Emergent Themes

3. Review Ownership Alternatives
    a. Stratham purchases water/wastewater services from Exeter on a "retail" basis
    b. Stratham invests in water/wastewater systems operated by Exeter in exchange for lower purchase rates and guaranteed access
    c. Stratham pays capital buy-in based on reserved capacity; Stratham pays O&M costs based on volumetric flow rates
    d. Develop jointly-owned water/wastewater district

4. Develop Key Assumptions for Economic Model

5. Next Steps
    a. Develop Economic Model
    b. Schedule Next Meeting to Review Economic Model Results

## Exeter / Stratham Collaboration Feasibility Assessment
## Opinions of Probable Costs
## Comparison of Treatment and Interconnection Costs for Collaboration

### Comparison of Treatment + Interconnection Costs for Towns - Water

| | Independent Approach | Collaborative Approach |
|---|---|---|
| Town of Exeter Capital Costs for Water Plants Only | $6,842,000 | $6,842,000 |
| Town of Exeter Maintenance Costs for Surface Water Treatment Plant | $75,000 | $75,000 |
| Town of Exeter Operating Costs for Water Plants Only | $622,000 | $815,000 |
| Town of Stratham Capital Costs for Water Supply Only | $4,230,000 | N/A |
| Town of Stratham Operating Costs for Water Supply Only | $256,000 | N/A |
| Water Interconnection Capital Costs | N/A | $590,000 |
| Water Interconnection Operating Costs | N/A | $12,000 |
| Total Combined Capital Costs | $11,072,000 | $7,432,000 |
| Capital Cost Savings | | $3,640,000 |
| Capital Cost Savings (percent) | | 32.9% |
| Total Combined Operating and Maintenance Costs | $953,000 | $902,000 |
| Operating Cost Savings | | $51,000 |
| Operating Cost Savings (percent) | | 5.4% |

## Exeter / Stratham Collaboration Feasibility Assessment
## Opinions of Probable Costs
## Comparison of Treatment and Interconnection Costs for Collaboration

### Comparison of Treatment + Interconnection Costs for Towns - Wastewater
**(Future I/I reduction costs not included in analysis)**

**8 mg/l Total Nitrogen Permit for Exeter WWTF**

| | Independent Approach | Collaborative Approach |
|---|---|---|
| Town of Exeter Capital Costs for Wastewater Plant Only | $37,580,000 | $37,580,000 |
| Town of Exeter Operating Costs for Wastewater Plant Only | $710,000 | $830,000 |
| Town of Stratham Capital Costs for Wastewater Plant | $11,880,000 | N/A |
| Town of Stratham Operating Costs for Wastewater Plant + Pump Station | $504,000 | N/A |
| Stratham Pump Station Capital Costs (Interconnection or to WWTF) | $2,970,000 | $3,730,000 |
| Stratham Pump Station Operating Costs (Interconnection or to WWTF) | $17,000 | $22,000 |
| Total Combined Capital Costs | $52,430,000 | $41,310,000 |
| Capital Cost Savings | | $11,120,000 |
| Capital Cost Savings (percent) | | 21.2% |
| Total Combined Operating Costs | $1,231,000 | $852,000 |
| Operating Cost Savings | | $379,000 |
| Operating Cost Savings (percent) | | 30.8% |

**3 mg/l Total Nitrogen Permit for Exeter WWTF**

| | Independent Approach | Collaborative Approach |
|---|---|---|
| Town of Exeter Capital Costs for Wastewater Plant Only | $54,070,000 | $54,070,000 |
| Town of Exeter Operating Costs for Wastewater Plant Only | $1,530,000 | $1,790,000 |
| Town of Stratham Capital Costs for Wastewater Plant | $11,880,000 | N/A |
| Town of Stratham Operating Costs for Wastewater Plant + Pump Station | $504,000 | N/A |
| Stratham Pump Station Capital Costs (Interconnection or to WWTF) | $2,970,000 | $3,730,000 |
| Stratham Pump Station Operating Costs (Interconnection or to WWTF) | $17,000 | $22,000 |
| Total Combined Capital Costs | $68,920,000 | $57,800,000 |
| Capital Cost Savings | | $11,120,000 |
| Capital Cost Savings (percent) | | 16.1% |
| Total Combined Operating Costs | $2,051,000 | $1,812,000 |
| Operating Cost Savings | | $239,000 |
| Operating Cost Savings (percent) | | 11.7% |

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 | | $125,500 | | $156,875 | | $125,500 | $18,825 | $156,875 | $43,925 | $144,325 | | $200,800 | |
| Exeter Groundwater Treatment Plant:[3,5] | | | | | | | | | | | | | | |
| Fixed Costs | $0 | | $155,125 | | $155,125 | | $134,891 | $20,234 | $121,191 | $33,934 | $155,125 | | $155,125 | |
| Demand-dependent costs (chemicals+elec)[4] | $0 | | $73,000 | | $91,250 | | $73,000 | $10,950 | $91,250 | $25,550 | $83,950 | | $116,800 | |
| 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* | | *$1,829,050* | *$438,948* | *$1,878,675* | *$585,234* | *$1,733,510* | *$466,549* | *$1,718,447* | *$570,937* | *$2,130,942* | | *$2,220,267* | |
| 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 | $417,285 | $0 | $0 | $0 | $385,239 | $0 | $0 | $0 | $485,603 | $0 |
| *Subtotal Debt Service (P&I)* | *$455,746* | | *$1,185,862* | *$706,088* | *$786,691* | *$706,088* | *$1,154,991* | *$472,268* | *$692,419* | *$503,622* | *$1,185,862* | *$441,396* | *$855,009* | *$441,396* |
| **TOTAL EXPENSES** | **$2,314,921** | **N/A** | **$3,222,662** | **$1,145,036** | **$2,873,116** | **$1,291,322** | **$3,096,251** | **$938,816** | **$2,618,615** | **$1,074,559** | **$3,524,554** | **$441,396** | **$3,283,026** | **$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** | **$3,222,662** | **$1,145,036** | **$2,873,116** | **$1,291,322** | **$3,096,251** | **$938,816** | **$2,618,615** | **$1,074,559** | **$3,524,554** | **$441,396** | **$3,283,026** | **$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** | **$8.83** | **$20.91** | **$6.30** | **$10.11** | **$8.48** | **$17.15** | **$5.74** | **$8.41** | **$8.40** | **$8.06**[8] | **$5.62** | **$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.
4 Water treatment operating costs are estimated by dividing combined Exeter and Stratham demands evenly between Exeter surface water treatment plant and groundwater treatment plant as follows:
  a) Independent Option (Initial) - 500,000 gpd at surface WTP/500,000 gpd at groundwater plant (1,000,000 total demand Exeter only)
  b) Indpendent Option (Future) - 625,000 gpd at surface WTP/625,000 gpd at groundwater plant (1,250,000 gpd total demand Exeter only)
  c) Collaborative Option (Initial) - 575,000 gpd at surface WTP/575,000 gpd at groundwater plant (1,150,000 gpd total demand Exeter and Stratham)
  d) Collaborative Option (Future) - 800,000 gpd at surface WTP/800,000 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 | $342,285 | $0 | $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* | *$2,912,461* | *$753,020* | *$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** | **$4,623,885** | **$1,058,104** | **$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** | **$4,623,885** | **$1,058,104** | **$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** | **$5.28** | **$7.43** | **$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 | $492,671 | $0 | $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* | *$4,106,076* | *$908,905* | *$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** | **$6,569,432** | **$1,336,178** | **$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** | **$6,569,432** | **$1,336,178** | **$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** | **$7.50** | **$9.39** | **$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% |