

***WASTEWATER FACILITIES PLAN UPDATE***  
***for the***  
***TOWN OF LONDONDERRY,***  
***NEW HAMPSHIRE***



***January 2005***



# TOWN OF LONDONDERRY, NEW HAMPSHIRE WASTEWATER FACILITIES PLAN UPDATE

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# **EXECUTIVE SUMMARY**

## **BACKGROUND**

The Town of Londonderry has experienced significant growth in the past 30 years, and continues to grow resulting in increased demands for sewer service. A Sewer Facilities Plan was prepared for the Town in the late 1970's, and this Wastewater Facilities Plan Update has been prepared to reflect changes in the Town since the issuance of the original plan and to evaluate existing and future wastewater collection and treatment needs. This Facility Plan Update also addresses septage (waste pumped from septic tanks) disposal needs for the portions of Town not served by public sewer.

## **EXISTING CONDITIONS**

### **Collection and Pumping Facilities**

The Town is served by two separate Town-owned collection and interceptor sewer systems. The existing systems are discussed in more detail in Section 2 of the report and a map of the existing sewers is presented as Figure 1 in Appendix A.

The northern portion of the sewer system is the larger of the two and currently serves an area leading from the schools and Municipal Facilities on Mammoth Road, draining to the north through residential, commercial and industrial areas. Wastewater collected in this system ultimately drains to the Manchester Wastewater Treatment Facility. There are two town-owned pump stations in the northern system; the Plaza 28 Pump Station which has been in operation since 1986, and the Mammoth Road Pump Station which was constructed in 2002. The flow from North Londonderry to Manchester is measured at the Londonderry Metering Station (LMS). There is also a privately owned sewer system in the northwest portion of Town serving the Mill Pond development. Wastewater from this development enters Manchester in the vicinity of Bodwell Road and flows to the Cohas Brook Interceptor.

A portion of the southern collection system serves an area along Route 102 just west of I-93, and the Gilcreast Road area. This sewer flows to the Charleston Avenue Pump Station, which pumps flow to the Derry Wastewater Treatment Facility. Another portion of the southern collection system serves an area east of I-93, along Londonderry Road and Action Boulevard. The wastewater from this area is pumped from the Action Boulevard Pump Station to the Derry Wastewater Treatment Facility.

### **Treatment Facilities**

The Town of Londonderry has entered into Intermunicipal Agreements with the City of Manchester and the Town of Derry for treatment of wastewater generated in Londonderry. The current limits on wastewater flows and loads are summarized below.

#### **Manchester:**

- Average Daily Flow: 3.0 mgd
- Biochemical Oxygen Demand (BOD): 5,603 pounds per day (lbs/day)
- Total Suspended Solids (TSS): 7,004 lbs/day
- Limit for flow from the connection point in the Mill Pond Development (included in the total limits listed above):
  - Average Daily Flow: 12,000 gpd

#### **Derry:**

- Average Daily Flow: 200,000 gpd (allocation to increase to 329,600 gpd upon completion of treatment plant upgrade)
- Average Daily BOD: 350 lbs/day

### **Current Flows and Loads**

Monthly flow and loading data for flows to Manchester for the past two years were reviewed along with daily wastewater discharge records from AES, which can contribute over 60% of the total wastewater in Londonderry. To estimate current flows, the flow from AES is estimated at 0.87 mgd, which is the highest monthly average flow allowed by the discharge permit issued to AES by the Town. Although AES is allowed to discharge this quantity of flow for a month, its

monthly averages to date have typically ranged from 0.62 mdg to 0.77 mdg. The following summarizes the current flows and loads to Manchester.

**Manchester:**

- Average Daily Flow: 1.67 mgd (including 0.87 mgd from AES)
- BOD: Average 4,600 lbs/day (highest month 8,350 lbs/day)
- TSS: Average 1,600 lbs/day (highest month 2,600 lbs/day)

A similar review of flow data was completed for the wastewater that is pumped to Derry, although there is no BOD and TSS data. However, the BOD and TSS loads were estimated based on assumed loading concentrations.

**Derry:**

- Average Daily Flow: 85,000 gpd
- BOD: 240 lbs/day (estimated)
- TSS: 305 lbs/day (estimated)

**Non-sewered Areas**

A majority of the developed area of Londonderry is not currently served by public sewer. These properties are served by privately owned on-lot septic systems consisting of a septic tank and a subsurface disposal field. Although the non-sewered areas include some commercial establishments, many of these areas are residential. According to the Town of Londonderry's Master Plan, almost 86% of the Town's housing was constructed after 1970, and approximately 70% of the housing units in Town are single-family with a majority of the existing neighborhoods consisting of single family homes on one to two acre lots. For neighborhoods with this type of density, on-lot septic systems provide a cost-effective and acceptable means for wastewater disposal. In general, there is adequate land available for replacement systems when the original systems fail. Section 2 of the report discussed these residential areas in more detail.

Currently all the septage from Londonderry is disposed of at the Manchester Treatment Facility for treatment, which at this time has adequate capacity to treat the septage. According to records

kept by the City of Manchester, Londonderry contributes approximately 1,800,000 gallons of septage each year.

## **PROJECTED FUTURE FLOWS AND LOADS**

The Town's 1997 and 2004 Master Plan was reviewed with Town personnel to identify future growth areas that would potentially need to be served by Town sewer for the planning period of 20 years, and beyond. These areas consist of undeveloped lots in areas where Town sewer is already present, and areas within the vicinity of existing sewers where commercial, industrial, and high-density residential growth is projected to occur as promoted by the Town's Master Plan. These areas are identified by number or letter on Figure 3 in Appendix A, and the same designations are used throughout this Facilities Plan. Section 3 of this report summarizes a description of each area, wastewater flow projections for each area, and conceptual sewerage plans. The projected future flows and loads are summarized as follows:

**TABLE ES-1**  
**PROJECTED FLOWS AND LOADS FOR YEAR 2025**

	Average Daily Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)
To Manchester	3.52	8,431	7,408
To Derry	0.864	2,083	2,618

Although the future flow projections are conservative in general, it is possible that one or more industrial users with a high quantity wastewater discharge (like AES at 0.87 mgd) may wish to locate in Londonderry, possibly requesting a high percentage of the projected flow allocation. It may be prudent for Londonderry to request an additional 1 mgd of capacity from Manchester to bring its total flow allocation up to 4 mgd (0.48 mgd beyond the year 2025 projected flow). If an additional 1 mgd of capacity is requested, the BOD and TSS loads should also be increased for the additional 0.48 mgd beyond the projected flow. Therefore, if the Town requests an additional 1 mgd (above the current limit) of capacity from Manchester, the requested flow and loads limits would be:

- Average Daily Flow: 4.0 mgd
- BOD limit: 9,571 lbs/day
- TSS limit: 9,340 lbs/day

Included in the flow projections are Growth Areas B1, E, F, and G consisting mostly of existing low-density residential neighborhoods, with house lots typically 1-acre or larger, served by on-lot subsurface disposal system. It is not intended at this time to provide Town sewer to serve these areas, and costs to serve these areas are not included in cost summary below. However, because the areas are in the vicinity of existing or planned interceptor sewers, it is recommended that potential flows from these areas be included in future flow projections for consideration when the Town requests additional treatment capacity from Manchester and Derry.

### **Future Septage Projections**

Section 3 also includes the projections for additional septage through the year 2025 for projected growth outside the sewered areas. It is estimated that an additional 324,000 gallons of septage will be generated each year, resulting in an estimated 2.12 million gallons of septage per year generated in Londonderry by the year 2025.

### **RECOMMENDED FACILITIES TO MEET FUTURE NEEDS**

Section 4 of this report identifies and summarizes the required upgrades to existing facilities and the need for new facilities to meet the projected future wastewater requirements. Table 4-3 summarizes the costs for all wastewater facilities identified in Section 4, including costs that are anticipated to be paid by developers of the identified growth areas. The table also summarizes cost for facilities that may be funded with Town participation, pending Town voters approval, which include the cost to purchase treatment capacity in Manchester and Derry, upgrades to existing facilities required to accommodate future flows, and portions of sewer interceptor extensions to promote commercial and industrial development consistent with the Town's Master Plan. The total estimated cost of all facilities is \$33.8 million, and the total estimated costs of facilities that may be funded with Town participation is \$20.0 million. The recommended facilities that may be funded with Town participation are discussed in more detail in Section 5, and are itemized as follows:

- Purchase additional treatment capacity from Manchester: Estimated cost = \$6.0 million
- Purchase additional treatment capacity from Derry: Estimated cost = \$4.092 million
- Replace 1000 LF of existing interceptor sewer on Mammoth Road: Estimated cost = \$240,000
- Replace Plaza 28 Pump Station and force main: Estimated cost = \$2.0 million
- Upgrade Action Boulevard Pump Station and force main: Estimated cost = \$500,000
- Install sewer facilities for Area 15 - Pettingill Road Business Park: Estimated cost = \$3.03 million
- Extension of existing interceptor sewer to serve Exit 4A area: Estimated costs = \$3.03 million
- Extension of existing sewer on Mammoth Road (Area 20): Estimated costs = \$460,000
- Install interceptor sewer to serve Area A - Century Village: Estimated costs = \$600,000
- Install interceptor sewer in South Londonderry to serve Area B: Estimated costs = \$473,000
- Install interceptor sewer in South Londonderry to serve Area C: Estimated costs = \$1.65 million
- Reimbursement through future Connection Fees for Tokanel Drive Pump Station and force main installed by private developer: Estimated costs = \$800,000. This estimated cost is subject to change and will depend on the Sewer Connection Fee adopted by the Town.

## **FUNDING OF RECOMMENDED FACILITIES**

Section 5 provides detail discussion of methods for funding the recommended facilities itemized above. The funding sources include NHDES State Aid Grants, Sewer Connection Fees, and Town taxation. Sewer Connection Fees are a common method to fund capacity upgrades of sewers, pump facilities and treatment facilities. The Town is currently reviewing, and proposing to revise, its Sewer User Charge System, which includes the Sewer Connection Fee. Section 5 provides an analysis of the Connection Fee and recommends that a new Connection Fee be established as a fixed cost per gallon for all user types in all areas of Town. Table 5-1

summarizes estimates of the Connection Fee rate (\$/gallon) for the recommended facilities itemized above based on the projected flows from future users. Different scenarios, assuming varying combinations of Connection Fee and Town taxation to cover the cost of the facilities, are summarized in Table 5-1. It is recommended that the Town review the information on Sewer Connection Fees in Section 5, and establish a Town-wide Sewer Connection Fee as part of the new Sewer User Charge System.

## **OTHER RECOMMENDATIONS**

In addition to the recommended facilities outline above to address future wastewater needs, and the recommendations relative to the Sewer Connection Fee outlined above, the following recommendations are made:

- It is recommended that the Town monitor the flow to the Plaza 28 Pump Station by recording the flow meter totalizer readings a minimum of 3 times per week and reviewing the flow chart recorder data. Tracking this data as growth occurs in the service area will help determine the timing of the replacement of the pump station and force main.
- It is recommended that the Town submit copies of this Facilities Plan Update to NHDES, the City of Manchester and Town of Derry for their review and comment. The projections of flow and loads, and future septage quantities are needed by Manchester and Derry for their upcoming facilities planning.
- This Facilities Plan Update, with identification of upgrades to meet projected future capacity needs, and the current effort of developing GIS sewer mapping meet part of the pending Federal Regulation requirements for sewer systems called Capacity Management, Operation and Maintenance (CMOM). To meet other requirements of the CMOM regulations, it is recommended that the Town document its sewer inspection and maintenance program.

## **SECTION 1**

### **INTRODUCTION**

#### **1.1 GENERAL**

The Town of Londonderry has experienced significant growth in the past 30 years, and continues to grow resulting in increased demands for sewer service. A Sewer Facilities Plan was last prepared for the Town in the late 1970's, and it is time to update the plan to reflect changes in the Town since the issuance of the plan and to evaluate existing and future wastewater collection and treatment needs. This facility plan update also addresses septage disposal needs for the portions of Town not served by public sewer.

The Town is served by two separate Town-owned collection and interceptor sewer systems. The northern portion is the larger and currently serves an area leading from the schools and municipal facilities on Mammoth Road, draining to the north through residential, commercial and industrial areas. Wastewater collected in this system is ultimately conveyed to the Manchester Wastewater Treatment Facility.

A portion of the southern collection system serves an area along Route 102 just west of I-93, and the Gilcreast Road area. This sewer flows to the Charleston Avenue Pump Station, which pumps flow to the Derry Wastewater Treatment Facility. Another portion of the southern collection system serves an area east of I-93, along Londonderry Road and Action Boulevard. This wastewater is pumped from Action Boulevard to the Derry Wastewater Treatment Facility.

There is also a privately owned sewer system serving the Mill Pond development in the northeast portion of town. Wastewater from this area also flows to Manchester.

## **1.2 SCOPE OF WORK**

The scope of this Wastewater Facilities Plan Update includes the following:

### **1.2.1 Review Existing Conditions**

- The current sewer service areas have been defined and reviewed;
- The existing Intermunicipal Agreements with the City of Manchester and Town of Derry for the treatment of the wastewater generated in Londonderry were reviewed;
- Data relative to the existing wastewater flows and loads for the north and south collection systems were reviewed;
- Flow data, along with precipitation data, were evaluated to assess the magnitude of infiltration and inflow (I/I) in the sewer systems and determine if I/I is excessive and warrants further investigation;
- Pump station flow data and design parameters were reviewed to determine the capacity available to accommodate future growth;
- The City of Manchester was contacted to determine current septage quantities generated in Londonderry and to gauge the impacts of projected future septage generation.

### **1.2.2 Assessment of Future Sewer Service Needs**

- Meetings were held with representatives of the Town Planning and Economic Development Department to discuss the Town's Master Plan, determine the areas planned for residential, commercial and industrial growth and define the need to provide sewer service to those areas;
- Based on the designated growth areas expected to be served by Town sewer, flow projections were made for those areas, and the impacts to the existing collection system and pump stations were evaluated;
- The impact of projected flows and loads were also evaluated relative to the Town's allocated capacities at the wastewater treatment plants in Manchester and Derry;
- Town data relative to on-lot septic system replacement were reviewed to determine any projected needs to extend Town sewer to serve existing development;

- Projections of future septage quantities were made for expected growth outside the sewer service area.

### **1.2.3 Evaluation of Methods to Serve Current and Future Needs**

- Conceptual plans were developed for extending sewers to serve the identified growth areas that are not currently within the sewer service area, and the costs for these improvements were estimated;
- Cost estimates were prepared for improvements to existing facilities required to accommodate future flows;
- The impact of future flows and loads and the Town's ability to obtain additional treatment capacities were discussed with representatives from Manchester and Derry;
- A list of capital improvements anticipated as necessary to meet the future sewerage collection needs has been prepared;
- Methods to finance future capital projects were evaluated.

## **SECTION 2**

### **EXISTING CONDITIONS**

#### **2.1 PLANNING AREA**

Although the entire Town of Londonderry has been taken into consideration for the Wastewater Facilities planning, the majority of the effort centers around the area currently served by the existing sewer system and the areas projected to be served by Town sewer, consistent with the Town's 1997 and 2004 Master Plan. Development in the areas outside the proposed sewer service area is assumed to be served by on-lot subsurface disposal systems.

##### **2.1.1 Background**

The Town of Londonderry covers approximately 26,000 acres, of which 58% is currently zoned for residential development. The current population is approximately 25,000, and there are approximately 750 commercial or industrial businesses. A Sewer Facilities Plan was prepared in the late 1970's, and there have been significant changes to the Town since that time.

The Town has recently completed an update of its 1997 Master Plan. The purpose of this Wastewater Facilities Plan is to determine the Town's future wastewater needs as the Town continues to grow in a manner consistent with the Master Plan, and define capital improvements expected to be necessary to meet these wastewater needs.

#### **2.2 EXISTING WASTEWATER COLLECTION AND TRANSPORT FACILITIES**

The Town is served by two separate municipally-owned collection and interceptor sewer systems. A map of the existing sewer system is included as Figure 1 in Appendix A. The two sewer systems are commonly referred to as the North Londonderry Sewer and South Londonderry Sewer systems. The North Londonderry system is the larger of the two and wastewater collected in this system ultimately drains to the Manchester Wastewater Treatment Facility for treatment and disposal. The South Londonderry system currently serves the area adjacent to Exit 4 of I-93 and the wastewater from this area is pumped to the Derry Wastewater

Treatment Facility for treatment and disposal. The Town's sewer system is described in more detail below.

### **2.2.1 North Londonderry Sewer System**

The North Londonderry sewer system includes interceptor and collector sewers, and two Town-owned pump stations. A combination of 8-inch collector sewers and a 12-inch interceptor runs from the Town Center just north of Pillsbury Road to the Mammoth Road Pump Station. This pump station pumps wastewater to a 15-inch interceptor that runs north parallel to Mammoth Road to the Plaza 28 Pump Station. The Plaza 28 Pump Station also serves the area along Rockingham Road to the area just east of Exit 5 of I-93 via a 15-inch interceptor. The Plaza 28 Pump Station pumps to the gravity sewer system serving the mostly commercial/industrial area located in the northwest portion of Town, including the Airport. This area includes interceptor sewer piping ranging in size from 18-inch to 30-inch diameter, with the 30-inch interceptor connecting to the Manchester system at the municipal boundary. Part of the interceptor sewer in the airport area has recently been relocated and crosses under the expanded runway of the Manchester Airport. The Town has entered into an agreement with Manchester whereby Manchester is responsible for maintenance of this section of the interceptor. The wastewater flow to Manchester is measured at the Londonderry Metering Station (LMS), with the flow data used as a basis of billing by the City of Manchester for treating Londonderry's wastewater. There are other flows from Londonderry to Manchester accounted for in the billing from Manchester, such as the flow from Mill Pond Development, discussed below. However, the flow through the LMS accounts for approximately 98% of the Town flow to Manchester. There is also a small portion of the Manchester sewer system that flows into Londonderry and is included in the flow measured by the LMS. However, Manchester measures this flow and subtracts it from the flow measured by the LMS for billing purposes.

There is a private sewer system in a relatively new residential subdivision in the northeast corner of Town, known as the Mill Pond area. The sewer serving this area is owned by the Developer and connects to the Manchester sewer system in the vicinity of Bodwell Road, and the wastewater flows to the Cohas Brook Interceptor.

### ***2.2.1.1 Plaza 28 Pump Station***

The Plaza 28 Pump Station is located near the intersection of Mammoth Road and Rockingham Road, and has been in operation since 1986. The station includes a 10-foot diameter precast concrete wet well and a building that contains two self-priming pumps, discharge piping and valves, pump controls, electrical panels, and an emergency generator. The original pumps and motors were replaced with two new self-priming pumps and new motors in the spring of 2004. The pump station capacity is 1.75 million gallons per day (mgd) or 1,200 gallons per minute (gpm), which is the pumping rate of each pump. The pump station pumps wastewater through a 12-inch diameter force main which discharges to the 18-inch gravity sewer on Grenier Field Road. The total force main length is approximately 4,800 linear feet (LF).

### ***2.2.1.2 Mammoth Road Pump Station***

The Mammoth Road Pump Station is located on a private drive off Mammoth Road south of Shasta Drive. The pump station was constructed and put on-line in 2002. The station includes a 8-foot diameter precast concrete wet well that contains two submersible wastewater pumps, each with a pumping capacity of 500 gpm (0.72 mgd). An 8-foot diameter precast concrete valve pit, located next to the wet well, contains the pump discharge piping and valves. The pump station building houses the pump controls, electrical panels, emergency generator, and a chemical feed system that can be used to help control odors in the wet well and force main. The pumps discharge through an 8-inch diameter force main to a 15-inch gravity sewer in the Public Service of New Hampshire (PSNH) right-of-way just south of Bancroft Road. The total force main length is 4,100 LF.

## **2.2.2 South Londonderry Sewer System**

The South Londonderry sewer system includes collector and interceptor sewers serving the area near Exit 4, and two Town-owned pump stations. A short stretch of Route 102, west of I-93 and a portion of Gilcreast Road are served by a 12-inch diameter interceptor that carries flow to a 24-inch interceptor on Boston Avenue and ultimately to the Charleston Avenue Pump Station. The

area east of I-93 is served by an interceptor pipe ranging in size from 10-inch to 12-inch running along Londonderry Road, across Route 102 and onto Action Boulevard to the Action Boulevard Pump Station. Both the Charleston Avenue and Action Boulevard pump stations pump wastewater across the Town line to the Derry Wastewater Treatment Facility. Data collected by flow meters at both stations are used as a basis for billing by the Town of Derry for treatment of Londonderry's wastewater.

A private developer is currently constructing a new pump station at the end of Tokanel Drive to serve the private development located between Ross Drive and Route 102. This pump station and force main will be taken over by the Town upon completion of the project in 2005.

#### ***2.2.2.1 Charleston Avenue Pump Station***

The Charleston Avenue Pump Station has been in service since 1995, and is located on Charleston Avenue just south of Boston Avenue. The pump station includes a headworks area with sewage grinder in the influent channel, and a bar rack in the bypass influent channel. The wastewater flows from the influent channel into a divided 10-foot by 24-foot wet well. The station contains two solids-handling vertical turbine pumps with 2-speed motors. At the lower speed, each pump discharges approximately 1,100 gpm (1.58 mgd) and each pump discharges approximately 2,600 gpm (3.75 mgd) at the higher speed. Currently, both pumps operate only at the lower speed. The upper level of the station contains the pump controls, pump discharge piping and valves, electrical panels, and emergency generator. The pump station pumps through an 18-inch diameter force main, which passes under Route I-93, and discharges to a gravity sewer just upstream of the Derry Wastewater Treatment Facility.

#### ***2.2.2.2 Action Boulevard Pump Station***

The Action Boulevard Pump Station is located at the south end of Action Boulevard. The station was originally constructed and operated privately, and the Town assumed ownership of the station in the early 1990's. The pump station was upgraded in the late 1980's to its current condition. The Station includes a 6-foot diameter precast concrete wet well with a fiberglass pump building over the wet well. Two self-priming wastewater pumps are located in the

building, along with the pump discharge piping and valves. The station is not equipped with an emergency generator and there is no equipment to allow the connection of a portable generator. Based on information provided by the Town, the pumps each have a pumping capacity of approximately 700 gpm. A 6-inch diameter force main carries wastewater from the pump station to a gravity sewer just upstream of the Derry Wastewater Treatment Facility. At a pumping rate of 700 gpm, the velocity in the force main is approximately 8 feet/sec, which is well above recommended levels of 3 to 5 feet/sec.

## **2.3 WASTEWATER TREATMENT FACILITIES**

As discussed above, the Town of Londonderry does not have a wastewater treatment facility within the Town boundary. The wastewater generated in north Londonderry, collected in the North Londonderry Sewer System, is treated in Manchester. The wastewater from South Londonderry is treated in Derry. The Town of Londonderry has entered into intermunicipal agreements with both Manchester and Derry, which are summarized below.

### **2.3.1 Intermunicipal Agreement with Manchester**

In 1979, the Town of Londonderry entered into an Intermunicipal Agreement with the City of Manchester for treatment of wastewater generated in Londonderry. The Agreement defined the limitation of flows, biological oxygen demand (BOD), and total suspended solids (TSS) that could be discharged to Manchester. Limitations of other pollutants were also established, as well as the basis of billing for treatment costs and capital expenditures at the Manchester plant.

Three amendments have been made to the original Agreement, with the most significant being Amendment No. 2 in 1982, which revised the flows and loads allocation to Londonderry, and Amendment No. 3 in 1998, which allowed flow from a private sewer system in the northeast corner of Londonderry (Mill Pond Development) to connect to the Manchester sewer system.

The current limits on flows, loads, and other important information from the Agreement and Amendments are summarized below:

- Limits for flow and loads (Based on monthly averages):
  - Average Daily Flow: 3.0 mgd (including infiltration).
  - BOD: 5,603 pounds per day (lbs/day)
  - TSS: 7,004 lbs/day
- Limit for flow from the connection point in the Mill Pond Development (included in the total limits listed above):
  - Average Daily Flow: 12,000 gpd
  - Peak Hourly Flow: 36,000 gpd
- Renewal terms: The original Agreement had a term of 15 years, after which the Agreement was to be automatically renewed every five years, unless either party elects to terminate the Agreement by providing written notice at least one year before expiration of a renewal period.
- Septage: As long as Manchester accepts septage without limitation from surrounding towns, it will accept septage without limitation from Londonderry. If Manchester must limit septage, then the quantity of septage from Londonderry, relative to the total quantity of septage received at the plant, shall be proportional to the flow, BOD and TSS allocations as listed above. However, the limit of septage shall not be lower than 10,000 gallons per month.

The flow limit of 3 mgd for Londonderry is approximately 6% of the current design flow of the Manchester Treatment Facility (52 mgd).

### **2.3.2 Intermunicipal Agreement with Derry**

In 1981, the Town of Londonderry entered into an Intermunicipal Agreement with the Town of Derry for treatment of wastewater generated in Londonderry. The Agreement was later revised in 1991. The Agreement defined the limitation of flows and biological oxygen demand (BOD) that could be discharged to Derry. Limitations of other pollutants were also established, as well as the basis of billing for treatment costs and capital expenditures at the Derry plant.

An Addendum to the Agreement was executed in 1996 to address payment for the treatment of water discharged from the Tinkham Superfund Site in South Londonderry, and revise the flow limit from Londonderry as summarized below:

- Current limits for flow and loads:
  - Average Daily Flow: 200,000 gpd (including infiltration).
  - Average Daily BOD: 350 lbs/day

These average daily values must not be exceeded when calculated on any nine month period.

The 1996 Addendum allocates an additional 129,600 gpd of capacity to Londonderry upon the completion of the Derry Treatment Facility upgrade, currently scheduled for completion in 2005. Flows above 329,600 gpd may be available on a "first-come first-served" basis.

- Payment for additional capacity: The original Agreement established an impact fee to be charged to Londonderry for flows exceeding 200,000 gpd. The impact fee is \$4.11 per gallon of average daily flow, indexed to the Engineering News Record (ENR) Construction Cost Index for January 1, 1991. This translates to a cost of \$6.30 based on the ENR Cost Index for October 2004. The 1996 Addendum modified the impact fee for the flow from 200,000 gpd to 329,600 gpd to account for payment from Londonderry for treatment of flows from the Tinkham Superfund site. The current value of the modified

impact fee is \$5.58 per gallon. For flows over 329,600 gpd, the impact fee would be as originally described, or \$6.30 at the current ENR Cost Index.

- **Renewal Terms:** The Agreement has a term of 15 years (from 1991), after which the Agreement shall be automatically renewed every five years, unless either party elects to terminate the Agreement by providing written notice at least one year before the expiration of the original term or any renewal period.
- **Septage:** Derry will allow septage from Londonderry up to a maximum of 10,000 gallons per month if such capacity is available, as determined by Derry.

## **2.4 CURRENT FLOWS AND LOADS**

The Town has provided flow data for the flow to Manchester as measured at the Londonderry Monitoring Station (LMS), as well as flow data from each pump station. The data provided from the LMS is for three days each month, which correlates to the three days that testing is done for loadings (BOD and TSS). Daily flow data provided by Manchester for the months of April 2003, March 2004, and April 2004 was also reviewed. It is within these three months that the highest monthly average flows were recorded. The flow data provided for the pump stations is based on monthly flow meter totalizer readings taken once each month, resulting in monthly average flow values. The total flow to Derry is the sum of the flows from the Charleston Avenue and Action Boulevard Pump Stations.

### **2.4.1 Total Flows to Manchester**

Monthly Flow data from the LMS for 2003 and 2004 have been reviewed. The total flow to Manchester is greatly dependent on the flow discharged from one industrial user, AES Londonderry Cogeneration Facility (AES). The daily flow from AES can vary from less than 50,000 gpd to over 800,000 gpd. Over the past year, the flow from AES has averaged approximately 0.5 mgd. AES has a discharge permit with the Town that limits its discharge to the following:

- Annual Average Flow: 0.7432 mgd
- High Monthly Average Flow: 0.8698 mgd
- Maximum Daily Flow: 0.9350 mgd

In reviewing the flow data from the LMS and AES, the flow from AES can account for over 60% of the total flow to Manchester on any given day. Because AES is allowed to discharge up to 0.8698 mgd as a monthly average for any given month, this value will be used in establishing current monthly average flows, although AES has not discharged this quantity for any month to date. This is of importance when projecting future flows to Manchester to determine if Londonderry may need to request additional flow allocation beyond the 3.0 mgd currently permitted.

Over the past two years, the highest monthly average flows were recorded in April 2003, March 2004, and April 2004. To determine the highest monthly flow to Manchester without counting the flow from AES, the daily flows reported from AES was subtracted from the daily flows reported by Manchester for the three months listed above. The Average Daily Flow (ADF) without flows from AES, on a monthly average ranged from 0.62 mgd to 0.77 mgd. The highest monthly average of 0.77 mgd was recorded in April 2003. Because the flow limit to Manchester is based on a monthly average, it is proposed to use the highest monthly average in the past two years, rounded up to 0.8 mgd.

To establish current average flows to Manchester, the highest monthly flows are summarized below for comparison to the flow limits in the Agreement with Manchester.

**TABLE 2-1**  
**CURRENT AVERAGE DAILY FLOWS TO MANCHESTER**

	High Monthly Average Flow (mgd)
AES Flows	0.87
Non-AES Flows	0.80
Total	1.67

#### **2.4.2 BOD and TSS Loads to Manchester**

BOD and TSS loadings to Manchester are determined by sampling the wastewater at the LMS three consecutive days each month. The BOD and TSS loadings are summarized in TABLE 2-2. Values are given for annual averages and high monthly average, which can be compared to the permitted limit with Manchester.

**TABLE 2-2**  
**CURRENT AVERAGE LOADINGS TO MANCHESTER**

	Annual Average (lbs/day)	High Monthly Average (lbs/day)	Permitted Monthly Average (lbs/day)
BOD	4,600	8,350	5,603
TSS	1,600	2,600	7,004

As indicated in the table, the BOD loading does occasionally exceed the monthly average allowed in the Agreement with Manchester. The City of Manchester has indicated that it will not increase the BOD limit in the Agreement with Londonderry. The Town has two industrial users that discharge very high strength (BOD) waste. The Town is currently working with these industrial users to get their discharge in compliance with the Town's pretreatment requirements. It may also be beneficial to review the testing protocol, such as the testing frequency, to determine if the BOD values are a good representation of actual conditions. It is possible that

using only three days of data per month may be yielding artificially high monthly averages, especially if discharges from the industrial users are significantly reduced on weekends.

### **2.4.3 Current Flows to Pump Stations**

The total flows to Manchester reported above include the flow to the Plaza 28 and Mammoth Road Pump Stations. In order to assess the impacts of future flows on these stations, the current flows to each station must be defined. The flow data provided for the pump stations is based on monthly flow meter totalizer readings taken approximately once each month, resulting in monthly average flow values.

#### ***2.4.3.1 Plaza 28 Pump Station***

Based on almost 2 years of data, the average daily flow to the Plaza 28 Pump Station ranges from approximately 250,000 gpd to 350,000 gpd, with an overall average of 300,000 gpd. To estimate peak flow to the station, a peaking factor of 3.5 results in a peak flow of 1.05 mgd or 730 gpm. The original pumps at this station pumped at a rate of approximately 1100 gpm. The estimated peak flow of 730 gpm is consistent with the reporting that the influent flow does not exceed the capacity of one pump. The new pumps recently installed each pump at approximately 1200 gpm. Based on the data reviewed, infiltration/inflow (I/I) does not appear to be significant in the Plaza 28 Pump Station drainage area.

#### ***2.4.3.2 Mammoth Road Pump Station***

The Mammoth Road Pump Station has been in service for approximately 2 years. Based on monthly averages, the Average Daily Flow to the station is approximately 17,500 gpd. This station serves the Londonderry schools and, as expected, the daily flows to the station are lowest when school is not in session. If a peaking factor of 6 is used, the current peak flow to the station is approximately 73 gpm. Based on the data provided, I/I is not a problem in the Mammoth Road service area.

#### **2.4.4 Total Flows to Derry**

All the wastewater flow from Londonderry to Derry is pumped by either the Charleston Avenue Pump Station or the Action Boulevard Pump Station. The total flow to Derry is approximately 85,000 gpd. The breakdown of flow to each station is discussed below.

##### ***2.4.4.1 Charleston Avenue Pump Station***

Based on the monthly average flow data provided, the Average Daily Flow to the Charleston Avenue Pump Station ranges from 36,000 gpd to 50,000 gpd, with an overall average of approximately 45,000 gpd. Using a peaking factor of 6, the current peak flow to the station is approximately 190 gpm, well below the pumping capacity of 1,100 gpm with the pumps operating at the lower speed. Based on the limited flow and minor variations, I/I is not significant in the service area of the Charleston Avenue Pump Station.

##### ***2.4.4.2 Action Boulevard Pump Station***

The daily flow from the Action Boulevard Pump Station range from 35,000 gpd to 46,000, with an overall average of approximately 40,000 gpd. Assuming a peaking factor of 6, the current peak flow to the station is approximately 165 gpm. In reviewing the minor flow variations, I/I is not a problem in the service area of the Action Boulevard Pump Station.

#### **2.4.5 BOD and TSS Loads to Derry**

It is reported that Derry does not currently require sampling and testing of the wastewater from Londonderry. Therefore, the Town has no data on BOD and TSS for the wastewater pumped to Derry. As discussed above, there is not a significant amount of I/I in the South Londonderry sewer system so there is little dilution of the wastewater. Because there is no data available, an estimate of current loads is presented below.

The New Hampshire Department of Environmental Services (NHDES) design standards recommends values to use for projecting loads for wastewater from residential users. For BOD,

the loading rate is 0.2 pounds per capita per day (ppcd), and for TSS the loading rate is 0.25 ppcd. Based on an assumed wastewater contribution of 70 gallons per day per person, the equivalent loading concentrations are 340 mg/l of BOD, and 428 mg/l of TSS. Using these concentrations and an average daily flow of 85,000 gpd to Derry, the estimated current loads to Derry are:

- Estimated Current BOD load = 240 lbs/day
- Estimated Current TSS load = 305 lbs/day

## **2.5 NON-SEWERED AREAS**

A majority of the developed area of Londonderry is not currently served by public sewer. These properties are served by privately owned on-lot septic systems consisting of a septic tank and a subsurface disposal field. Although the non-sewered areas include some commercial establishments, many of these areas are residential. According to the 2004 Master Plan, almost 86% of the Town's housing was constructed after 1970, and approximately 70% of the housing units in Town are single-family detached homes. The majority of the Town's existing neighborhoods consist of single family homes on one to two acre lots. For neighborhoods with this type of density, on-lot septic systems provide a cost-effective and acceptable means for wastewater disposal. In general, there is adequate land available for replacement systems when the original systems fail. The remaining housing units are in higher density developments consisting of single or multiple units in attached structures, such as condominiums and townhouses, or mobile home parks.

Some of the higher density housing developments are on Town sewer, but many are not. Owners and/or representatives of some of these developments have approached the Town to discuss the potential of connecting to Town sewer to solve ongoing problems with on-lot subsurface disposal systems. Providing Town sewer to some of these areas is discussed in Section 3.

### **2.5.1 Septic System Replacements**

The Town provided a report of septic system replacements, listed by tax map lot, for the years 2000 through 2003. The replacements are typically required when an existing subsurface

disposal system fails. The typical lifespan of a subsurface disposal system can range from 5 to 30 years depending on the type of soil and the quantity of water used by the property owners. A summary of the number of replacements by year is provided in Table 2-3.

**TABLE 2-3**  
**SEPTIC SYSTEM REPLACEMENTS**

<u>Year</u>	<u>No. of Septic System Replacements</u>
2000	45
2001	40
2002	24
2003	43

The lot locations for the replacements were plotted on a map of the Town, as Figure 2, which is included at the end of this Section. The septic system replacements are scattered throughout Town. There is a slightly higher concentration of replacements in some of the older development areas south of Route 102 and east of Route 128. Since there appears to be adequate space for replacement systems to be constructed on most properties, extending Town sewers to serve existing residential areas should not be a priority of the Town. However, if a specific area experiences a significant number of system failures in a relatively short period of time, due to poor soils or high groundwater, extending Town sewer to the area is an option if there is an existing Town sewer close by.

### **2.5.2 Septage Disposal**

For properties served by on-lot septic systems, the septage collected in the septic tank must be pumped out and disposed of in a manner consistent with State regulations. It is recommended that septic tanks be pumped every 3 to 5 years to reduce the risk of excessive solids overflowing the septic tank and clogging the disposal field. The Intermunicipal Agreements with Manchester and Derry allow for septage collected in Londonderry to be discharged to the wastewater

treatment plants in both communities. Currently all the septage from Londonderry is discharged to the Manchester Treatment Facility, which at this time has adequate capacity to treat the septage and does not limit septage from any of the communities it serves. The City of Manchester provided records of the quantity of septage received from Londonderry each month for the past two years. The monthly totals range from 60,000 gallons in the winter months to as much as 235,000 gallons in the warmer months of the year (when most tanks are pumped out). The annual average is approximately 1,800,000 gallons.

In discussions with representatives from Manchester, the City does not intend to limit septage from neighboring communities until the overall wastewater loading (BOD and TSS) to the plant approaches the design levels. As part of Manchester's Facility planning to be conducted next year, Manchester will be discussing future septage needs with each community that they now serve to include in their planning.

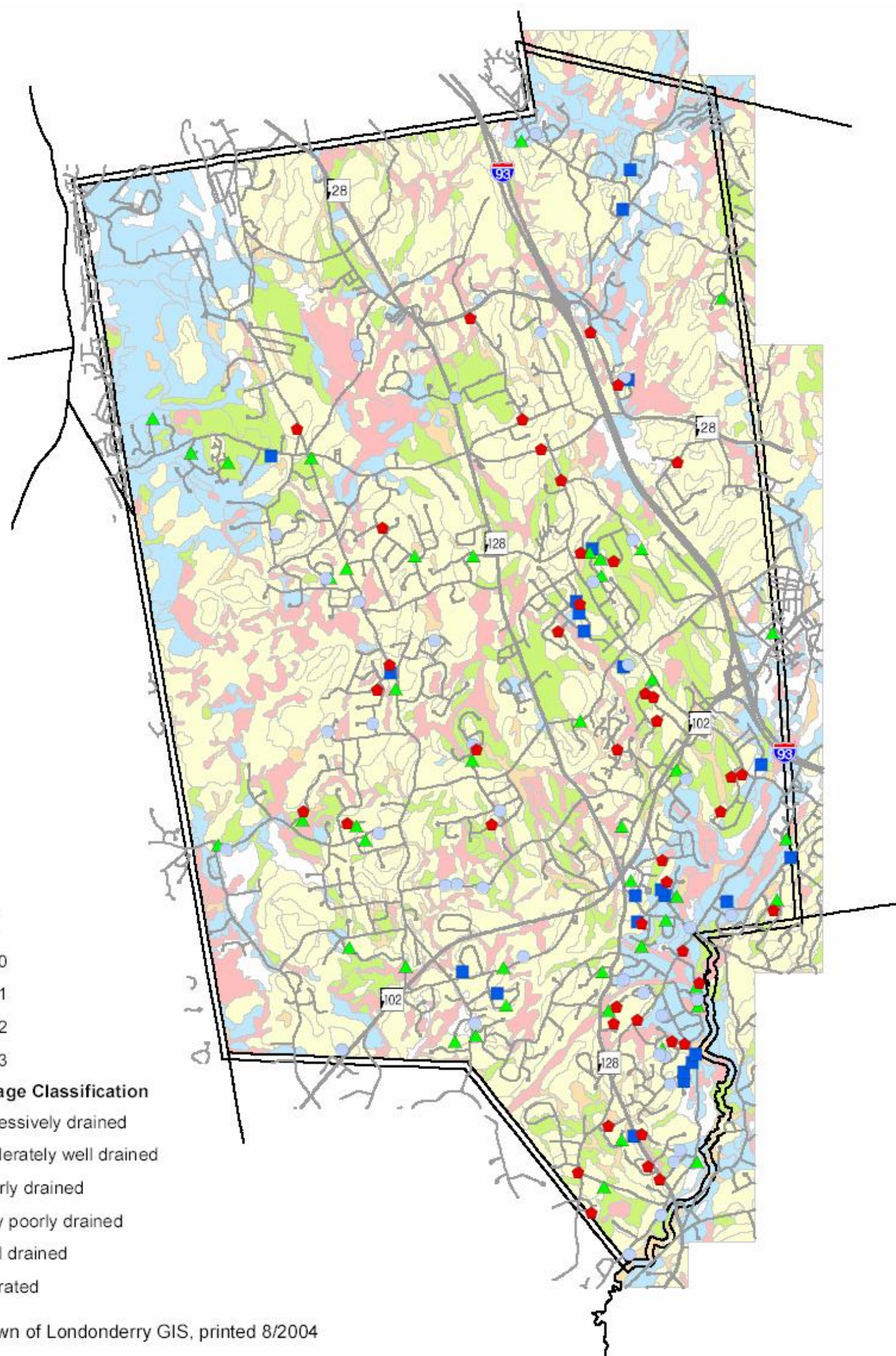
**Legend**

- ▲ 2000
- 2001
- 2002
- 2003

**Soil Drainage Classification**

- Excessively drained
- Moderately well drained
- Poorly drained
- Very poorly drained
- Well drained
- not rated

Map by Town of Londonderry GIS, printed 8/2004



Londonderry, NH Wastewater Facilities Plan Update		
Septic System Repairs / Replacements		
PROJ NO:	10317A	 Better Engineering. Better Treatment.
DATE:	Dec 2004	
SCALE:	NTS	
		FIGURE: 2

## **SECTION 3**

### **FUTURE NEEDS**

#### **3.1 PLANNING PERIOD**

The Town of Londonderry has recently completed an update of its Master Plan, which summarizes the Town's direction relative to future growth. To determine Londonderry's future wastewater needs, the Town's Master Plan was reviewed in meetings with the Town's Public Works and Planning departments. The planning period typically used for facilities planning is 20 years, and therefore the projections made in this facilities plan are through the year 2025. Population projections from the Master Plan were reviewed as well the priorities set in development of commercial and industrial areas. For the areas identified for future growth and development, future wastewater flows and loads were projected for the year 2025. However, the projected development in these areas is approaching build-out of the available land remaining to be developed. The rate of future development is difficult to predict, and growth may occur at different rates in different parts of Town. The projections of future wastewater flows and loads are summarized in this Section of the report.

#### **3.2 POPULATION PROJECTIONS**

The Town's Master Plan discusses the Town's history in terms of population growth. Between the years 1960 and 1990, the Town's population increased from 2,457 to 19,781 persons, an increase of over 700%. In the same time frame, New Hampshire and Rockingham County grew by 83% and 148% respectively. Since 1990, Londonderry's growth has slowed somewhat. According to the 2000 census, the Town's population was 23,236 and there is an average of 3 persons per household.

According to the New Hampshire Office of State Planning, Londonderry's population will increase by another 8,024 persons by the year 2025. Assuming the number of persons per household will remain approximately the same (3), the number of housing units can be expected to increase by approximately 2,675.

The majority of Town is currently zoned Agricultural-Residential (AR-I), made up of single-family neighborhoods with lot sizes ranging from just under one acre to over two acres. The Master Plan indicates that a majority of future residential growth will continue in this zone with similar neighborhoods. For lot sizes in the 1 to 2 acre range, wastewater disposal using on-lot subsurface disposal systems is the most practical and cost effective solution. Installing public sewer for housing with this density could be 2 to 3 times more expensive than constructing on-lot disposal systems.

Higher housing density is allowed in the Multi-family Residential (R-III) zone. This district includes areas along Route 28 between Exit 5 of I-93 and Manchester, and areas near Route 102 and Exit 4. Much of the land in the R-III zone is already developed or in the process of being developed. The Master Plan identifies the need to provide public sewer to these areas due the potential for high housing density. Of the 2,675 new housing units projected to be constructed in Londonderry by the year 2025, estimates are made in Section 3.5 as to how many of these new housing units will be constructed in areas to be served by the Town.

### **3.3 MASTER PLAN SUMMARY**

The updated Master Plan identified areas for commercial and industrial growth consistent with the current zoning of the Town. The major areas for commercial and industrial growth are in the northern portion of Town between the Airport area and I-93, and the area south of the airport. Other areas include the land near the proposed Exit 4A, and along Route 102 between I-93 and Mammoth Road. These areas were reviewed with Town personnel to determine the amount of land that could be developed and which areas will be served by Town sewer. Those areas are summarized in this Section of the report.

Areas of note that are not intended to be served by Town sewer, as currently defined in the Master Plan, include the section of Route 102 west of Mammoth Road, and Route 28 east of Exit 5. The Master Plan recommends that the western portion of Route 102 maintain its open, wooded nature with low density development, thus not requiring public sewer, with the exception of the far western end of Route 102, near the Hudson Town Line. The Master Plan has similar recommendations for the section of Route 28 east of Exit 5. Currently there is a mix of

residential and commercial properties along this portion of Route 28, and the Master Plan recommends maintaining the residential character with future commercial development to be low-impact and low density. This type of development typically does not require public sewer.

The Master Plan indicates that a majority of the residential growth will continue to be in neighborhoods with one to two acre lots, thus not requiring Town sewer. However, there are high-density residential developments currently planned or under development, with the potential for more in the northern portion of Town. The Master Plan recommends that these new high-density residential developments be served by Town sewer. There are also existing high-density residential areas that are not currently on Town sewer. It should be a priority to provide sewer to these areas. These areas are identified below along with the commercial and industrial areas to be served by existing or future sewers.

### **3.4 WASTEWATER FLOWS AND LOADS PROJECTIONS**

In order to project future wastewater flows and loads, specific areas of future development were identified in meetings with Town personnel. These areas consist of undeveloped lots in areas where Town sewer is already present, and areas within the vicinity of existing sewers where commercial, industrial, and high-density residential growth is projected to occur as promoted by the Town's Master Plan. These areas are identified by number or letter, and the same designations are used throughout this Facilities Plan.

#### **3.4.1 Flow Projections Basis**

The New Hampshire Department of Environmental Services (NHDES) has established standards for projecting wastewater flows from undeveloped areas. The standards include flow rates for commercial, industrial, and residential development, as well as allowances for infiltration. Peaking factors for estimating peak flows are also established, with peak flows used for sizing gravity sewer piping and pump stations.

### ***3.4.1.1 Industrial and Commercial Flow Projections***

The NHDES standards establish a flow rate of 2000 gallons/day/gross acre for commercial and industrial areas. The actual wastewater flow from these types of users can vary widely depending on the type of establishment. The average rate of 2000 gallons/day/gross acre is very high compared to water usage for typical commercial and industrial users. An exception would be a wet industry that uses a lot of water in its process, such as AES, Coca-Cola and Stonyfield. When considering commercial/industrial development in large areas, which is the case in this Facilities Plan, the use of 2000 gallons/day/gross acre would yield unrealistically high flow projections. As an example, one particular growth area called the Pettingill Road Business Park (area 15) consists of approximately 700 acres of land, some of which is likely not developable due to wetlands, steep slopes, etc. If a rate of 2000 gallons/day/gross acre is used, the flow projection for this area alone would be 1.4 mgd (not including infiltration). This is more than the current total average daily flow from Londonderry to Manchester, including the flow from AES, and the current amount of developed land is much higher than 700 acres. It is recommended that a reduced rate be used in projecting flows from undeveloped commercial/industrial land for Facilities Planning.

For one of the growth areas (Area 15), the Town has developed conceptual plans for development through *Design Charrettes* in which building areas are estimated. Where approximate building areas have been estimated, a flow rate is estimated using the following: 100 sq.ft.of building/employee and 10 gpd/employee based on a typical dry industry or retail store. For commercial/industrial areas where only gross acreage is known, a flow rate of 700 gallons/day/gross acre is used. This rate is based on review of actual wastewater flows from commercial/industrial areas in several communities for similar facilities planning. The rate of 700 gpd/gross acre is still conservatively high on average, but should yield more reasonable flow projections for planning purposes. Also, the peaking factors used to estimate peak flows tend to be conservatively high.

### ***3.4.1.2 Residential Flow Projections***

The 2000 census indicates that Londonderry averages 3 persons per home or residential unit. NHDES standards call for a minimum of 70 gallons per capita to be used for flow projections. At 3 persons per residential unit, this calculates to an average daily flow of 210 gpd per residential unit, which is used for flow projections in this Facilities Plan.

### ***3.4.1.3 Infiltration Allowance***

According to the NHDES standards, an allowance for infiltration of 150 gpd/acre is to be used for areas to be served by future sewers. When estimating peak flow rates, the peaking factor is only applied to sanitary flows, not the infiltration allowance. Based on our experience, this infiltration allowance provides a conservatively high estimate of infiltration.

## **3.4.2 Loads Projections Basis**

Along with the flow projections for future users, wastewater loads have been estimated, in terms of BOD and TSS. The NHDES design standards suggest that loading rates for residential users be estimated based on 0.2 pounds per capita per day (ppcd) for BOD and 0.25 ppcd for TSS, which will be used for residential users in this Facilities Plan. If a flow rate of 70 gpd is used for a residential user (not including infiltration), the equivalent concentration is 340 mg/l for BOD and 428 mg/l for TSS.

It is more difficult to assign a loading rate for commercial and industrial users, because the loading is greatly dependent on the type of business and the nature of its discharge to the sewer. Based on the current flow (3 mgd) and BOD loading (5,603 lbs/day) limits in Manchester, the equivalent BOD concentration is 225 mg/l. Similarly, the TSS loading (7,004 lbs/day) is equivalent to an overall TSS concentration of 280 mg/l. Note that these concentrations are based on flows that include infiltration, which typically has no BOD and TSS load. Actual sampling of the flow to Manchester indicates that BOD concentrations range from 220 mg/l to 1,200 mg/l, but these values are mostly dependent on the discharges from two industrial users. The data shows that TSS concentrations can range from less than 100 mg/l to 600 mg/l. For the purpose

of projecting loadings for this Facilities Plan, concentrations equivalent to the residential loading rates discussed above will be used (BOD of 340 mg/l and TSS of 428 mg/l). These concentrations will be applied to only the sanitary flow projections, not the infiltration allowances.

### **3.5 GROWTH AREAS DESCRIPTION AND FLOW PROJECTIONS**

As described above, the following is a brief summary of each of the growth areas identified through meetings with Town personnel in conjunction with the review of the Town's Master Plan. Included in each summary is the basis for the flow projections (number of residential units, number of acres available for potential development, etc.), the projected sanitary flow and infiltration allowance, a conceptual description of the sewer to serve the area where appropriate, and the estimated cost of the conceptual sewer plan for the area where appropriate. The growth areas are shown on Figure 3 in Appendix A. The number or letter assigned to each area is consistent throughout this report. The numbered areas represent land that is mostly undeveloped and planned to be developed consistent with the Master Plan. The areas that are identified by letters represent areas in the vicinity of existing or planned interceptor sewers that are mostly developed already, with a high percentage being residential development. The boundaries of the areas are approximate only and could be modified during the development of the areas and design of the sewers to include some of the properties adjacent to the identified areas, if necessary.

The cost estimates for the conceptual sewer plans for each growth area are approximate and intended only to provide an indication of the order of magnitude of possible costs to serve each area. Actual cost will depend on the final development layout, grading, and final sewer routing. For estimating purposes, the construction cost for gravity sewer installation is estimated at \$125/linear feet (LF), unless it is expected that sewer depth could be above the normal 7 to 10 foot depth, in which case higher unit costs may be used. If a pump station is anticipated, the projected construction costs range from \$100,000 for a small grinder type station (potentially serving one to several buildings) to \$500,000 for a larger submersible type station (similar to the Mammoth Road Pump Station). In addition to the construction costs, an allowance for Technical

Services (design, inspection, etc.) and Contingencies is included. This allowance is estimated to be 35% of the estimated construction cost, which is typical for planning level estimates

.

### **3.5.1 Area 1 - Sanborn Road #1**

The Town provided plans from a developer for this area, which is identified to be a residential development consisting of approximately 96 housing units. The area occupies approximately 50 acres of land. The projected sanitary flow from the 96 housing units is 20,160 gpd, and the infiltration allowance is 7,500 gpd, for a total average daily flow of 27,660 gpd. Wastewater from this development area would flow to the Plaza 28 Pump Station and then on to Manchester.

The sewer extension to service this area includes approximately 1,000 LF of 8-inch sewer along Sanborn Road, and approximately 1,750 LF of 8-inch sewer within the development area. The estimated cost for this conceptual sewerage plan is \$470,000. Based on discussions with the Town, it is assumed that the Developer would fund the entire construction of the sewer required for this development.

### **3.5.2 Area 2 - Sanborn Road #2**

Based on plans described under Area 1 and conceptual plans developed as the Londonderry Business Park Design Charette (see Area 5), Area 2 is identified to be a residential development consisting of approximately 125 housing units. It appears that Area 2 occupies approximately 30 acres of land. The projected sanitary flow from the 125 housing units is 26,250 gpd, and the infiltration allowance is 4,500 gpd, for a total average daily flow of 30,750 gpd. Wastewater from Area 2 would flow to the 8-inch sewer on Sanborn Road (to be installed in the development of Area 1) and to the Plaza 28 Pump Station, and then on to Manchester for treatment.

The sewer extension to service this area includes approximately 1,000 LF of 8-inch sewer along Sanborn Road (extended from the 1,000 feet of sewer from Area #1), and approximately 1,250 LF of 8-inch sewer within the development area. The estimated cost for this conceptual sewerage plan is \$390,000. Based on discussions with the Town, it is assumed that the Developer would fund the entire construction of the sewer required for this development.

### **3.5.3 Area 3 - Mill Pond #2**

Area 3 is projected to be a future expansion of the Mill Pond residential development described under Area 4 (see below). Area 3 includes approximately 200 acres of land, and based on the housing density proposed for Area 4 (already designed and partially constructed), it is estimated that Area 3 could include an additional 300 housing units. The projected sanitary flow from the 300 housing units is 63,000 gpd, and the infiltration allowance is 30,000 gpd, for a total average daily flow of 93,000 gpd. It is assumed that the wastewater from Area 3 would flow to the private sewer system and private pump station in Area 4 and on to Manchester. Flows from this area do not enter the public Town sewer system in Londonderry, however the Town has assisted the Developer in obtaining permission (through an amendment to the Intermunicipal Agreement) to connect to the Manchester sewer system with the private sewer. The flow from this development is included in the total flow that Londonderry is allowed to discharge to Manchester, and is therefore included in overall flow projections to Manchester. Before Area 3 can develop, the Town and the Developer will need to amend the existing Agreement with Manchester again to allow the additional flows to enter Manchester.

The Developer has completed design of the first phase of the Mill Pond project and is assumed to be responsible for the design and construction of the sewer system to serve Area 3. Also, the flow from this area will not impact any other portion of the Londonderry sewer system, so we have not developed a conceptual sewer plan and related costs for this area.

### **3.5.4 Area 4 - Mill Pond #1**

Area 4 is the first phase of a private residential development consisting of approximately 125 units. It appears that the Area occupies approximately 100 acres of land, as determined on the "Mill Pond" subdivision plans. The projected sanitary flow from the 125 housing units is 26,250 gpd, and the infiltration allowance is 15,000 gpd, for a total average daily flow of 41,250 gpd. Based on the current Intermunicipal Agreement with Manchester, the limit of flow from this development is 12,000 gpd, which will need to be amended again to accommodate the full development of the area.

The sewers and pump station for this area have already been installed by the developer, as shown on the existing sewer map, Figure 1. It is our understanding that the developer will retain ownership of these facilities and will be responsible for all future maintenance.

### **3.5.5 Area 5 - Page Road**

Area 5 is proposed to be a Mixed-use Development based on the "Londonderry Business Park Design Charette", which identified potential road locations and development areas. The development is proposed to consist of approximately 200 housing units and 20 acres of commercial property. It appears that the total development area is to be approximately 100 acres of land. It is assumed that Area 5 will be developed in conjunction with Areas 1 and 2. The projected sanitary flow from the 200 housing units and 20 acres of commercial land is 56,000 gpd, and the infiltration allowance is 15,000 gpd, for a total average daily flow of 71,000 gpd.

It may be possible for some of the wastewater from Area 5 to flow to the sewers installed in Areas 1 and 2, and some could flow directly to Sanborn Road. Based on available mapping of the area with 2-foot contours and the potential road layout from the Design Charette, a conceptual sewer plan was developed for the area as summarized below:

- Approximately 16,000 LF of 8-inch sewer
- Potentially 3 small grinder pump stations
- Approximately 1900 LF of force main piping

The estimated cost for this conceptual sewer plan is \$3,350,000. The layout of the sewer, the need for pump station, and the cost will be dependent on the final development plans. It is assumed that the developer of the property will be responsible for the cost to design and install the sewer and pump stations for Area 5.

### **3.5.6 Area 6 - Stonehenge Road**

Area 6 includes a proposed retirement community along Stonehenge Road consisting of approximately 140 housing units. It appears that the Area occupies approximately 50 acres of

land. The development area appears to include land north and south of Stonehenge Road, and it appears that the sewer for both parcels has yet to be designed. The projected sanitary flow from the 140 housing units is 29,400 gpd, and the infiltration allowance is 7,500 gpd, for a total average daily flow of 36,900 gpd.

For conceptual planning, it is assumed that the land north of Stonehenge Road will be served with an 8-inch sewer along Stonehenge Road that will flow by gravity to the existing sewer installed as part of system serving the Wagon Wheels mobile home park. The land south of Stonehenge Road may require a cross-country sewer to connect to the existing sewer on the southern end of Wagon Wheels property, which would require an easement from the Owner of the mobile home park. If this option is not available, then the flows from the southern parcel of land may need to be pumped to the sewer in Stonehenge Road. Wastewater from this development area would flow to the Plaza 28 Pump Station and then on to Manchester.

The cost to sewer Area 6 will depend on the sewer routing and if a pump station is required. The cost could range from \$1,000,000 to \$1,410,000. It is assumed that the entire cost of installing sewer in this area will be the responsibility of the Developer.

### **3.5.7 Area 7 - Whittemore Estates**

Area 7 includes a proposed retirement community east of Mammoth Road consisting of 83 housing units on approximately 25 acres of land. The projected sanitary flow from the 83 housing units is 17,430 gpd, and the infiltration allowance is 3750 gpd, for a total average daily flow of 21,180 gpd. Wastewater from this development area would flow to the Plaza 28 Pump Station and then on to Manchester.

The existing Mammoth Road Interceptor was constructed through this proposed development, so there is no need for a sewer extension to serve the property.

### **3.5.8 Area 8 - Hillside Drive**

Area 8 includes a potential residential development off Londonderry Road in the area of Hillside Drive, and 7 commercial lots (approximately 4 acres) on Londonderry Road. The residential area could potentially include 50 housing units on approximately 20 acres of land. The projected sanitary flow from the 50 housing units and 4 acres of commercial land is 13,300 gpd, and the infiltration allowance is 3,600 gpd, for a total average daily flow of 16,900 gpd. Wastewater from this development area would flow to the Action Boulevard Pump Station and then on to Derry.

The sewer for this area has not yet been designed. The sewer would connect to the existing sewer on Londonderry Road. Based on the aerial photography, it appears that there is a significant amount of wetlands in the residential parcel which could not be developed. The conceptual sewer plan includes approximately 1250 LF of pipe within the residential development, which is based on the assumption that the development will not occur within the wet areas, and 900 LF of pipe on Londonderry Road. The estimated cost for sewer in this area is \$370,000. It is assumed that the developer would be responsible for the cost to install the sewer for these developments.

### **3.5.9 Area 9 - Jack's Bridge Road**

This area is identified to be an Industrial Development with the potential to develop approximately 200 acres of land. The projected sanitary flow from potential industrial users on 200 acres of land units is 140,000 gpd, and the infiltration allowance is 30,000 gpd, for a total average daily flow of 170,000 gpd. Wastewater from this development area would flow to the Plaza 28 Pump Station and then on to Manchester.

The sewer and pump station needed to serve this area has already been designed and would discharge to the existing sewer on Rockingham Road. The sewer extension includes the pump station, 3,400 feet of 10-inch gravity sewer and 900 feet of 6-inch force main. The cost for this sewer extension within the development area is estimated to be \$1,340,000, and the total cost is the responsibility of the developer.

### **3.5.10 Area 10 - Planeview Drive**

The Town has indicated that 2 lots on Planeview Drive could be developed for commercial/industrial use. The lots consist of approximately 35 acres, of which approximately 15 could be developed. Based on 15 acres of commercial/industrial use, the projected sanitary flow is 10,500 gpd, and the infiltration allowance is 2,250 gpd, for a total average daily flow of 12,750 gpd.

It appears that this area will drain to the existing interceptor sewer that runs cross-country on the eastern edge of the lots to be served. However, it is possible that approximately 1250 LF of 8-inch gravity sewer could be required to connect the lots to the interceptor sewer. The cost for this sewer extension, if necessary, is estimated to be \$220,000. It is assumed that the developer would be responsible for this sewer extension. The wastewater from this area flows by gravity to Manchester and would not impact any existing pump stations.

### **3.5.11 Area 11 - Delta Drive**

Area 11 includes approximately 56 acres of undeveloped land zoned for industrial use on Delta Drive. Based on 56 acres of land for industrial use, the projected sanitary flow is 39,200 gpd, and the infiltration allowance is 8,400 gpd, for a total average daily flow of 47,600 gpd.

This area is already served by an existing sewer on Delta Drive and a cross-country sewer on the east end of Delta Drive. Therefore, no sewer extension is required to serve these lots. The wastewater from this area flows by gravity to Manchester and would not impact any existing pump stations.

### **3.5.12 Area 12 - Aviation Park Drive**

Area 12 includes approximately 56 acres of undeveloped land zoned for industrial use on Aviation Park Drive. Based on 56 acres of land for industrial use, the projected sanitary flow is

39,200 gpd, and the infiltration allowance is 8,400 gpd, for a total average daily flow of 47,600 gpd.

This area is already served by an existing sewer on Aviation Park Drive and a cross-country sewer on the east end of the road. Therefore, no sewer extension is required to serve these lots. The wastewater from this area flows by gravity to Manchester and would not impact any existing pump stations.

### **3.5.13 Area 13 - Webster Road**

Area 13 includes approximately 75 acres of undeveloped land zoned for industrial use in the area of Webster Road, both north and south of Grenier Field Road. Based on 75 acres of land for industrial use, the projected sanitary flow is 52,500 gpd, and the infiltration allowance is 11,250 gpd, for a total average daily flow of 63,750 gpd.

This area is served by existing interceptor sewers on Grenier Field Road and the cross-country sewer to Harvey Road. However, depending on the development plan to serve the entire area, it may be necessary to construct a roadway and extend the sewer. For the purpose of this Facility Plan, it is assumed that approximately 1000 LF of 8-inch sewer may need to be constructed. The cost for this type of extension is estimated to be \$190,000. It is assumed that the entire cost of a sewer extension if necessary will be the responsibility of the developer. The wastewater from this area flows by gravity to Manchester and would not impact any existing pump stations.

### **3.5.14 Area 14 - Akira Way**

Area 14 includes approximately 30 acres of undeveloped land zoned for industrial use on Akira Way. Based on 30 acres of land for industrial use, the projected sanitary flow is 21,000 gpd, and the infiltration allowance is 4,500 gpd, for a total average daily flow of 25,500 gpd.

This area is already served by an existing sewer on Akira Way and, therefore, no sewer extension is required to serve these lots. The wastewater from this area flows by gravity to Manchester and would not impact any existing pump stations.

### **3.5.15 Area 15 - Pettingill Road Business Park**

Area 15 includes approximately 700 acres of land along Pettingill Road, with potential development both to the north and south of Pettingill Road. A conceptual layout of this development was presented in the "Londonderry Business Park Design Charette", which identified potential road locations and development areas. The Charette also provided an estimate of 3.6 million square feet of commercial or industrial building space for the development. Sanitary wastewater flows of 360,000 gpd are projected, based on this square footage of building space. An infiltration allowance of 105,000 gpd is estimated based on an overall development of 700 acres. The total average daily flow projected for this area is 465,000 gpd. Using a peaking factor of 4 for the sanitary flows, the peak flow from this development is estimated to be 1.55 mgd.

Although the sewers for this area have not been designed, the Town provided a conceptual plan for this development. Based on the Conceptual Plan, it appears that the sewer system to serve this area could connect to the existing sewer in three locations. The Conceptual Sewer Plan includes approximately 13,000 LF of gravity sewer, 1 pump station and approximately 2,200 LF of force main pipe.

The total estimated cost for this conceptual sewer plan is \$3.03 million. The Town may participate in the funding for these sewer facilities as part of the development in this business park, consistent with the Master Plan, pending Town voters' approval.

### **3.5.15 Area 16 - Crestview Circle**

Area 16 is currently being developed by a private developer. Area 16 includes a high-density residential development consisting of 246 housing units on approximately 20 acres of land. The projected sanitary flow from the 246 housing units is 51,660 gpd, and the infiltration allowance is 3,000 gpd, for a total average daily flow of 54,660 gpd.

Construction of this development, along with the sewer installation is ongoing. The cost of the sewer to serve the development is the responsibility of the developer. Wastewater from this development area flows to the Plaza 28 Pump Station and then on to Manchester.

### **3.5.17 Area 17 - Vista Ridge Drive**

Area 17 is currently undeveloped and includes approximately 46 acres of land zoned for commercial development. The projected sanitary flow from this area is 32,200 gpd, and the infiltration allowance is 6,900 gpd, for a total average daily flow of 39,100 gpd.

It is assumed that the existing sewer can serve this area, and sewer services will be the responsibility of the developer. Wastewater from this development area flows to the Plaza 28 Pump Station and then on to Manchester.

### **3.5.18 Area 18 -Exit 4A**

Area 18 represents the potential development area adjacent to the proposed Exit 4A on I-93. The area consists of approximately 225 acres of potential industrial development. The projected sanitary flow from this area is 157,500 gpd, and the infiltration allowance is 33,750 gpd, for a total average daily flow of 191,250 gpd. Using a peaking factor of 4, the estimated peak flow from the area is approximately 664,000 gpd or 460 gpm. Wastewater from this area would flow to the Action Boulevard Pump Station and then on to Derry.

The sewer system to serve this area has not been designed, but it appears that a majority of the site can drain to the southwest corner of the site, where it appears it will be necessary to pump to a Town sewer on Londonderry Road. To serve this area, the existing 10-inch sewer on Londonderry Road will need to be extended approximately 900 LF to the high point on Londonderry Road. The sewer within the development area could consist of approximately 10,000 LF of gravity sewer, a pump station with a capacity of approximately 460 gpm, and approximately 800 LF of 6 or 8-inch force main that would discharge to the gravity sewer on Londonderry Road. It is possible that a small pump station may be necessary to serve the northeast portion of the site, depending on the final development layout and grading.

The Town may participate in the funding of the extension of the 10-inch interceptor pipe on Londonderry Road to help promote development in this area, pending Town voters' approval. The estimated cost for the 900 foot interceptor extension is \$160,000. The cost for the sewer within the development, including the pump station and force main, is estimated at \$2.75 million, which is assumed to be the responsibility of the developer.

### **3.5.19 Area 19 - Hannaford Plaza**

The area around the new Hannaford building is currently being developed, and the Town reports that there is approximately 12 acres of additional commercial land that could be developed. The projected sanitary flow from this area is 8,400 gpd, and the infiltration allowance is 1,800 gpd, for a total average daily flow of 10,200 gpd. Wastewater from this area will flow to the Charleston Avenue Pump Station and on to Derry.

This area is already served by Town sewer and it is assumed that any extensions required to serve the remaining lots will be the responsibility of the developer.

### **3.5.20 Area 20 - Mammoth Road North Extension**

This area includes an extension of the sewer on Mammoth Road from the intersection of Grenier Field Road north approximately 1700 LF. This sewer was designed as part of "Contract 5 - North Londonderry" in 1986, but was not constructed due to funding limitations. As designed, the sewer extension is an 8-inch diameter pipe to be installed at depths up to 25 feet. The extension could serve approximately 34 acres of commercial property and 4 residential units. The projected sanitary flow from this area is 24,640 gpd, and the infiltration allowance is 6,000 gpd, for a total average daily flow of 30,640 gpd. The wastewater from this area would flow to the Plaza 28 Pump Station and then to Manchester.

The installation of this sewer extension is included in the Town's Capital Improvement Plan (CIP). The Town may participate in the funding for this extension, pending Town voters'

approval. Due to the depth of the sewer, the total cost for this extension is estimated to be \$460,000.

### **3.5.21 Area 21 - Wentworth Avenue**

Area 21 includes three undeveloped lots, totaling approximately 20 acres, at the west end of Wentworth Avenue. The projected sanitary flow from this area is 14,000 gpd, and the infiltration allowance is 3,000 gpd, for a total average daily flow of 17,000 gpd. Using a peaking factor of 6 for the sanitary flows, the peak flow from this area is estimated to be 87,000 gpd or 60 gpm.

There is an existing sewer on Wentworth Avenue, but it does not extend to the lots on the western end of the road. It is reported that the plan to serve these three lots would include a small grinder pump station and associated force main for each lot. These pump systems and force mains would be privately owned, and therefore no expansion of the Town sewer is required. The cost to provide sewer service to these lots will remain the responsibility of the developer of the properties.

### **3.5.22 Area A - Century Village**

Area A is an existing high-density residential development on Winding Pond Road known as Century Village. The existing condominiums are currently served by cluster subsurface disposal system owned and operated by the condominium association. The association includes 344 housing units on approximately 46 acres of land. The projected sanitary flow from this area is 72,240 gpd, and the infiltration allowance is 6,900 gpd, for a total average daily flow of 79,140 gpd. Wastewater from this area would flow to the Tokanel Drive Pump Station currently under construction, then to the Charleston Avenue Pump Station where it would be pumped to Derry.

The residents of Century Village have approached the Town to request the extension of Town sewer to serve their development, because the subsurface disposal systems have experienced problems that result in expensive repairs. Also, subsurface disposal systems for high-density

housing developments such as this pose a potential environmental threat to the groundwater and surface water in the area. In 2001, a preliminary design to provide sewer service for Century Village was completed. The plan includes approximately 3700 LF of mainline sewer within the Town rights-of-way, and approximately 7500 LF of 8-inch sewer, four small pump stations, and 600 LF of force main on private property. The interceptor sewer in the Town right-of-way would be an extension of the South Londonderry Interceptor that is designed up to Winding Pond Road and is discussed further under Areas B and C below. The estimated cost for the mainline sewer in the Town rights-of-way is \$600,000. The Town may participate in the funding of this public portion of the sewer, pending Town voters' approval. The estimated cost for the sewer and pump stations on private property is \$1.17 million, which would be the responsibility of the Homeowner's Association.

### **3.5.23 Area B - South Londonderry Interceptor North of Route 102**

Area B is a portion of the service area of the South Londonderry Interceptor that was designed in 1999, but not yet constructed. Area B includes the Apple Tree Mall area as well as land on the north side of Route 102. The area includes approximately 105 acres of commercial property and 58 housing units, encompassing approximately a total of 214 acres. The projected sanitary flow from this area is 85,680 gpd, and the infiltration allowance is 32,100 gpd, for a total average daily flow of 117,780 gpd. Wastewater from this area will flow to the Tokanel Drive Pump Station currently under construction, then to the Charleston Avenue Pump Station where it is pumped to Derry.

The South Londonderry Interceptor, as designed, includes approximately 2,800 LF of 8-inch and 12-inch pipe through Area B. In addition to the interceptor pipe, approximately 4,500 LF of 8-inch pipe would be necessary to serve the remainder of the area. The Town may participate in the funding of the interceptor pipe to promote further commercial development in the area, pending Town voters' approval. The cost estimate for this portion of the interceptor is \$473,000. The remainder of the sewer for this area is estimated to cost approximately \$760,000, and it is assumed that the Town would not participate in funding this portion of the sewer.

### **3.5.24 Area B1 - Lancaster Drive - Cortland Street Area**

Area B1 includes the existing low-density residential neighborhood in the area of Lancaster Drive and Cortland Street. During the design of the South Londonderry Interceptor, an 8-inch diameter stub was designed into the interceptor east of Winding Pond Road to make it possible to serve this existing residential neighborhood in the future if the need arises. Area B1 includes approximately 86 housing units and approximately 100 acres. The projected sanitary flow from this area is 18,060 gpd, and the infiltration allowance is 15,000 gpd, for a total average daily flow of 33,060 gpd. Wastewater from this area would flow to the Tokanel Drive Pump Station currently under construction, then to the Charleston Avenue Pump Station where it would be pumped to Derry.

It is not the intention of the Town to provide Town sewer to existing neighborhoods like this one, where the lot sizes are 1-acre or larger and there is adequate space to accommodate replacement subsurface disposal systems. Typically, it is more cost effective to replace on-lot subsurface disposal system in low-density neighborhoods compared to installing public sewer. However, the possibility exists for these areas to require future treatment capacity from the Town of Derry and the City of Manchester. Therefore, there are several existing low-density residential neighborhood in the vicinity of existing or proposed Town owned interceptor sewers that are included in the future flow projections, in case there is an need to sewer these areas in the future for reasons that cannot be anticipated at this time. If these areas are to be sewered, it is assumed that the property owners would be responsible for the cost to extend public sewers. A conceptual plan to provide sewer for Area B1 includes approximately 8,000 LF of 8-inch gravity sewer, with a total estimated cost of approximately \$1.35 million

### **3.5.25 Area C - South Londonderry Sewer South of Route 102**

Area C includes the potential service area of the South Londonderry Interceptor already designed from Route 102, near the intersection of Buttrick Road to the Tokanel Drive Pump Station. It also includes the potential service area of another interceptor (not designed) to serve the area of the Route 102 and Mammoth Road intersection. The overall service area in Area C includes approximately 230 acres, consisting of approximately 160 acres of commercial area and

approximately 735 existing residential units. The projected sanitary flow from this area is 266,350 gpd, and the infiltration allowance is 34,500 gpd, for a total average daily flow of 300,850 gpd. Wastewater from this area would flow to the Tokanel Drive Pump Station currently under construction, then to the Charleston Avenue Pump Station where it would be pumped to Derry.

The sewer for Area C includes approximately 3,100 LF of the already designed 12-inch and 15-inch South Londonderry interceptor, approximately 5,300 LF of proposed 15-inch interceptor to serve the area of the Route 102/Mammoth Road intersection, and approximately 8,000 LF of collector sewers to serve the remaining area. The Town may participate in the funding of the remainder of the South Londonderry Interceptor (3,100 LF) and the interceptor to serve the Route 102/Mammoth Road intersection (5,300 LF) in an effort to serve the existing high-density residential area known as Woodland Village and existing and future commercial users, pending Town voters' approval. The total estimated cost of these interceptor sewers is \$1.65 million, of which \$0.525 million is for the portion of the South Londonderry interceptor already designed and \$1.125 million is for the interceptor to the Route 102/Mammoth Road Intersection.

The cost of the remaining collector sewers is estimated to be \$1.35 million. Like Area B1, the portion of Area C away from the interceptor sewers includes mostly existing low-density residential neighborhoods, which the Town does not anticipate serving with public sewer. The flows are included in the total projected flows to Derry in case this area needs to connect to the Town sewer in the future.

### **3.5.26 Area D - P. D. Associates Development**

Area D includes the residential retirement community currently under construction by the private developer P.D. Associates. The development includes 125 residential units on approximately 122 acres of land. The projected sanitary flow from this area is 26,250 gpd, and the infiltration allowance, as estimated by the developer's engineer, is 1,800 gpd, for a total average daily flow of 28,050 gpd. Wastewater from this area will flow to the Tokanel Drive Pump Station currently

under construction, then to the Charleston Avenue Pump Station where it will be pumped to Derry.

The sewer in this area is currently being constructed by the developer at their cost. The developer is also paying for the construction of the Tokanel Drive Pump Station and 12-inch diameter force main that discharges to the Charleston Avenue Pump Station. In an agreement with the developer, the Town agreed to reimburse the developer for part of the cost of the pump station and force main through future connection fees from users in the Tokanel Drive Pump Station service area. The reimbursement is limited to total cost of the facilities less the sewer connection fee for the entire development (Area D), resulting in a reimbursement limit of approximately \$800,000. This estimated cost is subject to change and will depend on the Sewer Connector Fee adopted by the Town.

### **3.5.27 Area E**

Area E includes a large area consisting of existing low-density residential neighborhoods north of Century Village. For flow estimating purposes, Area E includes approximately 550 acres and approximately 550 residential homes. The projected sanitary flow from this area is 115,500 gpd, and the infiltration allowance is 82,000 gpd, for a total average daily flow of 198,000 gpd. Wastewater from this area would likely flow to the Mammoth Road Pump Station, which in turn pumps to the Plaza 28 Pump Station and finally to Manchester.

As discussed under Area B1 above, the Town does not anticipate extending Town sewer to serve the existing homes in Area E. However, because the area is in the vicinity of the existing Mammoth Road Sewer, the Town would like to reserve flow capacity in Manchester for the area, if for some reason there is a need to sewer this area in the future. The cost to sewer Area E could be in the range of \$6 million to \$7 million (or more) depending on the sewer routing. If this area is to be served by public sewer, it is assumed that the property owners in the area to be served would pay for the sewer extensions required.

### **3.5.28 Area F**

Like Area E, Area F includes existing low-density residential neighborhoods in the vicinity of the existing Mammoth Road Interceptor that includes approximately 700 acres of total area. Some of the area is already served by the Mammoth Road Interceptor and is therefore not included in the infiltration calculations. For flow estimating purposes the area includes approximately 289 residential units within 525 acres. The projected sanitary flow from this area is 60,690 gpd, and the infiltration allowance is 78,750 gpd, for a total average daily flow of 139,440 gpd. Wastewater from this area would likely flow to the Mammoth Road Pump Station, which in turn pumps to the Plaza 28 Pump Station and finally to Manchester. Like Area E, flow projections for this area are made only to reserve flow in Manchester should this area need public sewer in the future.

The cost to sewer this area could range from \$5 million to \$6 million depending on the sewer routing. If this area is to be served by public sewer, it is assumed that the property owners in the area to be served would pay for the sewer extensions required.

### **3.5.29 Area G**

Like Areas E and F, Area G includes existing low-density residential neighborhoods in the vicinity of the existing Mammoth Road Interceptor encompassing a total of approximately 780 acres. Some of the area is already served by the Mammoth Road Interceptor and is therefore not included in the infiltration calculations. For flow estimating purposes the area includes approximately 700 residential units within an area of 500 acres. The projected sanitary flow from this area is 147,000 gpd, and the infiltration allowance is 75,000 gpd, for a total average daily flow of 222,000 gpd. Wastewater from this area would flow to the Plaza 28 Pump Station and on to Manchester. Like Area E, flow projections for this area are made only to reserve flow in Manchester should this area need public sewer in the future.

The cost to sewer this area could range from \$6 million to \$7 million depending on the sewer routing. If this area is to be served by public sewer, it is assumed that the property owners in the area to be served would pay for the sewer extensions required.

### **3.6 FLOW PROJECTIONS SUMMARY**

The calculations for the flow projections described above for each growth area are included in Appendix B. The flow projections are summarized in this section, first by the overall projected flows to Manchester and Derry, and then by pump station service area so the impact of future flows can be evaluated in terms of impact on existing facilities.

#### **3.6.1 Overall Flow Projections**

To summarize the flow projections made for each area in Section 3.5, the additional projected Average Daily Flow (ADF) to Manchester is 1,854,780 gpd, and the additional projected ADF to Derry is 777,225 gpd. The projected ADF to each treatment facility for the year 2025 is derived by adding the projected flows to the existing flows discussed in Section 2. The estimated ADFs for year 2025 are summarized below.

**TABLE 3-1**  
**AVERAGE DAILY FLOWS FOR YEAR 2025**

**Manchester**

Current non-AES High Monthly Ave.	800,000	gpd
AES Permit (High Mo. Avg.)	869,800	gpd
Projected Increase (ADF)	1,854,780	gpd
<b>Year 2025 ADF</b>	<b>3,524,580</b>	<b>gpd</b>

**Derry**

Current ADF	87,000	gpd
Projected Increase (ADF)	777,225	gpd
<b>Year 2025 ADF</b>	<b>864,225</b>	<b>gpd</b>

### 3.6.2 Flow Projections by Pump Station Service Area

A table included in Appendix B summarizes the future flow projections categorized by pump station service area and the LMS service area, to allow an evaluation of the impact to each of the existing pump stations and interceptors. The average daily flows and the estimated peak flows are provided for each pump station service area. The projected increase in peak flow to each pump station has been added to the estimated current peak flow, as discussed in Section 2, to determine the projected peak flow to each station for the year 2025. These projected peak flows are summarized in the table below.

**TABLE 3-2**  
**YEAR 2025 PEAK FLOWS TO PUMP STATIONS**

**Manchester**

Mammoth Road Pump Station		
Estimated Current Peak Flow =	75	gpm
Projected Peak Flow Rate =	600	gpm
<hr/>		
Estimated Year 2025 Peak Flow Rate =	675	gpm
Existing Capacity =	500	gpm
Plaza 28 Pump Station		
Estimated Current Peak Flow =	730	gpm
Projected Peak Flow Rate =	1975	gpm
<hr/>		
Estimated Year 2025 Peak Flow Rate =	2705	gpm
Existing Capacity =	1200	gpm

**Derry**

Tokanel Drive Pump Station		
Estimated Current Peak Flow =	0	gpm
Projected Peak Flow Rate =	1285	gpm
<hr/>		
Estimated Year 2025 Peak Flow Rate =	1285	gpm
Existing Capacity =	1250	gpm
Charleston Avenue Pump Station		
Estimated Current Peak Flow =	190	gpm
Projected Peak Flow Rate =	1305	gpm
<hr/>		
Estimated Year 2025 Peak Flow Rate =	1495	gpm
Existing Capacity =	2600	gpm
Action Boulevard Pump Station		
Estimated Current Peak Flow =	165	gpm
Projected Peak Flow Rate =	470	gpm
<hr/>		
Estimated Year 2025 Peak Flow Rate =	635	gpm
Existing Capacity =	700	gpm

The impact of future flows on existing pump stations and interceptors, and required upgrades to accommodate future flows are discussed in Section 4 of this report.

The flows outlined in the above table summarize the future flows to the Town owned pump stations. Peak flows are also projected to the privately owned pump station in the Mill Pond

development. Based on the flow projections for the Mill Pond development, Areas 3 and 4, the projected peak flow to the station is approximately 280 gpm.

### **3.7 WASTEWATER LOADS PROJECTIONS**

The NHDES design standards establish values to use for projecting loads for wastewater from residential users. For BOD, the loading rate is 0.2 pounds per capita per day (ppcd), and for TSS the loading rate is 0.25 ppcd. Based on an assumed wastewater contribution of 70 gallons per day per person, the equivalent loading concentrations are 340 mg/l of BOD, and 428 mg/l of TSS. To estimate the increase in loads to Manchester and Derry, the residential sanitary flow projections are divided by 70 gpd/person and then multiplied by 0.2 ppcd to calculate BOD and by 0.25 ppcd to calculate TSS loadings. NHDES does not provide a loadings rate for commercial and industrial flows because the loading is dependent on the nature of the waste discharged. For example, Coca-Cola and Stoneyfield discharge wastewater with relatively high BOD concentrations, while the discharge from AES has a relatively low BOD concentration. In order to estimate loads from commercial and industrial flows, concentrations equivalent to residential users established by NHDES (BOD at 340 mg/l and TSS at 428 mg/l) are used. This is based on the assumption that a majority of the wastewater from commercial and industrial users will be sanitary waste from employees. Loading rates will not be applied to the infiltration, which is assumed to have no contribution to the BOD and TSS. If future industrial users propose to discharge high strength waste, it is recommended that the Town require a pretreatment program for those users to limit the strength of the waste discharged to the sewer system. Pretreatment provisions are included in the existing (and proposed new) Sewer Use Ordinance.

The wastewater loading projections for future flows to Manchester and Derry are summarized in a table in Appendix B and the results of the projections are provided below:

- Manchester
  - Total increase in BOD loading = 3,831 lbs/day
  - Total increase in TSS loading = 4,808 lbs/day

- Derry
  - Total increase in BOD loading = 1,843 lbs/day
  - Total increase in TSS loading = 2,313 lbs/day

The loadings projected for future users have been added to the current loadings as discussed in Section 2, and the total project loads for the year 2025 are summarized in the table below.

**TABLE 3-3**  
**YEAR 2025 WASTEWATER LOADS**

	Annual Average (lbs/day)	High Monthly Average (lbs/day)
<b>Manchester</b>		
Current BOD	4,600	8,350
Future BOD	<u>3,831</u>	<u>3,831</u>
<b>Year 2025 BOD</b>	<b>8,431</b>	<b>12,181</b>
Current Limit:	5,603	
Current TSS	1,600	2,600
Future TSS	<u>4,808</u>	<u>4,808</u>
<b>Year 2025 TSS</b>	<b>6,408</b>	<b>7,408</b>
Current Limit:	7,004	
<b>Derry</b>		
Estimated Current BOD	240	
Future BOD	<u>1,843</u>	
<b>Year 2025 BOD</b>	<b>2,083</b>	
Current Limit:	350	
Estimated Current TSS	305	
Future TSS	<u>2,313</u>	
<b>Year 2025 TSS</b>	<b>2,618</b>	
Current Limit:	No Listed Limit	

### 3.8 PROJECTIONS OF FUTURE SEPTAGE QUANTITIES

The population projections indicate that an additional 8,024 people will move to Londonderry by the year 2025. Assuming that the average number of persons per household remains at 3 over that time period, it is projected that 2,675 new housing units will be constructed in Londonderry over the next 20 years. The flow projections by growth area summarized above estimate that

1,379 new housing units will be served by Town or private sewer. Therefore, it is estimated that 1,296 new homes will be constructed in non-sewered areas and served by septic tanks and subsurface disposal fields. Projections for septage quantities from these housing units in non-sewered areas are summarized in Appendix B. It is estimated that an additional 324,000 gallons of septage each year will be generated in Londonderry by the year 2025. This estimate is based on septic tanks being pumped out on average once every 4 years. The septage quantities are summarized in the table below.

There is the potential for low impact commercial growth outside the sewered area that will also contribute to future septage quantities. However, there are also some existing residential and commercial users currently on septic systems that are projected to be connected to the sewer in the future. For the purpose of projecting septage quantities, it is assumed that the increase in septage from future commercial development outside the sewered area will be offset by the reduction of septage, as a result of providing Town sewer to some existing commercial and residential users.

**TABLE 3-4**  
**PROJECTED SEPTAGE QUANTITIES FOR THE YEAR 2025**

Current Annual Septage Quantity	1,800,000 gallons/year
Projected Septage Increase	<u>324,000 gallons/year</u>
Projected Annual Septage Quantity for Year 2025	2,124,000 gallons/year

All the septage generated in Londonderry is currently disposed of at the Manchester Treatment Plant. Currently, Manchester does not limit the septage received from Londonderry or the other communities it serves. However, Manchester will be conducting facilities planning in the near future and will be requesting estimates of future septage quantities from all the communities its serves.

## **SECTION 4**

### **FACILITIES TO MEET FUTURE NEEDS**

#### **4.1 GENERAL**

This section of the report identifies required upgrades to existing wastewater facilities and the need for new facilities to meet the future wastewater needs as determined in Section 3. Cost estimates are also provided for the required improvements.

#### **4.2 TREATMENT CAPACITIES**

Based on the flows and loads projections for the year 2025, summarized in Section 3, additional treatment capacity allocations beyond the current contractual limits will be required from both Manchester and Derry.

##### **4.2.1 Manchester**

Table 4.1 below summarizes the projected flows and loads to Manchester for the year 2025 and also indicates the current limits established in the Intermunicipal Agreement.

**TABLE 4-1**  
**SUMMARY OF PROJECTED FLOWS AND LOADS TO MANCHESTER**

	Average Daily Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)
Year 2025 Projections	3.52	8,431	7,408
Current Limits	3.0	5,603	7,004

The BOD projection for year 2025 is based using the current annual average BOD for current conditions. There are months when the monthly average BOD load exceeds the current limit of 5,603 lbs/day. However, the Town is working with the industrial users that are responsible for the largest BOD contribution to get their discharge in compliance with the Town's pretreatment requirements.

Based on the projections outlined in this Facilities Plan, the Town of Londonderry will need to request additional treatment capacity from the City of Manchester. Although it may be many years before the Average Daily Flow exceeds 3 mgd, the Town should make the request in the near future because Manchester is about to begin its own facilities planning for the treatment plant. In discussions with Town personnel, it is the general consensus that Londonderry may have only this one last opportunity to request additional treatment capacity from Manchester. Although the future flow projections are believed to be conservative in general, flow projection rates (gallons per acre) for undeveloped commercial and industrial land are lower than recommended by NHDES (Refer to Section 3.4.1.1). Also, it is possible that one or more industrial users with a high quantity wastewater discharge (like AES at 0.87 mgd) may wish to locate in Londonderry, possibly using up a high percentage of the projected flow allowance. For these reasons, it may be prudent for Londonderry to request an additional 1 mgd of capacity from Manchester to bring its total flow allocation up to 4 mgd (0.48 mgd beyond the year 2025 projected flow).

If an additional 1 mgd of capacity is requested, the BOD and TSS loads should also be increased for the additional 0.48 mgd beyond the projected flow. This 0.48 mgd will include infiltration, so the concentrations of BOD and TSS would be lower than those used in calculating the loads on just the sanitary portion of the projected flow. The current TSS load limit of 7004 lbs/day applied to 3.0 mgd of flow corresponds to a concentration of 280 mg/l. If this concentration is applied to a flow of 4.0 mgd, the resulting TSS limit would be 9,340 lbs/day. The projected BOD load of 8,431 lbs/day applied to a flow of 3.52 mgd corresponds to a concentration of 285 mg/l. If this concentration is used, the corresponding BOD loading from the additional 0.48 mgd is 1140 lbs/day of BOD. Therefore, if the Town requests an additional 1 mgd (above the current limit) of capacity from Manchester, the resulting flow and loads limits would be:

- Average Daily Flow: 4.0 mgd
- BOD limit: 9,571 lbs/day
- TSS limit: 9,340 lbs/day

#### ***4.2.1.1 Cost Estimate for Additional Capacity in Manchester***

To obtain this additional treatment capacity from Manchester, there will be a fee charged by the City of Manchester. This fee will likely be determined during an upgrade of the Manchester plant to increase its treatment capacity in the future. The fee for 1 mgd of capacity will likely be proportional to the total cost of the upgrade and the total increase in capacity. The cost of 1 mgd of capacity is difficult to estimate at this time.

Three methods to estimate this cost are summarized in Appendix C. The first method is based on the \$750,000 Londonderry paid Manchester for an additional 1 mgd of capacity in 1992. Corrected to current costs using the Engineering News Record (ENR) construction cost index, this is estimated to be \$1.1 million in 2004 dollars. At the time of purchase, this capacity already existed at the plant and was originally allocated to another neighboring community. Therefore, the capacity was obtained at a relatively low cost to the Town. This cost is not believed to be a realistic estimate for an additional 1 mgd of capacity to be added to the existing plant.

The second estimated method is based on the cost to obtain additional treatment capacity from Derry as defined in the Intermunicipal Agreement with Derry. The Agreement sets a fee to purchase additional capacity at a cost of \$4.11 per gallon, corrected to current cost using the ENR construction cost index, which calculates to \$6.30 per gallon in current dollars. The cost for 1 mgd at this rate is \$6.3 million, which is a more realistic estimate compared to method 1 above.

The third method is based on the cost of the last upgrade to the Manchester Treatment Plant in 1995, which cost approximately \$27.3 million and added 8 mgd of capacity. This calculates to approximately \$3.4 million per mgd of capacity in 1995. Adjusting to current values, the cost per mgd of capacity is approximately \$4.6 million. It is reported that much of the space originally dedicated for plant expansions in Manchester has already been used in past expansions. Therefore, future expansions will occur with tighter space restrictions that typically translate to relatively higher construction costs. Therefore, to be conservative, the cost to purchase 1 mgd of additional capacity in Manchester has been estimated to be \$6 million.

#### 4.2.2 Derry

Table 4-2 below summarizes the projected flows and loads to Derry for the year 2025 and also indicates the current limits established in the Intermunicipal Agreement.

**TABLE 4-2**  
**SUMMARY OF PROJECTED FLOWS AND LOADS TO DERRY**

	Average Daily Flow (gpd)	BOD (lbs/day)	TSS (lbs/day)
Year 2025 Projections	864,225	2,083	2,618
Current Limits	200,000 *	350	---

***\*Flow allocation to be increased to 329,600 gpd upon completion of the pending Derry Treatment Facility Upgrade.***

##### ***4.2.2.1 Cost Estimate for Additional Capacity in Derry***

The original Intermunicipal Agreement with Derry established an impact fee to be charged to Londonderry for flows exceeding 200,000 gpd. The impact fee is \$4.11 per gallon of average daily flow, indexed to the Engineering News Record (ENR) Construction Cost Index for January 1, 1991. This translates to a cost of \$6.30 based on the ENR Cost Index for October 2004. The 1996 Addendum modified the impact fee for the flow from 200,000 gpd to 329,600 gpd to account for payment from Londonderry for treatment of flows from the Tinkham Superfund site. The current value of the modified impact fee is \$5.58 per gallon. For flows over 329,600 gpd, the impact fee would be as originally described, or \$6.30 at the current ENR Cost Index. The calculations for the cost to increase the flow limit in Derry from 200,000 gpd to 864,225 gpd are included in Appendix C. The current cost for this additional capacity is \$4.09 million.

The flow reserved for Londonderry will increase to 329,600 gpd upon the completion of the Derry Treatment Facility upgrade scheduled for 2005. Beyond this capacity, additional capacity will be made available on a "first-come-first-served" basis only if capacity is available at the

plant. Representatives from Derry have indicated that following the next planned upgrade of the Derry facilities (schedule not yet defined), the capacity reserved for Londonderry may be capped at 500,000 gpd. Therefore, it is recommended that the request for additional capacity be made to Derry in the near future so the projected flows can be taken into consideration by Derry in planning for their next upgrade. If Londonderry cannot secure the necessary capacity from Derry for all the future projected flows, Londonderry would need to reduce the proposed sewer expansion in South Londonderry or make provisions to direct some of the flows to the North Londonderry sewer system for treatment in Manchester.

### **4.3 PUMP STATION CAPACITIES**

In this section the impact of projected flows on each of the existing pumps stations is summarized and the costs for required upgrades, if necessary, are estimated. The private pump station serving the Mill Pond development is not owned by the Town or connected to a Town owned sewer, so it is assumed that any upgrades required to accommodate projected flow in the private development will be made by the developer.

#### **4.3.1 Plaza 28 Pump Station**

The current capacity of the new pumps (installed in the spring of 2004) in the Plaza 28 Pump Station is 1200 gpm. Current peak flows to the station are estimated at 730 gpm. The projected peak flow for year 2025 is 2705 gpm. The existing pumping equipment and structures do not have enough capacity for the projected peak flow, and it would be difficult, if not impossible, to upgrade the existing facility to accommodate this flow. Therefore, an entirely new pump station will be required. The Town may need to acquire additional land for the replacement pump station. Also, the existing 12-inch diameter force main is not adequate for a pumping rate of 2700 gpm, and will have to be replaced with a 16-inch diameter force main. The estimated cost to replace the pump station and force main (approximately 4800 LF of pipe) is approximately \$2 million.

Many years ago, a gravity interceptor sewer, approximately 9000 feet in length, was designed that could eliminate the Plaza 28 Pump Station and force main. The original plans were

reviewed and the pipe route was mostly cross-country, with pipe depths ranging from 6-feet to 28-feet. A significant amount of ledge removal would be required to install the pipe, and many of the deep sections are in areas of high groundwater in and around wetlands. The construction would be very difficult and it may also be very difficult to obtain the required permits with current environmental regulations. The current cost of the interceptor could be as high as \$3.2 million. For the purpose of Facilities Planning, it is assumed that the Plaza 28 pump station and force main would be replaced at a cost of approximately \$2 million dollars. However, the Town may wish to investigate further the option of the interceptor sewer along the designed route or other possible routes before replacing the pump station.

The timing of the pump station and force main replacement is dependent on the rate of development in the service area and the actual type of development. Approximately 950 gpm of the projected peak flow to the Plaza 28 Pump Station would be contributed by Areas E, F, and G. As discussed in Section 3, these areas consist mostly of existing low-density residential neighborhoods served by on-lot subsurface disposal system. It is unlikely that sewer extensions to serve these areas will occur in the next 20 years.

However the other growth areas in the Plaza 28 Pump Station service area, including Areas 1, 2, 5, 6, 7, 9, 16, 17, and 20 are either currently under development or likely to develop in the near future. It is recommended that the Town closely monitor the flows to the pump station by recording the flow meter totalizer data 3 times a week or more, to track the increase in flows over time to help anticipate when the replacement will be required. Also, the flow meter strip chart recorder should be maintained because this can indicate the length of pumping cycles and if two pumps are ever required to operate together to pump peak flows. If both pumps do need to run to pump peak flows occasionally, the station should be upgraded because the station should be able to pump peak flows with one pump out of service.

#### **4.3.2 Mammoth Road Pump Station**

The design capacity of the Mammoth Road Pump Station is 500 gpm. The projected peak flow to this station is estimated to be 675 gpm for the year 2025. This projected peak flow is based on

Areas E and F being completely served by Town sewer, which as discussed in Section 3 is unlikely to occur in the next 20 years. To accommodate a peak flow of 675 gpm, pumps with higher horsepower would be required. It is expected that the existing pumps will provide adequate pumping capacity for the next 20 year and likely beyond. As the pumps approach the end of their service life (approximately 15 to 20 years), the Town should review the flows at that time and the status of serving Area E and F. If necessary, pumps with higher capacity could be installed at that time. For the purpose of this Facilities Plan, it is assumed that the station will not need to be upgraded for additional capacity within the 20 year planning period.

#### **4.3.3 Charleston Avenue Pump Station**

The current pumping capacity of the Charleston Avenue Pump Station is 1100 gpm with the pumps operating at the lower speed. If the pumps are operated at the higher speed setting, the pumping capacity increases to 2600 gpm. The current peak flow to the station is estimated to be approximately 190 gpm. The projected peak flow for the year 2025 is 1495 gpm. The existing pumps can accommodate this peak flow by operating at the higher speed. Also the pump station was designed with adequate space for larger pumps to be installed if necessary in the future. Therefore, the Charleston Avenue Pump Station will not need to be upgraded for capacity reasons in the next 20 years, although other equipment upgrades may be needed to maintain reliable operation of the station.

#### **4.3.4 Action Boulevard Pump Station**

According to information provided by the Town, the current pumping capacity of the pumps at the Action Boulevard Pump Station is 700 gpm, and the current peak flow to the station is approximately 165 gpm. The projected future peak flow to the station is 635 gpm. Although it appears that the station has adequate capacity to accommodate future peak flows, there are improvements to the station and force main that should be made to provide reliable service as flows increase to the station. Currently the station is not equipped with an emergency generator or the electrical components to allow a portable generator to be connected to the station. An extended power outage at the station could result in surcharging of the influent sewer or potential overflows. At current flow rates, it may be possible to use septage pumping trucks to transport

wastewater from the station during an extended power outage, but this would not be practical at the higher projected flow rates. Therefore, it is recommended that a permanent generator and automatic transfer switch be installed at the station to provide emergency power automatically during a power outage.

The existing 6-inch force main is undersized for a pumping rate of 700 gpm. The velocity of the wastewater at this rate is approximately 8 feet/sec, which is well above the recommended levels of 3 to 5 feet/sec. The high velocity increases the friction losses in the pipe resulting in higher horsepower required to pump the wastewater compared to the same pumping system utilizing an 8-inch force main. Also, due to the solids and grit in wastewater, the abrasion from the higher velocity will shorten the lifespan of the force main pipe. It is recommended that the existing 6-inch force main be replaced with an 8-inch force main, resulting in velocity of 4.4 feet/sec, which is in the recommended range. This would require the installation of approximately 1200 LF of 8-inch force main. Replacing the force main will have an impact on the operating pressure of the pumps and the pumping rate. Therefore, it is recommended that the force main replacement occur when it is time to replace the pumps, so that the new pumps can be matched properly with the new operating pressures.

The estimated cost for the installation of the emergency generator and related electrical equipment, and the replacement of the force main is \$500,000.

#### **4.3.5 Tokanel Drive Pump Station**

The Tokanel Drive Pump Station is scheduled to be put into service in the near future. The pumping capacity of the station is 1250 gpm, although the pump station structures were sized to accommodate a pumping capacity of 1700 gpm in the future if necessary. The projected peak flow to the station is 1285 gpm. For the purpose of this Facilities Plan, it is assumed that the station will not need to be upgraded for additional capacity within the 20 year planning period.

#### **4.4 IMPACTS TO EXISTING GRAVITY INTERCEPTOR SEWERS**

The projected peak flows were reviewed relative to drainage areas and the capacities of existing interceptor sewers. The only section of existing interceptor sewer that does not have adequate capacity for the projected peak flow is a section of 10-inch diameter sewer on Mammoth Road running from Sanborn Road south towards Plaza 28 Pump Station. The depth of the sewer ranges from 12 to 18 feet. This section of sewer is approximately 1000 feet in length and is expected to carry the future flow from growth areas 1, 2, and 5, which could add approximately 0.45 mgd to the current peak flow. It is recommended that this section of pipe be replaced with 15-inch pipe. The estimated cost of this replacement is \$240,000. It is reported that the Town has granted conditional approval to a developer for a proposed development on Sanborn Road. As part of the conditional approval, the developer has agreed to replace this section of the interceptor on Mammoth Road, and the funding of this work is under negotiation by the Town and the developer.

#### **4.5 SEWER FACILITIES TO SERVE GROWTH AREAS**

In Section 3, each of the identified growth areas were described and a conceptual plan to provide sewer to each area was summarized. For some of the areas, sewer facilities are already in place to serve the undeveloped land. Where sewer extensions are required to serve the development area, it is assumed that in most cases the developer will be responsible to install the required sewer facilities meeting the Town sewer standards. However, the Town may participate in the funding of some of the sewer extensions to promote commercial and industrial development consistent with the Town's Master Plan. Areas where this may apply are discussed in the growth areas descriptions in Section 3. Areas 3 and 4 represent the Mill Pond Development which is intended to be served with a private sewer system constructed and maintained by the developer. Therefore, costs for the sewer facilities to serve Areas 3 and 4 were not estimated for this Facilities Plan.

In Area D, a private developer is paying for the construction of the Tokanel Drive Pump Station and 12-inch diameter force main that discharges to the Charleston Avenue Pump Station. In an agreement with the developer, the Town agreed to reimburse the developer for part of the cost of

the pump station and force main through future connection fees from users in the Tokanel Drive Pump Station service area. The reimbursement is limited to the total cost of the facilities less the sewer connection fee for the entire development (Area D), resulting in a reimbursement limit of approximately \$800,000. This cost is subject to change and will depend on the Sewer Connection Fee rate schedule established by the Town, as discussed in Section 5.

Growth areas B1, E, F, and G consist mostly of existing low-density residential neighborhoods, with house lots typically 1-acre or larger, served by on-lot subsurface disposal system. It is not intended at this time to provide Town sewer to serve these areas. However, because the areas are in the vicinity of existing or planned interceptor sewers, it is recommended that potential flows from these areas be included in future flow projections because the Town will need to obtain additional treatment capacity from Manchester and Derry, and this may be its last opportunity to request the additional capacity. Although planning level costs estimates to serve these areas are provided in Section 3, the costs are not included in the cost summary in Table 4-3 for all the facilities recommended in this Facilities Plan.

#### **4.6 SEPTAGE DISPOSAL**

All the septage generated in Londonderry is currently disposed of at the Manchester Treatment Plant. The current annual septage quantity is 1,800,000 gallons, and this is projected to increase to 2,124,000 gallons per year over the next 20 years.

Currently, Manchester does not limit the septage received from Londonderry or the other communities it serves. However, Manchester will be conducting facilities planning for its treatment plant in the near future and will be requesting estimates of future septage quantities from all the communities it serves. It is recommended that Londonderry inform Manchester of the septage projections so they can use the information in the facilities planning. At this time, the cost for septage disposal is paid for by the property owner, which is typical for most communities. It is recommended that this practice continue.

#### **4.7 SUMMARY OF COSTS FOR RECOMMENDED WASTEWATER FACILITIES**

Table 4-3 summarizes the costs for all the wastewater facilities identified in Section 4. In one column, the total estimated costs for all facilities are provided, including costs that are anticipated to be funded by developers of the identified growth areas. For some areas, \$0 is carried under total estimated capital costs. This implies that no sewer main extension is required to serve the area, although there would be private expenses for sewer services. No cost is carried for the Mill Pond Development, which is a private sewer system not connected to a Town sewer. The second column lists the costs that the Town may participate in with money collected through sewer connections fees, property taxes, state aid grants, or a combination of these sources. Town voters' approval is required before Town funds can be spend on these projects. The items that may be funded with Town participation include the cost to purchase treatment capacity in Manchester and Derry, upgrades to existing facilities required to accommodate future flows, and portions of sewer extensions to promote commercial and industrial development consistent with the Town's Master Plan.

**TABLE 4-3**  
**COST SUMMARY OF RECOMMENDED WASTEWATER FACILITIES**

		Total Estimated Capital Costs	Total Costs with Town's Participation
<b>Treatment Related Costs</b>			
	Estimate to buy additional 1 mgd in Manchester	\$6,000,000	\$6,000,000
	Cost to buy additional 0.677 mgd in Derry	\$4,092,000	\$4,092,000
	<b>Sub-Total</b>	<b>\$10,092,000</b>	<b>\$10,092,000</b>
<b>Required Upgrades to Existing Facilities</b>			
	Replace portion of Mammoth Road gravity sewer	\$240,000	\$240,000
	Replace Plaza 28 Pump Station and force main	\$2,000,000	\$2,000,000
	Improvements to Action Boulevard Pump Station	\$500,000	\$500,000
	<b>Sub-total</b>	<b>\$2,740,000</b>	<b>\$2,740,000</b>
<b>Sewer Extensions</b>			
Area 1	Sanborn Road #1	\$470,000	\$0
Area 2	Sanborn Road #2	\$390,000	\$0
Area 3	Mill Pond #2 (Private Sewer System)	\$0	\$0
Area 4	Mill Pond #1 (Private Sewer System)	\$0	\$0
Area 5	Page Road	\$3,350,000	\$0
Area 6	Stonehenge Road	\$1,410,000	\$0
Area 7	Whittemore Estates	\$0	\$0
Area 8	Hillside Drive	\$370,000	\$0
Area 9	Jack's Bridge Road	\$1,340,000	\$0
Area 10	Planeview Drive	\$220,000	\$0
Area 11	Delta Drive	\$0	\$0
Area 12	Aviation Park Drive	\$0	\$0
Area 13	Webster Road	\$190,000	\$0
Area 14	Akira Way	\$0	\$0
Area 15	Pettingil Road Business Park	\$3,030,000	\$3,030,000
Area 16	Crestview Circle	\$0	\$0
Area 17	Vista Ridge Drive	\$0	\$0
Area 18	Exit 4A	\$2,910,000	\$160,000
Area 19	Hannaford Plaza	\$0	\$0
Area 20	Mammoth Road North Extension	\$460,000	\$460,000
Area 21	Wentworth Avenue	\$0	\$0
Area A	Century Village	\$1,770,000	\$600,000
Area B	So. Londonderry Interceptor north of Rte. 102	\$1,240,000	\$473,000
Area C	So. Londonderry Interceptor south of Rte. 102	\$3,010,000	\$1,654,000
Area D	P.D. Associates Development	\$0	\$0
	Tokanel Road Pump Sta. and force main	\$800,000	\$800,000
	<b>Sub-total</b>	<b>\$20,960,000</b>	<b>\$7,177,000</b>
	<b>Total</b>	<b>\$33,792,000</b>	<b>\$20,009,000</b>

## SECTION 5

### RECOMMENDATIONS AND IMPLEMENTATION

#### 5.1 SUMMARY OF RECOMMENDED FACILITIES

The wastewater facilities that are required to serve the projected sewer growth in Londonderry are described and summarized in Section 4 of this report. Table 4-3 summarizes all the facilities along with the total estimated costs and the portion of those costs that may be funded with Town's participation. Sources of funding the Town's share of the costs are discussed later in this section.

The total estimated cost for the required wastewater facilities, as summarized in Table 4-3, is approximately \$33.8 million. Of this total, the Town may participate in the funding of approximately \$20 million. The portions of the facilities for which Town participation is recommended are summarized below. The summary includes a brief description of each item, a recommended schedule or timing issues, and the estimated cost.

- **Purchase additional treatment capacity from Manchester:** It is recommended that Londonderry request an additional 1 mgd of treatment capacity from Manchester, along with the associated BOD and TSS loading for the additional flow. The request would be to increase the limits as follows:
  - Average Daily Flow: 4.0 mgd
  - BOD limit: 9,571 lbs/day
  - TSS limit: 9,340 lbs/day

It is recommended that this request be made in the near future so Manchester can include the requested limits in its own facilities planning that is scheduled to begin in 2005.

Estimated costs = \$6 million

- **Purchase additional treatment capacity from Derry:** It is recommended that Londonderry request to reserve additional treatment capacity from the Town of Derry, along with associated BOD and TSS loading for the additional flow. The request would be to increase the limits as follows:
  - Average Daily Flow: 864,225 gpd
  - BOD limit: 2,083 lbs/day
  - TSS limit: 2,618 lbs/day

It is recommended that this request be made in the near future so Derry can include the requested limits in its own facilities planning that is scheduled to begin in 2005.

Estimated costs = \$4.09 million

- **Replace 1000 LF of existing interceptor on Mammoth Road:** It is recommended that approximately 1000 LF of existing 10-inch interceptor sewer be replaced with 15-inch pipe to accommodate projected peak flows from growth Areas 1, 2, and 5 in the Sanborn Road and Page Road areas. It is reported that the Town has granted conditional approval to a proposed development on Sanborn Road. As part of the conditional approval, the developer has agreed to replace this section of sewer with 15-inch pipe. The funding of this work is under negotiation by the Town and the developer.
- Estimated costs = \$240,000
- **Replace the Plaza 28 Pump Station and force main:** The existing pumping capacity of the Plaza 28 Pump Station is 1,200 gpm. Projected peak flows are estimated to reach 2,700 gpm if all the identified growth areas are completely developed and sewered. It is recommended that the existing pump station be replaced with a new pump station with a design capacity of 2,700 gpm. To accommodate this design peak flow rate, the existing 12-inch diameter force main will need to be replaced with a 16-inch diameter pipe. The schedule of this work is dependent on the rate of development of the identified growth areas upstream of the pump station. For planning purposes, it is recommended that the

town begin planning and design of the pump station and force main replacement in the next one to two years.

Estimated costs = \$2 million

- **Upgrade Action Boulevard Pump Station and force main:** The projected peak flow to the Action Boulevard Pump Station is 630 gpm. Based on available information from the Town, the current pumps have a pumping capacity of 700 gpm and should be adequate for future flows. However, there are currently no emergency power provisions at the station. It is recommended that a permanent emergency generator be installed at the station along with an automatic transfer switch to allow the pump station to continue to operate during a power outage. Also, the wastewater velocity in the existing 6-inch diameter force main is 8 feet/sec, which is well above the recommended range of 3 to 5 feet/sec. This could result in shortened lifespan of the pipe. It is recommended that the 6-inch force main (approximately 1200 LF) be replaced with an 8-inch diameter force main. Because this will impact the operating pressure of the pumps, it is recommended that the force main replacement be done in conjunction with the pump replacement, when the pumps need to be replaced due to age. This will allow the new pumps to be sized appropriately to operate with the new force main.

Estimated costs = \$500,000

- **Install Interceptor sewer for Area 15 - Pettingill Road Business Park:** Consistent with the Town's Master Plan to encourage the development of the Pettingill Road Business Park (Airport area), the Town may participate in the funding of the sewer facilities to serve this area. Based on conceptual plans in the "Londonderry Business Park Charette" and a conceptual sewer plan provided by the Town, approximately 13,000 LF of gravity sewer, 2,200 LF of force main and a pump station could be required to service the area. The schedule for the interceptor construction will depend on the schedule of the entire development.

Estimated costs = \$3.03 million

- **Extension of Existing Interceptor to serve Exit 4A area:** Although the installation of sewer facilities within the development area near the proposed Exit 4A is assumed to be the responsibility of the developer, the Town may participate in funding of the extension of the existing interceptor sewer to serve the area. It is estimated that the existing 10-inch interceptor on Londonderry Road would need to be extended north approximately 900 LF to a high point in the road to provide a proper discharge point for a pump station force main that is expected to be constructed as part of the development of the Exit 4A area. The schedule for this extension is dependent on the development schedule of the Exit 4A area.

Estimated costs = \$160,000

- **Extension of existing sewer on Mammoth Road:** The Town's Capital Improvements Plan (CIP) includes the extension of an 8-inch sewer along Mammoth Road from the intersection of Grenier Field Road north approximately 1700 LF. This sewer was designed in 1986 as part of "Contract 5 - North Londonderry" but was not constructed along with the remainder of the project due to funding limitations. This sewer could be constructed at any time.

Estimated costs = \$460,000

- **Install Interceptor to serve Area A - Century Village:** An evaluation and preliminary design of sewer facilities to serve the existing condominium development known as Century Village has been conducted. The subsurface wastewater disposal systems servicing the development have experienced problems resulting in costly repairs and potential pollution of local groundwater and surface waters. An extension of the South Londonderry Interceptor sewer (discussed below), which is already designed, could serve this development. Although the owners of the development would be responsible for the construction of sewer facilities on private property, the Town may participate in the funding of the interceptor sewer to be constructed in Town rights-of-way. The schedule

of this work is dependent on the schedule of the South Londonderry Interceptor.

Estimated costs = \$600,000

- **South Londonderry Interceptor - Area B:** A portion of the South Londonderry Interceptor project, designed in 1999, is currently being constructed by private developer. The remainder of the interceptor as designed would provide service from Constitution Drive north to the Apple Tree Mall (parts of Areas B and C). The portion of the interceptor in Area B would provide sewer service to the commercial areas along part of Route 102 and in the Apple Tree Mall. The interceptor would also allow the construction of collector sewers in the Route 102 area to promote commercial development and provide service to existing commercial users. The scheduling of these projects is dependent on the availability of additional treatment capacity in Derry and the development schedule of other identified growth areas in South Londonderry. The South Londonderry interceptor sewer could be constructed in phases as treatment capacity and funding becomes available.

Estimated costs = \$473,000

- **South Londonderry Interceptor - Area C:**

Area C includes a portion of the South Londonderry interceptor from the intersection of Constitution Drive and Capital Hill Drive to Route 102, that has already been designed. This section of the interceptor must be constructed before the interceptor in Areas A and B can be constructed. The cost for this portion of the interceptor is estimated to be \$0.525 million.

Another interceptor, not yet designed, would be required to provide sewer service to the Route 102 and Mammoth Road interceptor. The cost for this portion of the interceptor is estimated to be \$1.125 million.

Total Estimated costs = \$1.65 million

- **Tokanel Drive Pump Station and force main:** A private developer is paying for the construction of the Tokanel Drive Pump Station and 12-inch diameter force main that discharges to the Charleston Avenue Pump Station. In an agreement with the developer, the Town agreed to reimburse the developer for part of the cost of the pump station and force main through future connection fees from users in the Tokanel Drive Pump Station service area. The reimbursement is limited to the total cost of the facilities less the sewer connection fee for the entire development (Area D), resulting in a reimbursement limit of approximately \$800,000.

Estimated costs = \$800,000

## **5.2 FUNDING OPTIONS FOR RECOMMENDED FACILITIES**

There are several funding options for the recommended wastewater facilities outlined in this Facilities Plan. It is assumed that private developers will be responsible for a majority of costs associated with sewers and pump stations to be constructed within the identified growth areas discussed in Sections 3 and 4. This is typically how sewers have been constructed in the recent residential, commercial and industrial development projects. The sewers are constructed according to the Town's standards, and typically the sewers constructed in Town rights-of-ways or easements are accepted as Town owned sewers at the successful completion of the project.

It is generally understood that the Town does not plan to participate in funding of sewer extensions to serve existing low-density residential neighborhoods that are currently served by on-lot subsurface disposal systems (Areas B1, E, F, and G). If sewers are extended into these areas, it is assumed the property owners to be served would fund the project.

For the recommended wastewater facilities that may be funded with Town participation, the costs can be funded through grants, taxation, sewer connection fees, or a combination of these sources. These funding sources are discussed in more detail below. Another potential source of funding is the Sewer User Charge system. Sewer user charges, paid by current users of the sewer system, are typically used to pay for the operation, maintenance, and future replacement of

existing facilities. The fees are not typically used to pay for facilities or capacity required by future users, and it is recommended that they not be used for the facilities recommended above.

### **5.2.1 State Aid Grants**

The New Hampshire DES administers the State Aid Grants (SAG) program for wastewater facilities. Under the program, 20% of the project costs of eligible wastewater projects are reimbursed to the Town at the successful completion of the project. An additional 10% is available to communities in which the average residential sewer user charge is more than 20% higher than the State average. This is not the case for Londonderry, so the Town would only be eligible for 20% grant funding. Currently, eligible projects include construction of interceptor sewers, construction of collector sewers if it solves documented environmental problems, pump station and force main capacity upgrades, and treatment plant capacity upgrades. It is likely that all the interceptor projects and pump station upgrade projects listed in Section 5.1 would be eligible for 20% SAG grants, with the exception of the Tokanel Drive Pump Station which is being constructed by a private developer. For the projects to be eligible, the DES requirement for design, bidding and construction would need to be met, as was done with the Mammoth Road Interceptor project. It is likely that the future treatment plant capacity upgrades in Manchester and Derry would also be eligible for the 20% SAG grant, which could lower Londonderry's share of the cost.

There is no guarantee that the 20% SAG grants will be available in the future, or that the future projects will be eligible. Therefore, the full estimated costs of the recommended facilities are used in potential Connection Fee calculations in Section 5.2.3.

### **5.2.2 Town Taxation**

The Town's share of funding of the recommended facilities, or a portion of the funding, could come from Town Bonds with debt payments paid through Town Taxation. For a project to be bonded by the Town, voter approval at a Town Meeting would be required. The Town did vote to support the Mammoth Road Interceptor project with a Town Bond to be paid back through

taxation and other sources, but that project served the Town's schools and other Town facilities on Mammoth Road.

### **5.2.3 Sewer Connection Fees**

A common source of funding for future capacity upgrades to sewers, pumping facilities and treatment facilities is to collect a one-time fee when a new user connects to the sewer. This is typically called a Connection Fee or Access Fee. The Town of Londonderry currently calls this fee a Sewer Rental Fee. The Town currently has two separate rate structures for the Sewer Rental Fees, one for North Londonderry and one for South Londonderry. There are also different rates for existing homes and businesses (properties that are occupied before the sewer is constructed) and new homes and businesses. The current rate schedules are included in Appendix D.

Over the past few years, the Town has been reviewing its current Sewer User Charge system, including the Sewer Rental Fees (Connection Fees). The Town's intention is to revise the Connection Fee rate schedule based on the results of this Facilities Plan such that the new Connection Fee will provide the funding for all or a portion of the recommended facilities identified in the Plan. It is recommended that one rate structure be developed for the entire Town and that the same rate be used for existing and new homes and businesses. The justification for this is that every gallon of wastewater has the same impact on collection and pumping facilities owned by the Town of Londonderry and therefore the Connection Fee Rate should be the same cost per gallons for all types of users.

The Connection Fee rate should be based on the average daily flow of the new user. For residential users, the flow rate could be the 210 gpd average daily flow used for this facilities plan, or the flow can be based on the number of bedrooms. For commercial users, the daily flow should be calculated using established design flows from the New Hampshire subsurface

disposal design guidelines, Table 1008-1 Unit Design Flow Figures. This is the table that is used for sizing septic systems, and will provide a consistent method of estimating flows from all

commercial users. Large Industrial users will need to provide their own flow estimates to the Town for review and approval for use in calculating the Connection Fee.

To estimate the Connection Fee rate (\$/gallon), the costs of the facilities identified in this Plan (summarized in Table 4-3) are used. The projected wastewater flows from future users, as summarized in Section 3, are used to estimate the source of revenue from the Connection Fee. The flows used are only the sanitary flow projections. The infiltration flows are not used in the Connection Fee calculation because they are not assigned to specific users and will not be a source of revenue.

Table 5-1 below summarizes all the costs for the wastewater facilities identified in this Plan, the same as Table 4-3. Another column is added to indicate the projected sanitary flows for each growth area to be served. For Areas B and C, flows estimates are added for only those properties adjacent to the planned interceptor pipe, because the properties in the remainder of the areas may not connect (and thus would not pay a Connection Fee) if the collector sewers are not constructed. The Connection Fee is calculated under four different scenarios, and the estimated Connection Fee for each scenario is summarized and compared to the current fees.

Table 5-1 was revised on March 17, 2005 to address Town Council's directive to provide financial relief to owners of residential and commercial property existing prior to new sewer construction /availability. Two separate pricing schedules for Connection and Sewer Access Fees were established to address:

- properties developed during or after new sewer construction,
- properties existing prior to new sewer construction.

The revised Table 5-1 information appears in the following 2 pages.

CONNECTION FEE CALCULATIONS

Item	Total Estimated Capital Costs	Total Cost With Town's Participation (3)	Two-tiered Connection Fee Calculations			
			No. of Existing Residential Units	Flow from existing Res. units (gpd)	Area of Existing Commercial Users (acres)	Flow from existing Commercial (gpd)
<b>Treatment Plant Related Costs</b>						
Estimate to buy additional 1 mgd in Manchester	\$6,000,000	\$6,000,000				
Cost to buy additional 0.664 mgd in Derry	\$4,092,000	\$4,092,000				
<b>Required Upgrades to Existing Facilities</b>						
Replace portion of Mammoth Road gravity sewer	\$240,000	\$240,000				
Replace Plaza 28 Pump Station and force main	\$2,000,000	\$2,000,000				
Improvements to Action Boulevard Pump Station	\$500,000	\$500,000				
Sub-total	\$12,832,000	\$12,832,000				
<b>Sewer Extensions</b>						
Area						
1 Sanborn Road #1	\$470,000	\$0				
2 Sanborn Road #2	\$390,000	\$0				
3 Mill Pond #2	\$0	\$0				
4 Mill Pond #1	\$0	\$0				
5 Page Road	\$3,350,000	\$0				
6 Stonehenge Road	\$1,410,000	\$0				
7 Whittemore Estates	\$0	\$0				
8 Hillside Drive	\$370,000	\$0				
9 Jack's Bridge Road	\$1,340,000	\$0				
10 Plainview Drive	\$220,000	\$0				
11 Delta Drive	\$0	\$0				
12 Aviation Park Drive	\$0	\$0				
13 Webster Road	\$190,000	\$0				
14 Akra Way	\$0	\$0				
15 Pettigill Road Business Park	\$3,030,000	\$3,030,000				
16 Crestview Circle	\$0	\$0				
17 Vista Ridge Drive	\$0	\$0				
18 Exit 4A	\$2,910,000	\$180,000			3	2,100
19 Hannaford Plaza	\$0	\$0				
20 Mammoth Road North Extension	\$480,000	\$480,000	4	840	15	10,500
21 Wentworth Avenue	\$0	\$0				
A Century Village	\$1,770,000	\$600,000	344	72,240		
B So. Londonderry Interceptor north of Rte. 102 (1)	\$1,240,000	\$473,000	40	8,400	40	28,000
C So. Londonderry Interceptor south of Rte. 102 (1)	\$3,010,000	\$1,654,000	170	35,700	64	44,800
D P.D. Associates Development	\$0	\$0				
Tokeland Drive Pump Sta. and force main (2)	\$800,000	\$800,000				
Sub-total	\$20,960,000	\$7,177,000	558	117,180		85,400
<b>Total</b>	<b>\$33,792,000</b>	<b>\$20,009,000</b>				

Projected Flow (gpd) who infiltration used for Conn. Fee Calc.
20,160
26,250
63,000
26,250
56,000
28,400
17,430
13,300
140,000
10,500
39,200
39,200
52,500
21,000
360,000
51,660
32,200
157,500
8,400
24,640
14,000
72,240
57,400
53,200
0
1,385,430

(1) Only count flow from lots adjacent to Interceptor in areas B and C.  
 (2) Estimate of reimbursement to Gilcrest Realty Holdings II, LLC (GRH) from future connection fees for the pump station and force main portion of the South Londonderry Interceptor. Actual amount will depend on the Sewer Connection

Fee established by the Town. Refer to agreement between GRH and the Town.

(3) Pending Town voters approval

Connection Fee Calculations continued:

Scenario 1 - Total Estimated Capital Costs of All Facilities paid Entirely by Connection Fee

Total Estimated Capital Costs	\$33,792,000
Increase in Sanitary Flow	1,385,430
Connection Fee - Cost per Gallon	\$24.39
Connection Fee for Typical House	\$5,122 Based on 210 gpd per Residential Unit

Scenario 2 - Total Costs of Facilities to be Built With Town's Participation Paid Entirely by Connection Fee

Total Costs With Town's Participation	\$20,009,000
Increase in Sanitary Flow	1,385,430
Connection Fee - Cost per Gallon	\$14.44
Connection Fee for Typical House	\$3,032 Based on 210 gpd per Residential Unit

Scenario 3 - Total Costs of Facilities to be Built With Town's Participation Paid 50% by Connection Fees and 50% by Taxes or Other Sources

Total Costs With Town's Participation	\$10,004,500
Increase in Sanitary Flow	1,385,430

Connection Fee - Cost per Gallon	\$7.22
Connection Fee for Typical House	\$1,516 Based on 210 gpd per Residential Unit

Scenario 4 - Total Costs of Facilities to be Built With Town's Participation Paid 67% by Connection Fees and 33% by Taxes or Other Sources

Total Costs With Town's Participation	\$13,406,030
Increase in Sanitary Flow	1,385,430

Connection Fee - Cost per Gallon	\$9.68
Connection Fee for Typical House	\$2,032 Based on 210 gpd per Residential Unit

Comparison with Existing Connection Fees

	Existing Residential Unit	New Residential Unit	New Commercial User	New Industrial User
Current North Londonderry Connection Fees	\$500	\$1500 per bedroom	\$3.00 per gallon	\$3.00 per gallon (*)
Current South Londonderry Connection Fees	\$500	\$1500 per bedroom	\$8.00 per gallon	\$8.00 per gallon
Proposed - Scenario 1	\$5,122	\$5,122	\$24.39 per gallon	\$24.39 per gallon
Proposed - Scenario 2	\$3,032	\$3,032	\$14.44 per gallon	\$14.44 per gallon
Proposed - Scenario 3	\$1,516	\$1,516	\$7.22 per gallon	\$7.22 per gallon
Proposed - Scenario 4	\$2,032	\$2,032	\$9.68 per gallon	\$9.68 per gallon

(\*) \$3.00 per gallon for first 50,000 gpd, and \$1.00 per gallon for flow over 50,000 gpd

Two-tiered Connection Fee Calculations				
Flow from existing Residential and Commercial 202,580 gpd				
Connection Fee for Existing Users				
Residential	\$500	(\$2.38 per gallon x 210 gpd)		
Commercial	\$2.38 per gallon			
Revenue From Existing Residential and Commercial				
		Units or gallons	Rate	Revenue
Residential		558	\$500	\$279,000
Commercial		85,400	\$2.38	\$203,252
Total				\$482,252
Cost to be recovered by full connection Fee \$20,009,000 - \$482,252				
			\$19,526,748	
Remaining flow applied to full connection fee 1,182,850 gpd				
Scenario 2A				
Remaining Costs With Town's Participation Increase In Sanitary Flow				
			\$19,526,748	
			1,182,850	
Connection Fee - Cost per Gallon			\$16.51	
Connection Fee for Typical House			\$3,467	

TABLE 5-1

## CONNECTION FEE CALCULATIONS

Item		Total Estimated Capital Costs	Total Cost With Town's Participation (3)
Treatment Plant Related Costs			
	Estimate to buy additional 1 mgd in Manchester	\$6,000,000	\$6,000,000
	Cost to buy additional 0.664 mgd in Derry	\$4,092,000	\$4,092,000
Required Upgrades to Existing Facilities			
	Replace portion of Mammoth Road gravity sewer	\$240,000	\$240,000
	Replace Plaza 28 Pump Station and force main	\$2,000,000	\$2,000,000
	Improvements to Action Boulevard Pump Station	\$500,000	\$500,000
	Sub-total	\$12,832,000	\$12,832,000
Sewer Extensions			
Area			
1	Sanborn Road #1	\$470,000	\$0
2	Sanborn Road #2	\$390,000	\$0
3	Mill Pond #2	\$0	\$0
4	Mill Pond #1	\$0	\$0
5	Page Road	\$3,350,000	\$0
6	Stonehenge Road	\$1,410,000	\$0
7	Whittemore Estates	\$0	\$0
8	Hillside Drive	\$370,000	\$0
9	Jack's Bridge Road	\$1,340,000	\$0
10	Planeview Drive	\$220,000	\$0
11	Delta Drive	\$0	\$0
12	Aviation Park Drive	\$0	\$0
13	Webster Road	\$190,000	\$0
14	Akira Way	\$0	\$0
15	Pettingill Road Business Park	\$3,030,000	\$3,030,000
16	Crestview Circle	\$0	\$0
17	Vista Ridge Drive	\$0	\$0
18	Exit 4A	\$2,910,000	\$160,000
19	Hannaford Plaza	\$0	\$0
20	Mammoth Road North Extension	\$460,000	\$460,000
21	Wentworth Avenue	\$0	\$0
A	Century Village	\$1,770,000	\$600,000
B	So. Londonderry Interceptor north of Rte. 102 (1)	\$1,240,000	\$473,000
C	So. Londonderry Interceptor south of Rte. 102 (1)	\$3,010,000	\$1,654,000
D	P.D. Associates Development	\$0	\$0
	Tokanel Drive Pump Sta. and force main (2)	\$800,000	\$800,000
	Sub-total	\$20,960,000	\$7,177,000
Total		\$33,792,000	\$20,009,000

Projected Flow (gpd) w/o infiltration used for Conn. Fee Calc.

Superseded

(1) Only count flow from lots adjacent to Interceptor in areas B and C.

(2) Estimate of reimbursement to Gilcreast Realty Holdings II, LLC (GRH) from future connection fees for the pump station and force main portion of the South Londonderry Interceptor. Actual amount will depend on the Sewer Connection Fee established by the Town. Refer to agreement between GRH and the Town.

(3) Pending Town voters approval

Connection Fee Calculations continued:

Scenario 1 - Total Estimated Capital Costs of All Facilities paid  
Entirely by Connection Fee

Total Estimated Capital Costs	\$33,792,000
Increase in Sanitary Flow	1,385,430
Connection Fee - Cost per Gallon	\$24.39
Connection Fee for Typical House	\$5,122 Based on 210 gpd per Residential Unit

Scenario 2 - Total Costs of Facilities to be Built With Town's Participation  
Paid Entirely by Connection Fee

Total Costs With Town's Participation	\$20,009,000
Increase in Sanitary Flow	1,385,430
Connection Fee - Cost per Gallon	\$14.44
Connection Fee for Typical House	\$3,033 Based on 210 gpd per Residential Unit

Scenario 3 - Total Costs of Facilities to be Built With Town's Participation  
Paid 50% by Connection Fees and  
50% by Taxes or Other Sources

Total Costs With Town's Participation	\$10,004,500
Increase in Sanitary Flow	1,385,430
Connection Fee - Cost per Gallon	\$7.22
Connection Fee for Typical House	\$1,516 Based on 210 gpd per Residential Unit

Scenario 4 - Total Costs of Facilities to be Built With Town's Participation  
Paid 67% by Connection Fees and  
33% by Taxes or Other Sources

Total Costs With Town's Participation	\$13,406,030
Increase in Sanitary Flow	1,385,430
Connection Fee - Cost per Gallon	\$9.68
Connection Fee for Typical House	\$2,032 Based on 210 gpd per Residential Unit

Superseded

Comparison with Existing Connection Fees

	Existing Residential Unit	New Residential Unit	New Commercial User	New Industrial User
<i>Current North Londonderry Connection Fees</i>	\$500	\$1500 per bedroom	\$3.00 per gallon	\$3.00 per gallon (*)
<i>Current South Londonderry Connection Fees</i>	\$500	\$1500 per bedroom	\$8.00 per gallon	\$8.00 per gallon
Proposed - Scenario 1	\$5,122	\$5,122	\$24.39 per gallon	\$24.39 per gallon
Proposed - Scenario 2	\$3,033	\$3,033	\$14.44 per gallon	\$14.44 per gallon
Proposed - Scenario 3	\$1,516	\$1,516	\$7.22 per gallon	\$7.22 per gallon
Proposed - Scenario 4	\$2,032	\$2,032	\$9.68 per gallon	\$9.68 per gallon

(\*) \$3.00 per gallon for first 50,000 gpd, and \$1.00 per gallon for flow over 50,000 gpd

Scenario 1 estimates the Connection Fee based on the total costs of all facilities, including the sewer within the development areas. The estimated Connection Fee of \$24.39/gallon would result in a Connection Fee of \$5,122 for a typical residential user with an average daily flow of 210 gpd. This does not appear unreasonable compared to what new residential users would pay under the current rate structure (\$1500/bedroom). However, for commercial and industrial users, the rate is significantly higher than current rates and may prove to be cost prohibitive for many commercial and industrial users. This rate could discourage commercial and industrial development in Town, which is not consistent with the Town's Master Plan, and is not recommended.

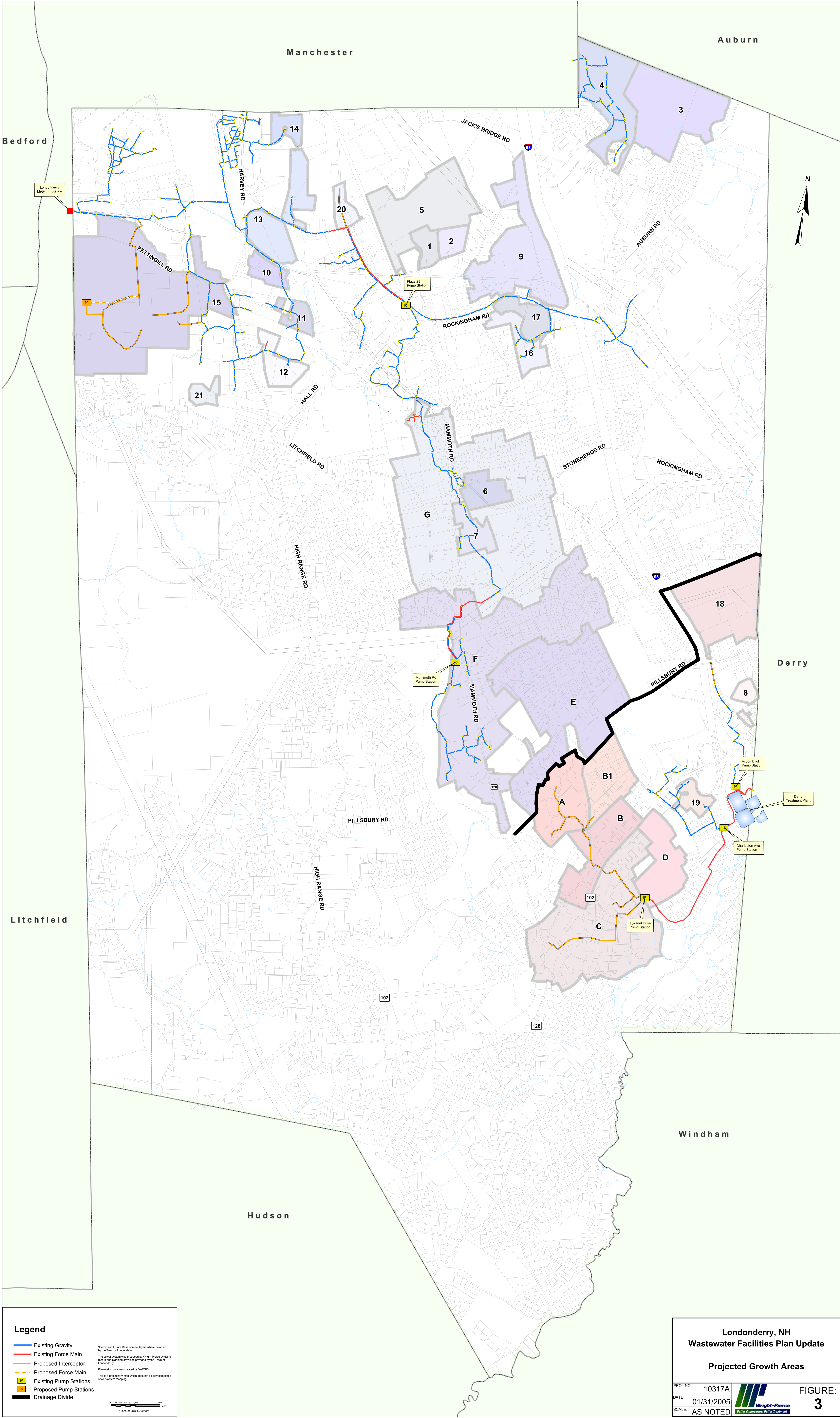
Scenarios 2, 3, and 4 consider only recovering the costs for the facilities that may be paid for with Town's participation (\$20 million). Scenario 2 assumes that all of these costs would be paid from Connection Fees only, while Scenarios 3 and 4 consider a portion of the cost paid through taxation or other sources. The estimated Connection Fees under these scenarios are lower than Scenario 1, and the Fee for residential users is considerably lower than the current rates for new homes.

It is recommended that the Town review the scenarios along with the updated Master Plan to determine which scenario would best promote the intentions of the Master Plan and be acceptable to sewer users and taxpayers in Town.

## **APPENDIX A**

### **Mapping**





**APPENDIX B**  
**Projected Flows and Loads Backup**

Londonderry, NH - Facility Plan  
Projected Flow Estimates

Last Updated 12/16/2004

**Projected Growth Areas Identified During Facility Planning**  
**(All flows are projected Average Daily Flows)**

Area 1 Sanborn Rd #1  
 Residential 96 units times 210 gpd/unit = 20,160  
 Infiltration 50 acres times 150 gpd/acre = 7,500  
**27,660** Area 1 Total Projected Flow (gpd)

Area 2 Sanborn Rd #2  
 Residential 125 units times 210 gpd/unit = 26,250  
 Infiltration 30 acres times 150 gpd/acre = 4,500  
**30,750** Area 2 Total Projected Flow (gpd)

Area 3 Mill Pond #2  
 Residential 300 units times 210 gpd/unit = 63,000  
 Infiltration 200 acres times 150 gpd/acre = 30,000  
**93,000** Area 3 Total Projected Flow (gpd)

Area 4 Mill Pond #1  
 Residential 125 units times 210 gpd/unit = 26,250  
 Infiltration 100 acres times 150 gpd/acre = 15,000  
**41,250** Area 4 Total Projected Flow (gpd)

Area 5 Page Rd.  
 Commercial 20 acres times 700 gpd/acre = 14,000  
 Residential 200 units times 210 gpd/unit = 42,000  
 Infiltration 100 acres times 150 gpd/acre = 15,000  
**71,000** Area 5 Total Projected Flow (gpd)

Area 6 Stonehenge Rd.  
 Residential 140 units times 210 gpd/unit = 29,400  
 Infiltration 50 acres times 150 gpd/acre = 7,500  
**36,900** Area 6 Total Projected Flow (gpd)

Area 7 Whittemore Estates  
 Residential 83 units times 210 gpd/unit = 17,430  
 Infiltration 25 acres times 150 gpd/acre = 3,750  
**21,180** Area 7 Total Projected Flow (gpd)

Area 8 Hillside Drive  
 Residential 50 units times 210 gpd/unit = 10,500  
 Commercial 4 acres times 700 gpd/acre = 2,800  
 Infiltration 24 acres times 150 gpd/acre = 3,600  
**16,900** Area 8 Total Projected Flow (gpd)

Area 9 Jacks Bridge Road  
 Industrial 200 acres times 700 gpd/acre = 140,000  
 Infiltration 200 acres times 150 gpd/acre = 30,000  
**170,000** Area 9 Total Projected Flow (gpd)

Area 10 Planeview Drive

Industrial	<table border="1"><tr><td>15</td></tr></table> acres times	15	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>10,500</td></tr></table>	10,500
15						
700						
10,500						
Infiltration	<table border="1"><tr><td>15</td></tr></table> acres times	15	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>2,250</td></tr></table>	2,250
15						
150						
2,250						
<b>12,750</b> Area 10 Total Projected Flow (gpd)						

Area 11 Delta Drive						
Industrial	<table border="1"><tr><td>56</td></tr></table> acres times	56	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>39,200</td></tr></table>	39,200
56						
700						
39,200						
Infiltration	<table border="1"><tr><td>56</td></tr></table> acres times	56	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>8,400</td></tr></table>	8,400
56						
150						
8,400						
<b>47,600</b> Area 11 Total Projected Flow (gpd)						

Area 12 Aviation Park Drive						
Industrial	<table border="1"><tr><td>56</td></tr></table> acres times	56	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>39,200</td></tr></table>	39,200
56						
700						
39,200						
Infiltration	<table border="1"><tr><td>56</td></tr></table> acres times	56	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>8,400</td></tr></table>	8,400
56						
150						
8,400						
<b>47,600</b> Area 12 Total Projected Flow (gpd)						

Area 13 Webster Road						
Industrial	<table border="1"><tr><td>75</td></tr></table> acres times	75	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>52,500</td></tr></table>	52,500
75						
700						
52,500						
Infiltration	<table border="1"><tr><td>75</td></tr></table> acres times	75	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>11,250</td></tr></table>	11,250
75						
150						
11,250						
<b>63,750</b> Area 13 Total Projected Flow (gpd)						

Area 14 Akira Way						
Industrial	<table border="1"><tr><td>30</td></tr></table> acres times	30	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>21,000</td></tr></table>	21,000
30						
700						
21,000						
Infiltration	<table border="1"><tr><td>30</td></tr></table> acres times	30	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>4,500</td></tr></table>	4,500
30						
150						
4,500						
<b>25,500</b> Area 14 Total Projected Flow (gpd)						

Area 15 Pettingill Road Business Park						
Industrial	<table border="1"><tr><td>3600000</td></tr></table> sqft bldg at	3600000	<table border="1"><tr><td>0.1</td></tr></table> gpd/sqft =	0.1	<table border="1"><tr><td>360,000</td></tr></table> *based on 100 sqft/emp and 10 gpd/emp	360,000
3600000						
0.1						
360,000						
Infiltration	<table border="1"><tr><td>700</td></tr></table> acres times	700	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>105,000</td></tr></table>	105,000
700						
150						
105,000						
<b>465,000</b> Area 15 Total Projected Flow (gpd)						

Area 16 Crestview Circle						
Residential	<table border="1"><tr><td>246</td></tr></table> units times	246	<table border="1"><tr><td>210</td></tr></table> gpd/unit =	210	<table border="1"><tr><td>51,660</td></tr></table>	51,660
246						
210						
51,660						
Infiltration	<table border="1"><tr><td>20</td></tr></table> acres times	20	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>3,000</td></tr></table>	3,000
20						
150						
3,000						
<b>54,660</b> Area 16 Total Projected Flow (gpd)						

Area 17 Vista Ridge Drive						
Commercial	<table border="1"><tr><td>46</td></tr></table> acres times	46	<table border="1"><tr><td>700</td></tr></table> gpd/sqft =	700	<table border="1"><tr><td>32,200</td></tr></table>	32,200
46						
700						
32,200						
Infiltration	<table border="1"><tr><td>46</td></tr></table> acres times	46	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>6,900</td></tr></table>	6,900
46						
150						
6,900						
<b>39,100</b> Area 17 Total Projected Flow (gpd)						

Area 18 Exit 4A						
Industrial	<table border="1"><tr><td>225</td></tr></table> acres times	225	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>157,500</td></tr></table>	157,500
225						
700						
157,500						
Infiltration	<table border="1"><tr><td>225</td></tr></table> acres times	225	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>33,750</td></tr></table>	33,750
225						
150						
33,750						
<b>191,250</b> Area 18 Total Projected Flow (gpd)						

Area 19 Hannaford Plaza						
Commercial	<table border="1"><tr><td>12</td></tr></table> acres times	12	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>8,400</td></tr></table>	8,400
12						
700						
8,400						
Infiltration	<table border="1"><tr><td>12</td></tr></table> acres times	12	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>1,800</td></tr></table>	1,800
12						
150						
1,800						
<b>10,200</b> Area 19 Total Projected Flow (gpd)						

Area 20 Mammoth Road North Extension						
Commercial	<table border="1"><tr><td>34</td></tr></table> acres times	34	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>23,800</td></tr></table>	23,800
34						
700						
23,800						
Residential	<table border="1"><tr><td>4</td></tr></table> units times	4	<table border="1"><tr><td>210</td></tr></table> gpd/unit =	210	<table border="1"><tr><td>840</td></tr></table>	840
4						
210						
840						
Infiltration	<table border="1"><tr><td>40</td></tr></table> acres times	40	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>6,000</td></tr></table>	6,000
40						
150						
6,000						
<b>30,640</b> Area 20 Total Projected Flow (gpd)						

Area 21 Wentworth Avenue						
Commercial	<table border="1"><tr><td>20</td></tr></table> acres times	20	<table border="1"><tr><td>700</td></tr></table> gpd/acre =	700	<table border="1"><tr><td>14,000</td></tr></table>	14,000
20						
700						
14,000						
Infiltration	<table border="1"><tr><td>20</td></tr></table> acres times	20	<table border="1"><tr><td>150</td></tr></table> gpd/acre =	150	<table border="1"><tr><td>3,000</td></tr></table>	3,000
20						
150						
3,000						

**17,000** Area 21 Total Projected Flow (gpd)

### Projected Growth Areas Identified During Previous Studies

**Area A Century Village**

Residential	344	units times	210	gpd/unit =	72,240
Infiltration	46	acres times	150	gpd/acre =	6,900

**79,140** Area A Total Projected Flow (gpd)

**Area B So. Londonderry Interceptor North of Rte 102**

Residential	58	units times	210	gpd/unit =	12,180
Commercial	105	acres times	700	gpd/acre =	73,500
Infiltration	214	acres times	150	gpd/acre =	32,100

**117,780** Area B Total Projected Flow (gpd)

**Area B1 Lancaster Drive - Cortland Street Area**

Residential	86	units times	210	gpd/unit =	18,060
Infiltration	100	acres times	150	gpd/acre =	15,000

**33,060** Area B1 Total Projected Flow (gpd)

**Area C So. Londonderry Interceptor South of Rte 102**

Residential	735	units times	210	gpd/unit =	154,350
Commercial	160	acres times	700	gpd/acre =	112,000
Infiltration	230	acres times	150	gpd/acre =	34,500

**300,850** Area C Total Projected Flow (gpd)

**Area D P.D. Associates Development**

Residential	125	units times	210	gpd/unit =	26,250
Infiltration	3950	LF 8" pipe	300	gpd/in-mi	1,795

**28,045** Area D Total Projected Flow (gpd)

**Area E**

Residential	550	units times	210	gpd/unit =	115,500
Infiltration	550	acres times	150	gpd/acre =	82,500

**198,000** Area E Total Projected Flow (gpd)

**Area F**

Residential	289	units times	210	gpd/unit =	60,690
Infiltration	525	acres times	150	gpd/acre =	78,750

**139,440** Area F Total Projected Flow (gpd)  
\*700 ac (w/out area 6&7) & 25% already served

**Area G**

Residential	700	units times	210	gpd/unit =	147,000
Infiltration	500	acres times	150	gpd/acre =	75,000

**222,000** Area G Total Projected Flow (gpd)  
\*based on 780 ac, with 1/3 already served

**Projected Flow Increases for Each Service Area**  
(Total flows are projected Average Daily Flows )

<b>Manchester Flows</b>	Sanitary Flows (gpd)	Infiltration Flows (gpd)	
<b>Mammoth Road PS</b>			
Area F Flows =	60,690	78,750	
Area E Flows =	115,500	82,500	ADF
Total Flow to Mammoth Rd PS =	176,190	161,250	337,440 gpd
Peaking Factor =	4		Peak Rate
Peak Flow to Mammoth Rd. PS =	704,760	161,250	866,010 gpd Peak Rate 601 gpm
<b>Plaza 28 PS</b>			
Area 1 Flows =	20,160	7,500	
Area 2 Flows =	26,250	4,500	
Area 5 Flows =	56,000	15,000	
Area 6 Flows =	29,400	7,500	
Area 7 Flows =	17,430	3,750	
Area 9 Flows =	140,000	30,000	
Area 16 Flows =	51,660	3,000	
Area 17 Flows =	32,200	6,900	
Area 20 Flows =	24,640	6,000	
Area G Flows =	147,000	75,000	
Total Flow to Plaza 28 PS =	544,740	159,150	ADF
Total Flow to Mammoth Rd =	176,190	161,250	337,440 gpd
Peaking Factor =	3.5		Peak Rate
Peak Flow to Plaza 28 PS =	2,523,255	320,400	2,843,655 gpd Peak Rate 1975 gpm
<b>Private Mill Pond PS</b>			
Area 3 Flows =	63,000	30,000	
Area 4 Flows =	26,250	15,000	ADF
Total Flow to Mill Pond PS =	89,250	45,000	134,250 gpd
Peaking Factor =	4		Peak Rate
Peak Flow to Mill Pond PS =	357,000	45,000	402,000 gpd Peak Rate 279 gpm
<b>Londonderry Metering Station (LMS)</b>			
Area 10 Flows =	10,500	2,250	
Area 11 Flows =	39,200	8,400	
Area 12 Flows =	39,200	8,400	
Area 13 Flows =	52,500	11,250	
Area 14 Flows =	21,000	4,500	
Area 15 Flows =	360,000	105,000	
Area 21 Flows =	14,000	3,000	
Total Gravity Flow to Manchester =	536,400	142,800	
Total Flow to Mammoth Rd PS =	176,190	161,250	ADF
Total Flow to Plaza 28 PS =	544,740	159,150	703,890 gpd
Peaking Factor =	3		Peak Rate
Peak Flow at LMS =	3,771,990	463,200	4,235,190 gpd
<b>Total Flow Increase to Manchester =</b>	<b>1,346,580</b>	<b>508,200</b>	<b>ADF</b> <b>1,854,780 gpd</b>
<b>Peaking Factor =</b>	<b>3</b>		<b>Peak Rate</b>
<b>Peak Flow to Manchester =</b>	<b>4,039,740</b>	<b>508,200</b>	<b>4,547,940 gpd</b> <b>Peak Rate</b> <b>3158 gpm</b>

<b>Derry Flows</b>	Sanitary Flows (gpd)	Infiltration Flows (gpd)	
<b>Tokanel Road PS</b>			
Area A Flows =	72,240	6,900	
Area B Flows =	85,680	32,100	
Area B1 Flows =	18,060	15,000	
Area C Flows =	266,350	34,500	
Area D Flows =	26,250	1,795	ADF
Total Flow to Tokanel Rd. PS =	468,580	90,295	558,875 gpd
Peaking Factor =	3.75		Peak Rate
Peak Flow to Tokanel Rd. PS =	1,757,175	90,295	1,847,470 gpd Peak Rate 1283 gpm
<b>Charleston Ave PS</b>			
Area 19 Flows =	8,400	1,800	
Total Flow to Charleston Ave. PS =	8,400	1,800	ADF
Total Flow to Tokanel Rd. PS =	468,580	90,295	558,875 gpd
Peaking Factor =	3.75		Peak Rate
Peak Flow to Charleston Ave. PS =	1,788,675	92,095	1,880,770 gpd Peak Rate 1306 gpm
<b>Action Boulevard PS</b>			
Area 8 Flows =	13,300	3,600	
Area 18 Flows =	157,500	33,750	ADF
Total Flow to Action Blv. PS =	170,800	37,350	208,150 gpd
Peaking Factor =	3.75		Peak Rate
Peak Flow to Action Blv. PS =	640,500	37,350	677,850 gpd Peak Rate 471 gpm
<b>Total Flow Increase to Derry =</b>	<b>647,780</b>	<b>129,445</b>	<b>ADF</b> <b>777,225 gpd</b>
<b>Peaking Factor =</b>	<b>3.5</b>		<b>Peak Rate</b>
<b>Peak Flow to Derry =</b>	<b>2,267,230</b>	<b>129,445</b>	<b>2,396,675 gpd</b> <b>Peak Rate</b> <b>1664 gpm</b>

Projected Loading Increases  
(Flows are projected Average Daily Flows)

Assumes a BOD loading rate of 0.20 lbs/capita for sanitary flows and 340 mg/l for Commercial/Industrial Flows  
Assumes a TSS loading rate of 0.25 lbs/capita for sanitary flows and 428 mg/l for Commercial/Industrial Flows  
Assumes that Infiltration flows contribute no BOD or TSS loading

Manchester Loadings	Residential Flows (gpd)	Com. & Ind Flows (gpd)	Infiltration Flows (gpd)
Area 1 Flows =	20,160	0	7,500
Area 2 Flows =	26,250	0	4,500
Area 3 Flows =	63,000	0	30,000
Area 4 Flows =	26,250	0	15,000
Area 5 Flows =	42,000	14,000	15,000
Area 6 Flows =	29,400	0	7,500
Area 7 Flows =	17,430	0	3,750
Area 9 Flows =	0	140,000	30,000
Area 10 Flows =	0	10,500	2,250
Area 11 Flows =	0	39,200	8,400
Area 12 Flows =	0	39,200	8,400
Area 13 Flows =	0	52,500	11,250
Area 14 Flows =	0	21,000	4,500
Area 15 Flows =	0	360,000	105,000
Area 16 Flows =	51,660	0	3,000
Area 17 Flows =	0	32,200	6,900
Area 20 Flows =	840	23,800	6,000
Area 21 Flows =	0	14,000	3,000
Area E Flows =	115,500	0	82,500
Area F Flows =	60,690	0	78,750
Area G Flows =	147,000	0	75,000
Total Flows to Manchester (gpd)=	600,180	746,400	508,200
Equivalent Population =	8574		

BOD Unit Loads (lbs/cap. or mg/l)=	0.20	340	0.00
BOD Total Loads (lbs/day)=	1,715	2,116	0

3,831 lbs/day  
TOTAL INCREASED BOD LOAD

TSS Unit Loads (lbs/cap. or mg/l)=	0.25	428	0.00
TSS Total Loads (lbs/day)=	2,144	2,664	0

4,808 lbs/day  
TOTAL INCREASED TSS LOAD

Derry Loadings	Residential Flows (gpd)	Com. & Ind Flows (gpd)	Infiltration Flows (gpd)
Area 8 Flows =	10,500	2,800	3,600
Area 18 Flows =	0	157,500	33,750
Area 19 Flows =	0	8,400	1,800
Area A Flows =	72,240	0	6,900
Area B Flows =	12,180	73,500	32,100
Area B1 Flows =	18,060	0	15,000
Area C Flows =	154,350	112,000	34,500
Area D Flows =	26,250	0	1,795
Total Flows to Derry (gpd)=	293,580	354,200	129,445
Equivalent Population =	4194		

BOD Unit Loads (lbs/cap. or mg/l)=	0.20	340.00	0.00
BOD Total Loads (lbs/day)=	838.8	1,004	0

1,843 lbs/day  
TOTAL INCREASED BOD

TSS Unit Loads (lbs/cap. or mg/l)=	0.25	428.00	0.00
TSS Total Loads (lbs/day)=	1048.5	1,264	0

2,313 lbs/day  
TOTAL INCREASED TSS

Londonderry, NH Facility Planning  
W-P Project No. 10317A  
Last Revised - 11/17/2004

# Estimated Increases in Septage Amounts from Londonderry to Manchester

Current Septage flows = 1.8 million gallons per year on average

Anticipated Population growth by 2024 = 8,024 people  
Assuming 3 people per home = 2,675 new housing units

## New Housing Units in Growth Areas to be Connected to Sewer When Built

Area #	Area Description	Estimated # Res. Units
1	Sanborn Rd. # 1	96
2	Sanborn Rd. # 2	125
3	Mill Pond # 2	300
4	Mill Pond # 1	125
5	Page Road	200
6	Stonehenge Rd.	140
7	Whittemore Estates	83
8	Hillside Drive	50
16	Crestview Circle	161
17	Vista Ridge Road	99
New Units on Public Sewer		1,379

Estimated New Units	2,675
New Units on Public Sewer	1,379
New Units on Septic Tanks	1,296

Assuming each tank holds 1,000 gallons and is pumped every 4 years

New Units on Septic Tanks	1,296
Average Tank Size	1,000 gal/tank (pumped every 4 yrs)
Additional Septage every 4 years	1,296,000 gallons every 4 years
	4 years
Additional Septage per Year	324,000 gallons
Existing Annual Septage	1,800,000 gallons
Annual Septage in 2025	2,124,000 gallons

**APPENDIX C**  
**Cost Estimates Backup**

Londonderry, NH  
Wastewater Facilities Plan  
Project No. 10317A

Estimate of cost to purchase an additional 1 mgd of capacity from the  
City of Manchester

Method 1 - Based on cost of \$750,000 for 1 mgd of capacity purchased in 1992  
from Manchester

Note: this 1 mgd was available capacity at the existing plant

ENR cost index in March 1992=	4927
Current ENR cost index =	7314

Current cost for 1 mgd purchased in 1992 =	<b>\$1,113,355</b>
--	--------------------

Method 2 - Use current cost to buy 1 mgd capacity from Derry using  
impact fee in Derry Agreement

Original Impact Fee =	\$4.11 per gallon
Original ENR index =	4770
Current ENR index =	7314

Current cost per gallon =	\$6.30 per gallon
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Cost for 1 mgd =	<b>\$6,302,000</b>
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Method 3 - Based on cost of last Upgrade of Manchester Plant  
in 1995.

Total cost of 1995 Upgrade =	\$27,317,000
Capacity increase	8 mgd
Cost per mgd of capacity	\$3,414,625

June 1995 ENR index =	5432
Current ENR index =	7314

Current cost per 1 mgd of capacity =	<b>\$4,600,000</b>
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<b>Amount to use for Facilities Plan =</b>	<b>\$6,000,000</b>
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Londonderry, NH  
Wastewater Facilities Plan  
Project No. 10317A

Estimate of Londonderry's share of Capital Costs in Derry

Current Flow limit is 200,000 gpd

For flows over 200,000 gpd, Londonderry will have to pay an "Impact Fee" to Derry as defined in the Intermunicipal Agreement.

Upon completion of the plant upgrade in Derry, the Town of Londonderry will have an additional 129,600 gpd of capacity reserved, but will have to pay a modified Impact Fee.  
Modified Impact Fee: \$4.11 (indexed to current ENR index) - \$1.62 (Tinkham credit)  
+ \$1.12 (recoupment cost) - \$0.22 (20% of recoupment for State Aid Grant)

Derry may allow flow exceeding 329,600 gpd, but additional capacity will be granted on a first come first serve basis, provided that there is capacity in Derry. Impact Fee for flow over 329,600 gpd will be based on Impact Fee of \$4.11 indexed to current ENR index

Impact Fee is \$4.11 per gallon of average daily flow based on ENR index of 4770 (January 1, 1991)

Correction for current ENR index (October 2004) of 7314

Impact Fee = \$6.30 per gallon

Projected ADF to Derry	864,225 gpd
Less current limit	<u>200,000 gpd</u>

Flow exceeding 200,000	664,225 gpd
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**Impact Fee**

For flow from 200,000 gpd to 329,600 gpd:  
\$6.30 - \$1.62 + \$1.12 - \$0.22 = \$5.58 per gpd

129,600 x \$5.58 = **\$723,168**

For flow over 329,600 gpd  
534,625 gpd x \$6.30 = **\$3,368,140**

**Total Impact Fee \$4,091,308**

**APPENDIX D**  
**Existing Sewer User Rates**

NORTH LONDONDERRY EXTENDED SEWER RENTAL FEES

SITUATION	RATE OF ASSESSMENT	MINIMUM CHARGE	PAYMENT PLAN	REMARKS
EXISTING HOMES	\$500 PER HOME	\$500	IN FULL AT TIME OF CONNECTION OR \$30 PER QTR FOR 5 YRS	
EXISTING BUSINESSES ON OLD SEWER LINES	\$1.00 / GPD AVERAGE DISCHARGE	\$900 PER UNIT	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	
BUSINESSES ON DELTA, BURTON, OR WENTWORTH	\$1.00 / GPD AVERAGE DISCHARGE	\$900 PER UNIT	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	
BUSINESSES, HARVEY & GRENIER FLD RDS	\$2.00 / GPD AVERAGE DISCHARGE	\$1,500 PER UNIT	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	
BUSINESSES ON OLE MAMMOTH & ROCKINGHAM RDS	\$2.00/ GPD AVERAGE DISCHARGE	\$1,500 PER UNIT	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	
BUSINESSES ON LIBERTY & INDEPENDENCE DR	\$2.00/ GPD AVERAGE DISCHARGE	\$1,500 PER UNIT	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	
NEW HOMES	\$1,500 PER BEDROOM	\$1,500	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	
NEW BUSINESSES	\$2.00/ GPD	\$3,000	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	NO. LONDRRY FLOW 0 - 1,000,000 GPD
	\$3.00/ GPD	\$4,500	IN FULL OR QTRLY PAYMENTS FOR 5 YRS (7% API)	NO. LONDRRY FLOW MORE THAN 1 MGD
HIGH WATER USERS 50,000 GPD OR MORE	0-50,000 GPD	\$1.00/GAL	IN FULL AT CONNECTION	NO. LONDRRY FLOW 0 - 500,000 GPD
	> 50,000 GPD	\$0.50/GAL	IN FULL AT CONNECTION	NO. LONDRRY FLOW 0.5 MGD TO 1.0 MGD
	0-50,000 GPD	\$2.00/GAL	IN FULL AT CONNECTION	NO. LONDRRY FLOW 0.5 MGD TO 1.0 MGD
	> 50,000 GPD	\$0.50 GAL	IN FULL AT CONNECTION	NO. LONDRRY FLOW 1.0 MGD TO 2.0 MGD
	0-50,000 GPD	\$3.00/GAL	IN FULL AT CONNECTION	NO. LONDRRY FLOW 1.0 MGD TO 2.0 MGD
	> 50,000 GPD	\$1.00/GAL	IN FULL AT CONNECTION	NO. LONDRRY FLOW 1.0 MGD TO 2.0 MGD

## NOTE SPECIAL SITUATIONS FOR ASSESSING FEES:

- RESIDENTIAL UNIT IS A SINGLE FAMILY HOME, APT, CONDO, TRAILER, TOWNHOUSE, ETC.
- FOR MULTIPLE COMMERCIAL USERS IN ONE OR MORE BLDGS ON COMMON LAND, A COMMERCIAL UNIT IS DEFINED AS 10,850 SQUARE FEET.
- FOR MULTIPLE INDUSTRIAL USERS IN ONE OR MORE BUILDINGS ON COMMON LAND, AN INDUSTRIAL UNIT IS DEFINED AS 28,460 SQUARE FEET.

TOWN OF LONDONDERRY, NH BOARD OF SEWER COMMISSIONERS  
NORTH LONDONDERRY SCHEDULE OF SEWER USER RATES  
REVISED MAY 23, 1996

SITUATION	RATE	MINIMUM SEWER USE FEES <sup>5</sup>
RESIDENTIAL USERS	\$80.00/RESIDENTIAL UNIT <sup>1</sup> (FLAT RATE)	\$80.00/RES. UNIT
COMMERCIAL & LITE INDUSTRIAL USERS	\$80.00 (0 - 3800 FT <sup>3</sup> ) + \$1.12/100 OVER 3800 FT <sup>3</sup>  (METERED WATER)	\$80.00/BUSINESS UNIT <sup>4</sup>
INDUSTRIAL USERS (CLASS I-III PERMITS)	\$156.00 (0 - 9400 FT <sup>3</sup> ) + \$1.12/100 OVER 9400 FT <sup>3</sup>  (METERED WATER)	\$156.00/INDUST. UNIT <sup>3</sup>
BIOCHEMICAL OXYGEN DEMAND (BOD <sub>5</sub> ) GREATER THAN 220 MG/L	\$9.90/HUNDRED LBS	
TOTAL SUSPENDED SOLIDS (TSS) GREATER THAN 250 MG/L	\$9.72/HUNDRED LBS	

**NOTE SPECIAL SITUATIONS FOR ASSESSING FEES:**

**RESIDENTIAL UNIT<sup>1</sup>** IS A SINGLE FAMILY HOME, APT, CONDO, TRAILER, TOWNHOUSE, ETC.

FOR MULTIPLE COMMERCIAL USERS IN ONE OR MORE BLDGS ON COMMON LAND, A **COMMERCIAL UNIT<sup>2</sup>** IS DEFINED AS 10,850 SQUARE FEET.

FOR MULTIPLE INDUSTRIAL USERS IN ONE OR MORE BUILDINGS ON COMMON LAND, AN **INDUSTRIAL UNIT<sup>3</sup>** IS DEFINED AS 28,460 SQUARE FEET.

A **BUSINESS UNIT<sup>4</sup>** AS IT APPLIES TO MULTIPLE COMMERCIAL OR INDUSTRIAL USERS IN ONE OR MORE BUILDINGS ON A COMMON LOT REFERS TO A SINGLE, SEPARATE, BUSINESS ENTITY HAVING LEASE, TITLE, OR RIGHTS TO OCCUPY CERTAIN SPACE IN THE BUILDING (S) FOR PUPOSES OF CONDUCTING COMMERCIAL, RETAIL, PROFESSIONAL, RESTAURANT/FOOD, OR INDUSTRIAL BUSINESS.

**MINIMUM SEWER USE FEES<sup>5</sup>** WILL BE ASSESSED TO OWNERS OF IMPROVED LOTS NOT CONNECTED TO THE PUBLIC SYSTEM AS REQUIRED BY THE SEWER ORDINANCE. ANY IMPROVED PROPERTY HAVING THE POTENTIAL TO GENERATE WASTEWATER WHETHER OR NOT OCCUPIED SHALL ALSO BE SUBJECT TO THE QUARTERLY MINIMUM CHARGES.

TO CONVERT CUBIC FEET (FT<sup>3</sup>) TO GALLONS MULTIPLY BY 7.48, EXAMPLE: 3800 FT<sup>3</sup> OF METERED WATER EQUALS (3800 x 7.48) = 28,424 GALLONS

EXTENDED SEWER RENTAL FEE SCHEDULE  
(Initial One-Time Charge)  
South Londonderry Area

Town of Londonderry, New Hampshire

July 10, 1993

SITUATION	MINIMUM CHARGE (1)	RATE OF ASSESSMENT	REMARKS	PAYMENT PLAN
Existing Residential Units (On Septic Systems)	\$ 500	\$ 500 per resid. unit	Residential Unit = single family home, apt. condo., trailer, townhouse, etc.	In full at or prior to connection or approx. \$ 30/qr for 5 years at 7.0% interest
Existing Residential Units (See Remarks) (On Holding Tanks)	\$ 500	\$ 500 per resid. unit	Residential Unit = single family home, apt. condo., trailer, townhouse, etc.	In full at or prior to connection or approx. \$ 30/qr for 5 years at 7.0% interest
New Residential Units	\$ 1,500	\$ 1,500 per bedroom	Flow Unit = flow per bedroom which = 150 gallons per day (GPD).	In full at or prior to connection
Existing Commercial Businesses (2) (On Septic Systems)	\$ 1,500 (See Remarks)	\$ 8.00 per GPD	Minimum charge = One (1) Flow Unit (Q = 150 GPD)	In full at or prior to connection
Existing Commercial Businesses (2) (On Holding Tanks)	\$ 3,000 (See Remarks)	\$ 8.00 per GPD	Minimum charge = Two (2) Flow Units (Q = 300 GPD) (2 units x 150 GPD/unit)	In full at or prior to connection
New Commercial Businesses (2)	\$ 3,000 (See Remarks)	\$ 8.00 per GPD	Minimum charge = Two (2) Flow Units (Q = 300 GPD) (2 units x 150 GPD/unit)	In full at or prior to connection
Industries & Large Volume Users (3)	\$ 8,000 per gross acre	\$ 8.00 per GPD (See Remarks)	Based on minimum 1.0 acre lot & 1,000 GPD/gross acre (Flows up to 1,000 GPD/gross acre)	In full at or prior to connection
		\$ 5.15 per GPD (4) (See Remarks)	Flows over 1,000 GPD/gross acre (NOTE: Applies only to that portion of flow in this range)	

(1) Cost includes application and inspections.  
(2) One commercial unit = 0 - 5425 sq. ft. building area  
based on 1/2 maximum allowable building area per acre.  
(3) For multiple industrial users on common land, an industrial  
unit shall be defined as 28,460 sq. ft. of bldg. area based  
on the maximum allowable bldg. area per acre.

(4) Or the accessibility fee being charged by the Town of  
Derry at the time of connection plus 25 %.

TOWN OF LONDONDERRY, NH  
BOARD OF SEWER COMMISSIONERS

REVISED DECEMBER 9, 1994

SOUTH LONDONDERRY SEWER USER RATE SCHEDULE  
(QUARTERLY BILLING)

<u>SITUATION</u>	<u>FEES</u>	<u>*MINIMUM CHARGE</u>
RESIDENTIAL (APARTMENTS; TRAILERS; HOMES; CONDOS)	\$80.00/UNIT DWELLING (FLAT RATE)	\$80.00
COMMERCIAL, OFFICE, RESTAURANTS, WAREHOUSE & DISTRIBUTION	\$2.72/100 CU FT OR \$3.64/1000 GALS (METERED WATER)	\$80./BLDG TENANT
INDUSTRIAL (USERS WITH INDUSTRIAL DISCHARGE PERMITS)	\$2.72/100 CU FT OR \$3.64/1000 GALS (METERED WATER)	\$156./BLDG TENANT

TERMS: NET 30 DAYS, 1% PER MONTH INTEREST CHARGE ON PAST DUE  
ACCOUNTS.

\* PROPERTY OWNERS OF IMPROVED LOTS NOT CONNECTED TO THE  
MUNICIPAL SYSTEM AS REQUIRED BY THE SEWER ORDINANCE ARE  
SUBJECT TO PAYMENT OF THE APPLICABLE MINIMUM CHARGES.

