

The Town of Tiverton Sewer System Maintenance Plan

May 2009

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1. COLLECTION SYSTEM MANAGEMENT

a. Goals

The Town of Tiverton's preventive maintenance plan (PMP) covers the assets we manage in our wastewater collection system and is one component of our overall Capacity, Management, Operations and Maintenance (CMOM) Plan. The PMP combines preventive, predictive and corrective maintenance strategies with our best management practices. The CMOM Plan and PMP have been prepared to help the Town of Tiverton effectively manage our wastewater collection system and achieve the following goals:

- Prevent public health hazards
- Protect the environment
- Comply with regulations
- Minimize the frequency of SSOs
- Mitigate the impact of SSOs
- Minimize disruptions in service
- Minimize complaints
- Provide quick response to any disruption in service that occurs
- Protect the Town of Tiverton's large investment in the sewer collection system by maintaining maximum capacity and extending the useful life of the associated assets
- Prevent unnecessary damage to public/private property
- Efficiently use the funds available for the maintenance of the infrastructure and the operation of services
- Reduce expenditures for emergency maintenance
- Convey wastewater to the City of Fall River waste water treatment facility with a minimum of infiltration, inflow and exfiltration
- Provide adequate capacity to convey peak flow
- Provide immediate, responsive, and efficient service to all emergency calls
- Provide a safe work environment for employees, employers, and residents in the Town of Tiverton
- Perform all operations in a safe manner to prevent personal injury
- Utilize evolving technology to increase our effectiveness and efficiency
- Provide reliable service now and into the future

b. Organization

The Town of Tiverton's Wastewater Management is under the Department of Public Works and is responsible for all aspects of our wastewater collection system and treatment, with the exception of private pumping stations and sewer lines, which are operated and maintained by the owners of the private infrastructure. Wastewater Management has a staff of one full time operation and maintenance position and one

part time billing clerk. Contractors or DPW crews are used for all maintenance activities and for emergency support. Figure 1 shows the organizational structure of the Wastewater Management.

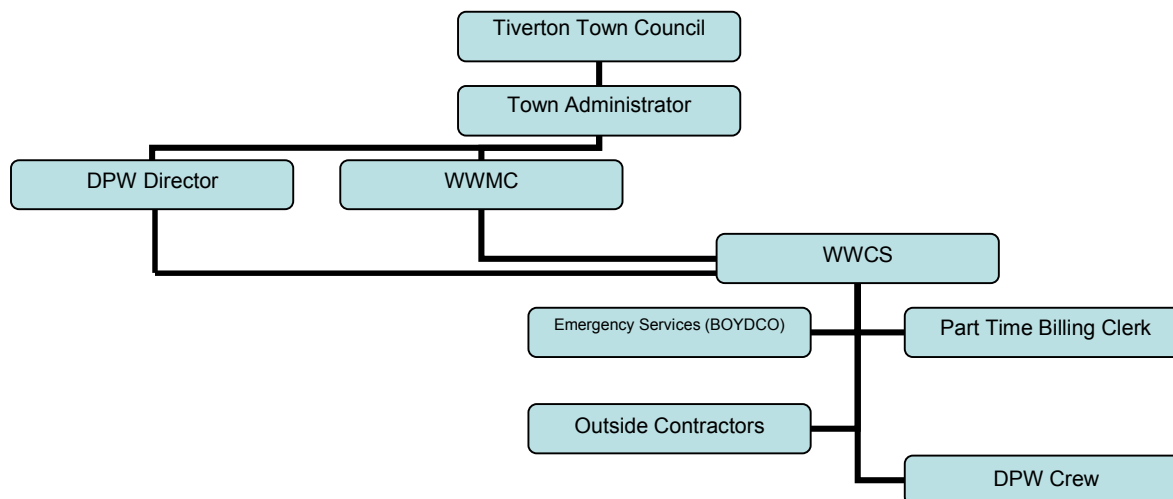


Figure 1- the Town of Tiverton Wastewater Management Organizational Chart

Wastewater Management has one full time and one part time employee. In addition, a seven member board, the Wastewater Management Commission, is staffed with volunteer residents. The Wastewater Management is fully staffed and operates under the following organizational structure:

Wastewater Management Commission – Seven Members, two alternates - Establishes policy, plans strategy, leads staff and delegates responsibility, allocates resources, authorizes outside contractors to perform services. In addition to the seven full members of the commission, the DPW director and the Wastewater Superintendent serve as non voting members.

A list of the current members can be found in appendix D.

Wastewater Collection Superintendent–

- Prepares wastewater collection system planning documents, manages capital improvement delivery system, documents new and rehabilitated assets, and coordinates development and implementation of CMOM Plan.
- Manages field operations and maintenance activities, provides relevant information to agency management, prepares and implements contingency plans, leads emergency response, investigates and reports SSOs, and trains field crews.
- Serves as the Town inspector_– Ensures that new and rehabilitated assets meet Town of Tiverton standards, works with field crews to handle emergencies when

contractors are involved.

- Responsible for preventive maintenance activities, mobilizes and responds to notification of stoppages and SSOs (e.g., mobilize sewer cleaning equipment, by-pass pumping equipment, and portable generators).
- The Town of Tiverton's Superintendent is required to maintain a RI Class 3 Wastewater Operator's Certification or an approved equal and a minimum of a Class 2 Wastewater Collections System Certification.
- Mr. John Lincourt is our current Wastewater Superintendent and currently holds a Massachusetts Grade 5C Wastewater Operators License and a Grade 4 Wastewater Collections Certification.

Administrative – Part-time Billing Clerk: assists with data entry and quality control, handles billing, customer response, and other support functions as needed.

Relation to Other Municipal Functions

Tiverton Wastewater Management is not a separate utility, but rather a stand-alone section within the Department of Public Works. It is responsible solely for management, operations and maintenance of the wastewater collection facilities. Wastewater Management personnel are utilized on an as available basis for the benefit of other Town of Tiverton functions. Many activities of the Tiverton wastewater collection system are supported by the following departments and partners:

- Resources and budget are overseen by Wastewater Management Commission and the Town Treasurer.
- Contingency equipment and replacement inventories are shared by the DPW
- Training for programs such as safety, operations, management, etc. is provided through Narragansett Water Pollution Control Association, NEWEA, New England Interstate, RI DEM.
- Design and Construction Standards for installation, rehabilitation and repair are reviewed by the Director of Public Works
- Standards for inspection and testing are developed by the Wastewater Superintendent and reviewed by the Director of Public Works
- Inspection of grease interceptors/separators is performed by the Wastewater Superintendent
- Outreach for Fats, Oils and Grease is performed the Wastewater Superintendent
- Personnel hiring and administration are performed by Town Administrator and the Personnel Board
- Procurement of non-routine equipment, services or supplies is authorized by the Town Council.
- The Town Solicitor provides legal services and advisory opinions to Wastewater Management on departmental issues, contracts and agreements, and is responsible for handling all claims against the department and prosecuting violations of all Sewer Use Ordinances.

- Private Contractors provide paving services to Wastewater Management on all sewer repairs performed within public streets. The Public Works Director works to coordinate street-paving schedules with sewer work.
- The Town Clerk maintains copies of Resolutions and Ordinances passed by the Town Council related to the operation of Wastewater Management.

c. Training

Tiverton's training program provides a mechanism for educating employees and establishing their technical competence through training programs such as NEWEA voluntary certification program. Tiverton utilizes specialized training through state and national associations, the University of Rhode Island, conferences and vendor training programs to enhance skills for performing daily work duties and provide certified operators continuing education hours. Skills' training for the Tiverton's employees include, but is not limited to:

- Routine Line Maintenance
- Heavy Equipment Operation
- Maintenance Equipment Operation
- Line Testing and Inspection
- Infrastructure Installation
- Pump Station Operation and Maintenance
- Electrical and Instrumentation
- Emergency Response
- Public Relations
- Safety
- Annual HAZWOPER 8 hr Recertification

Safety training is obtained from training agencies including Burgess & Associates. Tiverton expects employee adherence to the following safety policies and procedures.

- Confined Space Entry
- Hard Hat Policy
- Vehicle Operation Policy
- Seat Belt Policy
- Excavation Safety Policy and Program
- Injury Reporting Policy
- Safety Teams and Committee Policy
- Personal Protective Equipment (provided for the employee)
- Flagger
- Hazard Communication Program

Training records are maintained for each employee by each employee and at the DPW office. Wastewater Management maintains appropriate safety equipment including: protective clothing, safety glasses, hard hats, gloves, harnesses, tripods, hoists, fire extinguishers. Wastewater Management also maintains and calibrates atmospheric

testing equipment. Lights, and exhaust fans are also available. Other safety equipment is maintained by the DPW and is borrowed when needed.

d. Customer Service

Complaint Management Program

Currently, the Town of Tiverton does not have a formal complaint management program. Complaints that are currently received are forwarded to the Wastewater Superintendent and handled in order of priority.

A formal complaint management program will be developed – Target date to implement the program is May 2010. The program will include the following:

Complaints and requests which are received by various means (e.g., phone calls, e-mail, other departments, and occasionally in person). Regardless of the nature or means of receipt, complaints and requests, entries will include the following detailed information about the complaint/request:

Receiver of complaint / dispatcher

Time and date of request

Complainant information (Name, address, call back phone number)

Location of the problem

Type of complaint (Codes, eg. home back up, odor, manhole overflow, etc.)

Specific request

Personnel assigned to complaint

Findings type, including cause of problem

Complaint closeout information

Date complaint closed

Once a complaint is assigned, field personnel perform an investigation. If the problem cannot be immediately resolved, the wastewater superintendent will generate a work order to take appropriate action for permanent correction of the problem. If the Town of Tiverton is not responsible for correcting the problem, the Wastewater Management will provide the complainant with guidance on a recommended course of action. Once an investigation has been completed, the staff enters closeout information into the logbook or computer database. A copy of the log or computer database will be inserted here as an attachment which will depict a typical form.

Public Information and Education Program

The Town of Tiverton uses a variety of outlets for providing information and education to customers. The outlet(s) used to disseminate information is often based on the type of information and the targeted audience. The Town of Tiverton uses the outlets listed below to help the Town provide its citizens with the most up-to-date information possible:

Cox Cable TV Channel

The Town of Tiverton Website

Local Media (TV and Newspaper)

Neighborhood / Town Hall Meetings

Tiverton Town Council Agenda

Public Hearings

Personal Visits / Phone Calls

Customer Mailings

The Town of Tiverton has had good community relations regarding issues with the operation and maintenance of our collection system. Types of information and education provided to our customers are as follows:

Information and Education Programs

Sewer System Evaluation Survey Work

Types of Waste Treated

Industry Pretreatment Requirements

Customer Emergency Response

Complaint Procedures

Service Connection Requirements

Grease Handling Information

Sewer Use Ordinances

New Construction

Road Closures

Sewer Use Rates

Grinder Pump Operation and

Maintenance

Private Hauler Instructions

e. Information Management and Geographic Information Systems

The Town of Tiverton uses TurboCad and Excel computer programs as well as hard copies of as-built plans of the existing sewer system to manage information on our collection system. This system data is not currently connected to the Town's Geographic Information System (GIS).

Table 1.1: Collection System Map Information planned to be included in Tiverton's GIS

<p>Manholes Basic Map Information</p> <ul style="list-style-type: none"> - ID number or other unique identifier - Location, with reference to streets and property lines - Depth - GPS coordinates - Size 	<p>Manholes Additional Map Information</p> <ul style="list-style-type: none"> - Date built - Rim elevation - Invert elevation - Material Type - Worker safety information
<p>Pipes Basic Map Information</p> <ul style="list-style-type: none"> - ID number or other unique identifier - Location, with reference to streets, surface waters, property lines and manholes - Size - Direction of flow - Length - Material type - Date built 	<p>Pipes Additional Map Information</p> <ul style="list-style-type: none"> - Slope - Pipe invert elevations - Plan or as-built ID number - Service laterals
<p>Pump Stations Basic Map Information</p> <ul style="list-style-type: none"> - ID number - Location - Capacity 	<p>Pump Stations Additional Map Information</p> <ul style="list-style-type: none"> - Additional information on drawings
<p>Force Main Basic Map Information</p>	<p>Force Main Additional Map Information</p>

- | | |
|---|------------------------------|
| - ID number or other unique identifier | - Plan or as-built ID number |
| - Location, with reference to streets, surface waters, and property lines | |
| - Direction of flow and pump station associated | |
| - Length | |
| - Material type | |
| - Location of air release valves | |
| - Date built | |
| - Capacity | |

System information that will be managed in our files and Logbooks includes:

General
Parts inventory
Equipment and tools
Purchase orders
Revenue
Collection System
Continuous Sewer System Assessment
Collection system mapping
Collection system inventory
Flow monitoring
SSO/Emergency response
Personnel
Department staff
Safety incidents
Training
Job performance
Maintenance program
Routine and Priority Planned maintenance (cleaning, etc.)
Inspection scheduling and tracking
Manhole
Pipeline (Closed Circuit Television (CCTV), camera)
Pump station
Work Orders
Vehicle maintenance
Customer service program
Complaints
Customer service response
Billing information

Any activity performed by department personnel will be generated and tracked through a paper work order system and an excel spreadsheet. The spreadsheet will document when work orders for the performance of routine maintenance as well as repairs and corrective actions in response to inspection findings or customer complaints were completed. Upon completion of the task(s), data related to the work order is entered into

the spreadsheet for tracking performance and historical information on each piece of equipment or each manhole or pipe section that was maintained. The paper work order system and computer spreadsheet serves as Tiverton's information management system for the all of the collection system operation and maintenance.

All of our computers that have internet access are protected by two firewalls. The first firewall is hardware based which is resident within the Linksys router used by the system to allow all computers within the building to have internet access. The second firewall is software based. We currently use the following Internet Security program to protect our systems from malicious attacks:

AVG Internet Security.

The Town of Tiverton operates a Wide Area Network (WAN). The system is backed up every night and access is restricted. Passwords are provided to only those people who are designated for access, Only the following people have access to WWMC Files:

David Roberts: Network Administrator (Tiverton)

The Computer Doctors Inc. : Network Administrator (vendor)

John Lincourt : Wastewater Superintendent

Toni Lynn McGowan: Billing Clerk

The contact information for the current network administration vendor is:

The Computer Doctors Inc.

494 Main Rd

Tiverton, RI 02878

www.thecomputerdoctors.biz

f. Legal Authorities and Controls

1. Sewer Use Ordinance

The Town of Tiverton has established and implemented regulations regarding the use of the wastewater collection system. Tiverton has a comprehensive sewer use ordinance, consistent with EPA's model ordinance, in place since January 1999. As regulations and requirements have changed, Tiverton has revised the Sewer Use Ordinance to address those issues. The Ordinance is kept up-to-date and is available electronically on the Town's web site www.tiverton.ri.gov.

The items addressed through our sewer ordinance includes: sewer use and standards, access to pipelines and structures, pretreatment requirements, service connections, hauled waste/septage, user rates, permitting of flows into the system, inflow/infiltration control, enforcement of proper design, installation, and testing standards, and inspection requirements for new and rehabilitated sewers. The Town of Tiverton also has agreements with the City of Fall River. Tiverton reviews the adequacy of user rates annually (see Resources and Budget, Section 10).

2. Joint Sewer System Agreement

The Town of Tiverton has had an agreement with the City of Fall River, Massachusetts for treatment of Tiverton's wastewater since 1990. The latest agreement is dated June, 1990. The main items in the agreement are described below:

- The Town of Tiverton has purchased capacity rights for potentially 2 million gallons per day (gpd) from the City of Fall River Massachusetts.
- Tiverton is assessed an annual sewer charge from the City of Fall River each June. The sewer maintenance service charge includes: wastewater treatment
- The annual sewer charges include Tiverton's portion of major capital improvement for the joint sewer system.
- Tiverton is required to adopt a master plan for the current and future development within the Town's service area in order to provide input for the City of Fall River's capacity and capital planning.

To date, Tiverton has not encountered legal issues regarding wastewater flow sent to the City of Fall River.

2. GENERAL SYSTEM INFORMATION

a. Wastewater Collection System Description

The Town of Tiverton's first formal wastewater collection system dates back to 1996; however, a few small streets along the border with Fall River installed private sewers as early as the mid 1950's. The collection system transports wastewater to the City of Fall River's wastewater treatment facility located at 1979 Bay St, Fall River, MA 02724.

The oldest part of the system is along the state line in the North West corner of town. Four streets, Audet Street, Carpenter Street, Blaisdell Street and Cliff Street all have sewers that were installed privately by homeowners in the 1950's and 1960's. These streets tie directly into the Fall River sewer system in State Avenue. Three of these streets have 6-inch Vitrified Clay Pipe (VCP) sewers while Cliff Street, the last to be sewerer privately, has an 8-inch PVC sewer installed. The rest of the system has been installed since the late 1990's and is comprised exclusively of PVC pipe of various sizes.

The Mount Hope Bay Interceptor was installed in 2002 and runs primarily down a railroad right of way along the western edge of town. This sewer begins as a 24-inch PVC Gravity Sewer at the State Line (intersection of Foote St and State Avenue), runs south then east along Foote St to Bay St, then turns South along Bay St to Judson St then South into the Railroad right of way until it enters the Villages of Mt. Hope Bay Condominium development. At this point, it turns east, and runs up the hill, reducing in size from 24-inch, to 18-inch, to 15-inch and finally to 12-inch. The interceptor crosses Main Road just north of Souza Rd, turns south again to Souza Rd and finally terminates at the top of the hill on Souza Rd.

Lateral sewer stubs were installed at all intersecting streets along the path of the Mt Hope Bay Interceptor. In addition, the Villages on Mt. Hope Bay, a condominium village has a network of private sewers that tie into the interceptor. The Mt Hope Bay Interceptor as well as all tributary sewers that have been constructed to date have been installed by private developers and subsequently turned over to the Town.

Sewers currently tied into the Mt Hope Bay Interceptor include:

Street Name

- Horizon Drive
- Trailer Avenue
- Ford Farm Road

Sewer lines have been installed by the Town on and tributary to Shove Street in the north end of town. All wastewater generated in this sewer-shed flows by gravity to the Ponta Pumping Station and is then pumped up Walnut St then Clement St and discharges into the Fall River sewer system at the corner of State Ave and Clement St.

Sewers in this section include the following:

Street Name

- Rock Street
- Clement Street

- Walnut Street
- Hilton Street
- Canonicus Street
- Shove Street

In the Northeast corner of town, several streets have been tied directly into the Fall River sewer System in the Stafford Road/Hancock Street area. In addition, an age restricted gated community, Countryview Estates, has installed a sewer system which includes both private and public gravity sewers, two private pumping stations and one pumping station which has been turned over to the Town of Tiverton.

Public Sewers in this section include the following:

Street Name

- Songbird Lane
- Robin Drive
- ROW East of Stafford Rd
- ROW West of Stafford Rd
- William Canning Blvd

The Town of Tiverton and the City of Fall River each own the wastewater collection system within our respective jurisdictions and maintain our own collection systems. Tiverton's collection system includes four pump stations and approximately five miles of sewers, ranging in size from 6-inches to 24-inches in diameter. The Town of Tiverton also has three private pump stations that the Town is not responsible for maintaining.

Tiverton does not own or maintain any portion of the sewer laterals that drain each privately owned parcel or property beyond the property line. However, we do work with homeowners to prevent backups into their homes.

Tiverton staff and contractors perform planned maintenance tasks at scheduled frequencies. Frequencies are established based on experience and collection system information to minimize the risk of blockages or equipment failures that could lead to sewer overflows (see Cleaning, Inspection and Assessment, Section 3). Some portions of the wastewater collection system are maintained more frequently than others based upon past history and their importance to the effective operation of the wastewater collection system. Staff and/or contractors also perform unplanned maintenance (see Sewer Overflow Response Plan, Appendix A).

The school department maintains a small wastewater treatment plant on the High School campus located at 100 North Brayton Road. The wastewater treatment plant services the High School and the Ranger School on Stafford Road.

School department personnel are totally responsible for the operation and maintenance for this facility. The operation of the wastewater treatment plant is totally autonomous to the rest of the sewer system.

b. Collection System Details

- Service Area: Approx.: 10 Square miles
- Population Served in primary community: Approx.: 7600

Table 2.1 System Inventory owned by the Town of Tiverton:

Miles of gravity sewer	Miles of force main	Number of manholes	Number of pump stations		Number of siphons	Number of air relief valves
			Public	Private		
4.5	1.4	328	4	2	0	1

Number of Service Connections:

Residential: 485 Commercial: 9 Industrial: 0 Total: 494

Table 2.2 WWTF Flow Characteristics in MGD

Annual Average Daily System Flow	Average Daily Dry Weather Flow	Peak Wet Weather Flow	Treatment Plant Design Capacity (MGD)	
69,700	No Data*	No Data*	Average: 0.07	Maximum Flow: 6.0**

* No mass sewer meter data available

** Max allocation at Fall River WWTF

c. Age Distribution of Collection System

Wastewater Management conducts an ongoing program to assess the structural condition and maintenance needs of the collection system as a part of our Cleaning, Inspection and Assessment program described in section 3 and our capital planning described in Resources and Budget section 10, below. Wastewater Management has categorized our sewer system by age and size:

Table 2.3 The ages of the components of our wastewater collection system are as follows:

Age	Gravity Sewer miles	Force Main miles	Number of pump stations
0-25 years	4.4	1.4	5
26-50 years	0	0	1
51-75 years	.01		
> 76 years			

d. Table 2.4 Length of Pipe by Diameter

Pipe Diameter (inches)	Length (lineal feet)	Material	Replacement Cost per foot
2 FM	812	PVC	
3			
4			
6	900±	VCP	
6 FM	1,903	PVC	
8	9,839	PVC	
8 FM	4,484	PVC	
10			

12	1,144	PVC	
15	2,272	PVC	
18	1,687	PVC	
24	8,713	PVC	
36			
TOTAL	31,854		

e. Sanitary Sewer Overflow History

The Town of Tiverton has never experienced any sanitary sewer overflows (SSOs). The following table will be used to describe any future overflows, including dates, locations, quantities and causes.

Table 2.5: Sanitary Sewer Overflow History

SSO date	Location	Volume released	Cause of release

To assure sewer capacity, the Town of Tiverton conducted a Wastewater Facilities Plan in 1975 and updated it in 2000. These planning documents address capacity, inflow/infiltration, and limits of our sewer system. The documents and the specific sections are:

Town of Tiverton, Rhode Island
Wastewater Facilities Plan
Camp Dresser & McKee Inc., June 1975
Section 5 – Wastewater Collection System
Section 6 – Recommended Wastewater Facilities

Town of Tiverton, Rhode Island
Wastewater Facilities Plan Update
Louis Berger Group, Inc., January 2000
Section 7.0 – Evaluation of Alternatives
Section 8.0 – Plan Selection

f. System Map

A map of the existing sewer system is shown in Figure A. The map is updated manually each time a new section of pipe is added.

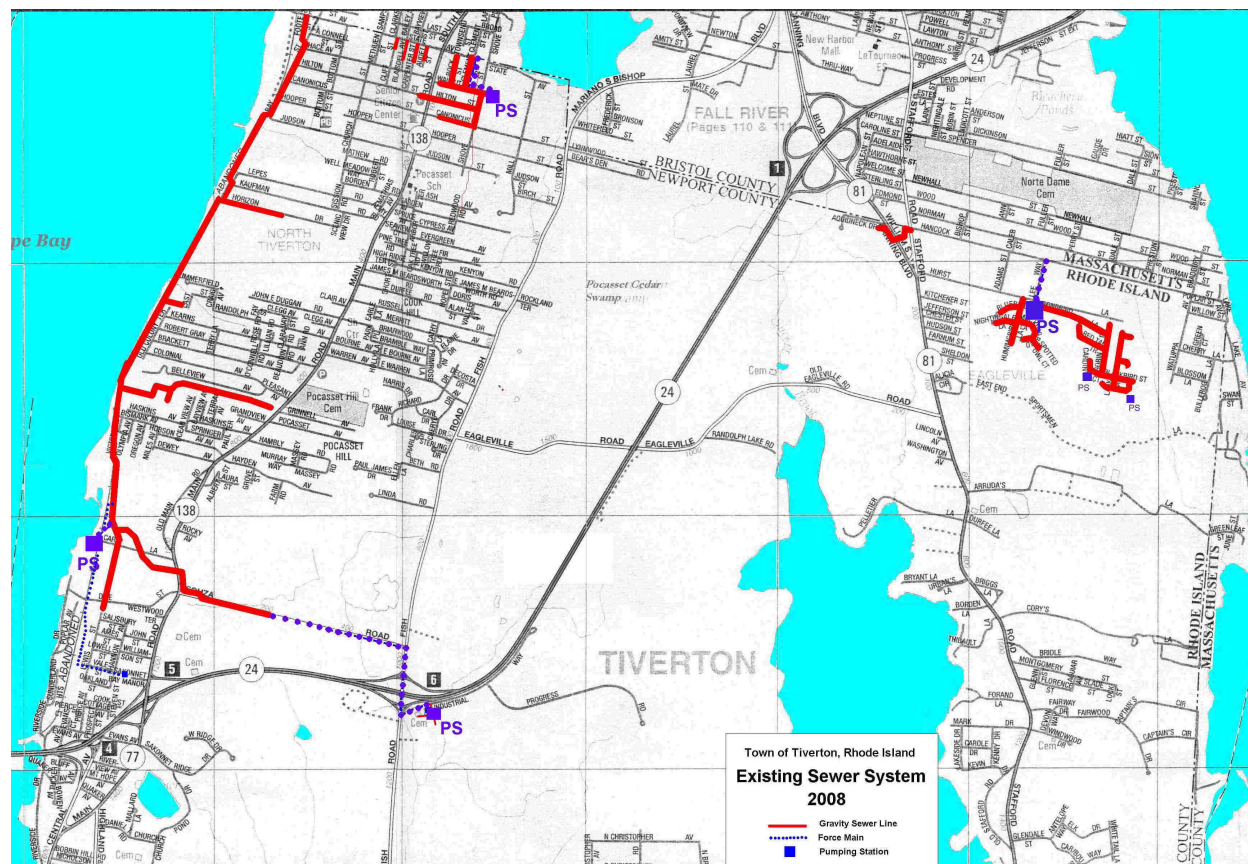


Figure A: Existing Tiverton Sewer System as of December 2008

g. Security

Protection of assets is part of the Town’s responsibility. The Town employs two levels of security on assets according to the specific need of that asset. The 1st level of security is simply deterrence – prevent access to the asset. We consider this level of security as a passive security measure. The second level of security is an active intrusion alarm system. This system provides the Town the opportunity to react to an intrusion.

- **Passive Security:** passive security is employed at all of the pumping stations and on those sections of the Interceptor that are along the Railroad Easement and therefore out of view. Employed at all pumping stations, are two levels of passive security. The first level is a locked chain link fence surrounding the perimeter of the station. Additionally, inside the station each component is fitted with either a padlock or an integral lock (eg. Engine Generators). On all manholes within the off road easement that runs along the Railroad tracks, locking manhole covers are installed to prevent unauthorized access.
- **Active Security:** An intrusion alarm is installed at both the Schooner Lane Pumping Station and the Industrial Way Pumping Station. These alarms are connected to the station’s general alarm panel and will alert Town Personnel in the event that unauthorized entry has occurred.

3. CLEANING, INSPECTION AND ASSESSMENT PROGRAM

In 2004 Tiverton began development of an effective and comprehensive preventive maintenance plan (PMP). This includes our Cleaning, Inspection, and Assessment program to assess the maintenance needs and structural condition of the entire collection system. The goal of this program is to complete the entire system assessment within 10 years.

Tiverton began the cleaning, inspection and assessment program with a focus on the known problem areas and the sections of Tiverton where there were no as-built drawings. The results from the inspection and assessment program are used to categorize the cleaning frequency and the repair or replacement needs for each component. Critical infrastructure components will be assessed.

The inspection and assessment efforts are performed by outside vendors. All data is compiled for each section of pipe and filed with all the other documentation for that section of pipe. Currently, there is no schedule to implement a computerized CMMS system

The inspection and assessment program includes: CCTV inspection of piping, visual inspection and classification of the manhole structures and their flow channels, an evaluation of the condition of the pipes and manholes, and sewer cleaning if required.

Results from the assessment program are used to categorize the cleaning and inspection frequencies for both the sub-areas and problem pipe-sections (described in more detail below and in the Gravity Line Preventive Maintenance, Section 4).

The CCTV schedules are closely coordinated. As Tiverton's goal is to have a complete inspection and system assessment every 10 years, approximately 10 percent of the system is reviewed by CCTV each year. System cleaning is completed on an as needed basis, Tiverton does not currently schedule a specific percentage of the system to be cleaned annually: Most of the system cleaning is for gravity lines, as described in more detail in Section b, below.

Information from inspections (see Inspection section, below), including any findings, is entered filed with the as-built information for that section of the system.

a. Cleaning

Sewer line cleaning is only performed if CCTV inspection identifies a section of pipe that requires cleaning. The Tiverton service area is divided into Six (6) sewershed areas as shown in Figure B. It should be noted here that these sewer sheds are based on the planned sewer system and correspond to the actual drainage basins. As each of these areas are brought on line, they will be added to the CCTV and Cleaning Schedule.

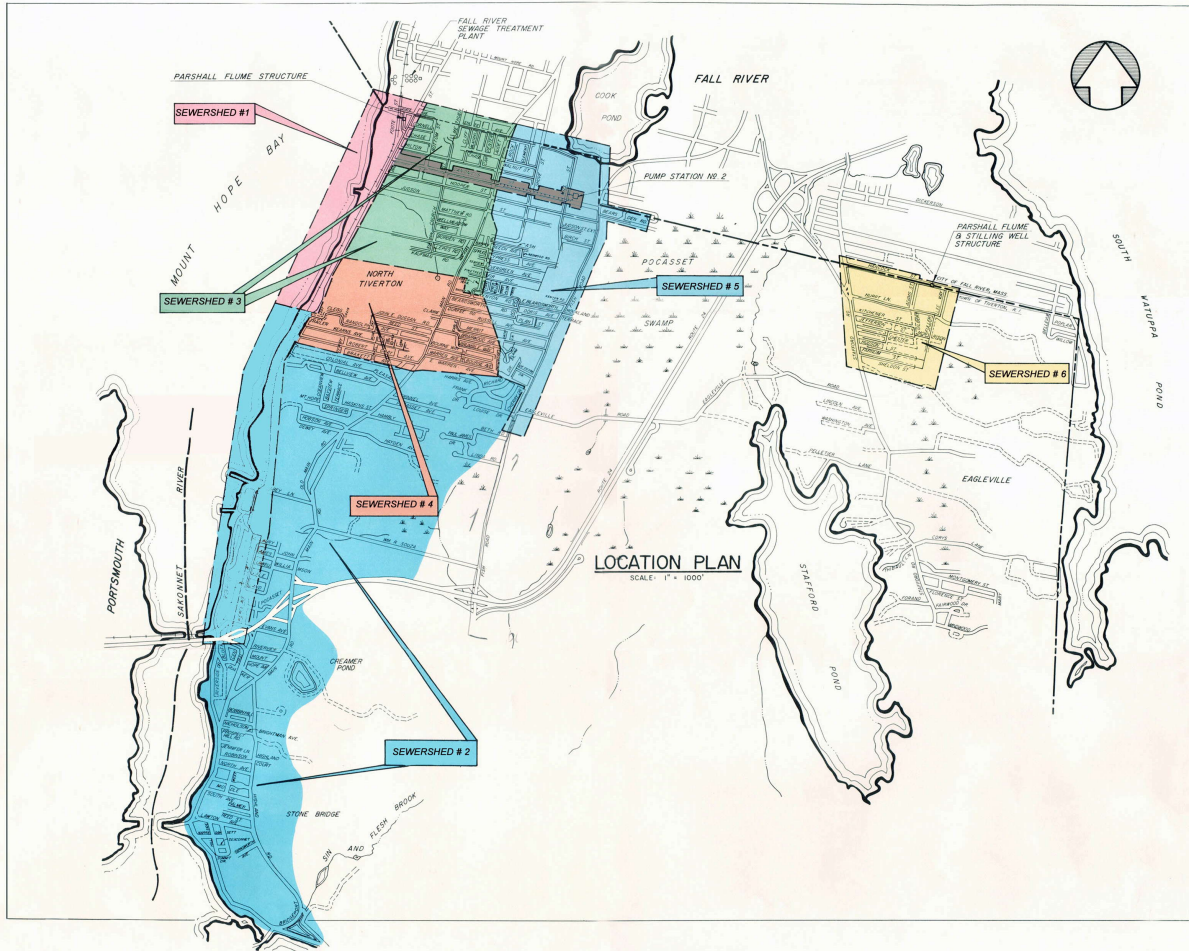


Figure 3.1 Planned Tiverton Sewer System showing Sewersheds

The cleaning of sewer lines, manholes and other appurtenances is categorized as: priority (annual or more frequent cleaning); intermediate (2-5 year interval); or long term (6 or more year interval) as identified by CCTV inspections.

Cleaning Schedules – Priority Cleaning

Pipe-sections on a priority cleaning frequency are identified based on the Known Trouble Spots and Critical Service Areas list. The Trouble Spots (see Table 3.1) have a history of FOG buildup as noted in the table below. The Critical Service Areas (see Table 3.2), indicate locations where sewer malfunction would lead to major disruption, are inspected and maintained at greater frequency due to the importance of their function.

Table 3.1: Collection System Inventory of Trouble Spots and Schedule for Priority Cleaning

Location	ID # (eg GIS #)	Description of problem	Cleaning Schedule
Pipe segments			
Shove St to Ponta PS		Grease Accumulation	2 yrs
Manholes			
Air Relief Valves			
Cleanouts			
Easements			

* Schedule Key: (M/Q/SA/A) = Monthly, Quarterly, Semi-Annual

Table 3.2: Collection System Critical Service Areas

Component	Location	Description	Cleaning Schedule	Contact #
Critical Facilities Served				
Hospitals/Nursing Homes				
Schools				
Food/Beverage Processing				
Other Institutions				

Cleaning - Gravity Lines Routine Cleaning

This section details schedules for the routine cleaning of each sub-area of the collection system.

Table 3.1 lists which areas are on each of the schedules.

During the first cycle of the Cleaning, Inspection and Assessment program, each pipe and manhole will be evaluated to determine cleaning frequency. A pole camera will be used to evaluate each sewer line to determine the need for cleaning and/or a CCTV structural inspection. A pipe section that has not been cleaned in over 5 years, but has been evaluated using the pole camera and shown that cleaning is not warranted, is assigned to the long term inspection frequency (5+ years). If the camera evaluation indicates a need for cleaning, the pipe section is put on the list of pipes to be cleaned. Long term experience will determine which pipe sections in a sub-area will be inspected and/or cleaned on a frequent basis.

The priority cleaning schedule (described in Section 3.A) includes those sections of sewer line that have been documented to have chronic problems; the intermediate schedule will include sections of sewer with a history of only intermittent problems and

the long term schedule will include sections of sewer with no history of problems.

The Shove Street area sewers have the highest percentage of sewers on the priority cleaning schedule due to documented FOG buildup. For other sections of our gravity sewer, the routine cleaning schedule is listed in the tables below and revised as necessary based on findings of inspections.

Cleaning Frequency for Chronic Problems Table 3.3

Sewershed area name	Pipe Diam. (in)	Length of segment (lf)	Pipe Material	Notes
Shove St Area Sewers				
Shove St Between S1 and Ponta PS	8	150	PVC	Grease Buildup in lower section of line

Cleaning Frequency for Intermittent Problem areas Table 3.4

Sewershed area name	Pipe Diam. (in)	Length of segment (lf)	Pipe Material	Notes
Mt Hope Bay Int				
Mt Hope Bay Interceptor from MH 1 to MH 5	24	1,000	PVC	Flat section – just need to keep up with a small amount of buildup until flow in the line gets higher.

Cleaning Frequency for all other areas 3.5

Sewershed area name	Pipe Diam. (in)	Length of segment (lf)	Pipe Material	Notes
Mt Hope Bay Lateral Sewers				
Shove St Area Sewers				
Audet St Area Sewers				
Stafford Rd Area Sewers				
Hurst Ln Area Sewers				

All cleaning records are kept in a in a separate file that tracks the following:

- date, time and location of cleaning activity;
- specific lines cleaned;
- equipment used;
- identity of cleaning crew;
- number of passes needed to clean the line;

- presence of root, grease, or debris; and
- problems identified or other follow up actions necessary.

Each line segment cleaned is identified by an upstream and downstream manhole number. A log is submitted for each day of work completed. We use the log form that the outside contractor uses. Support from private contractors is used for cleaning and repairs and for emergencies during non-business hours.

Manhole deficiencies are also noted in cleaning logs (see Section b, below). Information about manholes requiring attention logged and either scheduled for repair or it will be added to a capital repair schedule.

b. Pipe and Manhole Inspection

Planned manhole and pipe inspections are coordinated with the cleaning program and are used to identify sections of pipe that require cleaning. As Tiverton implements the first cycle of the PMP, inspection by zoom camera will be used to help establish cleaning frequencies. The cleaning, inspection and assessment program goal is to inspect the entire collection system within 10 years. During the first cycle of the PMP, prior to cleaning, either a zoom camera will be used to screen a pipe section to determine the cleaning frequency and whether a full CCTV screening is needed to assess its structural condition or other deficiencies. Tiverton currently uses outside vendors to document:

- the structural condition of the pipe
- root intrusion
- grease
- protruding taps
- evidence of inflow and infiltration (I/I) or surcharging
- manhole pave-overs, and
- other deficiencies that factor into condition assessment

Normally, planned cleanings are generally scheduled following the video inspections. In the event of a blockage, a video inspection will be used to assess the cause of the blockage. After the blockage is removed the line is evaluated with a CCTV crawler to assess the condition of the pipe and the cause of the backup. Tiverton will use outside vendors for this assessment.

Currently, new sewer lines are not required to be CCTV inspected by the contractor. To verify as-built drawings and ensure the line has no construction defects, all new pipes and manholes are required to be pressure or vacuum tested to ensure tightness and prevent release of sewer odors and future infiltration of storm water. Additionally, the lines are mandrel tested to insure that they have been installed correctly. This inspection and testing process must be completed prior to acceptance of the infrastructure from the construction contractor. The developers of new sewer lines are required to operate and maintain the new sewer line for one year prior to the Town taking over the infrastructure.

The following table (3.6) lists the schedule for the types of cleaning and inspections that are performed.

Table 3.6: Combined Routine Cleaning and Inspection Schedule

Description	H/ NC *	Information on asset	Monthly	Semi- Annua l	Annua l	2-5 year	> 5 year
Mt Hope Bay Interceptor	H	This is the main interceptor that runs along the shoreline.		G,S,I/I			PC
Shove St Sewers	NC					G,S,I/I	PC
Audet St Sewers	NC					G,S,I/I	PC
Stafford Rd Sewers	NC					G,S,I/I	PC
Hurst Ln Sewers	NC					G,S,I/I	PC

Table Legend:

*High Priority (H) Non-critical (NC)

** Work Codes:

Clean (C) Rodding (R), Jetting (J), Root Cutting (RC), [etc.],

Visual Inspections: Inspect General condition and overflow evidence (G),

Inspect for Surcharging evidence (S),

Inspect for loose bricks/mortar, (L),

Inspect for evidence of I&I (I/I),

CCTV Inspection (*specify* pole camera PC, crawler camera CC, camera on jetter CJ),

Flow Monitoring (FM),

Smoke or Dye testing (T),

Assess Condition (**A**),

Clean and Assess Condition (**C&A**)

Manhole inspections help keep our asset inventory up to date and are used not only to update collection system maps, but to determine structural condition. During manhole inspections, the field crew takes a complete inventory of each manhole including construction materials, ring size, depth to invert, flow conditions and evidence of problems according to the checklist in Appendix G). Information is recorded in the log of inspected manholes and additionally filed with the as-built information for that section of pipe. A digital camera is used during the inspection to document the condition of the manhole.

Manhole inspection results are reviewed for condition rating. Those needing repair (rated 5) are placed on a priority schedule, and routine repairs are coordinated with re-paving work, see Section 5. When repairs are recommended, they are scheduled or are put on a list of work to be completed through a larger project.

Town DPW personnel are responsible for completing small repairs to manholes. Repairs include invert work, frame and cover grade adjustment, and frame and cover replacement. More comprehensive repairs, such as complete relining of the manhole structure, are performed by outside vendors. As noted in Section 4, Equipment and Tool Inventory, Tiverton maintains an inventory of frames and covers. Work is completed based on priority.

If more comprehensive repairs such as the rehabilitation of manhole cones and risers or the need to seal a manhole using a grout machine for spraying the inside of manholes or chemical grout to stop specific leaks, the work is scheduled, bid and

performed by outside contractors. Repairs are always made on a priority basis.

c. Assessment

Pole mounted zoom camera and CCTV video inspections are the primary method used to assess the condition of the sewer pipes, while cleaning and visual inspection are used to assess the condition of manholes and surface facilities, All records are entered into the appropriate excel spreadsheet used to log maintenance performed.

In 2008, 650 feet of pipe were inspected. The DVD’s have been reviewed and condition assessments filed with the appropriate sewer line file.

Pipe condition information is used to determine short and long term maintenance strategies including increased cleaning, root treatment, sewer line repair, or replacement. The condition assessment helps establish the cleaning frequency and inform Tiverton’s capital planning. As more condition assessment information becomes available, the priority of capital projects may change. Sewer line repair or replacement projects are also coordinated with re-paving schedules, see Section 5.

Condition assessments document the following details and deficiencies:

- Characteristics including pipe diameter, and age and type of material
- Dips in line
- Grease build-up
- Root intrusion
- Sediment accumulation and encrustation
- Structural condition, including cracks, corrosion and erosion
- Joint alignment and movement
- Reverse slope
- Obstructions
- Deformations in line

Tiverton’s defect assessment will identify each asset (pipe, manhole, pump, etc.) and rate it for specific criteria (e.g., roots, grease, sedimentation, cracks, etc.). Based on the criteria ratings, the assessment will assign an overall rating for each asset. A ranking of each asset, based on its condition assessment rating (see Table 3.7), will then be used for prioritizing capital repairs and replacement.

Table 3.7

Condition Rating	Condition Description	Maintenance Required
0	New	Normal
1	Excellent Condition	Normal
2	Minor Defects Only	Minor
3	Backlog Maintenance	Significant
4	Requires Major Renewal	Renew
5	Almost Unserviceable	Replace

Assessment	Consideration	Scale
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Factor		
Criticality	How critical is the service of this asset?	0 (noncritical) – 10 (critical)
Performance	What level of performance is it providing?	New to unserviceable (on a scale of 0 to 5)
Impact of Failure	Is there a process, environmental, or safety issue?	0 (no issue) - 3 (significant) for each impact category
Capacity	Is it capable of meeting system needs?	Undersized – Oversized
Remaining Life	How much of its design life is used up?	Percentage from 0 to 100%
Redundancy	Does the component have a back up?	From 0 (no back up) to 200%

d. Staffing and Equipment

Tiverton has one staff member trained for cleaning, inspection and assessment. The Town generally utilizes outside contractors to perform actual cleaning or video activities and therefore has no equipment dedicated to this work. The Wastewater Superintendent oversees all outside contractors performing CCTV or cleaning work in town. The Wastewater Superintendent assesses the condition of our collection system. If defects are found, the work may be referred to our consulting engineer for proper remediation of the defect, then either repaired by Town DPW crews or let out to an outside contractor.

Since most of the Tiverton sewer system is virually brand new, the focus to date has been more on inspecting known areas where FOG build up rather than cleaning. Most inspections reveal clean lines which do not require cleaning or repairs. Even those older lines along State Ave that are VCP appear to be in good shape with no apparent buildup. To date, the Town has never had a SSO.

4. GRAVITY LINE PREVENTIVE MAINTENANCE

a. Fats, Oils and Grease (FOG)

Grease and grease-like products can significantly increase the likelihood of sewer overflows. Grease can also cause blockages or aggravate blockages due to roots or structural deficiencies. Restaurants, cafeterias, and other food service facilities, as well as industrial facilities, can discharge grease as part of their normal sanitary flows that can lead, in time, to blockages, backups and overflows. The discharge of fats, oils and grease (FOG) is regulated through our Sewer Use Ordinance: however, backups can sometimes occur. Areas of the collection system with known grease problems are identified on Table 3.3 - Trouble Spots, in Section 3.a.

Tiverton Wastewater Management is tasked with the inspection of all Food Service Establishments (FSEs) which is an important element in managing FOG at FSEs. The FOG program will include education for commercial /industrial facilities and residents, inspections and periodic sewer cleaning.

Tiverton has identified two areas of town with increased FOG potential. A review of historical data has not revealed any SSO's or blockages that are attributable to FOG. To date our program is to continue to monitor those areas with potential and take action before a situation arises that will create an SSO.

In 2009, all FSEs will be visited to develop a database of contacts and to determine the types of FOG removal technologies employed at each facility. Each FSE will be provided information on Fats, Oil and Grease and their responsibilities in preventing the discharge into the sewer system. As the sewer system grows, and more food service establishments are serviced by sewers, Tiverton will develop a map showing the locations of food service establishments and grease hotspots. Once the informational brochure on FOG is developed, it will be posted on Tiverton's website.

The Sewer Use Ordinance enacted by the Tiverton Town Council requires all commercial and industrial grease generating facilities to install and maintain a grease interceptor or automatic grease removal device, and maintain records of maintenance and operation. The ordinance also includes a discharge limit of 100 mg/l oil and grease (animal or vegetable origin). Periodic inspections of all FSEs will be done by the Wastewater Superintendent. The inspection is free. If the grease interceptor has not been maintained (with documented removal of accumulated grease and cleaning), has been bypassed, or if significant grease is discovered within the service connection, Tiverton will issue a letter to the owner giving notice of the ordinance/policy non-compliance and requiring action be taken to prevent further discharge of grease into the system. If the non-compliance is not remedied within a 30 days, the policy states that the enforcement authority of the sewer use ordinance may be invoked.

Tiverton will use a contractor to clean the sewers in these problem areas at a high priority frequency (See Table 3.4. All emergencies are handled by a private contractor hired by the town (see the Tiverton Sewer Overflow Response Plan).

To date, the FOG program has been effective in reducing blockages due to grease, and Tiverton has not needed to require FSEs to monitor for FOG.

b. Root Control

Tiverton does not have any areas within the present sewer system that have chronic root problems. If a crew encounters roots during routine cleaning, a hydraulic saw will be attached to the jetter and used to cut and remove the roots. The severity of the problem will be recorded on the daily log, and if necessary, the pipe section will be placed on the list for priority cleaning.

Cutting a tree's roots is like pruning the tree, and stimulates root growth into the system.

Consequently, mechanical treatment will need to be repeated every year or two, until a permanent solution to the root problem is implemented.

c. Service Laterals

While Tiverton maintains service laterals from the property line to the sewer main (portions in the public right-of-way), the service lateral from the building to the property line is the owner's responsibility. Tiverton will repair laterals that are located in the public right-of-way when responding to service complaints. If a complaint is received and the Town's field crew determines that the problem is limited to the section of the lateral between the property line and the main, the "lower" lateral will be rodded out if needed (at no cost to the customer) if a cleanout is available at the property line.

If service lateral problems are found to be the result of blockage or a collapse in the portion of the lateral under the property owner's responsibility, the Town will provide the property owner with a list of local contractors who are licensed to do work within the Town.

5. EASEMENTS and PAVING: MAINTENANCE AND ACCESS

a. Maintenance of Right of Way and Easements

Easements give Tiverton the right to install and maintain wastewater facilities on property not owned by the Town. Easements in Tiverton are usually no more than 15 or 20 feet wide, but run from as little as 30 feet to several miles in length as is the case with the Mt. Hope Bay Interceptor that runs along the Railroad Right of Way. Tiverton has 6 sewer access easements. These easements are recorded as deed records that are accessed through Tiverton’s Town Clerk’s Office. The Inventory of Sewer System Easements (Table 5.1, below) lists the easements for the sewer collection system.

Table 5.1: Inventory of Sewer System Easements

Location	Assoc. Manhole ID # (eg GIS #)	Owner of Property	Comments	Type of maintenance, frequency, and responsible party
RIDOT railroad Right of Way	MHBI – SMH #9 to SMH #45	RIDOT	Much of this line is within CRMC jurisdiction - no RIDOT permits required but must get permits from CRMC for all maint	WWMC inspects semi-annually for overgrowth, condition of line and erosion.
Trailer Ave	MHBI SMH # 32A to SMH 3	Private road – easements from all property owners		No additional maintenance required
Villages on Mt Hope Bay	MHBI SMH #45 to SMH # 66	Private Road – easement from Condo Development	Main Interceptor Line	No Additional maintenance required
Villages on Mt Hope Bay	MHBI SMH #54 to SMH # 509	Private Road – easement from Condo Development	12” Line from main interceptor to north end of Lewis Street	No Additional maintenance required
Country View Estates	Hurst Ln PS to Robin Ln	Private Road – easement from Condo Development	Main line running along Songbird Ln to Robin then turning North to pick up discharge from Hancock Estates	No Additional maintenance required
Berube Line	Stafford Rd to SMH 3	Line runs through the back lawns of 3 private properties	Line runs along the back of 3 property owners then turns and runs through the driveway to the Corner of Stafford Rd and Hancock St	Property owners maintain lawns – no additional maintenance required
Dialysis Ctr Line	Hancock St to Dialysis Ctr.	Line runs through the back of 3 private properties	Line runs along the back of 3 private properties to the Dialysis Ctr.	Property owners maintain lawns and parking lots – no additional maintenance required

Easements are important for our ability to operate and maintain our collection system. Tiverton's goal is that all easements remain clear of any fences, buildings, gardens, trees, shrubs and extensive landscaping, to allow equipment access for maintenance of the collection system. Tiverton is not liable to repair or replace any such items that are removed in the process of completing repairs or maintenance on the collection system. Crews are, however, instructed to work with the property owner whenever possible. Maintenance of easements is accomplished in various ways. Easements on privately-owned parcels are often maintained by the owner. Easements on public land are maintained by the entity responsible for property upkeep, as indicated in the Inventory of Sewer System Easements, Table 5.1. Manholes in easements are inspected as part of our ongoing preventive maintenance program.

Tiverton's Public Works department is responsible for coordinating street resurfacing and ensuring that all utilities are aware of scheduled resurfacing. A prioritized list of streets to be paved is developed each budget year. This list is distributed to all utilities to facilitate coordination of all underground work. Each department assesses the condition of their associated infrastructure to determine where repairs may be necessary, and notifies Public Works as to which streets need underground infrastructure work completed prior to resurfacing.

When Wastewater Management obtains the resurfacing list from Public Works, maps are reviewed for the presence or absence of sewer lines. If a street does not have a sewer line under the pavement, and there are no plans to install sewers within the next five years, the street is released immediately. All other streets are evaluated for pending repair projects. If not repair projects are anticipated within the next five years, then the street is released.

As sewer lines are inspected and assessed under our Cleaning, Inspection and Assessment program (See Section 3), repairs are scheduled in conjunction with the repaving schedule whenever possible. Sometimes work is performed on a priority basis so that repairs are completed on the highest priority street, working in coordination with the Public Works paving schedule. In this case, the Cleaning and Inspection schedules are modified to coordinate with Public Works' schedule. Upon completion of the sewer repairs for an individual street, it is released to Public Works for resurfacing.

During paving work, the contractor prepares manholes prior to the re-paving of any street with sewer lines. If repairs need to be made to the manhole structure, this is performed and then the cover and frame are reset at the new street grade. Most times, however, only the frame and cover need to be reset to the new grade of the road. In those cases where the roadway grade does not change, the frame and cover will be left in place and the new paving will be set to the grade of the existing cover. At no time are manhole covers allowed to be buried below new paving.

6. PUMP STATION/FORCE MAIN MAINTENANCE

Tiverton owns and operates Four (4) wastewater pump stations listed in **Table 6.1**. The collection system also includes seven grinder pumps that service private homes and businesses and three private pump stations. The pump stations owned and operated by Tiverton are routinely checked by trained personnel. The maintenance for the grinder pumps and private pump stations is the responsibility of the owners.

The performance of the Tiverton pump stations is monitored through weekly inspections by the Wastewater Superintendent and quarterly inspections by the Town's Emergency Services Contractor. During these inspections, the following parameters are reviewed:

- pump run hours,
- totalized flow,
- wet well levels
- alarms.
- Back- up generator status and run time

Backup generators are exercised weekly. On a semi-annual schedule, the Town hires a local septic pumper (Love Sanitation) to pump the wet wells and remove grease build up. The Emergency Services Contractor (BOYDCO Inc.) performs oil changes, and tune-ups on all emergency generators as required. Specific pump station inspection protocols are attached in Appendix G for each of Tiverton's three pump stations.

Inspection, maintenance and repairs are recorded on the pump station maintenance log (and excel spreadsheet) which is maintained for each separate pumping station. If a problem or maintenance issue is encountered, repairs are scheduled immediately. Repairs are a higher priority than routine maintenance, so if a repair is needed, scheduled routine maintenance will be delayed until the required maintenance is performed.

Table 6.1. Pump Station Locations

Pump Station Location	Description	Inspection Frequencies*
Ponta Pump Station – 70 Shove St	Smith & Loveless package PS - 1984. original controls, 1 original S & L Vacuum Primed Pump 4B2B, 1 new (2004) submersible pump Ebara 100DLMFU65.52, 7.5 hp.	W/Q
Hurst Ln PS – 247Hurst Ln	Submersible Pump Station – 1999 – Original controls - 2 Ebara 80DVB62.2S 3 hp pumps – 10'x6' wetwell – Genrac 20KW generator	W/Q
Industrial Way PS – 50 Industrial Way	Submersible Pump Station – 2006 - 2 Ebara 80 DLCMFU611.2 15 hp pumps – 6' Dia. wetwell – Olympian 60KW generator	W/Q
Schooner Lane	Submersible Pump Station – 2005 – 2 Ebara DLFMU 5 hp pumps – 6" Dia Wetwell – Olympian 60 KW Generator	W/Q

* D = daily; W = weekly; M = monthly; Q = quarterly; SA = semiannually; A = annually

Table 6.2. Pump Station Details

Equipment	Number	Specifications
Ponta Pump Station		
Pumps	2	1- S & L Vacuum Primed Pump - 4B2B, 100 gpm @61'TDH 1- submersible pump-Ebara 100DLMFU65.52, 180 gpm @55' TDH
Motors	2	7.7 hp 480 Volt, 3 Phase
Control Panel	1	Smith & Loveless – Original 1984
Float Switches	4	Warwick Series F Mercury float switch
Valves	4	2 x 4" CI Ball Valves & 2 x 4" swing check valves
Vacuum Pump	1	Rietchle Thomas # TA-2101
Meters		None at this stations
Alternate Power Sources		Non at this pump station
Hurst Lane Pump Station		
Pumps	2	submersible pump-EBARA # 80 DVB 62.2S, 220GPM @ 14' TDH
Motors	2	3 hp 208 Volt, 1-Phase
Control Panel	1	Panel Mounted (BOYDCO) Individual Enclosures for components
Float Switches	4	Warwick Series F Mercury float switch
Valves	4	2 x 4" CI Gate Valves & 2 x 4" Ball check valves
Vacuum Pump	1	Rietchle Thomas # TA-2101
Meters		Polysonics SX50 Doppler Flowmeter, Installed 2006
Alternate Power Sources		Kholer #20RZ Natural Gas powered, 24 KVA
Industrial Way Pump Station		
Pumps	2	submersible pump-EBARA # 80DLCMFU 611.2, 500GPM @ 66' TDH
Motors	2	15 hp 208 Volt, 3-Phase
Control Panel	1	Panel Mounted (BOYDCO) SS Enclosure houses all components
Float Switches	4	Warwick Series F Mercury float switches
Valves	4	2 x 6" DI Gate Valves & 2 x 6" Swing check valves
Meters		QCS 801 Doppler Flow Meter
Alternate Power Sources		Olympian 60 KV Diesel Powered
Schooner Lane Pump Station		
Pumps	2	submersible pump-EBARA # DLFMU 611.2, 250GPM @ ' TDH
Motors	2	5 hp 208 Volt, 3-Phase
Control Panel	1	Panel Mounted (BOYDCO) SS Enclosure houses all components
Float Switches	4	Warwick Series F Mercury float switches
Valves	4	2 x 6" DI Gate Valves & 2 x 6" Swing check valves
Meters	1	QCS 801 Doppler Flow Meter
Alternate Power Sources		Olympian 60 KV Propane Powered

Manufacturer's Operation and Maintenance (O&M) manuals for equipment are located in the following locations:

- 1 copy is kept on the Service truck
- All other copies are kept in the Superintendent's office at 346 Judson Street

All major repairs, including pump rebuilding, motor rewinds, HVAC repairs, repairs to motor control centers, flow meters, remote monitoring equipment, valves, and macerators for the pump stations are contracted to BOYDCO Inc, of East Providence RI. The Town does not maintain an inventory of parts for major repairs at the different

pumping stations. Routine maintenance parts, such as extra floats, vacuum hoses, etc are stored at the Superintendent’s office or on the service truck. Parts needed for repairs are generally obtained from local vendors or the Town’s Emergency Services Contractor, BOYDCO Inc. As pumps and other parts are replaced, Tiverton is making an effort to standardize pumping station equipment as much as possible.

Whether repairs are made by local vendors or by Tiverton personnel, all repairs are recorded and tracked on the appropriate pumping station log.

a. Mechanical and Electrical Maintenance

The size of the pump station and its related equipment determine its specific mechanical and electrical maintenance needs. The Wastewater Superintendent is responsible for insuring that all maintenance of each pump station is properly logged into each pump station log. The Wastewater Superintendent uses manufacturers’ Operation and Maintenance manuals to establish action items for pump station equipment. Pump stations listed in Table 6.1 have individual inspection protocols attached in Appendix G. A general description of weekly, quarterly and annual maintenance performed on pump stations by the Superintendent and the Emergency Services Contractor is listed as follows:

Mechanical Maintenance/Inspections	Electrical Maintenance/Inspections
Daily	
Weekly	
Review pump run hours Review totalized flow Check wet well levels, check for debris, turbulence or unusual noise Check alarms Ensure that all switches, controls and valves are in the correct position Record findings in log book Log pump hours Check hydraulic levels Operate each pump Check bearings and packing Check for pump vibrations, unusual noise Check chart recorder for routine pump performance Check valve operations and signs of leakage Lube and grease equipment (as required by manufacture) Pick up litter, general housekeeping Clean and maintain property	Ensure all breakers are on Ensure that all switches and controls are in the correct position Check Motor Control Centers (MCC) Check level controllers Check electrical service feed Check remote monitoring equipment Check indicator and alarm lamps Check general electrical items (lighting, etc.) Check back up generator Exercise stand by power (all stations are on automatic timer for this operation)
Quarterly	
Replace hydraulic fluids and oils (as required by manufacturer) Inspect pumps (oil levels, seals, packing, bearings, etc.) Replace packing Inspect discharge piping Check outflow pressure	Inspect internal Motor Control Center components Inspect & grease electrical contacts Inspect electrical pump cables Inspect electrical breakers Perform amperage readings on equipment

Check for corrosion problems Exercise check valves Check floats/bubbler system (clean and/or replace)	Check MCC for proper operations Check Generator: oil level water level fuel level inspect hoses and belts check piping for leaks check battery condition
Semi-Annually	
Pump the wet wells Remove grease build up	
Annual	
Service and calibrate all instrumentation: flow meters, level sensors, alarms, elapsed time meters and telemetry equipment	Emergency Generator serviced in accordance with manufacturer's recommendations

Capacity and discharge head in the pump stations are reviewed annually, following confirmation that the pumps are in good working order. Changes in capacity and discharge head are evaluated to determine whether cleaning of the force main is warranted.

All mechanical and electrical maintenance activities are recorded on a log sheet for each pumping station. Any problems or maintenance issues noted are reported to the Wastewater Superintendent for resolution.

b. Force Main Maintenance

Tiverton currently has three (3) force mains in the collection system with a combined length of 1.2 miles. The Industrial way force main has one (1) air release valve located at the high point of Industrial Way: All other force mains do not have intermediate high points that warrant air release valves. Our system includes a total of one (1) air release valve. Tiverton inspects and maintains the air release valve annually by back flushing the valves with clean water using a minimum of 30 psi. The air release valve and valve vault are inspected for signs of corrosion, connection point leakage, or improper operating characteristics.

The pressure on the discharge side of the pump is used to determine the need for force main cleaning. If the backpressure is more than 25% greater than the expected total operating head, the discharge pipe will be cleaned.

c. Private Pump Stations

Tiverton currently has two (2) private pump stations that discharge an average of 5,000 gallons per day to the collection system. These privately owned and operated pump stations are required to have an annual service contract with an emergency services contractor in effect at all times. The following table lists the private pump stations, owners and locations in Tiverton.

Table 6.3: Private Pump Stations [repeat table/ rows, as needed. A separate table should be created if you have details on the equipment at different private pump stations]

Pump Station Name	Location	Owner	Owner/operator contact information
Blackbird Ct. PS	Blackbird Ct, (in Countryview Estates)	Countryview Estates	Davis Logan 325 Hurst Lane 401 625-5935
Cardinal Ct Ps	Cardinal Ct (in Countryview Estates)	Countryview Estates	Davis Logan 325 Hurst Lane 401 625-5935

Of the three (3) of private pump stations in Tiverton, only one (1) has a history of service calls and none have any record of overflows. The history of these issues since 2004 is summarized in table 6.4, below.

Table 6.4: Private Pump Station History Since 2004

Pump Station Name	# Service Calls	# SSOs	Issue/Resolution
Blackbird Ct PS	1	0	grinder pump trip on overload – service provider called – replaced cutter blade.

d. Corrosion control

The Tiverton collection system has not experienced any excessive corrosion problems.

7. REACTIVE MAINTENANCE

This chapter outlines the process used by Tiverton to respond to non-overflow, unplanned maintenance needs in our collection system. It also provides an overview of responsibilities for emergency events. While Chapter 3 outlines Tiverton's preventive maintenance and Appendix A details Tiverton's response procedures for emergency sewer overflows, this chapter is written to address those unscheduled maintenance events that don't result in overflows or backups of sewage into basements. A formal Sewer Overflow Response Plan (SORP) has not been assembled at the time this plan was prepared. We plan to prepare a formal SORP by the end of 2010. Currently, the Wastewater Superintendent oversees all emergency work and would similarly oversee work to mitigate a future sewer overflow emergency response.

The following firms are typically utilized in a reactive maintenance situation:

- Equipment and supplies – BOYDCO, Inc, Humphreys Supply,
- Water Quality Monitoring – RI Analytical Laboratory
- Pump station problems – BOYDCO, Inc.

Sewer Overflow Response – Appendix A – is always a priority situation, details are provided in the SORP.

Responsibilities for reactive maintenance are assigned by the Wastewater Superintendent based on level of priority for response (as noted in the table 7.1, below).

a. Corrective Maintenance

Most repair needs are identified while conducting routine maintenance, inspections and assessments. Because there is such a wide range of potential unexpected events that it is not possible to prescribe the appropriate repair for every possible scenario, Tiverton has established a prioritization scheme for determining the timing of repairs outlined in Table 7.1, below. This is based first hand knowledge of the collection system. While this contingency analysis focuses on system upsets that would not result in immediate sewer overflow, the response timing is based on the potential for a resulting sanitary sewer overflow. Overflow response is covered in Appendix A.

Low-risk items, such as light bulbs or switches, and small non-critical valves, are planned for run-to-failure, and as such, are not part of the PM Program. These items are replaced when they fail. When assets critical to the process fail, they are scheduled for corrective maintenance either on an urgent or routine schedule. Some of these repairs are handled under the operations and maintenance account, and some must be put in as capital improvements as part of our asset management activities depending on asset cost and life expectancy. Assets valued at greater than \$5000 dollars and with a useful life of greater than 10 years are included in the capital budget.

Corrective maintenance repairs include (but are not limited to):

- cleaning to eliminate flow problems that are noted during inspections
- spot repair or replacement of a pipe that shows signs of deterioration
- replacing a rattling or failed manhole cover
- repairing or replacing a pump that is becoming clogged or has been damaged by debris

- responding to, investigating and mitigating customer complaints (see the SORP, Appendix A, for response to complaints of sewer overflows)
- repairing system parts subject to vandalism

Corrective maintenance response is outlined in Table 7.1

b. Scheduling

Scheduling of repairs runs the range from repairing components found to be in substandard condition during inspection, immediate repairs to pump stations that are malfunctioning, to major, capital-intensive, repair projects, such as a manhole-to-manhole pipe replacement or rehab (see Appendix A for manhole to manhole pumping on an emergency overflow). An emergency, however, always supersedes scheduled maintenance. Timing of other repairs is done by the extent of the repair. A major replacement or rehab may be specifically included in the budget, whereas minor repairs (generally \$2000 or less) are absorbed within the annual allowance for general repairs. These smaller repairs are scheduled as they arise. Larger repairs are scheduled and coordinated with the budgeting process.

Table 7.1: Collection System Non-Emergency Response and Repair Priority

Problem	Response Time	Action	Repair Time Goal

c. Tracking and Recording Repairs

The Superintendent documents corrective maintenance needs in the log book at the time of the event. Corrective maintenance tasks are recorded in the log book when completed. CCTV or other failure analysis may also be done as a corrective maintenance task after a problem occurs when there has been a blockage or surcharging event to diagnose the cause of the problem and recommend and schedule repairs if needed. Findings may lead to a spot repair of the pipe, root cutting, root foaming with an herbicide, re-cleaning for grease or debris removal on a periodic preventive basis, and if so, these tasks are included in an update of our schedule as described in Section 3, Cleaning, Inspection and Assessment.

d. Complaint Response

Wastewater Management is responsible for responding to sewer service complaints. Response is performed by the Wastewater Superintendent during work hours (Monday to Friday 8:00am until 4:00pm) and by the Police Dispatch during off work hours.

Complaint response includes both assessing the complaint and resolving the problem. The majority of our complaints are related to pump station alarms. During work hours, the Wastewater Superintendent answers the call. During non-work hours, Tiverton uses an emergency services company, BOYDCO, Inc. on stand-by to address

complaints.

Wastewater Management tracks these complaints and response activities in a spreadsheet, evaluates response time, trouble spots and uses the information to assess our performance, update this plan and prioritize repairs.

e. Reactive Response Summary

For detailed response information, refer to Sewer Overflow Response Plan. This chapter does not cover overflow response, in the event of a spill or overflow, see the SORP and contact the following:

Response Coordinator & Alternate

The Wastewater Superintendent: John Lincourt

Office – 401 625-6701

Home – 401 722-5607

BOYDCO, Inc.

Office – 401 438-6900

Rhode Island Dept. Environ. Mgmt.
Sewer Overflow Response Plan)

401-222-4700 (during business hours, and see

8. EQUIPMENT AND TOOL INVENTORY

a. Essential Day-to-Day Items

Tiverton provides the Superintendent with the essential work related items they use on a day-to-day routine basis. Should new or replacement equipment or tools be needed, the Superintendent orders them. Tiverton requires that all purchases with a value greater than \$5,000 be competitively bid. The award of these bids is through the Town Council. Purchases of goods over \$1,000 must be accompanied by a minimum of 3 telephone quotations unless the equipment is from a sole source vendor. Sole source vendors must be documented.

b. Spare Equipment and Tools

Tiverton keeps a limited supply of spare equipment and tools for personnel. In lieu of maintaining a full supply of spare equipment and tools for personnel, Tiverton has accounts with a number of local hardware and plumbing vendors. We also rely on Boydco Inc, our emergency services vendor to stock standard spare parts such as floats and relays. Equipment and tools can be purchased in amounts up to \$5,000 dollars.

Because large equipment and tools which are needed for certain tasks such as CCTV inspections and sewer jet cleaning are used so infrequently, the Town's policy is to either rent the equipment or hire a contractor that has the equipment to complete the work.

An inventory of the equipment and tools used by Tiverton to maintain the wastewater collection system is provided in Table 8.2. A list of supplies and essential spare parts necessary to be kept on site for normal and emergency use is included in Table 8.3. The estimated remaining life of the equipment inventory was calculated based on the date of manufacture, and factors that might be expected to extend or reduce the life of the equipment (e.g., repairs or hard use).

Table 8.1: Collection System Non-Emergency Response and Repair Priority

Description	Model Year	Use	Typical Useful Life, yrs	Estimated Year for replacement

Table 8.2: Current Equipment and Tool Inventory

Description	Model Year	Use	Typical Useful Life, yrs	Estimated Replacement Year
Service Truck	1975	Sewer supervisor truck	1	2010

Gas Detection Monitor		Confined space entry	10	2018
Safety Tripod		Confined space entry	10	2018
Computers/GIS		Sewer system management		
Photography				

Table 8.3: Supplies and Essential Spare Parts

Description	Use	Quantity On hand

9. CAPACITY MANAGEMENT

Tiverton’s collection system has not exceeded design capacity to contain wastewater flows from the Town. Tiverton’s wastewater collection system is essentially brand new. The Mt. Hope Interceptor was designed to handle in excess of 6 million gallons per day (peak flow) it currently only sees approximately 80,000 gallons per day. With the exception of 2 streets on the Fall River line, all lateral sewers currently in use are a minimum of 8”- diameter and have a capacity of handling twice the theoretical buildout flow. The following tables and discussion summarize the state of our system capacity to carry and contain flows.

Sanitary sewer overflows and building and basement backups caused by capacity restrictions in Tiverton’s collection system have never occurred.

Tiverton has undertaken the following evaluations to identify potential capacity issues:

Study Title	Scope of Study	Date
Wastewater Facilities Plan Update, January 2000, Louis Berger Group, Inc.	An update of the original FP approved by EPA in October 1976. The FPU catalogued buildout flows for all existing developed streets in the sewer district	January 2000
Wastewater Flows Inventory	An ongoing exercise by the Superintendent which takes the inventory prepared by Berger Group and adds wastewater flows from new developments as they are approved by the Planning Board	On-going

Lateral replacement program

Tiverton has a sewer system in which 95-percent of the pipes in the ground are PVC, and have been installed within the past ten years. For this reason, the Town does not have a need to replace lateral sewers. The one area where old Vitrified Clay pipe is in use will be replaced when the Town installs sewers in the rest of the sewershed

Sewer Capacity Certification/ Connection Policy

Sewer Capacity Certification is a process where any new development requiring the connection of its sanitary sewer service to the Tiverton sewer system is reviewed to determine whether adequate sewer system capacity exists to convey the new wastewater flow from the proposed development to our wastewater treatment facility. A capacity certification analysis by a professional engineer is required for all developments of five or more units.

10. RESOURCES AND BUDGET

The resources required for effective wastewater collection system operation, maintenance and repair include in the Town of Tiverton:

- A reliable, consistent, and sufficient funding source for the operating budget is in place. Tiverton currently uses a user-supported rate-paying structure, essentially an enterprise fund to support the wastewater collection system. All funds raised by sewer user fees go into a separate budget account and are not available to general fund.
- A formal operation and maintenance budget and expenditure plan is prepared each year. The budget includes all annual costs of operating and maintaining the collection system, including staff, equipment, tools, consumables (utilities, chemicals, etc.), contract services, and spare parts. The O&M budget is funded by the sewer user charges and miscellaneous revenue. The Town currently does not utilize the Government Accounting Standards Board (GASB) recommendation that assets are depreciated as an expense and that the expense is included in the O&M budget and the revenues to offset the depreciation be found in the capital improvement or reserve fund.
- A capital improvement plan (CIP) is prepared annually to insure that funds sufficient to ensure the continued longevity of the system are factored into the budget. The CIP includes replacement of the collection system components as they wear out. Costs include planning, design, construction, and inspection of new or rehabilitated facilities.

A copy of the Tiverton operating budget and revenue rate structure can be found in Appendix I.

a. Budget Process

Tiverton Wastewater Management's budget process complies with the Town of Tiverton budget cycle, which requires that the annual budget be completed for inclusion in the docket for the annual Town Financial Meeting on the 3rd Wednesday in May of each year. The actual budget year begins July 1 and ends June 30th the following year. For the Collection System operations and maintenance budget, the process begins with last year's numbers and projected needs for five years into the future.

Wastewater Management works with the Wastewater Management Commission and the Tiverton Budget Committee to prepare for budget hearings leading up to the annual Town Financial meeting.

b. Rate Setting, Budgetary Policies and Financial History

Wastewater Management's rate-setting policies are based on the following principles:

- Rates and fees are based on the actual cost to deliver each service.
- Current rates must be sufficient to cover current costs and to meet all bond covenants.
- Rates currently do not include funding for Capital Improvement Plan projects
- Rate increases are implemented in a gradual and predictable manner, avoiding

large one-time rate increases.

Tiverton Wastewater Management maintains an operating surplus account for use as needed. Contributions to and usage of, the surplus fund are reviewed each year. Each year, at the end of the fiscal year, any excess operating cash from the year’s operating budget is paid to the surplus account if any, is determined. This fund was established in 2000 and its balance at the end of FY-2007 was \$75,000 dollars.

Tiverton Wastewater Management operates for all practical purposes as an enterprise fund. All funds raised by sewer user fees go into a separate budget account and are not available to general fund.

The annual user charge has two components: an administrative service charge and a volume charge based on actual water usage as metered by the customer’s water department. Tiverton Wastewater Management’s expenses included operation and maintenance, and the cost of treating the wastewater delivered to the City of Fall River.

c. Historical Rate Review

Our current sewer rate structure is based on equivalent units an actual water usage. Customers are either billed semi-annually or quarterly (depending on their water purveyor) for wastewater services based on 100 % of the metered water use. In addition to flow charges, customers are also assessed a base charge to recover fixed costs. This cost is based on an equivalent unit rating the customer has been assigned. See Table 10.1, for a summary of user rates for the last two years.

The following table shows Tiverton’s sewer rates over the last 5 years.

Table 10.1: Sewer User Fee History

Fiscal Year	% Rate Increase	Base Charge /EU Small/(Large)	Residential Rate \$/100cf	Commercial Rate \$/100cf
2006	0	\$25	7.21	7.21
2006	0	\$25	7.21	7.21
2006	0	\$25	7.21	7.21
2007	Rate Restructure	\$130, (\$220)	5.21	5.21
2008	0	\$130, (\$220)	3.94	3.94
Avg. Increase				

d. Operating and Maintenance Expense

Estimated operating expenses for FY 2009 totaled \$ 290,711. This is an increase over the FY 2008 operating budget of \$ 278,088.

Operating and maintenance expenses include:

- Employee salary and compensation
- Operating supplies
- Utilities
- Repair and maintenance
- Professional services
- Routine capital outlay

- Debt Service

Professional Services includes planning and engineering studies for replacement projects.

Contractor Services includes contractual work for cleaning sewer lines and manholes, CCTV, and improvements to the collection system map.

Routine Capital Outlay includes items that are considered capital assets and are purchased from annual operating revenue rather than through bonds or the capital reserve fund. Items such as vehicles, specialized maintenance equipment, pumps, motors, office equipment and other smaller items generally costing less than \$ 5,000.

Debt service is the annual principle and interest payments for bonds, loans and other fiduciary instruments owed by the Town of Tiverton. Currently, Tiverton Wastewater does not have any debt service obligations.

e. Capital Improvement Program Overview

The Capital Improvement Plan (CIP) is part of the long-term CMOM planning, which uses the Cleaning, Inspection, and Assessment program (see Chapter 3) to evaluate the existing system and to recommend improvements needed to correct existing deficiencies. The CIP also incorporates our Capacity Assessment (Chapter 9) program to assess projected needs for maintaining the integrity of the collection system and expanding sewer capacity to accommodate growth by providing a detailed five-year capital improvement program.

Capital projects are evaluated based on the criticality of the need for the improvement (eg. Is the pump station becoming more problematic thereby requiring either rehabilitation or total rebuilding, has there been a documented need to replace septic systems in a neighborhood with sewer service)

Tiverton currently does not have any ongoing projects in its Capital Improvement Program. Tiverton's CIP program covers a five-year period and is updated annually. The CIP describes each proposed project, the budgeted cost for the project and the financing source(s). Currently, there is no funding for implementing any CIP projects.

The Capital Reserve fund can be used in an emergency to fund capital projects. The reserve funds are primarily used for:

- Non-bond funded capital projects
- Additional funds for bonded projects
- Emergency repair and maintenance

The available reserve fund generally ranges from \$ 50,000 to \$ 100,000. The amount varies based on the amount used in emergencies and how much we have been able to replace.

f. Capital Improvement Plan

Appendix J shows the proposed CIP adopted by Tiverton Wastewater Management. The CIP shows both funded and un-funded projects. The un-funded projects are included for tracking purposes and to allow for changes in the priority of the projects and as

funding levels change

Estimated total debt service for fiscal year 2009 is \$ 0.00, which is 0 % of the O&M budget.

1. Population Growth

Tiverton has been growing steadily for a number of years. In the 2000 census, the population of Tiverton was 15,260. By 2007, the population had dropped to 14,876, an average decline of 2.51 from 2000. The long range population growth however, is for Tiverton to grow at a rate of approximately 10 percent through the year 2030, reaching a population of 16,841.

The table below indicates the number of new residential housing permits.

TABLE 10.2 New Town Wide Dwelling Units by Fiscal Year

FY	Single Family	Condo*	Manufactured Homes**	Total
1998-1999	26	0	0	26
1999-2000	49	0	0	49
2000-2001	49	0	63	112
2001-2002	48	0	27	75
2002-2003	69	48	36	153
2003-2004	42	42	12	96
2004-2005	49	44	10	103
2005-2006	32	15	2	49
2006-2007	33	6	4	43
Average	44	17	17	78

* Condominium Units are for Starwood’s development with the exception of 5 units in FY 2003-2004.

** Manufactured Homes are for the Elderly Community known as Countryview Estates.

Source: Gareth Eames, Tiverton Code Enforcement, June 14, 2007.

2. Capacity and Fees

For planning purposes, Tiverton’s service capacity and treatment is based on 195 gallons per day (GPD) per residential equivalent plus 15 percent reserve capacity. Actual water usage records show that the average user in Tiverton uses only 155 GPD of water. Therefore, our planning meets the needs of the current service area and provides for additional capacity to accommodate projected residential growth through the year 2030. This service capacity includes current average sewer demands of 80,000 GPD and growth-related reserves of 1.92 MGD for a total sewer capacity of 2.0 MGD (average) for the Collection System and an allocated average of 2.0 MGD to be treated at the Fall River Wastewater Treatment Plant.

The growth of the Tiverton sewer system is directly related to funding new sewer projects. Since most of the planned sewer district is already 90 percent developed. Sewer expansion will be as new (already developed) neighborhoods within the sewer district are provided sewers.

Based on the anticipated sewer construction schedule, the collection of connection fee revenue can be expected to could jump by well in excess of 100 percent through the next 5 year financial planning period.

Connection fees are currently used to fund existing sewer expansion and to set money

aside for emergency repairs. Tiverton currently does not have a capital program to rehabilitate sewer system components. With the new neighborhoods coming on line as sewer contracts are completed, the next 5 years could have as many as 2,000 new units connected to the sewer system. The single family residential connection fee will be evaluated at the time of construction of the next contract. The Connection fee is currently \$ 2,700.

3. Capital Facilities Projects and Financing.

The total cost of the planned capital and non-capital projects during 5 year period is \$25,000,000. All projects are classified as non-capacity (See Table 10.3).

4. Operating Impact of Service Capital Improvements.

The cost of operating the proposed capital improvement projects during the next five-year period is estimated at \$10,000 per year (See Table 10.4.).

5. Tiverton Five Year Capital Improvement Plan Projects Map Key.

The following pages show location maps of all Sewer Utility projects for the five year Capital Improvement Plan cycle.

Table 10.3: Sources of Funds

Sources of Funds	Expenditure					
	2009	2010	2011	2012	2013	2014
Existing Revenue	\$305,711	\$261,057	\$279,787	\$291,805	\$304,365	\$317,494
Sewer Utility Fund	\$0					
Federal/State Grants	\$261,993	\$112,960	\$100,000	\$100,000	\$100,000	\$100,000
Loan from General Fund	\$0					
Cash from Bond Financing	\$0					
Investment Income	\$0					
Total Sources of Funds	\$567,704	\$374,017	\$379,787	\$391,805	\$304,365	\$417,494

Table 10.4: Uses of Funds (O&M)

Uses of Funds	Expenditure					
	2009	2010	2011	2012	2013	2014
Personnel Svc	\$82,416	\$95,652	\$98,522	\$101,477	\$104,522	\$107,657
Supplies and Expenses	\$25,616	\$23,525	\$24,701	\$25,936	\$27,233	\$28,595
Professional Services	\$2,500	\$2,500	\$2,625	\$2,756	\$2,894	\$3,039
Depreciation	\$0	\$0	\$0	\$0	\$0	\$0
Utilities	\$7,228	\$13,584	\$21,853	\$22,945	\$24,092	\$25,297
Usage Pmt to FR	\$187,951	\$125,796	\$132,086	\$138,690	\$145,625	\$152,906
Subtotal:	\$305,711	\$261,057	\$279,787	\$291,805	\$304,365	\$317,494

Capital Projects

Canonicus St Sewer Extension	\$261,993	\$112,960				
Shove St Ext			\$100,000	\$100,000	\$100,000	
Hooper St Ext						\$100,000
Debt Service						
Subtotal:	\$261,993	\$112,960	\$100,000	\$100,000	\$100,000	\$100,000

Total Expenditure	\$567,704	\$347,017	\$379,787	\$391,805	\$404,365	\$417,494
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This summary combines information found in the annual Wastewater Management Budget and the Capital Improvement Plan. It provides a single document for the Wastewater Management Commission, staff members, and the public to understand the scope, cost, funding, and status, of planned sewer improvement projects proposed to be undertaken by Tiverton.

11. SEWER SYSTEM PREVENTIVE MAINTENANCE PLAN UPDATES

a. Plan Update Process

Tiverton Wastewater Management will complete as-needed reviews of our Preventive Maintenance program and this plan beginning in January 2009. The review will consider the progress that has been made in developing and implementing our Preventive Maintenance Program, the results of our monitoring program described in Section b., below, and will incorporate updates to this Plan including:

- Changes to organizational structure, information management, contacts, and system maps,
- Changes to information on the collection system, such as the size and age of pipes, to incorporate information on repairs completed during the year,
- Incorporation of successful cleaning, inspection and assessment program improvements during the past year,
- Changes to our Sewer Use Ordinance and Fats, Oils and Grease programs,
- Updates to our pump station inspection and maintenance program,
- Updates as we evaluate our collection system capacity,
- Budget and Capital Planning updates,

As the sewer inspection history of any segment of pipe is retrievable electronically and the data is used to develop condition ratings, this aids in prioritizing future sewer rehabilitation projects, maintenance activities, and updating this plan. A formal Preventive Maintenance Plan will be developed during FY 2010.

b. Monitoring, Measurement, and Program Modifications

As noted in Chapter 1, Tiverton Wastewater Management maintains complaint and blockage records in a log, maintains our records of cleaning and other preventive maintenance activities, and records problems (e.g., excessive debris, observed manhole defects) identified through regular sewer maintenance activities in our maintenance log.

The sewer inventory, and maintenance database, discussed in Chapter 1, tracks and utilizes records related to any sewer segment in our system. Complaints and service calls are recorded and linked to preventive and reactive maintenance activities.

With the information available, the log is used to help measure the effectiveness of our program by tracking various parameters related to service calls, maintenance and inspection activities, and identifying system components that continually contribute to system failures. Specifically, we will be tracking the following parameters with which to measure the effectiveness of this Plan and meeting the goals we set (described in Chapter 1):

- Length of gravity sewers cleaned annually
- Actual versus scheduled cleaning dates for gravity sewers
- Length of gravity sewers CCTV inspected annually
- Record of pump station maintenance work completed annually
- Number of FOG inspections and compliance with FOG requirements

- Improvements in capacity due to reductions in I/I
- Service reliability as measured by the time it takes to resolve a call.
- Safety history/incidents
- Ratio of funds spent on preventive maintenance versus reactive and emergency response

This information will be assessed and reported to the Wastewater Management Commission during as part of our annual report as we keep Tiverton officials and coordinating departments up to date with our infrastructure work. Changes to this Preventive Maintenance Plan will address issues identified through this monitoring program as needed.