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**WASTEWATER FACILITIES
PLAN UPDATE**

**TOWN OF TIVERTON
RHODE ISLAND**



JANUARY 2000

Louis Berger Group, Inc.

295 Promenade Street, Providence, RI 02908

**WASTEWATER FACILITIES PLAN UPDATE
TOWN OF TIVERTON, RHODE ISLAND**



TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Table of Contents	(i)
List of Figures	(iii)
List of Tables	(iii)
Acknowledgements	(v)
Date: <u>March 28, 2000</u> Supervisor: <u>Manu J. Liberti</u> <i>MSJ</i> <u>Angelo S. Liberti</u> Chief, Office of Water Resources	
1.0 EXECUTIVE SUMMARY	
1.1 Existing Conditions	1-1
1.2 Future Conditions	1-3
1.3 Recommended Plan	1-4
1.4 Project Costs	1-5
2.0 PROJECT NEED AND PLANNING AREA	
2.1 Statement of Project Need	2-1
2.2 Planning Area Parameters	
2.2.1 Planning Area	2-1
2.2.2 Political/Institutional Structures	2-2
2.2.3 Planning Entities	2-3
3.0 SUMMARY OF EXISTING WASTEWATER FACILITIES PLAN	
3.1 Introduction	3-1
3.2 Wastewater Management Needs	3-1
3.3 Wastewater Flows	3-2
3.4 Wastewater Collection System	3-4
3.5 Wastewater Treatment and Disposal	3-5
4.0 CURRENT SITUATION	
4.1 Surficial Soils	4-1
4.2 Geology	4-2
4.3 Wetlands	4-4
4.4 Floodplains	4-4
4.5 Coastal Areas	4-4
4.6 Surface Water Characteristics	
4.6.1 Public Drinking Water Reservoirs	4-8
4.6.2 Point Sources of Pollution	4-8
4.6.3 Nonpoint Sources of Pollution	4-9
4.7 Groundwater Characteristics	4-9
4.8 Land Use and Demographic Data	4-10

TABLE OF CONTENTS (CONTINUED)

<u>SECTION</u>	<u>PAGE</u>
5.0 WASTEWATER MANAGEMENT FACILITIES	
5.1 Summary of ISDS Systems	5-1
5.2 Wastewater Treatment Facilities	5-2
5.3 Initial and Ultimate Wastewater Flowrates	5-3
6.0 FUTURE SITUATION	
6.1 Land Use	6-1
6.2 Demographics	6-2
6.3 Economics	
6.3.1 Introduction	6-3
6.3.2 Tax Base	6-5
6.3.3 Economic Goals and Objectives	6-6
6.4 Wastewater Generation	6-6
7.0 EVALUATION OF ALTERNATIVES	
7.1 Unsewered Areas	7-1
7.2 Optimum Use of Existing Facilities	7-1
7.3 Summary of Alternatives	7-1
7.3.1 No Action	7-2
7.3.2 Community Wastewater Treatment and Disposal	7-2
7.3.3 Sewering Alternatives	7-3
7.4 Preliminary Cost Estimates	7-5
7.5 Environmental Impacts	7-8
7.6 Temporary Construction Impacts	7-10
8.0 PLAN SELECTION	
8.1 Selected Plan	8-1
8.2 Environmental Impacts of Selected Plan	8-1
9.0 PLAN IMPLEMENTATION	
9.1 Institutional Responsibilities	9-1
9.2 Implementation Steps	9-2
9.3 Operation and Maintenance	9-2
10. PLAN FINANCING	
10.1 Project Cost/Fee Descriptions	10-1
10.2 Project Costs	
10.2.1 Capital Costs	10-2
10.2.2 Operation and Maintenance Costs	10-5
10.3 Cost Allocation	10-7

**TABLE OF CONTENTS
(CONTINUED)**

<u>SECTION</u>	<u>PAGE</u>
11. PUBLIC PARTICIPATION PROGRAM	
11.1 Summary of Program	11-1
11.2 Agency Comments	11-1
11.3 Public Comments	11-9
11.4 Responsiveness Summary	11-9
GLOSSARY & LIST OF ABBREVIATIONS	G-1
REFERENCES	R-1

<u>LIST OF FIGURES</u>	<u>FOLLOWING PAGE</u>
Figure 2-1 Town Map - Tiverton	2-1
Figure 2-2 Town Map - North Tiverton Study Area	2-1
Figure 3-1 Summary of Recommended Plan, Facilities Plan 1976	3-7
Figure 4-1 Soil Types	4-2
Figure 4-2 Summary of Septic Constraints	4-3
Figure 4-3 Wetlands	4-4
Figure 4-4 Flood Hazard Areas	4-4
Figure 4-5 Public Water Supply Reservoirs	4-8
Figure 4-6 Groundwater Classifications & Wellhead Protected Areas	4-10
Figure 5-1 Typical ISDS System	5-1
Figure 5-2 Wastewater Flow Rates Service Area	5-4
Figure 7-1 Sewering Alternative #1	7-5
Figure 7-2 Sewering Alternative #2	7-5
Figure 7-3 Sewering Alternative #3	7-5
Figure 8-1 Recommended Sewering Alternative	8-3

<u>LIST OF TABLES</u>	<u>PAGE</u>
Table 3-1 Residential Population Densities Estimated for the Year 2025	3-2
Table 3-2 Estimated Wastewater Characteristics	3-3
Table 3-3 Areawide Intercepting and Trunk Sewers	3-6
Table 4-1 Tiverton Surficial Soils	4-3
Table 4-2 Shoreline Development In CRMC Type 1 Waters	4-6
Table 4-3 Summary of Water Quality Evaluation 305(B) Report	4-7
Table 4-4 303(d) List: Tiverton Water Bodies	4-7

**TABLE OF CONTENTS
(CONTINUED)**

<u>SECTION</u>	<u>PAGE</u>
Table 4-5 Tiverton Zoning Districts	4-14
Table 4-6 Housing Age	4-15
Table 5-1 Summary of Wastewater Flowrates	5-4
Table 6-1 Newport County Population Projections	6-3
Table 6-2 Tiverton Financial Characteristics - Expenditures	6-5
Table 6-3 Ultimate Wastewater Generation	6-6
Table 7-1 Summary of Sewer System Elements	7-6
Table 7-2 Preliminary Cost Estimates	7-7
Table 9-1 Institutional Responsibilities	9-1
Table 10-1 Project Cost/Fee Descriptions	10-1
Table 10-2 Phase 1 Municipal Bond Schedule	10-3
Table 10-3 Phase 2 Municipal Bond Schedule	10-4
Table 10-4 Projected Annual O&M Costs	10-6
Table 10-5 Projected Annual Capital Costs	10-9
Table 10-6 Projected Annual Average Residential User Costs	10-9

APPENDICES

- A. Wastewater Collection System Theoretical Flows
- B. Summary of Design Alternatives
- C. Public Hearing and Response To Comments
- D. Intermunicipal Agreement

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Raymond Houle, Jr., Town Administrator

Raul Fernandes, Director of Sewer Commission

Tiverton Sewer Commission

Thomas Brady, Chairman

Don Wilbur

Les Cory

Raul Fernandes

Peter DiMarzo

Stephen Freitas

1.0 EXECUTIVE SUMMARY

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The Louis Berger Group, Inc. (Berger), under contract to the Town of Tiverton, has completed this Facilities Plan Update in accordance with the requirements of the Rhode Island Department of Environmental Management (RIDEM), Division of Water Resources. As the town prepares its infrastructure for the 21st century, the Facilities Plan Update will serve as a twenty-year planning tool to the year 2020. Completion of this Facilities Plan Update is also a requisite first step in the state and federal funding process through which municipalities receive monies for facility establishment and upgrades.

A draft final report of Comprehensive Community Plan (CCP) of the town, dated 1996, is under the process of final review and approval by the Planning Board, Town Council and the State of Rhode Island Division of Planning. The draft final CCP has been utilized in this Facilities Plan Update as the basis of existing and future conditions in the town. The data, projections, and recommended actions presented in this Facilities Plan Update are in accordance with the CCP.

A detailed townwide Wastewater Facilities Plan for Tiverton was approved by EPA on October 15, 1976. The purpose of this Facilities Plan Update is to amend the currently approved Facilities Plan by reaffirming the need for sewer service in the northern portion of the town, including proposed industrial/commercial and high density residential developments in this area, and to update the environmental assessment necessary to address provision of sewer service to Tiverton. The Facilities Plan, dated 1976, recommended providing a wastewater collection system in four areas of the Town: North Tiverton, Stone Bridge, Bulgarmash Road, and Stafford Road. The Facilities Plan concluded that the remainder of the Town would be best served by individual on-site sewer disposal systems. The basis of this decision was on economics, landuse, lot sizes, and soil conditions. The conclusion remains valid and consistent with the Draft CCP. Therefore, the planning area of this document was limited to these areas.

The Town is currently in the process of developing an Individual Sewage Disposal System (ISDS) Wastewater Management Plan on a town wide basis. The ISDS Wastewater Management Plan will be a separate stand alone document that develops the goals and objectives of the ISDS Wastewater Management Plan for unsewered areas. The ISDS Wastewater Management Plan will also address areas that sewerage is planned, but may not be constructed for a period of time.

The Town has limited the area to be sewerage to North Tiverton and portions of east Tiverton and Stone Bridge Areas. At this point, it is considered economically infeasible to expand sewer service to Bulgarmarsh Road and the Stafford Pond area. The decision to eliminate portions of the Stone Bridge Area and Bulgarmarsh Road were also based on larger lot sizes present in medium density residential development (R-30) and soil conditions. The focus of the Town has shifted to the development of an ISDS Wastewater Management District to service these areas of the Town. The decision to eliminate the Stafford Pond area was based on the Town's proposed development and implementation of ISDS Wastewater Management District.

The primary, initial objective for the Town in developing an ISDS Wastewater Management Plan was to focus on the residential areas adjacent to Stafford Pond. The Town has determined that it is most cost effective to focus on serving these areas along with the remainder of the Town with conventional, alternative on-site, and/or community systems. Should the Plan determine that it is not economically and/or environmentally beneficial (or detrimental to public health) to utilize alternative on-site or community ISDS systems for any specific areas, then the Town would be required to update the Facilities Plan accordingly.

1.1 Existing Conditions

At present almost all of the wastewater generated in Tiverton is disposed of through onsite disposal systems, except for a limited number of properties bordering Fall River, Massachusetts, which are connected to the Fall River sewer system.

Approximately 80 percent of the land within the town has severe or very severe limitations for the location of septic tank leaching fields. These types of soil conditions are also prevalent in North

Tiverton, and many of the existing residential and commercial on-site systems in the area experience operational problems.

1.2 Future Conditions

Several large developments are proposed or beginning implementation in Tiverton, as follows:

- As part of the economic development identified in the CCP, the town is in the process of developing a 228-acre industrial park area near the Fish Road/Route 24 intersection.
- An additional 600-acres of privately owned land (Douglass Property) is potentially available for industrial/commercial development, contiguous to the town park area.
- The former tank farm property along Mount Hope Bay straddling Carey's Lane (known as Northeast Properties), may be developed with a mix of high density residential and commercial/office space.

The ability of existing residential/commercial properties in the study area to expand within current zoning provisions, and the development of any high water use businesses in the area, is greatly restricted by the poor soils conditions where sanitary sewers are not available. Therefore, actions such as addition of bedrooms, conversion of basements or garages to living spaces, or startup of food service or other similar businesses in North Tiverton are typically not approvable due to wastewater management constraints.

1.3 Recommended Plan

It is recommended that the identified wastewater management needs in North Tiverton be addressed in a two phase approach. The first phase involves providing the main sewer interceptor that will serve the entire area and transport flows to Fall River, and three collection sewers to connect each of the proposed new developments. The second phase involves progressive sewerage of the existing residential/commercial areas, to connect them to the Phase 1 interceptor.

The recommended phased approach allows the large developments to obtain service first, hence contribute financially at the outset of the project and reduce the financial burden on the existing properties. Provision of sewers to the proposed North Tiverton developments will have a direct beneficial impact on Tiverton's economy, and facilitate the eventual sewerage of the existing development in the northern end of town. The Town remains committed to implementation of Phases 1 and 2 sewer projects. However, it is anticipated that implementation of Phase 2 will occur over an extended period of time to minimize the financial burden to property owners in the area.

The analysis of potentially feasible alternatives for providing sewer service to North Tiverton has resulted in the development of the following recommended cost-effective plan:

PHASE 1

1. Gravity interceptor (Mount Hope Bay Interceptor) extending from the end of Carey's Lane at the Mount Hope Bay, north to the Fall River Wastewater Treatment Facility (WWTF). This interceptor is located within an abandoned railroad right-of-way.
2. A pumping station in the town industrial park, with capacity for all other tributary residential/commercial properties, as well as the potential future industrial development in this location.

PHASE 2

1. A pumping station on the eastern end of Judson Street, to convey flows from the low lying areas east of Main Road to the future North Tiverton collection system.
2. A gravity collection network throughout the existing residential/commercial areas, generally between Main Road and the Mount Hope Bay. These sewer mains will convey wastewater to the new Mount Hope Bay Interceptor. It is anticipated that implementation will occur over an extended period of time to minimize the financial burden to property owners in this area.

It is proposed that all wastewater collected will be conveyed to the Fall River WWTF. Tiverton currently has an agreement with Fall River for treatment of 2 million gallons per day of wastewater at the facility. Estimates of wastewater generation included in this Facilities Plan Update indicate that the 2 MGD capacity for Tiverton flows will be sufficient during the next 20 years.

1.4 Project Costs

The estimated costs to implement the recommended sewer system alternative are summarized as follows (1997 dollars - Engineer News Record Construction Cost Index (ENRCCI) 5500):

PHASE 1:	\$ 3,026,231
PHASE 2:	<u>\$ 18,784,314</u>
TOTAL PROJECT:	\$ 21,810,545

Capital costs of the project could be potentially allocated in varying degrees between the North Tiverton residents and businesses who would be the direct beneficiaries of the facilities, and the town as a whole which would benefit indirectly from the facilities through enhancement of the industrial/commercial tax base and preservation of the town's environment. The following scenarios are considered:

Scenario A: North Tiverton property owners pay for all capital costs associated with residential/commercial flows in the service area. The Town pays for the Town Industrial Park facilities and for industrial park's capacity in the interceptor. To the extent possible, industries locating in the proposed Town Industrial Park and Northeast Properties site would contribute costs associated with their individual flowrates and necessary downstream capacity for those flows.

PHASE 1:

- Town Tax Base - TIP plus percentage of MHBI used (28.75%)
- North Tiverton - percentage of MHBI used (71.25%)

PHASE 2:

Town Tax Base - none

North Tiverton - All Phase 2 work

Scenario B: Tiverton property owners as a whole pay for the main elements of the project, including the Mount Hope Interceptor and facilities needed for the Town Industrial Park. North Tiverton users would pay for collector sewers and the Phase 2 pumping station needed to serve individual streets in the service area. As in Scenario A, new industries would pay for capacity allocated to their flow rates.

PHASE 1:

Town Tax Base - All Phase 1 work

North Tiverton - none

PHASE 2:

Town Tax Base - none

North Tiverton - All Phase 2 work

The projected annual average residential user costs, including capital and operations and maintenance expenditures, are summarized as follows:

**TABLE ES-1
PROJECTED ANNUAL CAPITAL COSTS**

	PHASE 1			PHASE 2			TOTAL
	Users	Share		Users	Share		
<i>Average Annual Cost</i>			\$ 107,282			\$ 1,043,117	\$ 1,150,399
SCENARIO A							
Town Tax Base		41.8%	\$ 44,844	0.0%	\$ -	\$ -	\$ 44,844
	5675		\$ 8	6435		\$ -	\$ 8
North Tiverton		58.2%	\$ 62,438	100.0%	\$ 1,043,117	\$ 1,043,117	\$ 1,105,555
	2919		\$ 21	3647		\$ 286	\$ 307
SCENARIO B							
Town Tax Base		100.0%	\$ 62,438	0.0%	\$ -	\$ -	\$ 62,438
	5675		\$ 11	6435		\$ -	\$ 11
North Tiverton		0.0%	\$ -	100.0%	\$ 1,043,117	\$ 1,043,117	\$ 1,043,117
	2919		\$ -	3647		\$ 286	\$ 286

**TABLE ES-2
PROJECTED ANNUAL AVERAGE RESIDENTIAL USER COSTS**

	PHASE 1				PHASE 2			
	Users	O&M	CAP.	TOTAL	Users	O&M	CAP.	TOTAL
SCENARIO A								
Town Tax Base	5675	\$ -	\$ 8	\$ 8	6435	\$ -	\$ -	\$ -
				\$ -				\$ -
North Tiverton	2919	\$ -	\$ 21	\$ 21	3647	\$ 391	\$ 286	\$ 677
SCENARIO B								
Town Tax Base	5675	\$ -	\$ 11	\$ 11	6435	\$ -	\$ -	\$ -
				\$ -				\$ -
North Tiverton	2919	\$ -	\$ -	\$ -	3647	\$ 391	\$ 286	\$ 677

2.0 PROJECT NEED AND PLANNING AREA

2.0 PROJECT NEED AND PLANNING AREA

2.1 Statement of Project Need

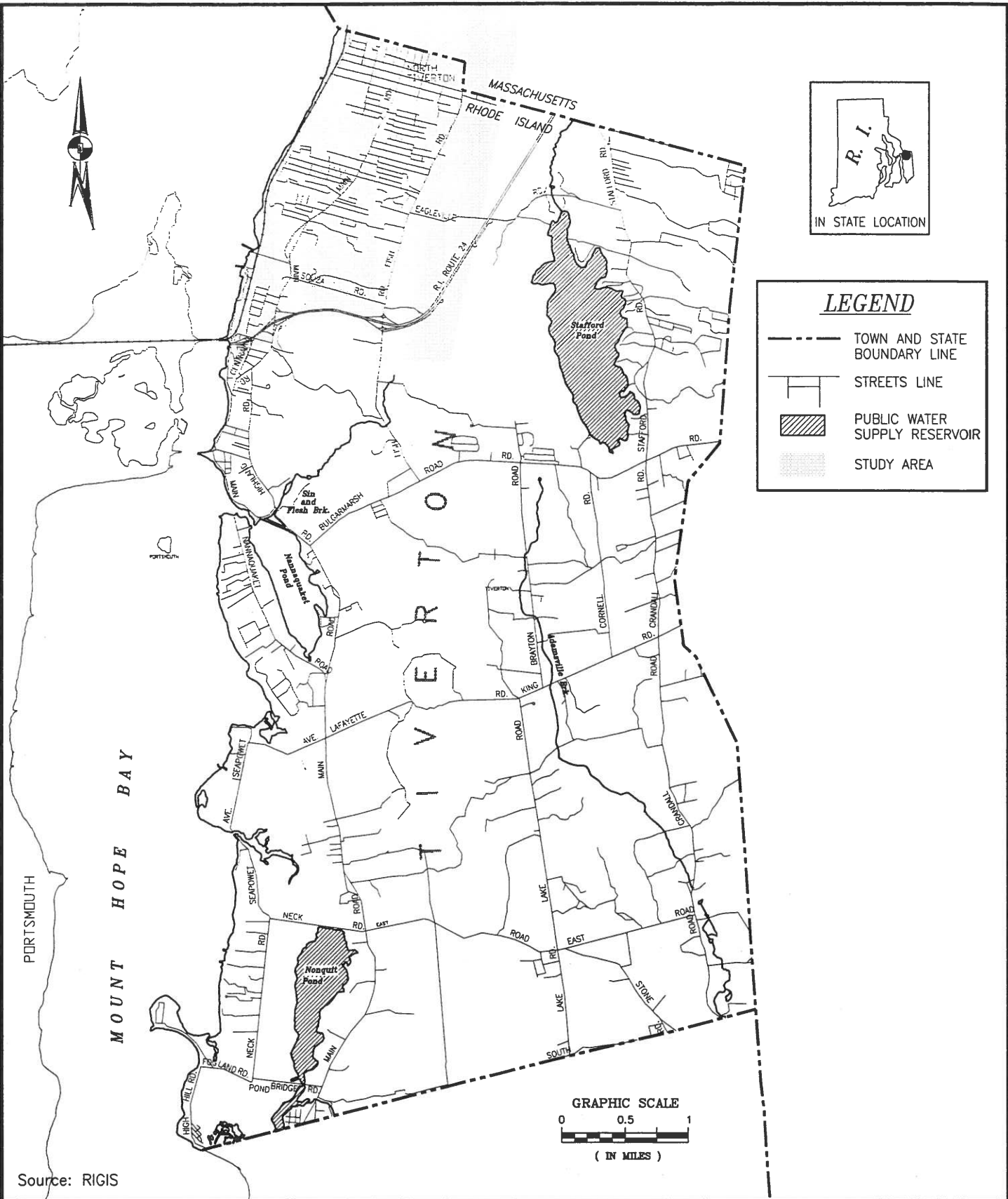
This Town of Tiverton Wastewater Facilities Plan Update has been prepared in conformance with the Rhode Island Department of Environmental Management (RIDEM) policies and guidelines. The Facilities Plan satisfies the intent of the State Guide Plan and the draft Tiverton Comprehensive Community Plan (CCP, 1996) by providing a blueprint for systematic management of the town's present and future wastewater facilities, and to plan for optimal future expansion of the system. The Facilities Plan Update also allows the Town to qualify for State Revolving Fund assistance for capital investments to the system, as well as other federal monies that may become available.

The purpose of this Facilities Plan Update is to update the currently approved Facilities Plan by reaffirming the need for wastewater needs in Tiverton, particularly in the proposed Town Industrial Park area and for other proposed developments, and to update the environmental assessment necessary to address provision of sanitary sewer service to high density residential areas of North Tiverton. The current townwide Wastewater Facilities Plan was approved by EPA on October 15, 1976.

2.2 Planning Area Parameters

2.2.1 Planning Area

The Town of Tiverton is located in the East Bay section of Rhode Island, in Newport County as shown in Figure 2-1. The Town borders Westport, Massachusetts to the east, Little Compton to the south, and Fall River, Massachusetts to the north. The western boundary of the Town is defined by the Sakonnet River and Mount Hope Bay.



Source: RIGIS



**TOWN OF TIVERTON, RI
WASTEWATER FACILITIES PLAN
UPDATE**

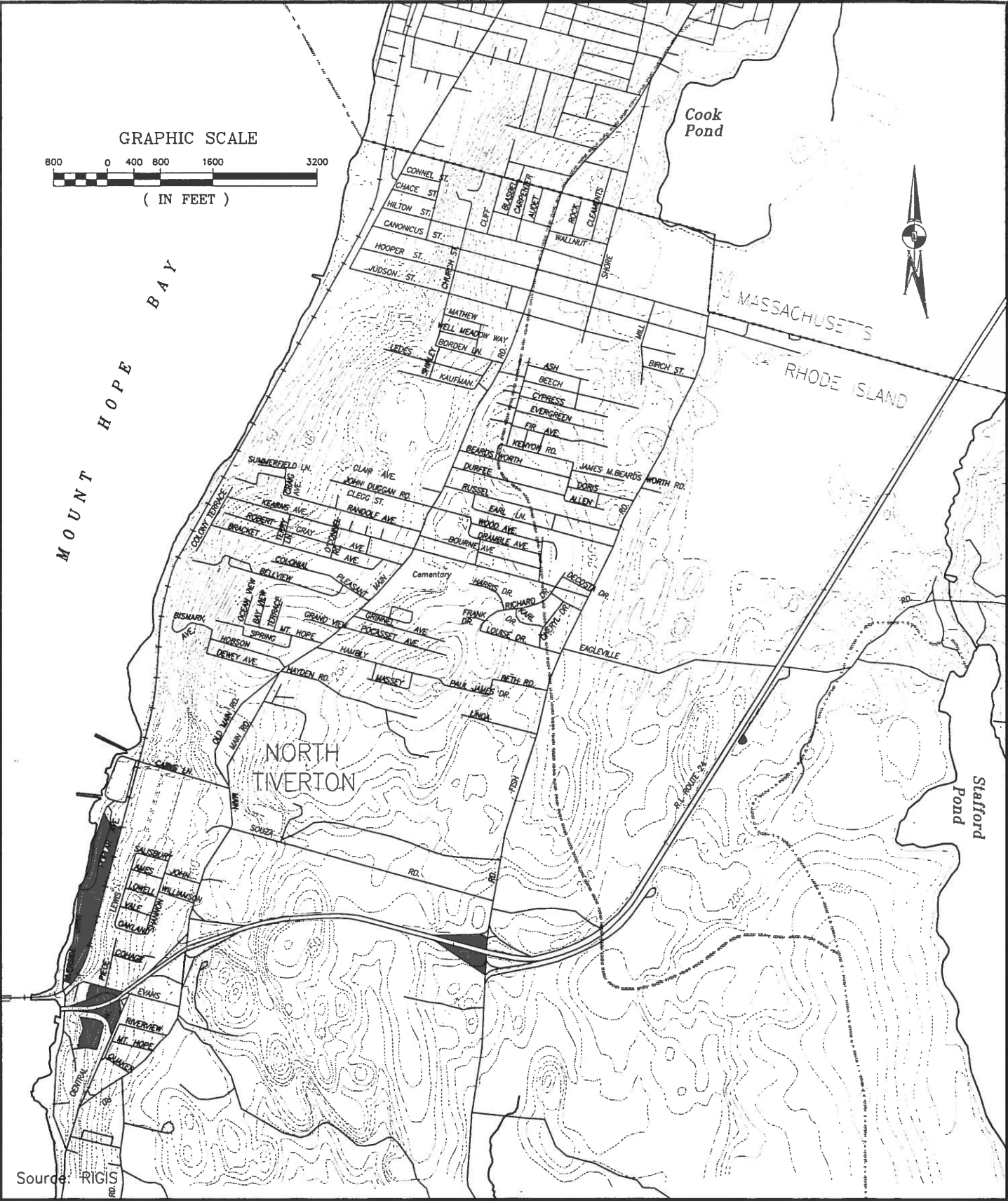
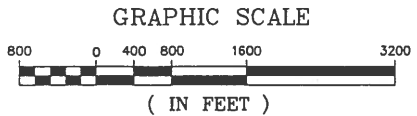


The LOUIS BERGER GROUP, Inc.
295 Promenade Street, Providence, RI 02908

**Figure 2-1:
TOWN MAP - TIVERTON**

Scale: As Shown

January 2000



Source: RIGIS



**TOWN OF TIVERTON, RI
WASTEWATER FACILITIES PLAN
UPDATE**



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**Figure 2-2:
STUDY AREA**

Scale: As Shown

January 2000

The Facilities Plan, dated 1976, recommended providing a wastewater collection system in four areas of the Town: North Tiverton, Stone Bridge, Bulgarmarsh Road, and Stafford Road. The Facilities Plan concluded that the remainder of the Town would be best served by on-site individual sewerage disposal systems (ISDS). The basis of this decision was on economics, landuse, lot sizes, and soil conditions. The conclusion remains valid and consistent with the draft CCP. Therefore, the planning area of this document will be limited to these areas. Figure 2-2 depicts the planning area.

The Town is currently in the process of developing an ISDS Wastewater Management Plan on a town wide basis. The ISDS Wastewater Management Plan will be a separate stand alone document that develops the goals and objectives of the ISDS Wastewater Management Plan for unsewered areas. The ISDS Wastewater Management Plan will also address areas in which sewerage is planned, but may not be constructed for a period of time.

The facilities planning area shown in Figure 2-2 includes the high density residential area of North Tiverton, as well as the proposed 228-acre industrial development area adjacent to the intersection of Route 24 and Fish Road. It also includes consideration of the Fall River Wastewater Treatment Facility (WWTF) which receives all wastewater and septage generated in the town for treatment and disposal. Currently, only a limited number of properties adjacent to the town line are connected to the Fall River sanitary sewer system.

2.2.2 Political/Institutional Structures

The Town of Tiverton has a Council form of government. The Council President is the Chief Executive, while the Town Administrator manages the day-to-day affairs of the Town. The majority of the Town's policy and planning functions are carried out by various volunteer boards and commissions, which are overseen by the elected town council. The annual budget is developed by the budget committee and subject to review and approval by a financial town meeting at the beginning of May each year. The Town's fiscal year begins on July 1.

2.2.3 Planning Entities

Sewer system planning for the Town of Tiverton is coordinated by the Sewer Commission under general oversight by the Town Administrator and the Town Council. The Town completed a draft Comprehensive Community Plan (CCP) in 1996, which is currently under review by the Town Council and the State Planning Board. The draft CCP was used in the development of this Facilities Plan Update to establish baseline and future conditions in Tiverton.

Berger is assisting the Town Administrator and Sewer Commission by developing an inventory of existing and future conditions affecting wastewater facilities, and by formulating and evaluating alternatives for wastewater management in this Wastewater Facilities Plan Update document. As previously stated, the Town is currently in the process of developing an ISDS Wastewater Management Plan on a town wide basis that develops the goals and objectives of the ISDS Wastewater Management Plan for unsewered areas.

**3.0 SUMMARY OF EXISTING WASTEWATER
FACILITIES PLAN**

3. SUMMARY OF EXISTING WASTEWATER FACILITIES PLAN

3.1 Introduction

In accordance with the requirements of Section 201 of Public Law 92-500 "Federal Water Pollution Act Amendments of 1972", the Town of Tiverton prepared a wastewater collection and treatment "Facilities Plan" dated October 15, 1976. The Plan aimed at meeting the townwide wastewater management needs present in 1976, and established a 20-year planning solution for the collection and treatment of wastewater generated townwide.

3.2 Wastewater Management Needs

The Facilities Plan identified the following wastewater management needs throughout the town:

- Extensive use of septic tanks and leaching fields are used to dispose of the wastewater. In 1974, a soils report prepared by the Soil Conservation Service concluded that 80-percent of the land within the town has severe or very severe limitations for the location of septic tank leaching fields based on water table elevation, bedrock depths, slopes, degree of stoniness, etc. The report also stated that septic systems can be located in some areas with generally undesirable soils characteristics, but the cost of installation and operation may be substantial.
- There is a potential health hazard from surfacing of wastewater effluent due to poor soil characteristics and the large number of subsurface disposal systems. Due to limited areas in town having access to public water supply, there is also a greater health hazard from potential contamination of groundwater due to the proximity of private wells to subsurface disposal systems.

- Disposal of domestic and industrial wastewater for densely populated areas can most efficiently be managed by the installation of a municipal sewer system.
- In more sparsely populated areas of the town, such as south Tiverton, zoning restrictions requiring larger lot sizes can help to minimize potential future problems due to increased development pressures.

3.3 Wastewater Flows

The potential wastewater flows in the town were estimated as follows:

- **Period of Design:** The system was designed to serve the town of Tiverton to the year 2025, thus had an expected design life of 50 years.
- **Population:** The projections were made using the "Cohart Method". The saturation and average population for the five residential development types were developed, as shown in Table 3-1.

**TABLE 3-1
RESIDENTIAL POPULATION DENSITIES ESTIMATED FOR THE YEAR 2025**

Zoning Classification	Location	Lot Size	Saturated Density	Average Density
		sq.ft.	People per acre	People per acre
High density (R-15)	North Tiverton Area	15,000	7.2	6.8
Medium Density (R-30)	Stone Bridge & Stafford Road Areas	30,000	3.8	2.7
Low Density (R40)	Highland Road - Stone Bridge Area	40,000	3.1	1.7
Low Density (R60)	South Tiverton Area	60,000	2.2	1.0
Rural Density (R80)	South Tiverton	80,000	1.6	0.7

- **Wastewater Flows:** The following were the design aids/assumptions used to determine the design wastewater flows generated. Table 3-2 summarizes the projected population, wastewater generation, and daily loadings for typical wastewater characteristics for the design period of the project.

**TABLE 3-2
ESTIMATED WASTEWATER CHARACTERISTICS**

		1975 Initial	2000 Initial Design	2025 Ultimate Design
Town Population		15,000	19,500	24,000
Population Sewered		7,600	13,500	16,100
Residential Flow	mgd	0.39	0.94	1.54
Commercial & Industrial Flow	mgd	0.34	0.52	0.68
Infiltration	mgd	0.26	0.54	0.78
Total Average Daily Flow	mgd	1.0	2.0	3.0
Minimum 24 hrs	mgd	0.4	0.9	1.4
Maximum 24 hrs	mgd	2.2	4.2	6.0
Peak Hourly	mgd	3.7	6.6	9.4
BOD5	ppd	1,960 (360)	3,700 (300)	5,180 (380)
SS	ppd	2,630 (1,030)	4,400 (1,040)	6,450 (1,650)
NH3-N	ppd	195 (30)	360 (25)	530 (32)

Note: Values in parenthesis indicate contribution from septage

The figures in Table 3-2 were based on the following assumptions:

- **Residential Wastewater Flows:**
 - Initial Demand of 47 gpcd (gallons per capita per day)
 - 2 percent increase per year for the residential per capita wastewater flows
 - Ultimate residential wastewater demand in the year 2025 is projected as 94 gpcd

- **Commercial Wastewater Flows:**
 - Initial average demand of 500 gpad (gallons per acre per day)
 - Saturation average demand flow of 1,750 gpad was estimated
- **Industrial Wastewater Flows:**
 - Initial average demand of 500 gpad (gallons per acre per day)
 - Saturation average demand flow of 1,750 gpad was estimated
- **Infiltration Flows:**
 - Average design infiltration rate was assumed as 4,200 gpdm (gpd/mile)
 - Maximum rate of infiltration was assumed as 6,300 gpdm

3.4 Wastewater Collection System

A wastewater collection system was developed by dividing the Town into the following four subareas (see Figure 3-1):

- ▶ North Tiverton;
- ▶ Stone Bridge;
- ▶ Bulgarmarsh Road; and
- ▶ Stafford Road.

The North Tiverton area consisted of Mount Hope Interceptor and a series of local sewer mains. The Mount Hope Interceptor ran along the rail road easement to a pump station just prior to the State line for ultimate discharge at the Fall River WWTF. The interceptor began as a 30-inch line and terminated as a 36-inch line with a peak design flow of 22,000 gpd.

Stone Bridge was defined from Bulgarmarsh Road to approximately the Sakonnet River Bridge. The sewer service in this area consisted of extension to the Mount Hope Interceptor, two pump stations, and local laterals. The interceptor began as an 18-inch line with 6,650 gpd peak flow and increased to a 30-inch line at Bridgeport Road.

Bulgarmarsh Road (Route 177) area was defined from the State line to Main Road. The sewer service consisted of a force main, pump station, and two trunk sewers. The Bulgarmarsh Interceptor also picked up flow from the Stafford Pond Interceptor in addition to some medium density residential areas adjacent to Bulgarmarsh Road.

Stafford Road area was defined as the residential area adjacent to Stafford Pond in the Northeastern area of Tiverton. The sewer service in this area consisted of the following trunk sewers: Stafford Road Trunk, Windwood Drive Trunk, Montgomery Trunk, and Eagleville Trunk. The sewershed flows towards the Bulgarmarsh Road via a number of pump stations and force mains.

The collection system consisted of Interceptors, trunk sewers, and local sewer mains. Table 3-3 summarizes the length, size and the design peak flowrates developed for Interceptors and trunk sewers in each of the four areas. Figure 3.1 illustrates the location of sewers, direction of flow, size of lines, and phased construction.

3.5 Wastewater Treatment and Disposal

The Facilities Plan recommended two alternatives for the treatment of the wastewater generated in Tiverton: construct a wastewater treatment facility in Tiverton or utilize existing Fall River WWTF. The preferred alternative for the treatment of wastewater was to connect to the existing Fall River WWTF. This alternative was clearly more cost-effective than siting a new treatment and disposal facility in the town.

**TABLE 3-3
AREAWIDE INTERCEPTING AND TRUNK SEWERS**

Area	Intercepting sewer			
	Description	Pipe Size (in)	Length (ft)	Design Peak Flowrates (gpd)
North Tiverton	Mount Hope Interceptor (P.S. No. 4 to State Line)	30, 36	14,150	16,350 & 22,000
	Mount Hope Interceptor (State Line to Fall River WWTF)	36	1,100	22,000
Stone Bridge	Mount Hope Interceptor (North Ave to P.S. No. 4)	24, 30	3,300	11,250 & 16,350
	Mount Hope Interceptor (Bridgeport Rd to P.S. No. 7)	30	6,650	16,350
	Mount Hope Interceptor (Bulgarmarsh Rd to Bridgeport Rd)	18, 21, 30	2,350	6,650 & 9,050 & 16,350
Bulgarmarsh Road	Bulgarmarsh Road Interceptor (Fish Road to Main Road)	15	4,100	4,150
	Bulgarmarsh Road Interceptor (Presidential Ave to P.S. No. 6)	18, 24	9,250	6,650 & 11,250
	State Line Trunk Sewer	10, 12	3,900	1,750 & 2,400
Stafford Road	Stafford Road Trunk Sewer (Manchester St to Montgomery St)	10, 12, 18	7,200	1,750 & 2,400 & 6,650
	Stafford Road Trunk Sewer (Old Stafford Rd to P.S. No. 10)	18	1,600	6,650
	Windwood Drive Trunk Sewer	18	1,000	6,650
	Montgomery Street Trunk Sewer	18	1,900	6,650
	Eagleville Trunk Sewer	10	2,100	1,750

The wastewater collection system was scheduled to be completed in four stages, as follows:

■ **First Stage:**

- Acquire capacity in the Fall River WWTF through an Intermunicipal Agreement.
- Construct an Interceptor along the Mount Hope Bay to convey the collected wastewater from North Tiverton to the Fall River WWTF; and
- Construct trunk sewers and local sewer mains to serve the North Tiverton area.

■ **Second Stage:**

- Construct local sewer mains in the Stone Bridge area.

■ **Third Stage:**

- Construct local sewer mains in the Bulgarmarsh Road and Stafford Road areas.

■ **Fourth Stage:**

- The future design would be developed based on the development patterns in the town.

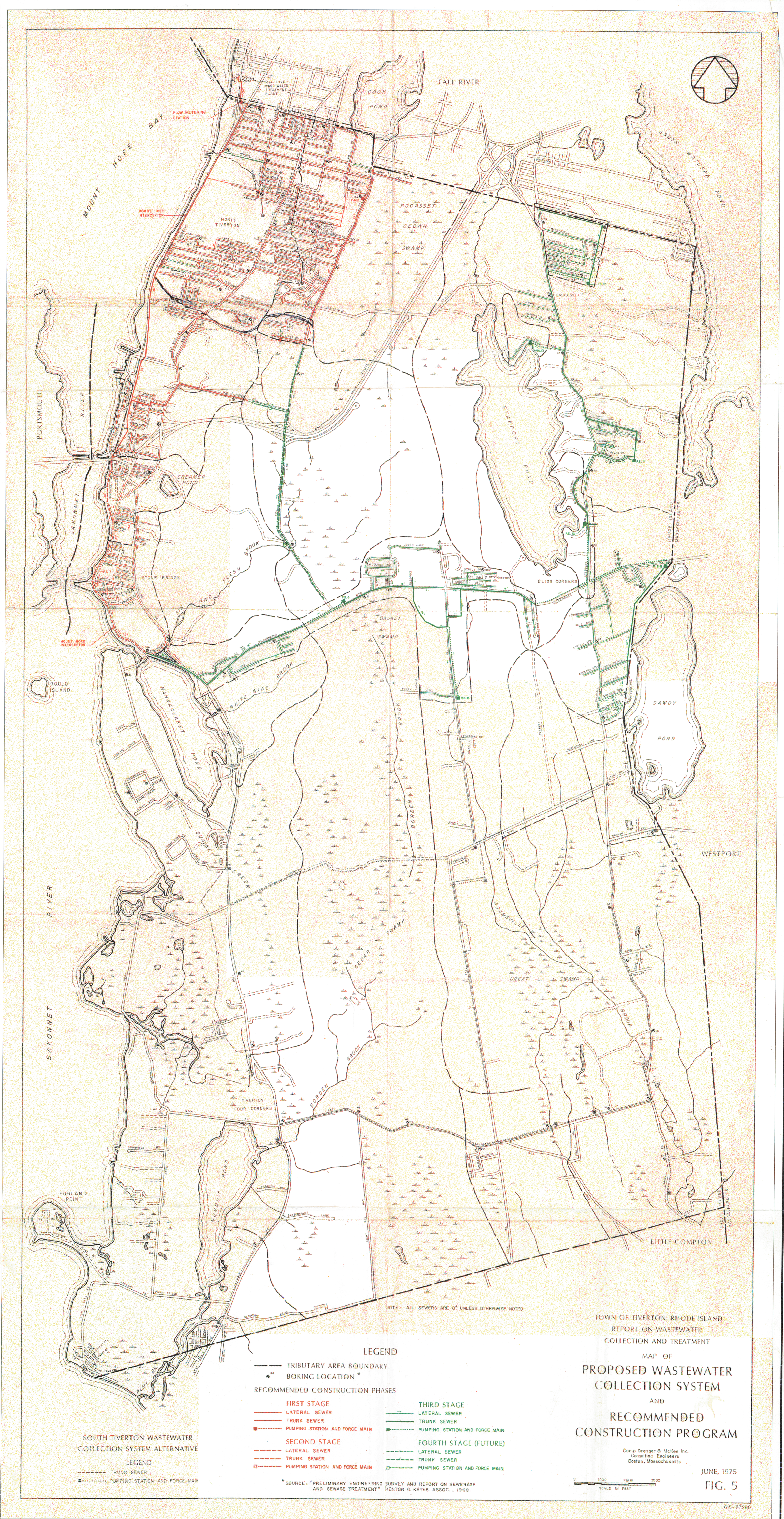


Figure: 3-1

4.0 CURRENT SITUATION

4.0 CURRENT SITUATION

The current physical, demographic, and infrastructure characteristics of Tiverton are summarized in this section. The discussions are focused on the study area, as defined in Section 2.2.1. These current conditions define the baseline physical constraints and service needs against which the proposed wastewater management facilities will be evaluated.

This section also summarizes various environmental characteristics with relevance to implementation of wastewater management systems/facilities.

4.1 Surficial Soils

Surficial soils are a determining factor for the suitability and performance of on-site wastewater disposal systems. The majority of the surficial soils in the study area have severe septic constraints due to high water table, steep slopes, and low permeability, based on the Soil Conservation Service Soil Survey of Rhode Island. Figure 4- 1 shows the soil types present in the study area.

Table 4-1 presents the dominant soil types in Tiverton (> 1% in area) and their limitations for on-site wastewater disposal. RIDEM Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems (ISDS) specify that leach lines should be installed with the outflow line at a minimum depth of 18 inches. Although the leach line may be as deep as 42 inches, it is recommended that it be placed as shallow as practical. Therefore, the permeability of soil at a depth range of 18 to 24 inches is very important for the performance of an ISDS system. RIDEM ISDS Regulations also specify that the minimum ISDS percolation rate for use of a subsurface disposal system is not to be greater than 40 minutes/inch.

As indicated in Table 4-1, the soils in the majority of Tiverton are generally unsuitable for the installation and use of ISDS absorption fields due to low percolation rates (>40 minutes per inch) within the 18-24 inch zone. The most prevalent soils group in Tiverton is the Newport series

consisting of deep, well-drained medium textured soils. The permeability of these soils is moderate to moderately rapid in the surface layer, however, very slow in the substratum. The substratum layer of low permeable soil places moderate to severe constraints to on-site wastewater disposal, typically necessitating special design and installation considerations. The depth to the high water table is typically greater than four feet.

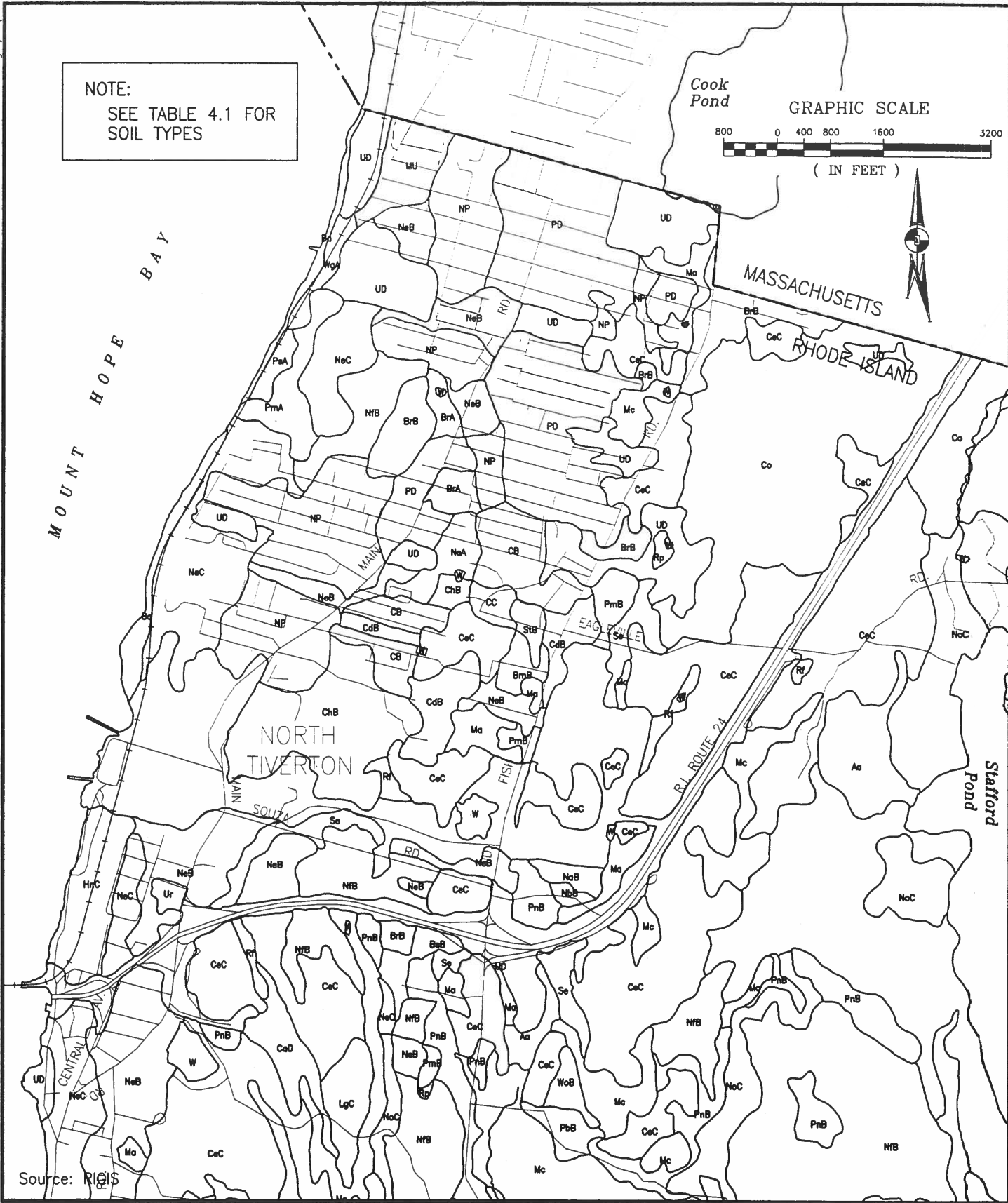
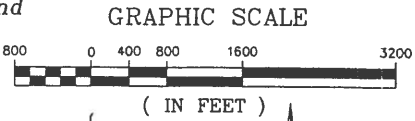
In summary, the soils of Tiverton typically present on-site wastewater management constraints due to physical properties such as a high groundwater table and low permeability. Figure 4-2 shows the extent of the areas within the study area with severe septic constraints based upon SCS soil classifications.

4.2 Geology

The topography of Tiverton consists of a gently rolling topography which rises from waterfront to low bluffs along the Sakonnet River. Low lying coastal and freshwater wetlands occupy a large area of the Town. The highest elevation in Tiverton is located at Pocasset Hill in North Tiverton with an elevation of 320 feet above mean sea level. From this point, a ridge line is formed along Main Road to Fall River roughly parallel to the Sakonnet River. This ridgeline serves as a divide to define the glacial till within the Town. The area to the east of the ridge is upland till plains, while the area to the west is Narragansett till plains.

Upland till plains is the most prevalent glacial till in Rhode Island. The till is derived mostly from granite, schist, and gneiss rocks. The till is commonly characterized as being relatively loose and unconsolidated. Glacial stones and boulders are scattered on the surface and bedrock outcrops are common. Narragansett till plains are covered with glacial till from sedimentary rock, shale, sandstone, conglomerate, and coal. The till is generally compacted and finer textured. The bedrock in Tiverton is comprised of older granite from several ages and Pennsylvania sedimentary rock.

NOTE:
SEE TABLE 4.1 FOR
SOIL TYPES



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**Figure 4-1:
SOIL TYPES**




Scale: As Shown

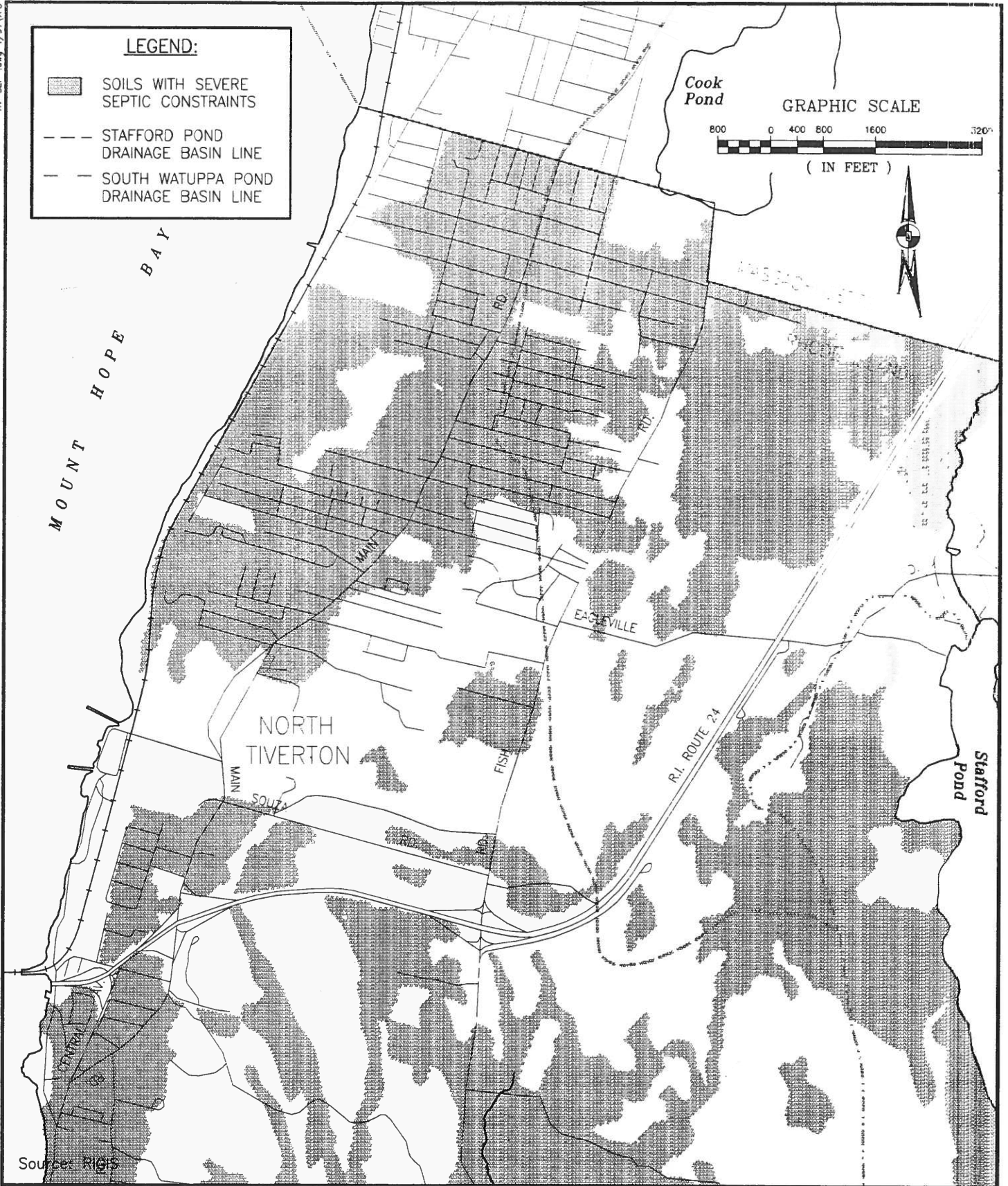
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TABLE 4-1. TIVERTON SURFICIAL SOILS

	Soil	Area		Disposal Constraints	Depth (inches)	Perm. (min/in)
		Acre	%			
Aa	Adrian Muck	330	1.7	Severe: wetness, floods	0-20 20-60	3-20 3-20
BsB	Broadbrook very stony silt loam	880	4.6	Severe: percs slowly	0-36 36-60	30-100 > 300
CeC	Canton-Charleton fine sandy loam	2,010	10.5	Moderate: slope, large stones	0-22 22-60	10-30 3-10
ChB ChD	Canton-Charleton stony fine sandy loam	785	4.1	Moderate: slope, large stones	0-22 22-60	10-30 3-10
Co	Carlisle Muck	750	3.9	Severe: wetness, floods	0-55	10-30
EfA EfB	Enfield silt loam	250	1.3	Slight	0-25 25-60	30-100 > 3
Ma	Mansfield mucky silt loam	275	1.4	Severe: wetness, floods	0-15 15-60	30-100 > 300
Mc	Mansfield very stony mucky silt	1,310	6.8	Severe: wetness, floods	0-15 15-60	30-100 > 300
Mk	Matanuck mucky peat	280	1.5	Severe: wetness, floods	0-6 6-60	3-10 > 3
NeA NeB NeC	Newport silt loam	3,505	18.3	Severe: percs slowly	0-8 8-24 24-60	10-100 10-100 > 300
NfB	Newport very stony silt loam	1,230	6.4	Severe: percs slowly	0-33 33-60	30-100 3-30
NoC	Newport extremely stony silt loam	665	3.5	Severe: percs slowly, large stones	0-8 8-24 24-60	10-100 10-100 > 300
PmA PmB	Pittstown silt loam	745	3.9	Severe: wetness, percs slowly	0-28 28-60	30-100 300-1000
PnB	Pittstown very stony silt loam	735	3.8	Severe: wetness, percs slowly	0-28 28-60	30-100 300-1000
Rf	Ridgebury, Whitman and Leicester extremely stony fine sandy loam	525	2.7	Severe: percs slowly, large stones	0-20 20-60	10-100 > 300
Se	Stissing silt loam	680	3.6	Severe: wetness, percs slowly	0-15 15-60	30-100 300-1000
Sf	Stissing very stony silt loam	500	2.6	Severe: wetness, percs slowly	0-28 28-60	30-100 300-1000
UD	Udorthents, urban land complex	790	4.1	N/A	N/A	N/A

LEGEND:

-  SOILS WITH SEVERE SEPTIC CONSTRAINTS
-  STAFFORD POND DRAINAGE BASIN LINE
-  SOUTH WATUPPA POND DRAINAGE BASIN LINE



Source: RIGIS



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**Figure 4-2:
SUMMARY OF
SEPTIC CONSTRAINTS**

Scale: As Shown

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4.3 Wetlands

Figure 4-3 shows the wetland sites in Tiverton identified by the Rhode Island Geographic Information System (RIGIS). Wetlands comprise a significant land area in Tiverton and create a major natural feature within the town. Saltwater wetlands, defined by having a salinity in excess of 0.5 parts per thousand, comprise over 528 acres. The two largest saltwater wetlands in Tiverton are Sapowet and Fogland Marshes. Freshwater wetlands cover approximately 4,500 acres. The most significant freshwater wetlands are Great Swamp and Cedar Swamp in southern Tiverton and Basket Swamp and Pocasset Cedar Swamp in North Tiverton.

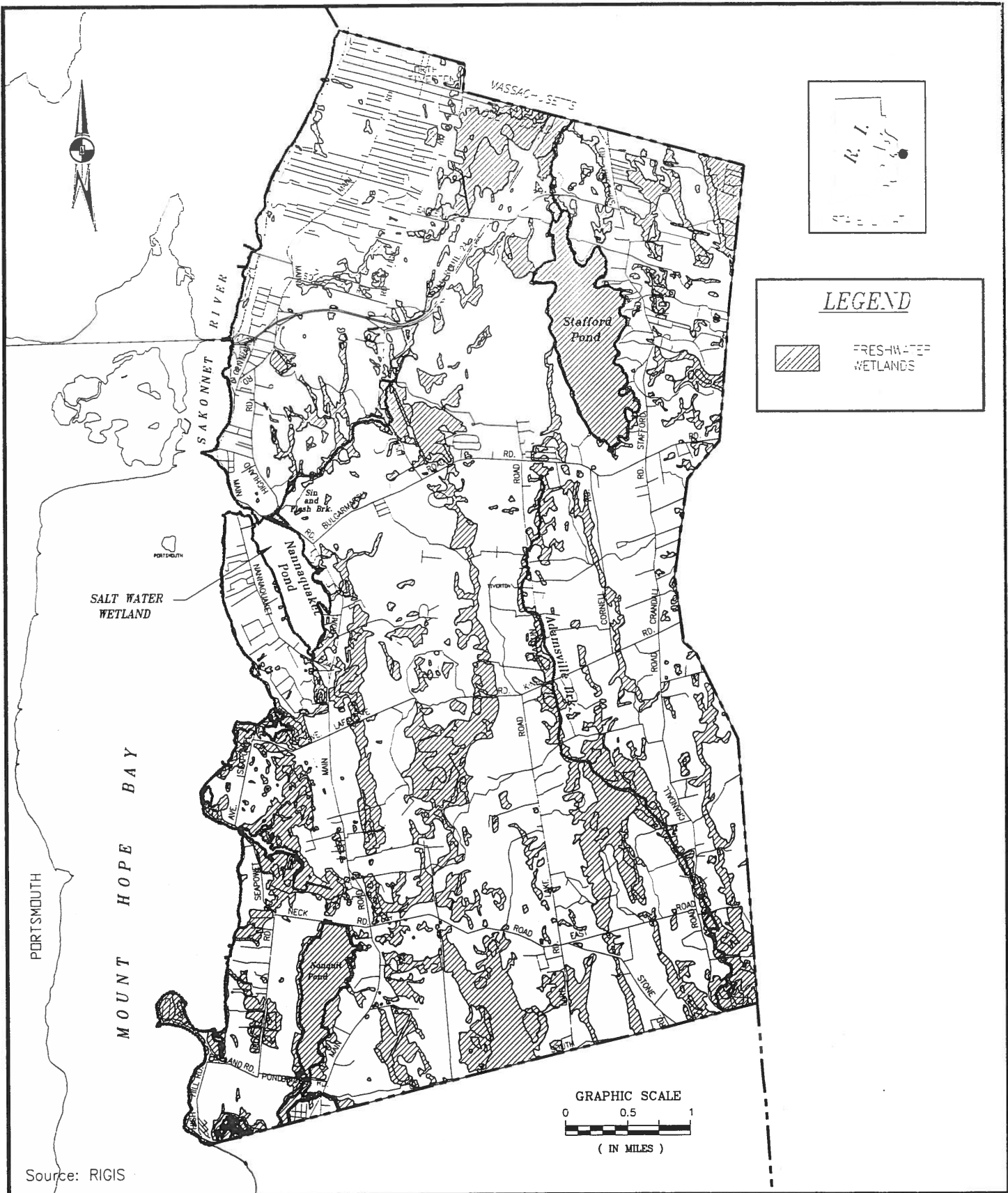
4.4 Floodplains

Development in stream flood plains may exacerbate flooding due to increased or concentrated downstream runoff. The flood hazard areas associated with Tiverton surface waters are defined in the Flood Insurance Rate Maps for the town showing flood boundaries, floodways, and base flood elevations (FEMA 1992). Flood hazard analyses have been completed by the Federal Emergency Management Agency (FEMA) in the Flood Insurance Study revision of April 17, 1984, and indicate the anticipated extent of flooding and detailed water surface data.

Figure 4-4 presents flood hazard areas for Tiverton. The areas outlined are subject to coastal flooding. The areas denoted by "1" and "2" are subject to velocity hazard due to wave action.

4.5 Coastal Areas

The coastal resources of Tiverton are regulated by the state Coastal Resources Management Council (CRMC) program, which defines six types of coastal waters and the appropriate activities allowed in each. CRMC jurisdiction extends to all tidal waters including coastal ponds, non-tidal coastal ponds associated with a barrier beach system, shoreline features such as beaches, coastal wetlands, coastal cliffs, bluffs and banks, rocky shores and manmade shorelines, and a 200-foot buffer zone shoreward of all of these features.



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**Figure 4-3:
WETLANDS**

Scale: As Shown

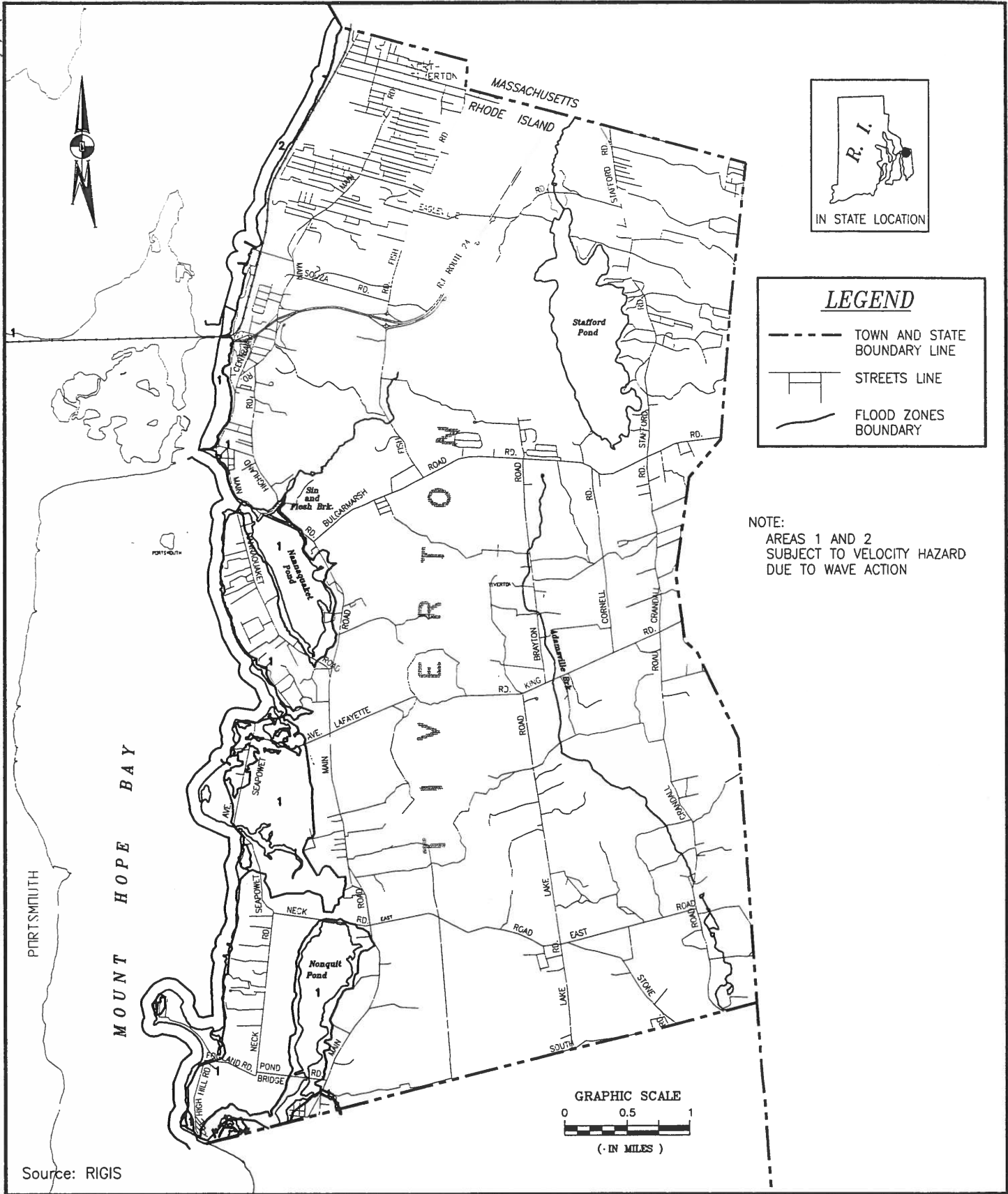
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LEGEND

-  TOWN AND STATE BOUNDARY LINE
-  STREETS LINE
-  FLOOD ZONES BOUNDARY

NOTE:
AREAS 1 AND 2
SUBJECT TO VELOCITY HAZARD
DUE TO WAVE ACTION



Source: RIGIS



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**Figure 4-4:
FLOOD HAZARD AREAS**

Scale: As Shown

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Table 4-2 indicates the shoreline development types prohibited or permitted in accordance with CRMC Category A and B applications for Type 1 Conservation Waters. Category A applications are required for routine matters and categories of construction and maintenance work that do not require review by the full Council if established criteria are met. More rigorous Category B review is required to ensure that proposed alterations conform with the goals, policies, prerequisites, information requirements, and standards of the CRMC program.

4.6 Surface Water Characteristics

RIDEM assesses the water quality of the State's rivers, streams, estuaries and oceans to identify whether or not designated uses are being supported/attained. The most recent summary of RIDEM's water quality findings is published in the biennial State of the State's Waters - Rhode Island: A Report to Congress, July 1997. This report classifies the water quality resources of the following water bodies in Tiverton: Sakonnet River, Stafford Pond, Nonquit Pond, and Adamsville Brook (refer to Figure 4-3 for the location of the subject waters). Provided in Table 4-3 is a summary of RIDEM's evaluation.

Pursuant to Section 303(d) of the Clean Water Act, RIDEM has provided public notice of a draft list of Rhode Island water bodies that are not in compliance with Rhode Island Water Quality Standards, and for which more stringent pollution controls need to be developed. The Section 303(d) list provides a comprehensive inventory of water bodies impaired by all sources, including point sources, non-point sources, or a combination of both. Section 303(d) established a continuous process for Rhode Island priorities in development of a Total Maximum Daily Load (TMDL) study. The water bodies located in Tiverton included in the 1998 303(d) list are shown in Table 4-4.

TABLE 4-2
SHORELINE DEVELOPMENT IN CRMC TYPE 1 WATERS

Filling, Removal, and Grading of Shoreline Features

- Prohibited in or on Beaches and Dunes, Coastal Wetlands, Cliffs, Bluffs and Banks, Rocky Shores
- Category A review is required on Moderately Developed Barrier Beaches
- Category B review is required in Areas of Historic/Archaeological Significance

Residential, Commercial/Industrial and Recreational Structures

- Prohibited in or on Tidal Waters, Beaches and Dunes, Moderately Developed Barrier Beaches, Coastal Wetlands, Cliffs, Bluffs, and Banks, and Rocky Shores
- Category B review is required for residential and recreational structures in areas of Historic and Archaeological Significance, and for recreational structures along Manmade Shores.

Municipal Sewage Treatment Facilities

- Category B review is required in areas of Historic and Archaeological Significance and for municipal sewer line construction on Moderately Developed Barrier Beaches
- Prohibited in or on Tidal Waters, Beaches and Dunes, Coastal Wetlands, Cliffs, Bluffs and Banks, Rocky Shores and along Manmade Shorelines.

ISDS

- Prohibited in or on Tidal Waters, Beaches and Dunes, Moderately Developed Barrier Beaches, Coastal Wetlands, Cliffs, Bluffs and Banks, Rocky Shores and along Manmade Shorelines.
- Category B review is required in areas of historic and archaeological significance.

Source: CRMC, *The State of Rhode Island Coastal Resources Management Program* (as amended), 1990.

**TABLE 4-3
SUMMARY OF WATER QUALITY EVALUATION 305(B) REPORT**

Waterbody	Status	Water Quality Class	Comment
Adamsville Brook	Threatened	B	Biological monitoring indicate waterbody moderately impaired.
Nonquit Pond	Threatened	A	Historical elevated levels of turbidity, and total coliform.
Sakonnet River	Not Supporting	SA	Impacted due to high density of boats in Stone Bridge area, non-point sources from road and agricultural runoff, and failed septic systems.
Stafford Pond	Partially Supporting	A - drinking water with treatment	Excessive nutrient loadings cause frequent algae blooms. Failed septic systems and agricultural runoff expected sources.

**TABLE 4-4
303(d) LIST: TIVERTON WATER BODIES**

Item	Stafford Pond	Sakonnet River
Waterbody ID Number	RI0007037L-01	RI0010031-00
TMDL Priority	Group 1	Group 1
Area (Acres)	480.00	0.63
Status	PS	NS
DEM Trophic Class	E	--
Water Quality Class	A	SA
Cause	Hypoxia, nutrients, excessive algal growth	Fecal Coliform, Shellfish Closure

Source: Rhode Island Department of Environmental Management, *1998 Rhode Island 303(d) List*: 1998

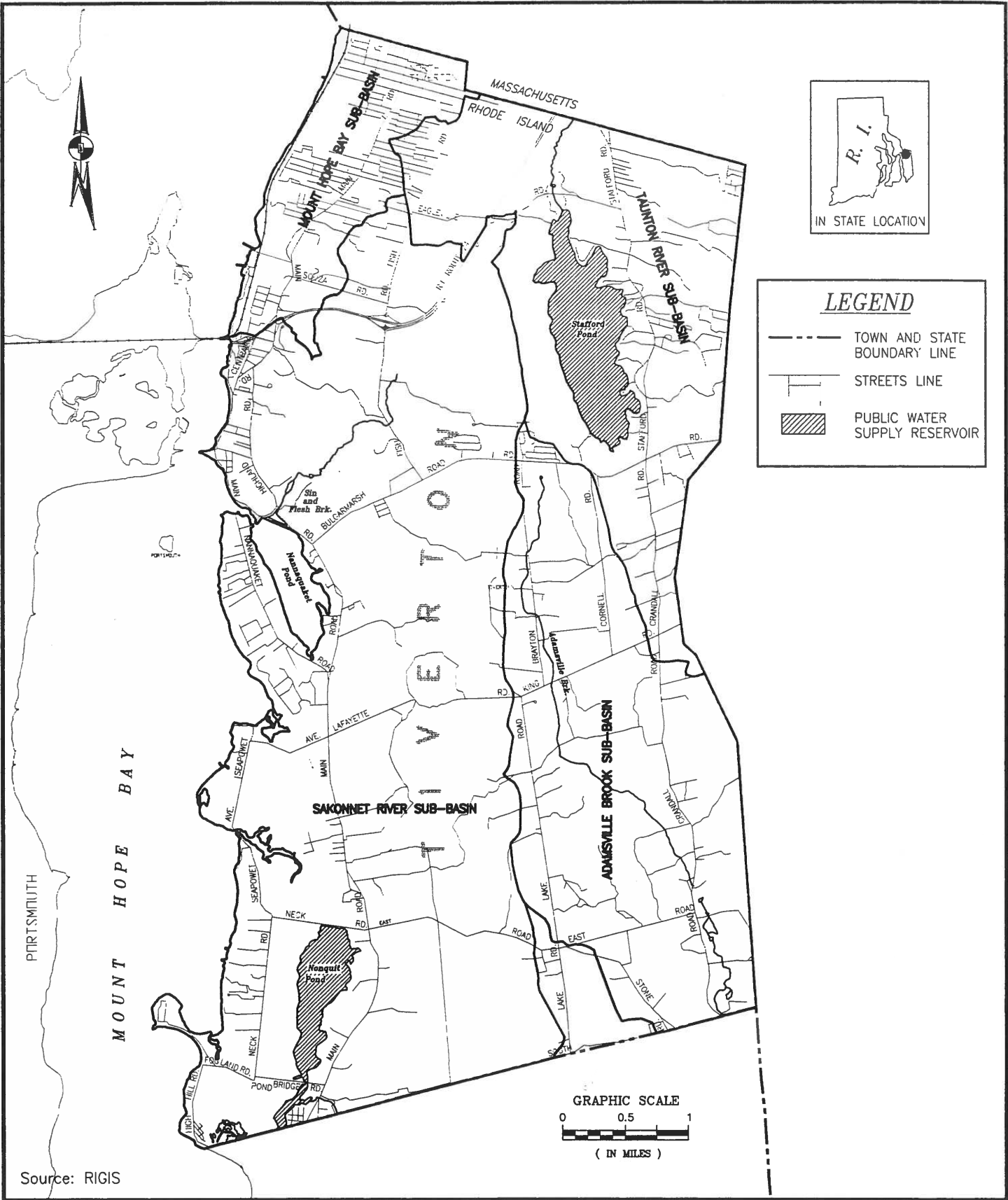
Key: PS = Partially Supporting; NS = Non Supporting; E = Eutrophic

4.6.1 Public Drinking Water Reservoirs

There are two public drinking water reservoirs located in Tiverton: Stafford Pond and Nonquit Pond. Stafford Pond, located in northeastern Tiverton, is the primary source of drinking water for Tiverton, Fall River, and Portsmouth. The water rights to the pond are owned by the City of Fall River and are purchased by Town's three water districts: Stone Bridge Fire District, former Tiverton Water Authority, and North Tiverton Fire District. Stafford Pond is a tributary to South Watuppa Pond, which is also part of the Fall River water supply system. Stafford Pond only partially supports its water quality classification due to elevated fecal coliform and nutrient levels. Failed septic systems from development on its eastern shore, and runoff from a nearby dairy farm, have been potentially identified as major sources of pollutants. In addition, recreational uses on the Pond including the use of motor boats have the potential for contamination. Nonquit Pond is currently evaluated as fully supporting of its water quality classification, but threatened due to historical elevated levels of coliform and turbidity. Provided in Figure 4-5 are the watershed basins for Stafford Pond located within the study area.

4.6.2 Point Sources of Pollution

The Regulations for the Rhode Island Pollutant Discharge Elimination System (RIPDES) prohibits point source discharges of pollutants to Waters of the State, unless authorized by a RIPDES permit. Currently, there are three facilities authorized to discharge to surface waters in Tiverton: Borden and Remington (RI0000442), former Charter Oil Terminal (RI0000410), and Tiverton High School (RI0100200). The Town of Tiverton owns and operates a package treatment plant that discharges secondary treated sanitary wastewater to Sin and Flesh Brook. Borden and Remington is authorized to discharge stormwater from a petroleum handling area through an oil/water separator to Mount Hope Bay. The former Charter Oil Terminal (now known as Northeast Properties) no longer stores petroleum on-site and is undergoing an active groundwater and soils remediation project to prepare the site for future development. The discharge authorized by the RIPDES permit at this site is for treated groundwater and stormwater associated with remedial activities.



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**Figure 4-5:
PUBLIC WATER SUPPLY
RESERVOIRS**

Scale: As Shown

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4.6.3 Non-point Sources of Pollution

Non-point sources of pollution are described as a wide and diffused group of activities and processes which contribute pollutants to surface water bodies and ground water aquifers. Sources of non-point source pollution include: failing septic systems, soil erosion from construction sites, application of road salts to roadways, overuse of fertilizers and pesticides on lawns and gardens, leaking underground storage tanks, agricultural runoff, and runoff from streets and parking lots. The mass of pollutants from these non-point sources can be reduced through source control techniques or installation of pollution control measures.

RIDEM has developed a Non-point Source Pollution Management Plan for Ten Surface Water Supply Watershed; Stafford Pond basin is one of the ten. The purpose of this plan is to provide communities and water suppliers with data and recommendations that can assist with the protection of the surface water reservoirs via enhanced management of land use within reservoir watersheds. The plan includes recommendations to help mitigate existing non-point source pollution problems. The Town has adopted a Soil Erosion and Sedimentation Control Ordinance to minimize the transport of sediment to surface waters from construction activities. The Town must continue its efforts in establishing a surface and groundwater management strategy to control non-point pollution. Pollutants associated with construction activities, runoff from residential developments, failed septic systems, and poor agricultural practices are the most common sources of non-point pollution threatening water quality. It has been concluded that non-point source pollution is the cause for Stafford Pond partially supporting its water quality classification.

4.7 Groundwater Characteristics

The groundwaters of the state are regulated by RIDEM in accordance with Rules and Regulations for Groundwater Quality. These regulations establish classifications for the aquifers with corresponding water quality standards, and community and non-community wellhead protection guidelines. The groundwater classifications define the quality standards, appropriate uses, and level of protection necessary for aquifers, as follows:

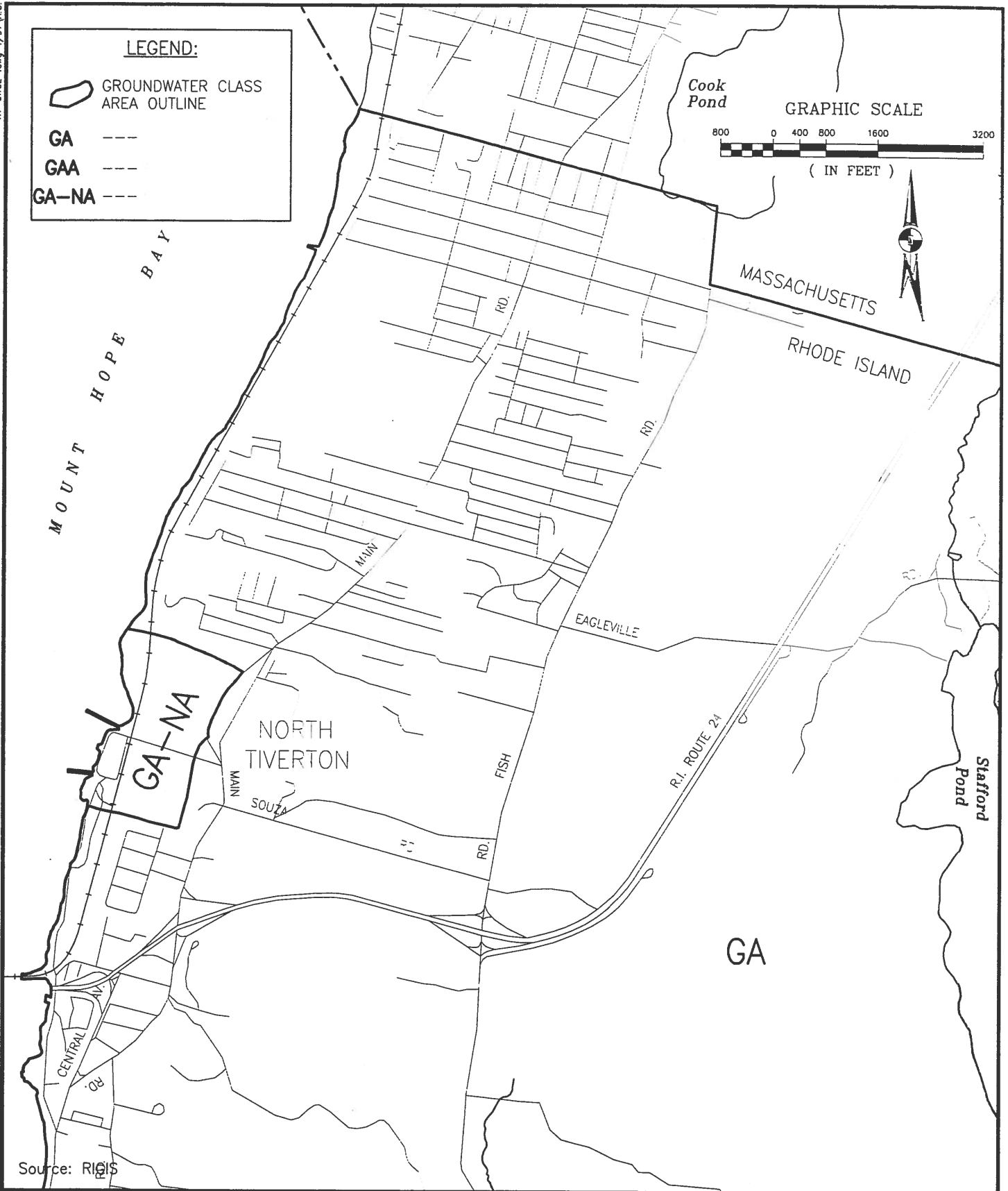
- GAA*: Groundwater sources suitable for public drinking water use without treatment. Includes the critical portions of the aquifer recharge area.
- GA*: Groundwater sources that may be suitable for public or private drinking water use without treatment.
- GB*: Groundwater sources that may not be suitable for public and private drinking water use without treatment due to known or presumed degradation.
- GC*: Groundwater sources that may be suitable for certain waste disposal practices, including primarily the areal extent of active landfills.
- NA*: Areas classified NA describe groundwater that does not meet standards established for these classes (NA: non-attainment).

Provided in Figure 4-6 is a map depicting the groundwater classifications for North Tiverton. As illustrated by the figure, the groundwater classification for North Tiverton is GA. There are two areas within the aquifer that are not attaining the GA standard. One area of the aquifer in non-attainment is adjacent to the former Charter Oil Terminal (Northeast Properties) site in the vicinity of Main Road and Carey's Lane. As described in Section 4.6.2, the former terminal is the site of an active groundwater and soils remediation process due to historic releases of petroleum. The other area in non-attainment of the GA standard is the eastern shore of Stafford Pond. This area does not attain the GA standard primarily due to failed septic systems.

4.8 Land Use and Demographic Data

The following information is provided in the CCP in Section 5.1, "Current Land Use"

- The pattern of land use and development within this area includes four distinct sectors - North Tiverton, East Tiverton, Stone Bridge and Southern Tiverton. Tiverton's area includes 29.7 square miles of land and 5.8 square miles of water, a combined total of 35.5 square miles on the eastern shore of the Sakonnet River.
- North Tiverton is an area of older residential and commercial development, extending north of Route 24. The area includes a neighborhood retail and service strip along Main Road; and



Source: RI GIS



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**Figure 4-6:
GROUNDWATER CLASS AND
WELLHEAD PROTECTED AREAS**

Scale: As Shown

January 2000

residential development, primarily single family units, on the side streets. The area south of Judson Street, along Main Road strip is prevailed by commercial uses. The east side of Fish Road has development with general commercial and light industrial uses, while the west side remains essentially residential with some institutional uses.

- Bourne Mill, an historic 19th Century mill building, is currently occupied by a braided rug manufacturer. Other significant land uses in this area include Pocasset School, and the eight acre Pocasset Park, and two oil tank farms. A tank farm at the foot of State Avenue is in limited use. The large oil storage tanks, formerly owned by Northeast petroleum, on 100 acres of land on both sides of Main Road at Souza Road are inactive and have since been dismantled. The site has been used to store oil since the 1920's. During the Korean War the federal government used the site for oil storage. Northeast Petroleum has owned the site since 1965, but ceased operations in 1985. Future use of the property hinges on environmental concerns.

Residential Land Use- Approximately 85 percent of the land area of Tiverton is zoned for residential use. High density residential use includes multi-family housing, duplexes or single family housing on lots generally one third of an acre or less, and mobile home parks. North Tiverton has developed primarily in a high density residential pattern.

Medium density residential development includes areas predominantly developed for single family housing on individual lots of one-half to three-quarters of an acre. Medium density development is located in areas which are more environmentally sensitive or lack either public water or public sewers. Many of the medium density areas, zoned R-30 and R-40, are located within reservoir watersheds.

Low density residential areas are zoned R-60 and R-80 and typically support less than one dwelling per acre. Agricultural production, single family residential dwellings, large estates, essential public/quasi-public uses and facilities and open space/recreation are appropriate uses in these areas. Soils are often limited in their ability to support high-density development; frequent flooding is sometimes experienced along the areas' waterways. (See Figure 4-4)

Commercial Land Use - Commercial land use prevails along major portions of Main Road north of Route 24 and limited portions of Main Road south of Route 24 and the area east of Fish Road. General commercial and service land use is present on portions along Stafford Road near Route 24 and segment north of Bulgarmarsh Road.

Industrial Land Use - The area in North Tiverton on either sides of Route 24 are zoned General Industrial (GI) and Light Industrial (LI). Major industries are not prevalent due to lack of infrastructure and support services. An industrial park having a total area of 228 acres is being developed at the intersection of Route 24 and Fish Road. The following light industries exist in the park or adjacent to the park: Tiverton Power Associates, Fibre glass boat manufacturer, Murdock Systems, and a Printing Company.

Institutional Uses- Public facilities in Tiverton include municipal buildings and public schools. Municipal buildings include town hall and the town library located on Highland Road, the police headquarters located south of Route 24 at Fish Road, and the senior citizens center on Canonicus Street.

A total of six public schools are located in Tiverton. These include Fort Barton elementary, Nonquit elementary, Pocasset elementary, Ranger elementary, Tiverton Middle School and Tiverton High School.

Conservation, Recreation and Open Space Uses- This land use type includes the following areas which are currently eliminated from intensive use and not anticipated to be extensively developed in the future:

- Fresh water ponds, wetland and streams
- Salt marshes, tidal ponds and coastal beach areas
- Areas subject to periodic flooding
- Unique natural areas
- Public recreation lands
- Major conservation lands, public and private

An ordinance was adopted under Zoning laws in 1987, to provide for cluster development. This zoning provision allows for the modification of certain zoning requirements which will allow for the preservation of open space or recreational areas within a subdivision. The cluster provisions require the deduction of the acreage of special natural features when calculating the density of development and imposes dimensional requirements.

Zoning- The current Tiverton zoning ordinance was adopted in 1964 and revised in 1970. Ten land use districts are established - five residential districts, three commercial and two industrial districts. Table 4-5 summarizes the zoning districts, their intent and basic area standards.

A watershed protection overlay district around Stafford Pond was created in 1986. The purpose of the district is to protect the quality and quantity of the drinking water supplies by regulating development around the pond. The district limits density of residential development to 3 acres per unit, provides for a 200-foot buffer from Stafford Pond, and restricts the use of chemicals, fuels, pesticides and other sources of contamination.

Demographics- Based on the 1990 Federal Census, the total population relevant to the sewer system design of study area is 7,259 (Census Tracts 416.01 and 416.02). The following 1990 Census data is relevant to the proposed sewer system:

- Of 2,919 total housing units, over 70 percent were owner-occupied.
- Average of 2.5 persons per housing unit (owner- or renter-occupied unit).
- 79 percent (2,318 units) dwellings are in single-family (attached or detached) units.
- 89 percent single family (attached or detached) housing were owner-occupied units.
- Of those in multifamily buildings, 616 are in 2 to 4 unit dwellings and 90 were in buildings with 5 or more units.
- Mobile homes and trailers comprise less than 1 percent housing stock.

**TABLE 4-5
TIVERTON ZONING DISTRICTS**

Symbol	District	Description
RESIDENCE DISTRICTS		
R-80	Single family residential	80,000 sq. ft.
R-60	Single family residential	60,000 sq. ft.
R-40	Single family residential	40,000 sq. ft.
R-30	Single and multi-family residential	30,000 sq. ft. single family; 40,000 sq. ft. +5,000 sq. ft. per unit multi-family
R-15	High density, single and multi-family residential	15,000 sq. ft. single family; 20,000 sq. ft. +3,000 sq. ft. per unit multi-family
COMMERCIAL DISTRICTS		
LC	Limited commercial, neighborhood retail and service uses	10,000 sq. ft.
GC	General commercial, community retail and service uses	12,000 sq. ft.
HC	Highway commercial, regional retail and service uses	20,000 sq. ft.
INDUSTRIAL DISTRICTS		
LI	Limited industrial; general business and light industrial uses property performance standards	40,000 sq. ft.
GI	General industrial, district performance standards	40,000 sq. ft.

Source: *Comprehensive Amendment: Zoning Ordinance*, Town of Tiverton.

The following describes the population characteristics for the entire town of Tiverton. Table 4-6 shows the age of Tiverton's housing. Nearly 40 percent of the housing stock was constructed between 1950 and 1970. However approximately 25 percent of the housing in Tiverton was constructed before 1939, prior to subdivision developments.

The profile that emerges from these statistics is one of Tiverton as a moderately growing community with a significant percentage of housing stock in single-family owner-occupied units. Over half of the housing stock is more than thirty years old, therefore constructed prior to current building codes and ISDS regulations, and including features that might not be in compliance with today's codes. In addition, many of these structures are at an age when renovation or rehabilitation of on-site systems may be indicated.

**TABLE 4-6
HOUSING AGE**

DECADE	HOUSING UNITS BUILT	Percent
1939 or earlier	1,399	25.6
1940-1949	484	8.8
1950-1959	1,017	18.7
1960-1969	1,072	19.7
1970-1979	878	16.1
1980-1989	600	11.1

Source: US Census 1990

Rhode Island Housing and Mortgage Finance Corporation

5.0 WASTEWATER MANAGEMENT FACILITIES

5.0 WASTEWATER MANAGEMENT FACILITIES

5.1 Summary of ISDS Systems

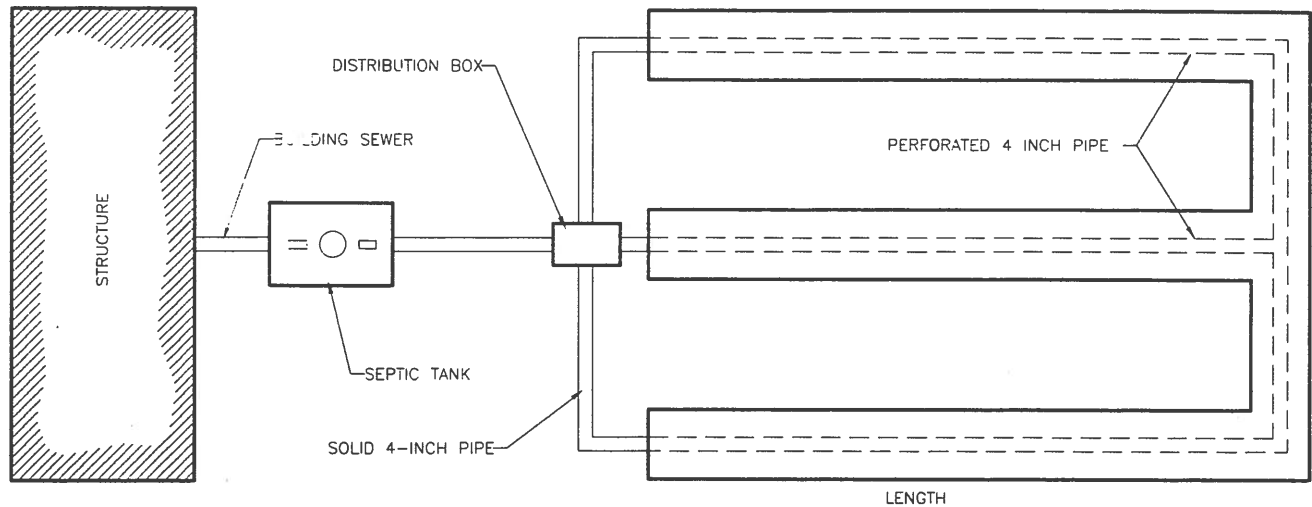
Almost all of the wastewater generated in the study area is disposed of through onsite disposal systems. Due to the limitations of the unsuitable soils and relatively high groundwater levels existing throughout the town, these systems are typically subject to regular maintenance problems and inefficient operation.

RIDEM ISDS regulations govern the installation and operation of on-site wastewater disposal systems. The ISDS regulations include specific provisions for acceptable soil percolation; set backs from site features such as structures, wells, surface water, etc.; and design criteria for on-site systems. A typical modern septic system of the most common leach trench type as defined by ISDS is shown in Figure 5-1.

The ISDS regulations first became effective and enforceable by RIDEM in 1970. Prior to 1970 the design, construction, and use of on-site systems was not regulated. According to the 1990 Census, 73 percent of the total housing units in Tiverton were constructed prior to 1970, and would not have been subject to any formal on-site system regulations. According to this percentage there are approximately 4,140 housing units townwide, and 2,130 in North Tiverton, that were constructed prior to 1970 and are utilizing an on-site system that was not subject to prior RIDEM review.

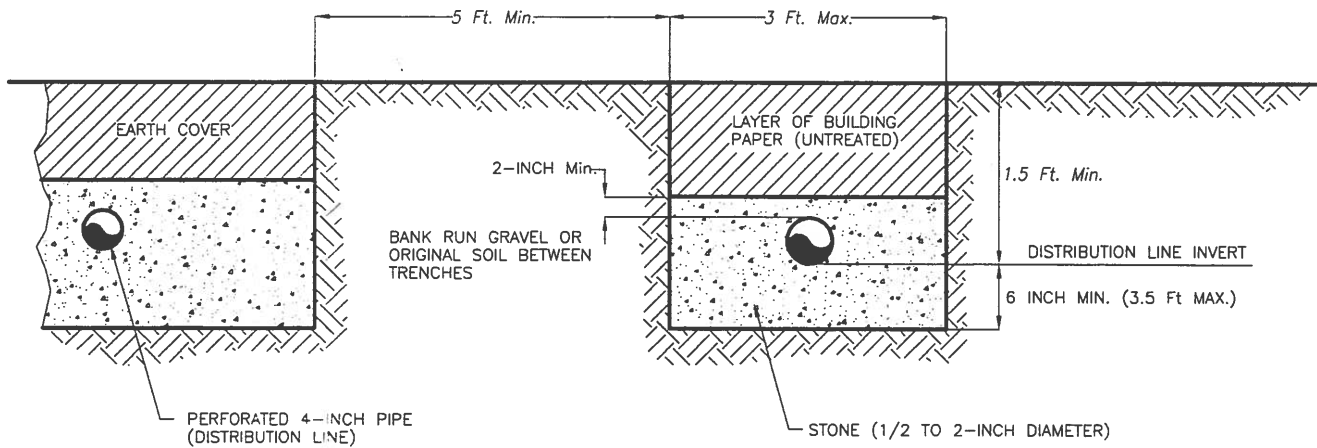
It is not uncommon for residences of older construction to have systems utilizing features that may have been standard practice at the time of construction that are no longer in compliance with RIDEM ISDS regulations, such as small metal drums or wooden cisterns for solids separation in lieu of a septic tank, and leach area overflow outlets to surface water.

As stated previously, an ISDS Wastewater Management Plan is being developed concurrently on a town wide basis. The ISDS Wastewater Management Plan will provide sufficient land use and environmental data to serve as the basis for establishment of an ISDS Wastewater Management District. Specific information included in the analysis will include at a minimum the following:



TYPICAL PLAN VIEW

NOT TO SCALE



TYPICAL CROSS SECTION VIEW

NOT TO SCALE

Source: RIDEM



**TOWN OF TIVERTON, RI
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Figure 5-1: TYPICAL ISDS SYSTEM

Scale: As Shown

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- Identification of the approximate number, type, and location of ISDS systems;
- Identification of the approximate number, of impacts of failed/failing systems on surface waters and groundwater; and
- Analysis of cause of ISDS failure area (s) (i.e., soils, age etc).

The Town has limited the area to be sewerred to North Tiverton and portions east Tiverton and Stone Bridge Area. At this point, it is considered economically infeasible to expand sewer service to Bulgarmarsh Road and Stafford Pond area. The decision to eliminate portions of Stone Bridge Area and Bulgarmarsh Road were also based on larger lot sizes present in medium density residential development (R-30) and soil conditions. The focus of the Town has shifted to the development of an ISDS Wastewater Management District to service these areas of the Town. The decision to eliminate the Stafford Pond area was based on the Town's proposed development and implementation of an ISDS Wastewater Management District.

The primary, initial objective for the Town in developing an ISDS Wastewater Management Plan was to focus on the residential areas adjacent to Stafford Pond. The Town has determined that it is most cost effective to focus on serving these areas along with the remainder of the Town with conventional, alternative on-site, and/or community systems. Should the Plan determine that it is not economically and/or environmentally beneficial (or detrimental to public health) to utilize alternative on-site or community ISDS systems for any specific areas, then the Town would be required to update the Facilities Plan accordingly.

5.2 Wastewater Treatment Facilities

Tiverton does not operate any wastewater treatment facilities. Wastewater generated from approximately 50 residences located in northern part of the town bordering Fall River, Massachusetts, are discharged to the Fall River WWTF. All septage pumpings from Tiverton ISDS septic tanks are also discharged into the Fall River WWTF. All other wastewater generated in Tiverton is disposed of in subsurface on-site systems.

5.3 Initial and Ultimate Wastewater Flowrates

The wastewater flowrates within the study area estimated in this section are based on existing development (residences, commercial/industrial, institutions) that would generate "initial" flows, and potential future development that would generate "ultimate" flows. In order to assess the maximum potential need for wastewater management facilities in the study area, it has been assumed that all wastewater flows generated presently, and those resulting from future development, would be connected to the proposed sanitary sewer system.

The categories of wastewater generation are described in following sections, with initial and ultimate wastewater flowrates summarized in Table 5-1. The permitted maximum annual average discharge into the Fall River WWTF system is 2.0 million gallons per day (MGD), and a maximum daily peak discharge of 6.0 MGD. Figure 5-2 depicts the areas noted as Mount Hope and Fish Road for flow calculations.

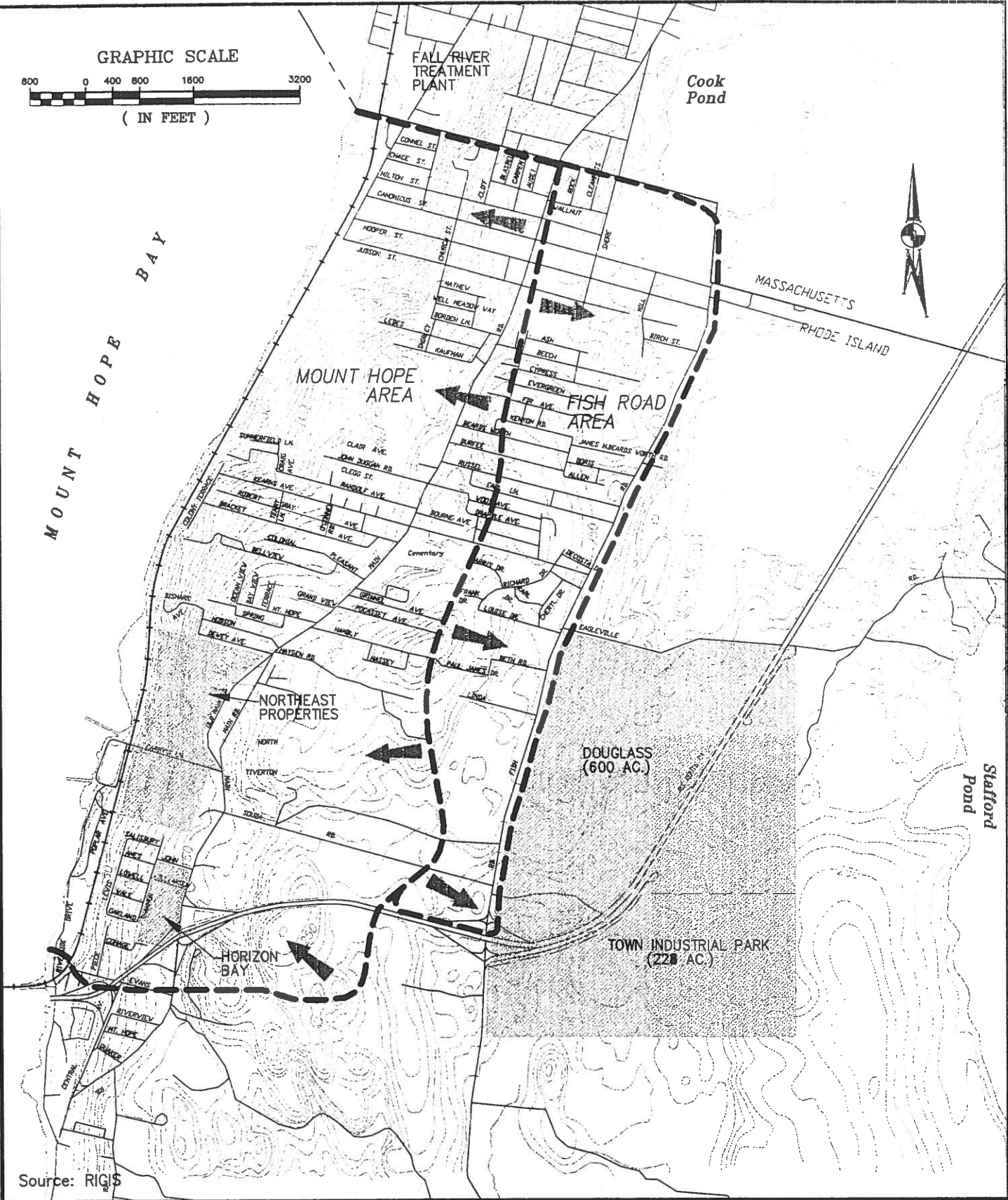
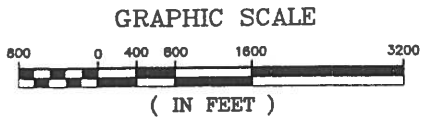
The ultimate average wastewater generation for the study area is estimated to be 1.93 MGD, as follows (detailed calculations are included in Appendix A):

- *Residential:* Based on the water use data from fiscal year 1995/6, which includes actual metered water use as well as estimated water use for users on individual wells (Appendix C), all potentially developed properties would generate 0.71 MGD.
- *Industrial/Commercial:* Estimated based on development according to the landuse projections in the CCP and known projects, all potentially developed properties would generate 1.2 MGD.
- *Institutional:* Based on the existing institutions (schools, etc.) and including future development, all properties would generate 0.024 MGD.

The peak ultimate wastewater flowrate has been estimated to be 4.02 MGD, based on the projected population and the *TR-16 Guide For The Design of Wastewater Treatment Works* peak flow curve and equation. It is noted that industrial/commercial and institutional flowrates have not been multiplied by a peaking factor since they do not typically exhibit the diurnal fluctuations and peaks that are typical of residential flows.

**TABLE 5-1
SUMMARY OF WASTEWATER FLOWRATES**

	Mount Hope Bay			Fish Road			TOTAL		
	Services	Average	Peak	Services	Average	Peak	Services	Average	Peak
	#	Flow	Flow	#	Flow	Flow	#	Flow	Flow
	GPD	GPD	GPD		GPD	GPD		GPD	GPD
Residential:									
Initial	2,018	393,510	1,534,455	901	175,695	702,780	2,919	569,205	2,237,239
Ultimate	503	98,085	382,473	225	43,875	175,500	728	141,960	557,969
Subtotal	2,521	491,595	1,916,928	1,126	219,570	878,280	3,647	711,165	2,795,208
Industrial/Commercial									
Initial	30	33,300	33,300	7	7,770	7,770	37	41,070	41,070
Ultimate	30	33,300	33,300	33	1,121,200	1,121,200	63	1,154,500	1,154,500
Subtotal	60	66,600	66,600	40	1,128,970	1,128,970	100	1,195,570	1,195,570
Institutional									
Initial	2	4,500	4,500	3	6,750	6,750	5	11,250	11,250
Ultimate	-	-	-	1	13,000	13,000	1	13,000	13,000
Subtotal	2	4,500	4,500	4	19,750	19,750	6	24,250	24,250
Total Flows									
Initial		431,310	1,572,255		190,215	717,300		621,525	2,289,559
Ultimate		131,385	415,773		1,178,075	1,309,700		1,309,460	1,725,469
Total		562,695	1,988,028		1,368,290	2,027,000		1,930,985	4,015,028



Source: RIGIS



TOWN OF TIVERTON, RI
WASTEWATER FACILITIES PLAN
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Figure 5-2:
WASTEWATER FLOW RATES
SERVICE AREA

Scale: As Shown

January 2000

6.0 FUTURE SITUATION

6.0 FUTURE SITUATION

This section summarizes the physical, demographic, and infrastructure situation projected to occur in Tiverton by the year 2020. Future conditions reflect the zoning and infrastructure demands for which the proposed wastewater management facilities will include capacity. Projections of future conditions are based upon population data projections obtained from the Rhode Island Statewide Planning.

6.1 Land Use

As indicated in Section 6.2, "Demographics," growth in Tiverton is expected to level off after the year 2010. The future growth in the study area is expected to be high density residential and planned light industrial. A brief description of the future trends in various land use categories are as follows:

- **Residential Land Use-** It is anticipated that future residential development in the study area will occur in all densities, as identified in Table 4-5. Development in high density residential areas (R15) will occur along Main Road and west side along Fish Road, assuming that the future land use plan is adhered to and that future subdivisions are environmentally feasible.
- **Commercial Land Use-** Commercial land use in the future is expected to follow existing trends and occur within established highway business corridors generally along Main Road and Fish Road. The Northeast Properties site (former Charter Oil) is anticipated to develop with mixed high density residential and commercial uses.
- **Industrial Land Use-** The Town Industrial Park is proposed in a 228-acre area at the intersection of Route 24 and Fish Road. Adjacent industrial development may also occur along Fish Road north of the Souza Road intersection, including a potential area of 600-acres (Douglass Property).

The CCP presented Tiverton's future Land Use Plan, with a scope of analysis based upon the following:

- Consider allocation of land for residential, business, industrial, municipal facilities, public and recreation, major institutional facilities, mixed uses, open space, natural and fragile areas.
- Consider performance zoning as a means for determining lot area requirements.
- Reassess zoning regulations to ensure that developments that seek to enhance the identity of special areas are not precluded and projects that would destroy the identity of the town are prevented.
- Explore zoning regulations to provide buffers between zones which have incompatible uses.
- Review currently allowed uses within commercial zones to reduce incompatibility, such as for commercial amusement businesses.
- Prepare and implement regulations with regards to the siting of utility and accessory structures.
- Inventory and evaluate town-owned property to determine its best use based on the comprehensive plan. Review inventory on a periodic basis as part of the capital planning process.
- Evaluate development options on vacant industrial property for possible re-zoning.
- Evaluate the potential to create a waterfront zoning district.
- Evaluate the need for professional technical services, and update the fee structure for site plan, special exception and building permit review that would cover costs of consultants.

6.2 Demographics

Newport County population projections prepared by the Rhode Island State Wide Planning through the year 2020 are presented in Table 6-1. Tiverton's population is anticipated to increase from the 1995 Census estimate (14,210) to the 2020 estimate (15,135), which is a 6.5 percent growth over the 25 year period. Newport County is projected to increase in population from 86,572 to 98,473, which is a 13.7 percent increase over 25 years.

TABLE 6-1
NEWPORT COUNTY POPULATION PROJECTIONS

Municipality	1995	2000	2005	2010	2015	2020
Jamestown	4,963	5,339	5,705	6,083	6,490	6,945
Little Compton	3,315	3,470	3,610	3,745	3,890	4,051
Middletown	19,361	20,336	21,263	22,183	23,155	24,245
Newport	28,026	28,184	28,158	28,069	27,994	28,007
Portsmouth	16,997	17,460	18,095	18,710	19,358	20,090
Tiverton	14,210	14,473	14,645	14,787	14,937	15,135
<hr style="border-top: 1px dashed black;"/>						
Newport County	86,572	89,262	91,476	93,577	95,824	98,473

Source: Rhode Island Statewide Planning, *Rhode Island Population Projections*, October 6, 1999.

6.3 Economics

6.3.1 Introduction

Tiverton's economic base is founded on farming and fishing, with a more recent growth in light industrial and minor commercial enterprises. The following three areas have been identified that would promote the economic growth retaining the original identity of the town:

- Improvement on the existing attributes - agriculture and fishing;
- The investment and the environmentally sensitive planning that has been done for the ongoing industrial park development has the potential to provide growth opportunities for large, clean commercial enterprises; and
- Examination of the Town's regulations for possible changes to promote small business which could provide economic growth with little change to the face of the town.

The following information is from the Tiverton CCP:

- Forty five percent of the Town's private industry jobs were in retailing, followed by services which accounted for twenty three percent. New commercial construction accounted for 206,803 sq. ft. from 1980 to 1989, with a total value of \$10 million. Most of this construction was in small commercial buildings of 15,000 sq. ft. or less. Industrial construction totalled only 9,200 sq. ft.
- A significant portion of North Tiverton is zoned for commercial and industrial uses. Tiverton has taken a proactive stance to promote economic activity by purchasing 228 acres of industrially zoned property near the Fish Road exit off Route 24. The town proposes to develop the property as a high-quality industrial park under the auspices of the Industrial and Recreational Commission. A site plan is in the process of being prepared for the park and the permitting process has begun. A 15 year build-out has been projected.
- Market studies prepared for the park in 1988 indicate very little demand for unsewered industrial land in the market area. The Industrial and Recreational Commission has proposed to provide sewer extension to the industrial park. With proper infrastructure requirements in place the proposed project could be very competitive with other area industrial parks if it is developed as a high-end facility with signage and layout, and appropriate industrial infrastructure.
- Agricultural activities are a special form of economic enterprise in Tiverton. According to the Rhode Island Division of Agriculture and Marketing there are 28 agricultural enterprises in the town. These farms include dairy, sheep, hogs, fruits and vegetables, eggs and poultry, and Christmas trees. According to information from Rhode Island Geographical Information Systems (RIGIS), approximately 2,100 acres in the town are in active agricultural use, totalling about 11 percent of the land area of the town.
- Tiverton has an active fishing industry which operates off its coast. A fleet of "Quahoggers" sail daily from Tiverton for grounds in the lower Sakonnet and Narragansett Bay. They bring their catch to the town's four fish markets.

6.3.2 Tax Base

Town financial characteristics for fiscal year 1990 are presented in Table 6-2.

**TABLE 6-2
TIVERTON FINANCIAL CHARACTERISTICS - Expenditures**

	Fiscal Year 1990 (\$ 1,000)	Percent
General Government	\$ 352	2.1
Financial Administration	1,125	6.7
Protection to Persons and Property	2,039	12.2
Health & Sanitation	347	2.1
Public Works	528	3.2
Town Maintenance	28	0.2
Associated Activities	119	0.7
Education	11,968	71.9
Parks, Recreation & Leagues	78	0.5
Elderly Activities	60	0.4
Total	\$ 16,644	100.0

Source: Town of Tiverton Treasurer's Office, 1990.

The following information was also obtained from the Tiverton CCP:

- Expenditure appropriations for the fiscal year 1990 amounted to \$ 16,644,018. Town Budget was primarily for educational service, which amounted to 71.9 percent.
- General governmental expenditures for administration comprised 8.8 percent. The remaining 19.3 percent was used for providing all of the services.
- The town tax rate for the year 1991 was 28.26 per \$1,000 assessed valuation. Residential property tax revenues accounted for approximately 74 percent of total budget revenues, compared to 65 percent statewide. Approximately 12 percent was commercial, compared to 19 percent statewide.

6.3.3 Economic Goals and Objectives

The town desires to expand economic opportunities and pursue forms of development that will maximize economic benefit with a minimal impact on the environment and character of Tiverton.

Specific objectives include the following:

- Promote mechanisms to encourage small business opportunities and job development;
- Formulate a commercial and industrial development strategy which creates opportunities to enlarge the tax base and is consistent with the character of the town;
- Preserve and maintain the fiscal ability of the town to deliver essential services and fund necessary public improvements;
- Promote the utilization of Tiverton's waterfront for water-dependent economic uses; and
- Preserve and protect agricultural activities which contribute to the economic life of Tiverton residents.

6.4 Wastewater Generation

The sewer system needs in the study area have been identified based on development of existing parcels and open space according to current zoning regulations. "Build out" residential development and projected industrial/commercial development including the Town Industrial Park and Northeast Properties parcel will result in the ultimate wastewater flowrates shown in Table 6-3.

**TABLE 6-3
ULTIMATE WASTEWATER GENERATION**

Source	Average Flow (MGD)	Peak Flow (MGD)
Residential	0.711	2.795
Industrial/Commercial	1.195	1.195
Institutional	0.024	0.024
TOTALS	1.930	4.014

7.0 EVALUATION OF ALTERNATIVES

7.0 EVALUATION OF ALTERNATIVES

This section summarizes the evaluation of feasible alternatives for wastewater management within the study area. The alternatives developed are consistent with the town's approved Wastewater Facilities Plan, and the town CCP.

7.1 Unsewered Areas

Except for the small number of users at the RI/MA stateline which are currently connected to the Fall River WWTF, none of the areas of North Tiverton are served by sanitary sewers. A majority of the area in North Tiverton also exhibits significant constraints to onsite sewage disposal systems. As stated previously, an ISDS Wastewater Management Plan is being developed concurrently to address the Town's needs prior to the construction of any sewers.

7.2 Optimum Use of Existing Facilities

Operation and maintenance of onsite wastewater disposal systems should be in compliance with RIDEM guidelines. The following are recommended measures that should be encouraged to optimize operation of onsite systems:

- Solids pumping should be performed on a regular basis, at least every 3 years;
- Attention should be given to limiting peaks in residential flowrates (i.e. doing fewer loads of laundry on a regular basis, rather than a large number in a single day); and
- Minimize extraneous water and surface runoff to leaching areas (i.e. redirect roof leader flows).

7.3 Summary of Alternatives

The following sections describe the alternatives that were evaluated for the study area:

7.3.1 No Action

The existing on-site wastewater disposal facilities would be operated and maintained according to the RIDEM guidelines to ensure proper functioning. No further action would be taken to install a municipal system for the conveyance and treatment of wastewater. This alternative is considered infeasible for the following reasons:

- Potential public health problems due to on-site disposal of wastewater will continue, and may become more prevalent in the future as development density increases.
- Potential environmental impacts due to on-site disposal of wastewater will continue.
- In the study area limitations on land use due to the lack of adequate wastewater facilities would impact the feasibility of future commercial/industrial development.

7.3.2 Community Wastewater Treatment and Disposal

This alternative would consist of implementing a small community wastewater treatment and disposal systems in the Study area, which typically utilize subsurface disposal in a location with suitable soils. This alternative is considered infeasible for the following reasons:

- A sewer collection system to convey flows to the proposed site would still be required, hence implementation costs would not be significantly reduced; and
- A site with adequate soils for reliable longterm subsurface disposal of the proposed wastewater flowrates is not available in the study area.

Sites may be available for subsurface disposal of reduced flowrates, potentially serving residential uses only. However, this would not address the land use issues for commercial/industrial development and therefore place a greater financial burden on the residential users that would have to solely pay for the system. This alternative will be addressed further in the ISDS Wastewater Management Plan

7.3.3 Sewering Alternatives

As stated in Section 5.0, the town has limited the area to be sewerred to North Tiverton and portions of east Tiverton and Stone Bridge area. At this point, it is considered economically infeasible to expand sewer service to additional areas with the Town. The focus of the Town has shifted to the development of an ISDS Wastewater Management District to service the remainder of the unsewered areas of the Town.

In order for the town to implement the Town Industrial Park (TIP) area, and to protect the public health and environment in the study area, three alternatives were formulated to provide sewer service to the study area. All three alternatives include conveyance of flows to the Fall River WWTF via an interceptor sewer (Mount Hope Bay Interceptor) along the abandoned railroad right-of-way. Each of the alternatives is also proposed to be implemented in two phases. Phase 1 includes construction of the Mount Hope Bay Interceptor (MHBI), initial sewer service to the TIP, and the TIP pumping station. Phase 2 includes construction of the local collection system throughout North Tiverton. Each of the alternatives provide service to the same areas, but differ in the location of the trunk sewer along Fish Road to serve the TIP. Following is a description of the three sewerred alternatives evaluated (preliminary design included in Appendix B):

ALTERNATIVE 1: (See Figure 7-1)

Phase 1: The MHBI would consist of 12-inch diameter PVC pipe between Salisbury and Trailer Lanes for a length of 2,450 LF; 18-inch to Canonicus Street (4,400 LF); terminating at the Fall River WWTF with 24-inch diameter pipe (2,240 LF). The MHBI will have capacity to eventually serve the entire area of North Tiverton, and will provide service directly to the areas west of Main Road.

This phase also includes the construction of a pump station to serve the TIP, and the trunk sewer along Fish Road and Canonicus Street. The pump station would be located in the TIP area south of State Route 24 and Fish Road intersection. Ultimate wastewater flows from the TIP, the adjoining Douglass properties, and the tributary residential area from State Route 24 and Russell Drive, between Fish and Main Roads,

would be pumped north in a 12-inch diameter force main along Fish Road. The wastewater would then be conveyed to a second pump station located northwest of Fish Road and Canonicus Street intersection, by gravity in an 18-inch pipe (3,800 LF). The force main from the second pump station would run west along Canonicus Street, and be 12-inch (2,600 LF) to the Main Road intersection. The flow would then be conveyed by gravity to the MHBI through an 18-inch pipe (2,550 LF).

Phase 2: Sewer mains along each of the streets would be built. Almost all of the local sewer mains would be 8-inch diameter, with a total length of approximately 139,000 LF.

ALTERNATIVE 2: (See Figure 7-2)

Phase 1: MHBI and the Fish Road trunk sewer would be built, including the TIP pump station south of State Route 24 and Fish Road intersection. The MHBI would be located along the abandoned rail road tracks, with an initial reach of 8-inch diameter PVC pipe (4,550 LF to Bellview Avenue). The MHBI would continue north of Bellview Avenue with 12-inch pipe (1,450 LF to Kearns Avenue). The size of the interceptor then increases to 18-inches (4,400 LF to Canonicus Street), and would terminate at the Fall River WWTF with a 24-inch diameter PVC pipe.

As part of Phase 1 sewer service would be provided to the TIP, including ultimate flows from the Douglass properties along Fish Road. A 12-inch diameter PVC force main (7,100 LF) would be built north along Fish Road and west along Kearns Avenue. A trunk gravity sewer (12-inch) would be built at the end of the force main, increasing to 18-inch to connect this subarea to the MHBI (1,450 LF).

Phase 2: The second pump station would be built northwest of Fish Road and Canonicus Street intersection. A 2,600 LF force main, 8-inch diameter, would convey the wastewater along Canonicus Street to the Main Road intersection. Flows would then be conveyed by gravity by a 12-inch pipe (3,260 LF) to the MHBI.

A total of approximately 136,000 LF of 8-inch diameter pipe would form the network of sewer mains in the remaining streets.

ALTERNATIVE 3: (See Figure 7-3)

Phase 1: The MHBI would be built north along the abandoned railroad tracks, adjacent to Mount Hope Bay. The MHBI would begin with an 8-inch diameter pipe between Salisbury and Carey's Lane, increasing to 18-inches north of Carey's Lane to the Judson Street intersection (9,050 LF). It would terminate at the Fall River WWTF with a 24-inch diameter (2,990 LF).

Phase 1 also includes the construction of the TIP pump station to convey wastewater from the industrial area and Douglass properties to the MHBI via a 10-inch force main along Souza Road (3,560 LF), and by gravity thereafter via an 18-inch diameter pipe (3,460 LF).

Phase 2: Phase 2 would include a second pump station at the eastern end of Judson Street to convey residential flows from this area. A 6-inch diameter force main would convey the wastewater collected east of Main Road to a 12-inch pipe (3,150 LF), flowing west by gravity along Judson Street to the MHBI.

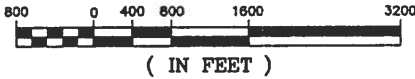
The network of 8-inch diameter sewer mains would also be built, with a total length of approximately 130,000 LF.

7.4 PRELIMINARY COST ESTIMATES

A preliminary capital cost estimate has been developed for the design and construction of each of the three design alternatives. Table 7-1 summarizes the sewer system elements during the construction Phases 1 and 2 for each of the three alternatives.

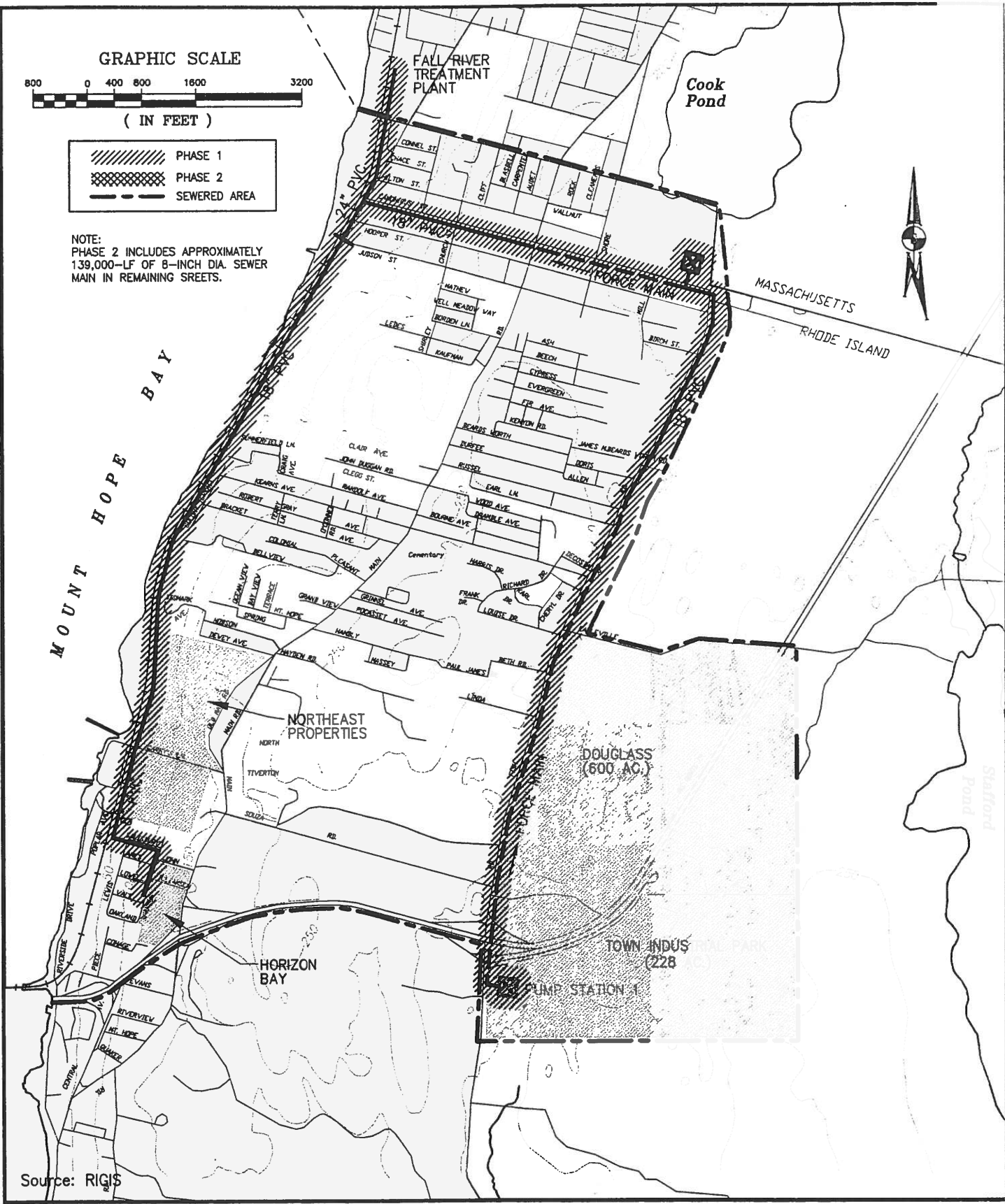
Table 7-2 summarizes the capital costs involved in the implementation of the wastewater management plan. A Phase 1 engineering design cost is identified separately, to aid in decisions regarding the acquisition of funds for project initiation. Table 7-2 also includes O&M Costs for the collection system and a present worth analysis considering O&M costs.

GRAPHIC SCALE



 PHASE 1
 PHASE 2
 SEWERED AREA

NOTE:
PHASE 2 INCLUDES APPROXIMATELY
139,000-LF OF 8-INCH DIA. SEWER
MAIN IN REMAINING STREETS.



Source: RIGIS



TOWN OF TIVERTON, RI
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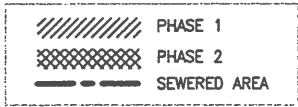
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Figure 7-1:
SEWERING ALTERNATIVE #1

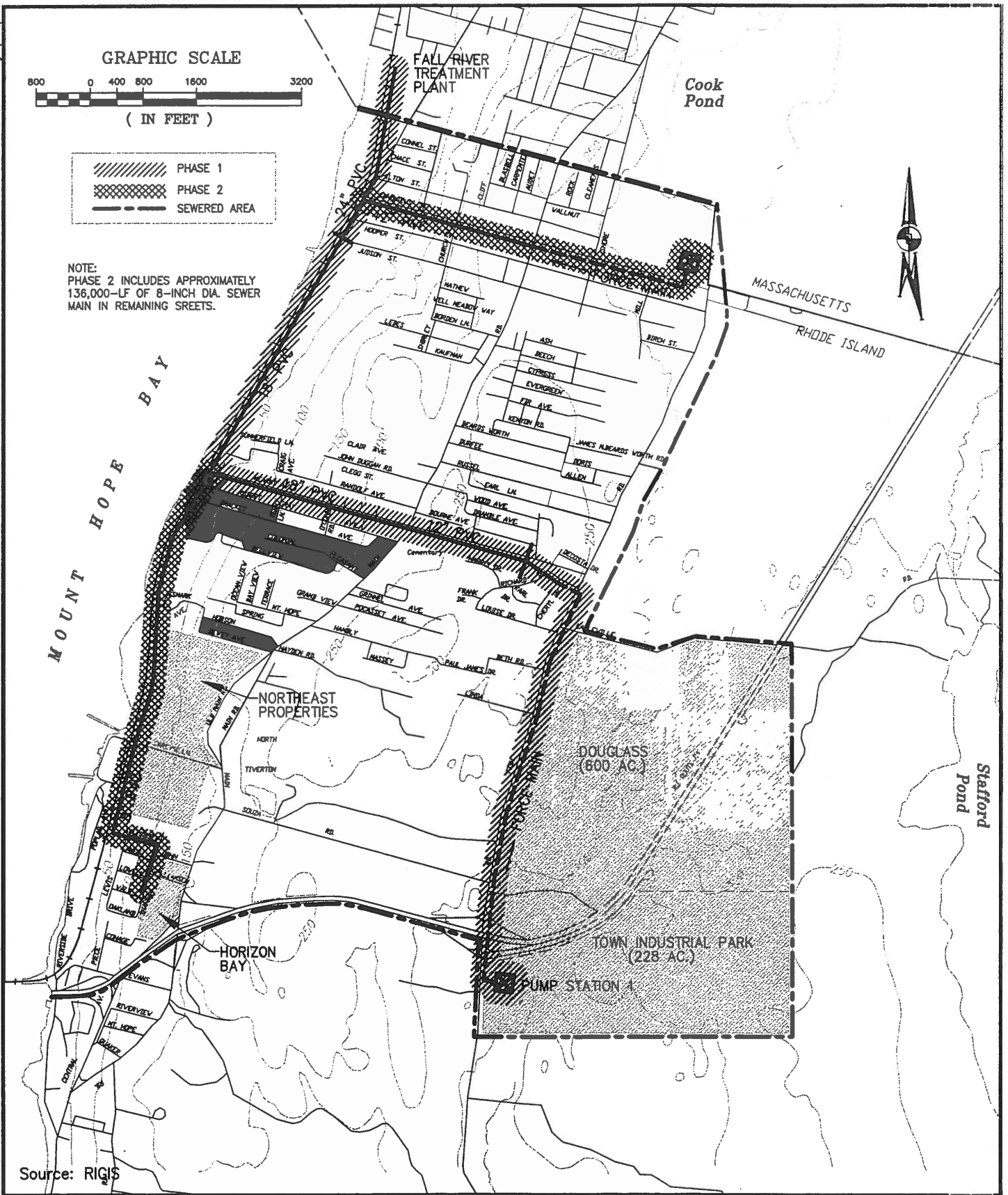
Scale: As Shown

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GRAPHIC SCALE



NOTE: PHASE 2 INCLUDES APPROXIMATELY 136,000-LF OF 8-INCH DIA. SEWER MAIN IN REMAINING STREETS.



Source: RIGIS



TOWN OF TIVERTON, RI WASTEWATER FACILITIES PLAN UPDATE



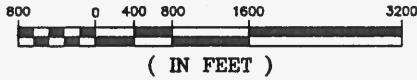
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Figure 7-2: SEWERING ALTERNATIVE #2

Scale: As Shown

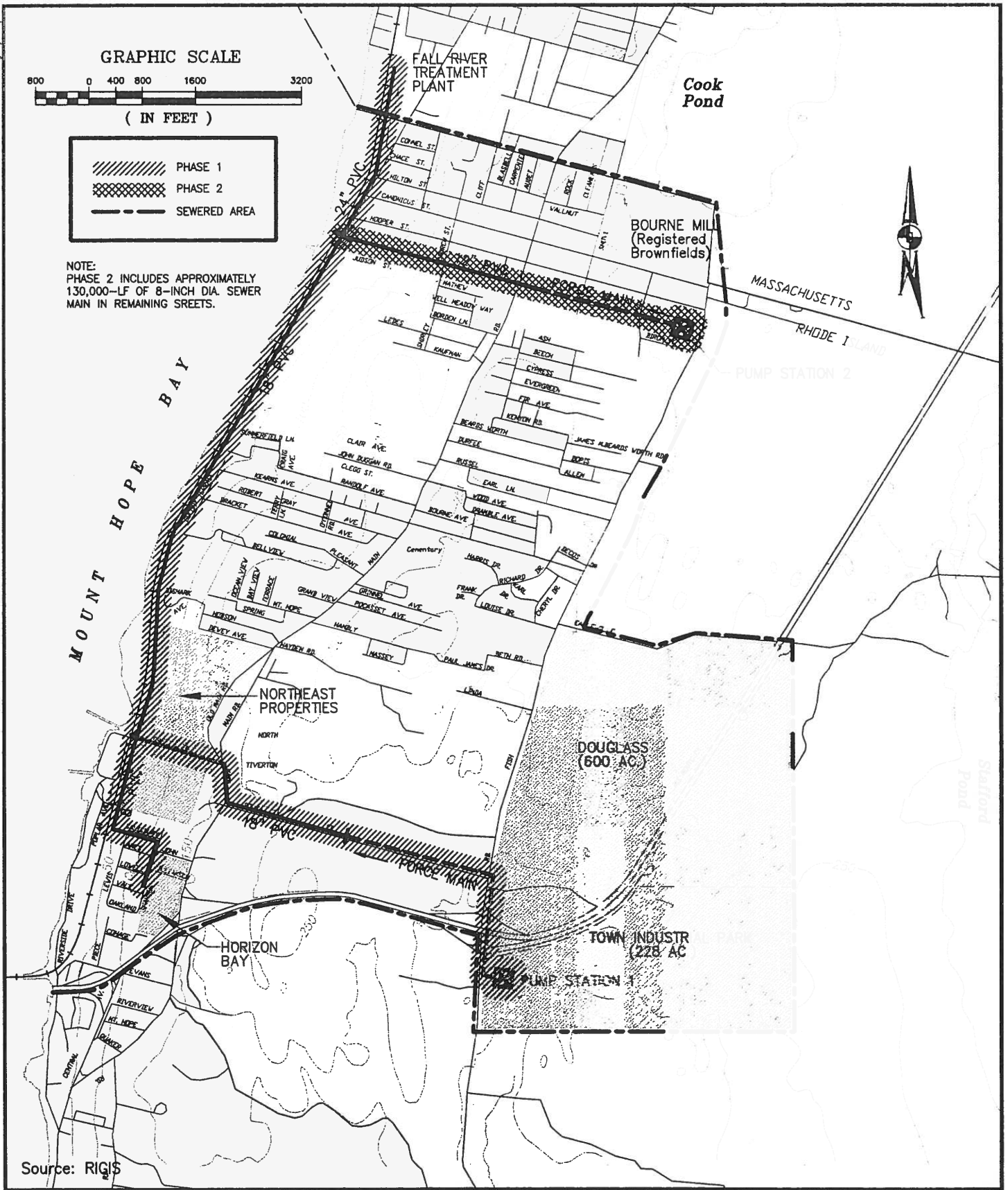
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GRAPHIC SCALE



 PHASE 1
 PHASE 2
 SEWERED AREA

NOTE:
PHASE 2 INCLUDES APPROXIMATELY
130,000-LF OF 8-INCH DIA. SEWER
MAIN IN REMAINING SREETS.



Source: RIGIS



TOWN OF TIVERTON, RI
WASTEWATER FACILITIES PLAN
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Figure 7-3:
SEWERING ALTERNATIVE #3

Scale: As Shown

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**TABLE 7-1
SUMMARY OF SEWER SYSTEM ELEMENTS**

Alternatives		Size(in)	Length (LF)
# 1: Phase 1	<ul style="list-style-type: none"> • Interceptor - Mount Hope Bay, gravity 	8, 12, 18, 24	3,550, 2,450, 4,400, 2,240
	<ul style="list-style-type: none"> • Pump Station 1 • Force Main, Fish Road • Interceptor - Fish Road, gravity • Pump Station 2 • Force Main, Canonicus Street • Trunk Sewer - Canonicus Street, gravity 	-- 12 18 -- 12,18 --	7,500 3,800 -- 2,600, 2,550
Phase 2	<ul style="list-style-type: none"> • Collector Sewers 	8	139,000
# 2: Phase 1	<ul style="list-style-type: none"> • Interceptor - Mount Hope Bay, gravity 	8, 12, 18, 24	4,550, 1,450, 4,400, 2,240
	<ul style="list-style-type: none"> • Pump Station 1 • Force Main, Fish Road • Trunk Sewer - Kearns Avenue, gravity 	-- 12 12, 18	-- 7,100 1,700, 3,260
Phase 2	<ul style="list-style-type: none"> • Pump Station 2 • Force Main, Canonicus Street • Trunk Sewer - Canonicus Street, gravity • Collector Sewers 	-- 8 12 8	-- 2,600 3,260 136,000
# 3: Phase 1	<ul style="list-style-type: none"> • Interceptor - Mount Hope Bay, gravity 	8, 18, 24	1,350, 9,050, 2,990
	<ul style="list-style-type: none"> • Pump Station 1 • Force Main, Fish Road & Souza Road • Trunk Sewer - Souza Road, gravity 	-- 10 18	-- 3,560 3,460
Phase 2	<ul style="list-style-type: none"> • Pump Station 2 • Force Main, Judson Street • Trunk Sewer - Judson Street, gravity • Collector Sewers 	-- 6 12 8	-- 2,120 3,150 165,830

TABLE 7-2
PRELIMINARY COST ESTIMATES (ENR CCI 5500)

ITEM	ALTERNATIVE					
	1		2		3	
	Total	Phase 1	Total	Phase 1	Total	Phase 1
SEWER CONSTRUCTION	\$ 17,753,100	\$ 1,981,950	\$ 17,497,000	\$ 2,126,200	\$ 17,032,150	\$ 2,010,350
PUMP STATION CONSTRUCTION	\$ 850,000	\$ 850,000	\$ 700,000	\$ 450,000	\$ 700,000	\$ 450,000
SUBTOTAL	\$ 18,603,100	\$ 2,831,950	\$ 18,197,000	\$ 2,576,200	\$ 17,732,150	\$ 2,460,350
CONSTRUCTION CONTINGENCY 15%	\$ 2,790,465	\$ 424,793	\$ 2,729,550	\$ 386,430	\$ 2,659,823	\$ 369,053
CONSTRUCTION TOTAL	\$ 21,393,565	\$ 3,256,743	\$ 20,926,550	\$ 2,962,630	\$ 20,391,973	\$ 2,829,403
ENGINEERING/INSPECTION 8%	\$ 1,488,248	\$ 226,556	\$ 1,455,760	\$ 206,096	\$ 1,418,572	\$ 196,828
PROJECT TOTAL	\$ 22,881,813	\$ 3,483,299	\$ 22,382,310	\$ 3,168,726	\$ 21,810,545	\$ 3,026,231
ANNUAL O&M COST*	\$ 2,080,500	\$ 1,314,000	\$ 2,080,500	\$ 1,314,000	\$ 2,080,500	\$ 1,314,000
PRESENT WORTH **	\$ 39,754,668	\$ 9,332,964	\$ 39,255,165	\$ 9,018,391	\$ 38,683,400	\$ 8,875,896

Note:
 * Annual O&M costs for Tiverton collection system were based on \$3 per 1,000 gallons (see Section 10.2.2) and ultimate flow rate.
 ** For present worth calculation, the following parameters were used: i=4%, n=10 for total project annual O&M cost, and n=5 for Phase I annual O&M cost.

7.5 Environmental Impacts

As stated in Section 7.4, all three alternatives include conveyance of flows to the Fall River WWTF via the Mount Hope Bay Interceptor along the abandoned railroad right-of-way. Each of the alternatives is also proposed to be implemented in two phases. Phase 1 includes construction of the Mount Hope Bay Interceptor (MHBI), initial sewer service to the TIP, and the TIP pumping station. Phase 2 includes construction of the local collection system throughout North Tiverton. Each of the alternatives provide service to the same areas, but differ in the location of the trunk sewer along Fish Road to serve the TIP. Therefore, the environmental impacts of the three alternatives is substantially similar.

Potential environmental impacts of the selected alternative sewer system construction projects are summarized in the following paragraphs according to the regulatory jurisdiction affected:

- *Wetlands:* Regulated wetlands are identified in the vicinity of the Town Industrial Park, as well as in several locations throughout the existing residential/commercial area (Figure 4-3). In new development areas all improvements, including wastewater facilities, will receive site plan review and approval. During this process, all potential wetlands impacts will be identified and mitigated according to RIDEM regulations. RIDEM review and approval will also be required for construction of wastewater facilities within the existing residential/commercial areas. Construction of the sewers will occur within existing public right-of-ways and therefore have minimal environmental impact. Required permits, for items such as stream crossings during construction, will be obtained where applicable

Hence, potential impacts to wetlands by wastewater facilities implementation in North Tiverton will be fully avoided or mitigated. It is anticipated that during the design phase the siting of wastewater system elements within existing wetlands will be avoided, particularly for pumping stations which are typically in low-lying locations conducive to wetlands occurrence.

- *Flood Hazard Areas:* The proposed Mount Hope Bay Interceptor is located adjacent to flood hazard areas identified along the Mount Hope Bay (Figure 4-4). Construction of the Interceptor is proposed within the abandoned railroad right-of-way, either along or adjacent to the alignment of the previous tracks. The top of the track berm was constructed above the regulatory flood height (100-year floodplain), therefore, the construction of the proposed Interceptor will not be occurring in a flood hazard area. It should be noted that watertight joints are proposed for the Interceptor along its entire length abutting Mount Hope Bay, to ensure that exfiltration of wastewater from the pipe to the groundwater/Bay does not occur.
- *Public Water Supply:* Surface and ground water supply sources will not be impacted by the proposed facilities. A benefit to groundwater is anticipated from the implementation of the sewer system, which will cease the existing discharge of wastewater to the subsurface through on-site systems.
- *Coastal Resources:* The proposed Mount Hope Bay Interceptor is within 200 feet of the Bay, therefore, a Category B review by CRMC is anticipated. Since the Interceptor is located entirely within the former railroad right-of-way, no potential coastal resources impacts have been identified. Potential benefits may be implemented along the Interceptor alignment by enhancing ground surface conditions with improvements such as removal of railroad ballast and introducing plantings, and potential placement of a bike/hiking trail in the abandoned right-of-way.
- *Cultural Resources:* Based on the location of known sites and on environmental models developed by Historical Preservation and Heritage Commission, the general project area has a high likelihood of containing archeological sites associated with pre-colonial and colonial uses of the area. However, it is likely that development of roads and houses has disturbed some, perhaps most of this area, destroying its archeological integrity. During the design phase, the need and extent of Phase I assessment study will be conducted to determine if any intact land surfaces have survived. This assessment may dictate the need for an extensive Phase I subsurface testing in undisturbed areas (if applicable) to determine if there are archeological resources with in the project area.

The main benefit of the proposed wastewater management facilities will be the cessation of subsurface discharges of wastewater in the study area. Other positive environmental benefits of the selected plan include preservation of currently protected areas in concert with the town zoning ordinance and other regulations such as wetlands and coastal jurisdictions. New development growth has not been projected beyond levels that can be sustained while maintaining the environmental quality of North Tiverton.

7.6 Temporary Construction Impacts

Construction of the sewers and the interceptor will occur within existing public right-of-ways and therefore private land takings would not be required. The construction impacts for each of the three alternatives would be essentially the same. Minor short-term traffic impacts would be anticipated during construction. The impacts would be minimized by the development and implementation of a traffic maintenance plan. In addition, there are potential construction nuisance impacts such as noise, dust, site debris, and erosion. However, they would be regulated by the town through requirements included in the construction specifications.

The major construction item common to each of the three alternatives is the Mount Hope Interceptor which is located along an abandoned railroad easement. The benefit of this proposed alignment is that it minimizes short-term construction impacts to the business district and residential areas.

8.0 PLAN SELECTION

8.0 PLAN SELECTION

8.1 Selected Plan

The plan selected for the management of Tiverton's wastewater facilities is design Alternative 3, based on relative costs and the ability of this alternative to be phased to address key needs during the initial stages. Phase 1 of this plan consists of providing sewer service to the following areas:

- The Town Industrial Park area (228 acres) south of the Route 24/Fish Road intersection, including the adjoining potentially industrial parcels (Douglass properties, ~600 acres).
- The Northeast Properties parcel along Mount Hope Bay surrounding Carey's Lane.
- The Mount Hope Bay Interceptor to connect the North Tiverton service area to the Fall River WWTF.

Phase 2 consists of construction of trunk sewers along Fish Road and Main Road, and provision of service to the residential/commercial properties between these routes and the proposed Interceptor along the Bay. An additional pumping station is required in the northeast corner of the service area. The ultimate sewerage of this area may be implemented in several future phases, depending primarily upon availability of funds. Provided in figure 8-1 is a map of the selected alternative depicting phased construction.

The proposed wastewater system facilities have been designed in compliance with all applicable RIDEM regulations.

8.2 Environmental Impacts of Selected Plan

Potential environmental impacts of the selected sewer system construction project are summarized in the following paragraphs according to the regulatory jurisdiction affected:

- *Wetlands:* Regulated wetlands are identified in the vicinity of the Town Industrial Park, as well as in several locations throughout the existing residential/commercial area (Figure 4-3). In new development areas all improvements, including wastewater facilities, will receive site plan review and approval. During this process, all potential wetlands impacts will be identified and mitigated according to RIDEM regulations. RIDEM review and approval will also be required for construction of wastewater facilities within the existing residential/commercial areas.

Hence, potential impacts to wetlands by wastewater facilities implementation in North Tiverton will be fully avoided or mitigated. It is anticipated that during the design phase the siting of wastewater system elements within existing wetlands will be avoided, particularly for pumping stations which are typically in low-lying locations conducive to wetlands occurrence.

- *Flood Hazard Areas:* The proposed Mount Hope Bay Interceptor is located adjacent to flood hazard areas identified along the Mount Hope Bay (Figure 4-4). Construction of the Interceptor is proposed within the abandoned railroad right-of-way, either along or adjacent to the alignment of the previous tracks. The top of the track berm was constructed above the regulatory flood height (100-year floodplain), therefore, the construction of the proposed Interceptor will not be occurring in a flood hazard area. It should be noted that watertight joints are proposed for the Interceptor along its entire length abutting Mount Hope Bay, to ensure that exfiltration of wastewater from the pipe to the groundwater/Bay does not occur.
- *Public Water Supply:* Surface and ground water supply sources will not be impacted by the proposed facilities. A benefit to groundwater is anticipated from the implementation of the sewer system, which will cease the existing discharge of wastewater to the subsurface through on-site systems.
- *Coastal Resources:* The proposed Mount Hope Bay Interceptor is within 200 feet of the Bay, therefore, a Category B review by CRMC is anticipated. Since the Interceptor is located entirely within the former railroad right-of-way, no potential

coastal resources impacts have been identified. Potential benefits may be implemented along the Interceptor alignment by enhancing ground surface conditions with improvements such as removal of railroad ballast and introducing plantings, and potential placement of a bike/hiking trail in the abandoned right-of-way.

- *Cultural Resources:* based on the location of known sites and on environmental models developed by Historical Preservation and Heritage Commission, the general project area has a high likelihood of containing archeological sites associated with pre-colonial and colonial uses of the area. However, it is likely that the development of roads and houses has disturbed some, perhaps most of this area, destroying its archeological integrity. During the design phase, the need and extent of Phase I assessment study will be conducted to determine if any intact land surfaces have survived. This assessment may dictate the need for an extensive Phase I subsurface testing in undisturbed areas (if applicable) to determine if there are archeological resources with in the project area.
- *Temporary Construction Impacts:* Construction related impacts will occur when the project is implemented. Construction will occur within existing public right-of-ways and therefore have minimal environmental impact. Required permits, for items such as stream crossings during construction, will be obtained where applicable. Construction on state highways will require a permit through RIDOT Division of Maintenance. Potential construction nuisance impacts such as dust, site debris, and erosion will be regulated by the town through requirements included in the construction specifications. The major construction item is the Mount Hope interceptor, which is located along an abandoned railroad easement. The benefit of this proposal alignment is that it minimizes short-term construction impacts to the business district and residential areas.

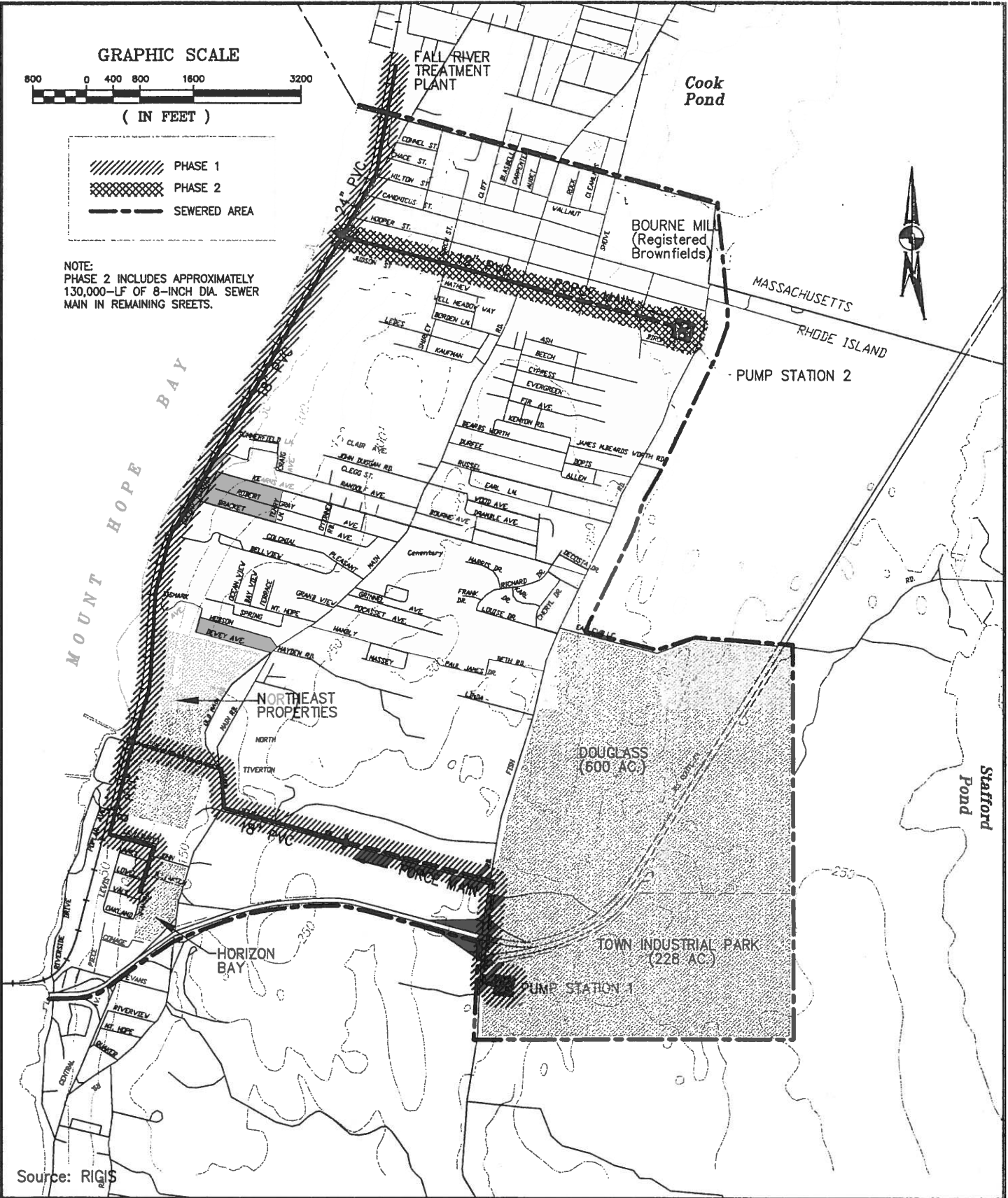
The main benefit of the proposed wastewater management facilities will be the cessation of subsurface discharges of wastewater. Other positive environmental benefits of the selected plan include preservation of currently protected areas in concert with the town zoning ordinance and other regulations such as wetlands and coastal jurisdictions. New development growth has not been projected beyond levels that can be sustained while maintaining the environmental quality of North Tiverton.

GRAPHIC SCALE



- PHASE 1
- PHASE 2
- SEWERED AREA

NOTE:
PHASE 2 INCLUDES APPROXIMATELY
130,000-LF OF 8-INCH DIA. SEWER
MAIN IN REMAINING SREETS.



Source: RI GIS



TOWN OF TIVERTON, RI
WASTEWATER FACILITIES PLAN
UPDATE



The LOUIS BERGER GROUP, Inc.
295 Promenade Street, Providence, RI 02908

Figure 8-1:
RECOMMENDED ALTERNATIVE

Scale: As Shown

January 2000

9.0 PLAN IMPLEMENTATION

9.0 PLAN IMPLEMENTATION

This section summarizes the considerations included in implementation of the selected alternative in the study area.

9.1 Institutional Responsibilities

The institutional responsibilities involved in establishing and effectively operating the North Tiverton wastewater facilities are summarized in Table 9-1.

Table 9-1
Institutional Responsibilities

Town Level:

1. Implement bonding to finance the construction phases of the selected alternative. Establish a betterment assessment which includes industrial/commercial user contributions that will pay for their relative use of facilities.
2. Maintain the existing Intermunicipal Agreement with Fall River to obtain wastewater treatment capacity at the Fall River WWTF.

Public Works Department Level:

1. Provide Operation and Maintenance services for the facilities, including adequate staffing and equipment, compliance monitoring, record keeping, etc.

Sewer Commission Level:

1. Administer sewer construction contracts, user connections, and fee structures.

Building & Planning Department Level:

1. Continue to regulate new development in accordance with the town Zoning Ordinance, limiting unsewered development to locations with suitable soils and site conditions.
-

9.2 Implementation Steps

A proposed implementation schedule for the selected alternative is summarized as follows:

- Step 1-** As indicated in Table 9-1, the town will identify and obtain the funding sources for implementation of the project according to an affordable phasing schedule. A preliminary financing schedule has been developed in Section 10.
- Step 2-** The town will coordinate with the Town of Fall River to expand administrative framework per the existing Intermunicipal Agreement, as necessary. A copy of the existing Agreement has been attached in Appendix D.
- Step 3-** The construction of the sanitary sewer system will be completed in two major phases, as described in Section 8.1.

9.3 Operation and Maintenance

The O&M of the Tiverton system will be implemented by the PWD, under the direction and with funding support from the Sewer Commission. The collection system will be maintained in compliance with all RIDEM regulations, as well as according to standard practices for wastewater facilities. Tiverton will develop and submit an Operations and Maintenance Manual for the proposed Wastewater Collection System to RIDEM for review and approval.

10.0 PLAN FINANCING

10.0 PLAN FINANCING

This section addresses the financing of implementation of the selected plan. Project costs are summarized, including both construction/capital costs and on-going O&M costs that will be associated with the wastewater management facilities. A cost allocation scheme is developed to identify methods for determining the fair share of project costs to be borne by users and potentially the town as a whole. Financing alternatives are then developed with varying degrees of participation by the sewer users/residents, industrial/commercial developments, and the townwide tax base.

It is anticipated that the project financing will be a key item of further interest and comment during the public participation of this Facilities Plan Update, therefore, a recommended financing alternative has not been identified prior to further public input. During the Public Hearing (July 13, 1998), the Town residents accepted the proposed sewer design alternatives, but requested information on grants and obligation by the Town for any expenditures. The Town Council informed the public that although no financial obligations were required an approval of the town was required.

10.1 Project Cost/Fee Descriptions

Table 10-1 summarizes the types of project costs and fees that will be incurred during implementation of the wastewater management facilities.

**TABLE 10-1
PROJECT COST/FEE DESCRIPTIONS**

COST/FEE TYPE	DESCRIPTION	TYPICAL RANGE
Debt Service	Principle and interest payments to retire the bond (20 to 30 year period).	\$200-\$300 per year for avg. resid. user
Connection Fee	One-time fee paid by each user at the time of connection to the system.	\$500-\$1,000 for avg. resid. user
Facilities Assessment	One-time fee paid by large users for share of costs of downstream facilities.	Depends on capacity needed
User Fee	On-going costs for O&M of the WWTF and PWD staff/equipment, based on water use.	\$200-\$300/ year for avg. resid. user (\$4/1,000 gal)

10.2 Project Costs

10.2.1 Capital Costs

The project capital costs (including construction and engineering) in 1997 dollars (ENR CCI 5500) for the selected plan are as follows:

- PHASE 1: \$ 3,026,250
- PHASE 2: \$18,784,300
- TOTAL PROJECT: \$21,810,550

The town has applied for an Economic Development Assistance (EDA) grant of up to \$2 million for Phase 1 improvements, which must be matched by local funding. The town share capital costs can be financed with a State Revolving Loan Fund (SRF) bond with an interest rate of ½ prime, which is currently at approximately 8.50 percent.

The Phase 1 capital costs are estimated to be \$3,026,250, which results in a grant/local equal share of \$1,513,125 for Phase 1. Table 10-2 shows the payment schedule to retire a \$1.5 million bond at an interest rate of 4.25 percent, over a 20-year period. Average annual payments would be \$107,282.

The Phase 2 project capital costs are estimated to be \$18,784,300, resulting in a Total Project cost of \$21.8 million. At this time EDA or other grant monies have not been identified for future Phase 2 construction. Table 10-3 shows the payment schedule to retire a \$18.78 million bond at an interest rate of 4.25 percent, over a 30-year period. Average annual payments for this bond would be \$1,043,117.

**TABLE 10-2
TOWN OF TIVERTON
PHASE 1 WASTEWATER FACILITIES
MUNICIPAL BOND PAYMENT SCHEDULE**

Capital Costs:	\$1,513,125	Legal, rating service, printing:	2.2%
Bond Expenses:	\$33,289	Interest on Bond:	4.25%
Total Bond Value	\$1,546,414	Term:	20 years
		Interest on Bond Anticipation Note:	4.0%

General Obligation Bond - Level Principle Payment

Year	Principal	Interest	Payment	Balance
BAN Year 1	\$ -	\$ 61,857	\$ 61,857	\$ 1,546,414
2	\$ -	\$ 61,857	\$ 61,857	\$ 1,546,414
Bond Year 1	\$ 77,321	\$ 65,723	\$ 143,043	\$ 1,469,093
2	\$ 77,321	\$ 62,436	\$ 139,757	\$ 1,391,772
3	\$ 77,321	\$ 59,150	\$ 136,471	\$ 1,314,452
4	\$ 77,321	\$ 55,864	\$ 133,185	\$ 1,237,131
5	\$ 77,321	\$ 52,578	\$ 129,899	\$ 1,159,810
6	\$ 77,321	\$ 49,292	\$ 126,613	\$ 1,082,490
7	\$ 77,321	\$ 46,006	\$ 123,326	\$ 1,005,169
8	\$ 77,321	\$ 42,720	\$ 120,040	\$ 927,848
9	\$ 77,321	\$ 39,434	\$ 116,754	\$ 850,528
10	\$ 77,321	\$ 36,147	\$ 113,468	\$ 773,207
11	\$ 77,321	\$ 32,861	\$ 110,182	\$ 695,886
12	\$ 77,321	\$ 29,575	\$ 106,896	\$ 618,566
13	\$ 77,321	\$ 26,289	\$ 103,610	\$ 541,245
14	\$ 77,321	\$ 23,003	\$ 100,324	\$ 463,924
15	\$ 77,321	\$ 19,717	\$ 97,037	\$ 386,603
16	\$ 77,321	\$ 16,431	\$ 93,751	\$ 309,283
17	\$ 77,321	\$ 13,145	\$ 90,465	\$ 231,962
18	\$ 77,321	\$ 9,858	\$ 87,179	\$ 154,641
19	\$ 77,321	\$ 6,572	\$ 83,893	\$ 77,321
20	\$ 77,321	\$ 3,286	\$ 80,607	\$ -
Total	\$ 1,546,414	\$ 813,800	\$ 2,360,214	
Average Payment :			\$ 107,282	
Level Payment Schedule:			\$ 116,321	

Note: A Bond Anticipation Note is issued for the first 2 years (during construction) whereby only interest payments are made. Thereafter a Bond is issued, with payments of principle and interest due.

TABLE 10-3
TOWN OF TIVERTON
PHASE 2 WASTEWATER FACILITIES
MUNICIPAL BOND PAYMENT SCHEDULE

Capital Costs:	\$18,784,300	Legal, rating service, printing:	2.2%
Bond Expenses:	\$413,255	Interest on Bond:	4.25%
Total Bond Value	\$19,197,555	Term:	30 years
		Interest on Bond Anticipation Note:	4.0%

General Obligation Bond - Level Principle Payment

Year	Principal	Interest	Payment	Balance
BAN Year 1	\$ -	\$ 767,902	\$ 767,902	\$ 19,197,555
2	\$ -	\$ 767,902	\$ 767,902	\$ 19,197,555
Bond Year 1	\$ 639,918	\$ 815,896	\$ 1,455,815	\$ 18,557,636
2	\$ 639,918	\$ 788,700	\$ 1,428,618	\$ 17,917,718
3	\$ 639,918	\$ 761,503	\$ 1,401,421	\$ 17,277,799
4	\$ 639,918	\$ 734,306	\$ 1,374,225	\$ 16,637,881
5	\$ 639,918	\$ 707,110	\$ 1,347,028	\$ 15,997,962
6	\$ 639,918	\$ 679,913	\$ 1,319,832	\$ 15,358,044
7	\$ 639,918	\$ 652,717	\$ 1,292,635	\$ 14,718,125
8	\$ 639,918	\$ 625,520	\$ 1,265,439	\$ 14,078,207
9	\$ 639,918	\$ 598,324	\$ 1,238,242	\$ 13,438,288
10	\$ 639,918	\$ 571,127	\$ 1,211,046	\$ 12,798,370
11	\$ 639,918	\$ 543,931	\$ 1,183,849	\$ 12,158,451
12	\$ 639,918	\$ 516,734	\$ 1,156,653	\$ 11,518,533
13	\$ 639,918	\$ 489,538	\$ 1,129,456	\$ 10,878,614
14	\$ 639,918	\$ 462,341	\$ 1,102,260	\$ 10,238,696
15	\$ 639,918	\$ 435,145	\$ 1,075,063	\$ 9,598,777
16	\$ 639,918	\$ 407,948	\$ 1,047,867	\$ 8,958,859
17	\$ 639,918	\$ 380,751	\$ 1,020,670	\$ 8,318,940
18	\$ 639,918	\$ 353,555	\$ 993,473	\$ 7,679,022
19	\$ 639,918	\$ 326,358	\$ 966,277	\$ 7,039,103
20	\$ 639,918	\$ 299,162	\$ 939,080	\$ 6,399,185
21	\$ 639,918	\$ 271,965	\$ 911,884	\$ 5,759,266
22	\$ 639,918	\$ 244,769	\$ 884,687	\$ 5,119,348
23	\$ 639,918	\$ 217,572	\$ 857,491	\$ 4,479,429
24	\$ 639,918	\$ 190,376	\$ 830,294	\$ 3,839,511
25	\$ 639,918	\$ 163,179	\$ 803,098	\$ 3,199,592
26	\$ 639,918	\$ 135,983	\$ 775,901	\$ 2,559,674
27	\$ 639,918	\$ 108,786	\$ 748,705	\$ 1,919,755
28	\$ 639,918	\$ 81,590	\$ 721,508	\$ 1,279,837
29	\$ 639,918	\$ 54,393	\$ 694,312	\$ 639,918
30	\$ 639,918	\$ 27,197	\$ 667,115	\$ 0

Total \$ 19,197,555 \$ 14,182,193 \$ 33,379,748

Average Payment : \$ 1,043,117
Level Payments: \$ 1,144,141

Note: A Bond Anticipation Note is issued for the first 2 years (during construction) whereby only interest payments are made. Thereafter a Bond is issued, with payments of principle and interest due.

10.2.2 Operations and Maintenance Costs

The O&M costs will be paid by all users of the sewer system, with fees including the following items:

- The town's proportionate share of the O&M of the Fall River WWTF.
- The town's proportionate share of future capital improvements to the Fall River WWTF and Fall River collection system.
- Any surcharges due to Fall River for treatment of flows in excess of the agreed capacity available to the town (2.0 MGD average daily flow, 6.0 MGD peak flow).
- O&M of the town's sewer collection system and pumping stations.

According to the Fall River Water Pollution Control Authority, current O&M charges at the WWTF are \$2.31 per 100 cubic feet (\$3.00/1,000 gallons). Therefore, the town's maximum O&M contribution would be a total of \$2,190,000 per year for 2.0 MGD, and the average residential user at 195 gpd would pay \$217 per year. This figure would be based on the actual monitored flow received at the WWTF from Tiverton, and per the Intermunicipal Agreement charges to individual Tiverton users would be administered by the town (See Appendix D). It is anticipated that sewer use billings would be based on water supply consumption. The Fall River WWTF has recently been upgraded, including Phase I of the CSO Program and these costs are reflected in the \$3.00/1,000 gallon fee. Future upgrades to the Fall River WWTF and collection system that may cause the fee to increase would be the on-going project to reduce Combined Sewage Overflows (CSOs).

It is estimated that the O&M of the sewer system by the Tiverton Sewer Commission (TSC) would amount to \$3.00 per 1,000 gallons used, or \$214 per year for the average residential user of 195 gpd. This estimate is based on the \$3.30/1,000 gallon cost that the Town of Middletown is charging for a similar wastewater management system in which sewage is collected and pumped to the City of Newport for treatment. The O&M cost estimate for North Tiverton facilities has been reduced by 10% since the Middletown system has many older sewer reaches, as well as a total of 23 pumping stations. The projected total O&M costs for the Tiverton sewer users are shown in Table 10-4, for both existing and future flowrates and numbers of users.

TABLE 10-4
PROJECTED ANNUAL O&M COSTS

Unit Costs	EXISTING	O&M COSTS / 1,000 GAL			ULTIMATE	O&M COSTS / 1,000 GAL		
		FR WWTF \$	TIV \$	TOTAL \$		FR WWTF \$	TIV \$	TOTAL \$
RESIDENTIAL								
Users	2,919				3,647			
Flowrate	569,205				711,165			
Average Flowrate	195				195			
Average O&M Per User		\$ 214	\$ 214	\$ 427		\$ 214	\$ 214	\$ 427
INDUSTRIAL/COMMERCIAL								
Users	37				100			
Flowrate	41,070				1,195,570			
Average Flowrate	1,110				11,956			
Average O&M Per User		\$ 1,215	\$ 1,215	\$ 2,431		\$ 10,968	\$ 17,455	\$ 28,423
INSTITUTIONAL								
Users	5				6			
Flowrate	11,250				24,250			
Average Flowrate	2,250				4,042			
Average O&M Per User		\$ 2,464	\$ 2,464	\$ 4,928		\$ 4,426	\$ 4,426	\$ 8,851
TOTALS								
	621,525	GPD	\$ 1,361,140		1,930,985	GPD	\$ 4,452,883	

10.3 Cost Allocation

Capital costs of the project could be potentially allocated in varying degrees between the North Tiverton residents and businesses who would be the direct beneficiaries of the facilities, and the town as a whole which would benefit indirectly from the facilities through enhancement of the industrial/commercial tax base and preservation of the town's environment. The following scenarios are considered:

Scenario A: North Tiverton property owners pay for all capital costs associated with residential/commercial flows in the service area. The Town pays for the TIP facilities and for TIP capacity in the MHBI. To the extent possible, industries locating in the proposed Town Industrial Park and Northeast Properties site would contribute costs associated with their individual flowrates and necessary downstream capacity for those flows.

PHASE 1:

Town Tax Base - TIP plus percentage of MHBI used (28.75%)

North Tiverton - percentage of MHBI used (71.25%)

PHASE 2:

Town Tax Base - none

North Tiverton - All Phase 2 work

Scenario B: Tiverton property owners as a whole pay for the main elements of the project, including the Mount Hope Interceptor and facilities needed from the Town Industrial Park. North Tiverton users would pay for collector sewers and the Phase 2 pumping station needed to serve individual streets in the service area. As in Scenario A, new industries would pay for capacity allocated to their flowrates.

PHASE 1:

Town Tax Base - All Phase 1 work

North Tiverton - none

PHASE 2:

Town Tax Base - none

North Tiverton - All Phase 2 work

Table 10-5 shows the projected capital costs per average residential user under Scenarios A and B, for Phases 1 and 2 of the project.

Table 10-6 shows the estimated total project costs (capital and O&M) that the average residential user would pay.

TABLE 10-5
PROJECTED ANNUAL CAPITAL COSTS

	PHASE 1			PHASE 2			TOTAL
	Users	Share		Users	Share		
<i>Average Annual Cost</i>			\$ 107,282			\$ 1,043,117	\$ 1,150,399
SCENARIO A							
Town Tax Base		41.8%	\$ 44,844		0.0%	\$ -	\$ 44,844
	5675		\$ 8	6435		\$ -	\$ 8
North Tiverton		58.2%	\$ 62,438		100.0%	\$ 1,043,117	\$ 1,105,555
	2919	-	\$ 21	3647		\$ 286	\$ 307
SCENARIO B							
Town Tax Base		100.0%	\$ 62,438		0.0%	\$ -	\$ 62,438
	5675		\$ 11	6435		\$ -	\$ 11
North Tiverton		0.0%	\$ -		100.0%	\$ 1,043,117	\$ 1,043,117
	2919		\$ -	3647		\$ 286	\$ 286

TABLE 10-6
PROJECTED ANNUAL AVERAGE RESIDENTIAL USER COSTS

	PHASE 1				PHASE 2			
	Users	O&M	CAP.	TOTAL	Users	O&M	CAP.	TOTAL
SCENARIO A								
Town Tax Base	5675	\$ -	\$ 8	\$ 8	6435	\$ -	\$ -	\$ -
				\$ -				\$ -
North Tiverton	2919	\$ -	\$ 21	\$ 21	3647	\$ 391	\$ 286	\$ 677
SCENARIO B								
Town Tax Base	5675	\$ -	\$ 11	\$ 11	6435	\$ -	\$ -	\$ -
				\$ -				\$ -
North Tiverton	2919	\$ -	\$ -	\$ -	3647	\$ 391	\$ 286	\$ 677

11.0 PUBLIC PARTICIPATION PROGRAM

11.0 PUBLIC PARTICIPATION PROGRAM

This section summarizes the public participation program elements that were received through public and agency review of the Facilities Plan.

11.1 Summary of Program

The public participation program for the Tiverton Wastewater Facilities Plan consists of the following elements:

- A. *Informal public workshop* to review the draft Plan, conducted in a regularly scheduled Town Council meeting. The primary purpose of this workshop is to ensure that all of the town departments and officials have been able to provide input to the Plan prior to general public and agency distribution. Interested members of the public may also attend the workshop and provide preliminary comments according to the bylaws governing town council meetings.
- B. *Public review* of the draft plan will commence with a formal public hearing on the Plan, to be conducted in Tiverton after a public notice period. The public hearing record will include comments from members of the public, as well as local agencies.
- C. *Agency review* of the draft Plan will be conducted through the State Clearinghouse. All involved state agencies will be provided the opportunity to review and comment on the Plan. The public hearing record will be included in the draft Plan submitted for agency review.

11.2 Agency Comments

The Department of Environmental Management submitted comments dated February 22, 1999. The comments and responses are summarized below:

1. **Comment:** The Selected Plan consists of sewerage industrial developments and Horizon Bay and constructing the related interceptors/pump station to convey those flows to the Fall River WWTF as Phase 1. The FPU then indicates that Phase 2 will only be implemented as funds become available. This office doesn't agree with the phasing of the proposed wastewater collection system. Our basis is that the 1976 report indicated areas of Tiverton which demonstrated a need for sewers based on poor soils and existing information (at the time) on ISDS failures. In the 1976 report, the proposed residential flows were 1.54 MGD vs. the FPU's estimate of 0.71 MGD. The proposed industrial/commercial flows were 0.68 MGD vs. the FPU's estimate of 1.2 MGD. It appears that the Town has basically shifted its priorities to sewer industrial properties, while the residential areas that were problematic over 20 years ago will remain unsewered until some future time. The Stafford Pond Road, Bulgarmarsh Road and Stone Bridge areas, which were identified in the 1976 report as areas to be sewerage, have been deleted, either in whole or part, in this FPU. Assuming that the problem with failed ISDS systems still exist today, these areas should receive priority for sewerage since the need was identified in the original report and has not been addressed. While it is understandable that the town wants to be able to provide sewer service for future industrial development, this should not take precedent over providing service to areas of documented need. At a minimum, please provide a schedule in this FPU indicating specific timeframes for implementation of Phase 1 and Phase 2. Phase 1 should include sewerage the existing residential areas with the most pressing need as well as the proposed industrial areas. Relying on revenues from future industrial development to determine when *and if* sewers can be economically extended to residential areas with long-standing problems, is unacceptable.

Response: The Facilities Plan, dated 1975, recommended providing a wastewater collection system in four areas of the Town: North Tiverton, Stone Bridge, Bulgarmarsh Road, and Stafford Road. The Facilities Plan concluded that the remainder of the Town would be best served by individual on-site sewer disposal systems. The basis of this decision was on economics, landuse, lot sizes, and soil conditions. The conclusion remains valid and consistent with the Draft CCP. Therefore, the planning area of this document was limited to these areas.

The Town is currently in the process of developing an ISDS Wastewater Management Plan on a town wide basis. The ISDS Wastewater Management Plan will be a separate stand alone document that develops the goals and objectives of the ISDS Wastewater Management Plan for unsewered areas. The ISDS Wastewater Management Plan will also address areas that sewerage is planned, but may not be constructed for a period of time.

The Town has limited the area to be sewerage to North Tiverton and a portion of Stone Bridge Area. At this point, it is considered economically infeasible to expand sewer service to Bulgarmarsh Road and Stafford Pond area. The decision to eliminate portions of Stone Bridge Area and Bulgarmarsh Road were also based on larger lot sizes present in medium density residential development (R-30) and soil conditions. The focus of the Town has shifted to the development of an ISDS Wastewater Management District to service these areas of the Town. The decision to eliminate the Stafford Pond area was based on the Town's proposed development and implementation of ISDS Wastewater Management District.

The primary, initial objective for the Town in developing an ISDS Wastewater Management Plan was to focus on the residential areas adjacent to Stafford Pond. The Town has determined that it is most cost effective to focus on serving these areas along with the remainder of the Town with conventional, alternative on-site, and/or community systems. Should the Plan determine that it is not economically and/or environmentally beneficial (or detrimental to public health) to utilize alternative on-site or community ISDS systems for any specific areas, then the Town would be required to update the Facilities Plan accordingly.

With regards to phasing of the project, the Town remains committed to implementation of Phases 1 and 2. However, it is anticipated that implementation of Phase 2 will occur over an extended period of time to minimize the financial burden to property owners in the area.

2. **Comment:** In the Executive Summary, revise the text to indicate the study area is the whole town, not just North Tiverton. Also, revise Figure 2-1 to include the whole town in the study area.

Response: See Response # 1.

3. **Comment:** In Chapter 3, provide a more detailed description of the recommended plan in the 1976 report and a map showing the areas that were going to be sewerred, including the interceptors and pump stations. As mentioned in the text on page 3-6, please delineate each of the four stages on this map.

Response: The text has been modified accordingly. In addition, Figure 3-1 has been added.

4. **Comment:** On page 4-5, Section 4.6, revise the text in the 1st paragraph, second sentence from "October 1994" to "July 1997". In addition, please revise Tables 4-3 and 4-4, if necessary, to reflect any changes made to the 303(d) list and the *State of the State's Waters*. For updated information on these documents, you can contact Connie Carey of the OWR Standards Section at 222-3961, x7239.

Response: References to 305(b) Report State of the States Waters has been updated to July 1997. Tables 4-3 and 4-4 have also been modified to reflect most recent changes to the 303(d) list.

5. **Comment:** In Chapter 4, provide information on the problems that have been experienced with the existing ISDS's in town (i.e., # of times tanks are being pumped, # of failures reported/in what areas, # of repair applications in to RIDEM/in what areas, etc.). This information should be presented in the FPU in order to reaffirm, substantiate and/or justify the problem areas in town. If ISDS problems are still occurring in the Stone Bridge Bulgarmarsh or Stafford Pond areas, then those areas should be included as future sewer service areas, as they were in the 1976 document. Please also include a Land Use Map in this chapter.

Response: See Response #1.

6. **Comment:** On page 4-8, the text states that Figure 4-5 shows the watershed basins for Stafford Pond. However, the Figure does not appear to show any watershed basins. Please revise the text and/or Figure 4-5 accordingly.

Response: Figure 4-5 has been modified to include the watershed boundaries.

7. **Comment:** Chapter 5, Section 5.3 concerns future wastewater flows and Table 5-1 provides a summary. This section should refer to mapping which shows where these future service areas are. Include the areas referred to as Mount Hope Bay and Fish Road.

Response: Figure 5-2 has been added to illustrate the areas referred to as Mount Hope Bay and Fish Road for future wastewater calculations.

8. **Comment:** On page 6-1, the 1st paragraph indicates the planning period to extend to the year 2015. However, the 1st paragraph of the Executive Summary states the FPU will be the planning tool to the year 2020. Please revise as necessary.

Response: The text and tables have been modified to update population projects to the year 2020 to be consistent.

9. As indicated in comment #2, please add text to discuss the southern portion of Tiverton in Section 7.1 Unsewered Areas on page 7-1. At a minimum, this discussion should focus on the establishment of a Wastewater Management District for those areas of town (in both the northern and southern areas) which will retain ISDS's as the means of wastewater disposal. Your attention is directed to the OWR Facilities Plan Checklist Section VI.C (copy enclosed). Please follow the checklist when compiling this discussion. Addressing these issues during facilities planning will guarantee Tiverton eligibility for state-assisted funding for repair/replacement of failed ISDS's through the Community Septic System Loan Program (CSSLP). For information on the (CSSLP), you can contact Jim Riordan of the OWR Watersheds Section at 222-3961, x4421.

Response: See Response #1.

- 10 **Comment:** In Chapter 7, add a section on the environmental impacts of all three alternatives. The additional Section should be structured like Section 8.2, except there would be a discussion of *Wetlands*, *Flood Hazard Areas*, etc. for each alternative. In addition to the information provided in Section 8.2, please also mention traffic impacts and adverse economic impacts to existing businesses under the *Temporary Construction Impacts* section. Proper planning requires that all impacts, not just cost, be evaluated in determining the selected alternative. Also, in Section 7.4, please revise the cost estimates to include O & M costs and present the overall cost on a Present Worth or Equivalent Annual basis. Please also provide an ENR construction cost index that can be associated with the costs presented. On Figures 7-1 through 7-3, please indicate which facilities will be constructed under which phase.

Response: Sections 7.4 and 7.5 have been added to include discussions on Environmental Impacts and Short-Term Construction Impacts for each of the proposed three sewer alternatives. Also, Table 7-2 has been modified to include O&M cost for the collection system and a present worth analysis considering O&M costs. Figures 7-1 to 7-3 have been modified to illustrate the phased approach.

- 11 **Comment:** In Chapter 8, Section 8.2, provide a brief recap of the environmental impacts of the selected alternative. Also, include a map in this chapter that shows the selected plan, including Phases 1 and 2 and all associated wastewater collection facilities.

Response: The text has been modified accordingly. In addition, Figure 8-1 has been added to recap the selected alternative with the phasing illustrated.

- 12 **Comment:** In Chapter 9, Section 9.2, what is meant by "The Town will confirm the intermunicipal agreement..." in Step 2? The Executive Summary indicates that Tiverton already has an intermunicipal agreement with Fall River to treat up 2 MGD. Is there a chance that Fall River will not be able to accept this amount in the future? Confirming the agreement should be done now, as part of the facilities planning process, not as a future step once the

FPU is approved. A copy of the intermunicipal agreement should be included in the Appendices.

Response: Provided in Appendix D is a copy of the Intermunicipal Agreement between Tiverton and Fall River. The Agreement remains valid and in effect.

- 13 **Comment:** In Chapter 9, Section 9.3, add language indicating that an O & M manual for the proposed collection system will be compiled and submitted to RIDEM for review and approval.

Response: The following language was been added: "Tiverton will develop and submit an Operations and Maintenance Manual for the proposed wastewater collection system to RIDEM for review and approval."

- 14 **Comment:** In Chapter 10, the 2nd paragraph states that project financing will be a key issue during the public participation phase. However, it appears that the Public Hearing was already held on July 13, 1998. The meeting minutes in Appendix C indicate that there was some discussion about project financing. Update the text in Chapter 10 to indicate that the Public Hearing was already held and briefly discuss the results for that Hearing. In addition, the O & M costs must be included in the overall project costs. Also, on page 10-5, Section 10.2.2, 3rd bullet, change the permitted peak flow to 6.0 MGD. In addition, the text in this section mentions the Fall River CSO Project. Is there information available from Fall River that can be used in estimating the additional cost to the ratepayers of Tiverton as a result of implementing the CSO project? Will Fall River expect Tiverton to share the cost of CSO corrections? If information is available, it should be presented in this section as well as in Section 7.4.

Response: Text has been added to Section 10 to clarify discussions regarding project financing. In addition, there has been text added to discuss current status of the Fall River CSO Project. The sewer costs have been updated to reflect an increase in cost due to Phase 1 of CSO project. Tiverton is responsible for 7% of costs associated with Fall River WWTF, including CSOs.

15 **Comment:** On page 11-2, the text indicates that a Public Meeting was held on March 10, 1997. Please provide all relevant information from that meeting, including prior notification of the meeting, copy of the agenda, meeting minutes, copies of handouts, etc. in Appendix C. In addition, provide a copy of any Hearing notes (i.e., notes on who from the public asked questions, etc.) in Appendix C. On December 7, 1998, this office received a consistency with the State Guide Plan determination letter from the RI Statewide Planning Program. They did, however, state that there were comments from both RIDOT and the Historical Preservation & Heritage Commission. Please include copies all correspondence with state and/or federal agencies in Appendix C.

Response: The information relevant to the Public Hearing has been added to Appendix C. Please refer to additional text included in Section 11.2 and Appendix C regarding comments from RIDOT and Historical Preservation & Heritage Commission.

The Department of Transportation submitted comments through Intergovernment Review process on December 7, 1998. The comment and response are provided below:

Comment: Any work on a State Highway will require a permit through RIDOT Maintenance Division.

Response: Following text has been added to page 8-3: "Construction on State Highways will require a permit through RIDOT Maintenance Division".

Historical Preservation and Heritage Commission submitted Comments through Intergovernmental Review Process on December 1, 1998. The comments and responses are provided below:

Comments: This office has reviewed the application in accordance with Section 106 of the National Historical Preservation Act. It is our conclusion that the proposed project might affect significant archeological and historical properties.

Response: The following text has been added to section 7.5: "*Cultural Resources:* based on the location of known sites and on environmental models developed by Historical Preservation and Heritage Commission, the general project area has a high likelihood of containing archeological sites associated with pre-colonial and colonial uses of the area. However, it is likely that do the development of roads and houses has disturbed some, perhaps most of this area, destroying its archeological integrity. During the design phase, the need and extent of Phase I assessment study will be conducted to determine if any intact land surfaces have survived. This assessment may dictate the need for an extensive Phase I subsurface testing in undisturbed areas (if applicable) to determine if there are archeological resources with in the project area.

11.3 Public Comments

A public workshop was held on March 10, 1997, as part of a regularly scheduled Town Council meeting. A presentation of the Wastewater Facilities Plan was made, with questions and comments following from the public and the Council.

A public hearing was held on July 13, 1998, in the Town Hall of Tiverton. A notification for the public hearing was duly posted. The Town Administrator summarized the sewer feasibility study and pointed out that the acceptance of the plan at the public hearing was necessary for grant application.

The residents of the Town accepted the proposed sewer design alternatives, but requested information on amounts of the grants and the obligation by the Town for any expenditures. The Town Council informed that although no financial obligation was required an approval of the residents of the Town was required. Minutes of the public hearing are presented in Appendix C.

11.4 Responsiveness Summary

A summary of the responses to all agency and public comments are listed in Section 11.2 and compiled and presented in Appendix C.

GLOSSARY AND LIST OF ABBREVIATIONS

GLOSSARY OF TERMS

CRMC- Coastal Resources Management Council.

Domestic Wastewater- The liquid wastes generated by residences, commercial, and institutional facilities.

Effluent- Domestic wastewater or other waste liquid, that is partially or completely treated (see Raw Wastewater).

FEMA- Federal Emergency Management Agency.

Fragipan- Friable layer of hard, consolidated soil material, generally less than 24 inches thick.

Industrial Wastewater- The liquid wastes resulting from the processes employed in industrial manufacturing, trade or business establishments, as distinct from Domestic Wastewater.

Infiltration- The groundwater that enters a sewer system through such means as defective pipes, pipe joints, or porous manhole walls. Infiltration does not include Inflow, however, "Rainfall Induced Infiltration" (RII) of groundwater may occur during and for a short period after rainfall events and have similar characteristics to Inflow.

Inflow- Storm water that enters a sewer system directly through a connection such as roof leaders; basement, foundation, and yard drains; catch basins, etc.

I/I- The total quantity of water in a sewer system from both infiltration and inflow, not distinguished as to source.

ISDS- Individual sewage disposal systems, as regulated by the Rhode Island Department of Environmental Management.

Outfall- The point, location, or structure where a liquid discharge occurs to a surface receiving water.

Overflow- a discharge of untreated wastewater from the collection system.

DPW- the Tiverton Department of Public Works.

Raw Wastewater- Untreated wastewater, such as that conveyed in a sewer system.

Receiving Water- The surface water body receiving the ultimate discharge of partially or completely treated wastewater effluent, or of untreated wastewater overflows.

RIDEM- Rhode Island Department of Environmental Management.

RIGIS- Rhode Island Geographic Information System.

Sanitary Sewer- A sewer intended to carry only domestic and industrial wastewaters.

Septage- The mixture of liquid and solid wastes originating in septic tanks or cesspools, which is periodically pumped from the tanks and transported to a wastewater treatment facility.

TSC- Tiverton Sewer Commission

WWTF- Wastewater Treatment Facility

LIST OF ABBREVIATIONS

CFS	Cubic Feet per Second
BOD ₅	Five Day, Biochemical Oxygen Demand
fps	Feet per Second
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
gpm	Gallons per Minute
HP	Horsepower
MG	Million Gallons
mg/l	Milligrams per Liter
MGD	Million Gallons per Day
ppb	Parts Per Billion
ppm	Parts Per Million

REFERENCES

REFERENCES

Documents

- Coastal Resources Management Council, 1990. *The State of Rhode Island Coastal Resources Management Program* (as amended).
- Federal Insurance Management Agency, April 17, 1984. *Flood Insurance Study* (revision).
- Federal Emergency Management Agency, 1992. Flood Insurance Rate Maps, community panel numbers 44501-0001 to -0003.
- Camp Dresser & McKee Inc. June, 1975. *Wastewater Facilities Plan, Town of Tiverton, Rhode Island*.
- Rhode Island Geographic Information System (RIGIS), 1995. Aquidneck Island.
- Town of Tiverton, Rhode Island, March 1996. *Comprehensive Community Plan (Final Draft)*.
- Rhode Island Department of Environmental Management. *State of the State's Waters - Rhode Island: A Report to Congress* (PL 94-500, 305b).
- Rhode Island Department of Environmental Management, Amended June 18, 1992. *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems (ISDS)*.
- TR-16 *Guide for the Design of Wastewater Treatment Works*, 1980.
- U.S. Department of Agriculture, Soil Conservation Service, July 1981. *Soil Survey of Rhode Island*.
- Rhode Island Department of Economic Development, May 1, 1992. *Rhode Island Population & Housing 1990 Census Summary*.

Personal Communications

- Town Administrator, Town of Tiverton
- Sewer Commission, Town of Tiverton
- North Tiverton Fire District, Town of Tiverton

APPENDIX A
WASTEWATER COLLECTION SYSTEM
THEORETICAL FLOWS

SANITARY SEWER SYSTEM DATA

	STREET NAME	THEORETICAL FLOWS										REACH FLOWS				
		RESIDENTIAL					COMM. / INDUST.			INSTITUTIONAL		AVERAGE	PEAK			
		SERV. #	AVG. FLOW GPD	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD				
	UNITS															
	UNIT RATE		195	4						1,110						
	Subsection I															
	<i>West of Main Road, North of Judson Street, South of RI-MA State Line</i>															
EW																
1	Connell St.	9	1,755	4	7,020					-			1,755		7,020	
2	Chase Ave.	32	6,240	4	24,960					-			6,240		24,960	
3	Hilton St.	41	7,995	4	31,980					-			7,995		31,980	
4	Canonicus St.	45	8,775	4	35,100					-	150		8,925		35,250	
5	Hooper St.	42	8,190	4	32,760					-			8,190		32,760	
6	Judson St.	36	7,020	4	28,080					-			7,020		28,080	
NS																
7	Foote St.	7	1,365	4	5,460					-			1,365		5,460	
8	Bay St.		-	4	-					-			-		-	
9	Bottom St.	3	585	4	2,340					-			585		2,340	
10	Church St.	3	585	4	2,340					-			585		2,340	
11	Metheun St.	7	1,365	4	5,460					-			1,365		5,460	
12	Cliff St.	9	1,755	4	7,020					-			1,755		7,020	
13	Blaisdell Ave.	7	1,365	4	5,460					-			1,365		5,460	
14	Main Road	44	8,580	4	34,320					9,990	150		18,720		44,460	
	Mount Hope Interceptor	285	55,575	4	222,300					9,990	300		65,865		232,590	
	Subsection II															
	<i>East of Main Road, West of Fish Road</i>															
	<i>North of Judson Street, South of RI-MA State Line</i>															
EW																
1	Walnut St.	21	4,095	4	16,380					-			4,095		16,380	
2	Hilton St.	18	3,510	4	14,040					-			3,510		14,040	
3	Canonicus St.	52	10,140	4	40,560					-			10,140		40,560	

SANITARY SEWER SYSTEM DATA

	STREET NAME	THEORETICAL FLOWS										REACH FLOWS	
		RESIDENTIAL					COMM. / INDUST.			INSTITUTIONAL		AVERAGE	PEAK
		SERV. #	AVG. FLOW GPD	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	
4	Hooper St.	58	11,310	4	45,240							11,310	45,240
5	Judson St.	57	11,115	4	44,460							11,115	44,460
6	Bears Den Rd.	22	4,290	4	17,160							4,290	17,160
7	Cedar St.	23	4,485	4	17,940							4,485	17,940
8	Weaver St.	27	5,265	4	21,060							5,265	21,060
NS													
9	Rock St.	13	2,535	4	10,140							2,535	10,140
10	Clement St.	13	2,535	4	10,140							2,535	10,140
11	Shove St.	16	3,120	4	12,480							3,120	12,480
12	Mill St.	20	3,900	4	15,600							3,900	15,600
	Fish Road Interceptor	340	66,300	4	265,200							66,300	265,200
	Subsection III												
	<i>North of Kearns Ave., South of Judson Street, West of Main Road</i>												
EW													
1	Mathew Rd.	15	2,925	4	11,700							2,925	11,700
2	Weil Meadow	16	3,120	4	12,480							3,120	12,480
3	Borden Rd.	26	5,070	4	20,280							5,070	20,280
4	Leeps Rd.	48	9,360	4	37,440							9,360	37,440
5	Horizon Dr.	35	6,825	4	27,300							6,825	27,300
6		44	8,580	4	34,320							8,580	34,320
7		44	8,580	4	34,320							8,580	34,320
8		44	8,580	4	34,320							8,580	34,320
9	Claire Ave.	44	8,580	4	34,320							8,580	34,320
10	Summerfield Ln.	13	2,535	4	10,140							2,535	10,140
11	John Duggan Rd.	42	8,190	4	32,760							8,190	32,760
12	Clegg St.	12	2,340	4	9,360							2,340	9,360
13	Randolf Ave.	47	9,165	4	36,660							9,165	36,660
14	Kearns Ave.	52	10,140	4	40,560							10,140	40,560

SANITARY SEWER SYSTEM DATA

STREET NAME	THEORETICAL FLOWS										REACH FLOWS	
	RESIDENTIAL					COMM. / INDUST.					AVERAGE	PEAK
	SERV. #	AVG. FLOW GPD	PEAK FLOW GPD	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD
15 Trailer Ave.	6	1,170	4	4,680	4	4,680	-	-	-	-	1,170	4,680
NS												
16 Robert St.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
17 Sisson Rd.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
18 Scenic View Dr.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
19 Fay St.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
20 Jay St.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
21 Craig Ave.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
22 Last St.	6	1,170	4	4,680	4	4,680	-	-	-	-	1,170	4,680
23 Jeff Rd.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
24 Rose Rd.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
25 Lillian St.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
26 Clara St.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
27 Ann Rd.	4	780	4	3,120	4	3,120	-	-	-	-	780	3,120
28 Main Road	53	10,335	4	41,340	4	41,340	12	13,320	-	-	23,655	54,660
Mount Hope Interceptor	591	115,245	3.8	437,931	12	13,320	-	-	-	-	128,565	451,251
Subsection IV												
<i>North of Warren Ave., South of</i>												
<i>Judson Street, East of Main Road</i>												
<i>West of Fish Road</i>												
Subsection IV (M)												
EW												
1 Garden Ave.	5	975	4	3,900	4	3,900	-	-	-	-	975	3,900
2 Spruce Ave.	9	1,755	4	7,020	4	7,020	-	-	-	-	1,755	7,020
3 Seaview Ct.	7	1,365	4	5,460	4	5,460	-	-	-	-	1,365	5,460
4 Pine Tree Rd.	7	1,365	4	5,460	4	5,460	-	-	-	-	1,365	5,460
5 High Ridge Terr.	7	1,365	4	5,460	4	5,460	-	-	-	-	1,365	5,460
6 James M. Beardsworth Rd.	16	3,120	4	12,480	4	12,480	-	-	-	-	3,120	12,480

	STREET NAME UNITS	THEORETICAL FLOWS										REACH FLOWS	
		RESIDENTIAL				COMM. / INDUST.		INSTITUTIONAL		AVERAGE	PEAK	FLOW	GPD
		SERV. #	AVG. FLOW GPD	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD			
7	Durfee Rd.	24	4,680	4	18,720		-					4,680	18,720
8	Russell Dr.	24	4,680	4	18,720		-					4,680	18,720
9	Merritt Ave.	20	3,900	4	15,600		-					3,900	15,600
10	Briarwood Ave.	26	5,070	4	20,280		-					5,070	20,280
11	Dramble Way	16	3,120	4	12,480		-					3,120	12,480
12	Bourne Ave.	36	7,020	4	28,080		-					7,020	28,080
13	Warren Ave.	42	8,190	4	32,760		-					8,190	32,760
NS													
14	Arbor Terr.		-	4	-		-					-	-
15	Short St.	4	780	4	3,120		-					780	3,120
16	Earle Ln.	4	780	4	3,120		-					780	3,120
17	Holly Ln.		-	4	-		-					-	-
18	Primrose Ln.		-	4	-		-					-	-
	Pocassett School (Main Road)		-	4	-		-					10,000	10,000
	Main Road Interceptor	247	48,165	4	192,660		-					58,165	202,660
	Subsection IV (F)												
EW													
1	Ash Ave.	33	6,435	4	25,740		-					6,435	25,740
2	Beech Ave.	59	11,505	4	46,020		-					11,505	46,020
3	Cypress Ave.	55	10,725	4	42,900		-					10,725	42,900
4	Evergreen Ave.	53	10,335	4	41,340		-					10,335	41,340
5	Fir Ave.	52	10,140	4	40,560		-					10,140	40,560
6	Kenyon Rd.	46	8,970	4	35,880		-					8,970	35,880
7	James M. Beadsworth Rd.	42	8,190	4	32,760		-					8,190	32,760
8	Durfee Rd.	16	3,120	4	12,480		-					3,120	12,480
9	Doris Ave.	23	4,485	4	17,940		-					4,485	17,940
10	Alan St.	17	3,315	4	13,260		-					3,315	13,260
11	Russell Dr.	28	5,460	4	21,840		-					5,460	21,840
12	Merritt Ave.	26	5,070	4	20,280		-					5,070	20,280
13	Decosta Dr.	10	1,950	4	7,800		-					1,950	7,800

SANITARY SEWER SYSTEM DATA

	STREET NAME UNITS	THEORETICAL FLOWS										REACH FLOWS	
		RESIDENTIAL				COMM. / INDUST.			INSTITUTIONAL		AVERAGE	PEAK	
		SERV. #	AVG. FLOW GPD	PEAK FLOW	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD
14	Warren Ave.	14	2,730	4	4	10,920	-	-	-	-	-	2,730	10,920
NS													
1	Redwood Rd.	4	780	4	4	3,120	-	-	-	-	-	780	3,120
2	Willow Tree Rd.	4	780	4	4	3,120	-	-	-	-	-	780	3,120
3	Oak Tree Rd.	4	780	4	4	3,120	-	-	-	-	-	780	3,120
4	Hope St.	4	-	4	4	-	-	-	-	-	-	-	-
5	Vallee St.	4	780	4	4	3,120	-	-	-	-	-	780	3,120
6	Cathy Ln.	4	780	4	4	3,120	-	-	-	-	-	780	3,120
7	Elaine Dr.	4	780	4	4	3,120	-	-	-	-	-	780	3,120
	Fish Road Interceptor	498	97,110	4	4	388,440	-	-	-	-	-	97,110	388,440
	Subsection V												
	<i>North of Careys Ln., South of</i>												
	<i>Kearns Ave., West of Main Road</i>												
EW													
1	Robert Gray Ave.	52	10,140	4	4	40,560	-	-	-	-	-	10,140	40,560
2	Brackett Ave.	46	8,970	4	4	35,880	-	-	-	-	-	8,970	35,880
3	Colonial Ave.	43	8,385	4	4	33,540	-	-	-	-	-	8,385	33,540
4	Bellview Ave.	50	9,750	4	4	39,000	-	-	-	-	-	9,750	39,000
5	Pleasant Ave.	6	1,170	4	4	4,680	-	-	-	-	-	1,170	4,680
6	Grandview Ave.	14	2,730	4	4	10,920	-	-	-	-	-	2,730	10,920
7	Haskins Ave.	59	11,505	4	4	46,020	-	-	-	-	-	11,505	46,020
8	Spinger Ave.	20	3,900	4	4	15,600	-	-	-	-	-	3,900	15,600
9	Bismark Ave.		-	4	4	-	-	-	-	-	-	-	-
10	Hobson Ave.	36	7,020	4	4	28,080	-	-	-	-	-	7,020	28,080
11	Dewey Ave.	31	6,045	4	4	24,180	-	-	-	-	-	6,045	24,180
12	Carey Ln.	22	4,290	4	4	17,160	-	-	-	-	-	4,290	17,160
13		1	4,680	4	4	18,720	-	-	-	-	-	4,680	18,720
14		2	4,290	4	4	17,160	-	-	-	-	-	4,290	17,160
15		3	3,900	4	4	15,600	-	-	-	-	-	3,900	15,600

SANITARY SEWER SYSTEM DATA

	STREET NAME	THEORETICAL FLOWS										REACH FLOWS	
		RESIDENTIAL					COMM. / INDUST.			INSTITUTIONAL		AVERAGE	PEAK
		SERV. #	AVG. FLOW GPD	PEAK FLOW GPD	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD
16	UNITS	4	2,730	4	10,920	-	-	-	-	-	2,730	10,920	
NS													
13	Terry Ln.	4	780	4	3,120	-	-	-	-	-	780	3,120	
14	O'Connell Rd.	4	780	4	3,120	-	-	-	-	-	780	3,120	
15	Old Colony Terr.	9	1,755	4	7,020	-	-	-	-	-	1,755	7,020	
16	Ocean View	10	1,950	4	7,800	-	-	-	-	-	1,950	7,800	
17	Bay View Ave.	11	2,145	4	8,580	-	-	-	-	-	2,145	8,580	
18	Terrace Ave.	9	1,755	4	7,020	-	-	-	-	-	1,755	7,020	
19	Paul Terr.	4	780	4	3,120	-	-	-	-	-	780	3,120	
20	Victoria Ave.	8	1,560	4	6,240	-	-	-	-	-	1,560	6,240	
21	Olympia Ave.	29	5,655	4	22,620	-	-	-	-	-	5,655	22,620	
22	Oregon Ave.	41	7,995	4	31,980	-	-	-	-	-	7,995	31,980	
23	Miles Ave.	25	4,875	4	19,500	-	-	-	-	-	4,875	19,500	
24	Main Road	64	12,480	4	49,920	9	9,990	-	-	-	22,470	59,910	
	Mount Hope Interceptor	677	132,015	3.8	501,657	9	9,990	-	-	-	142,005	511,647	
	Subsection VI												
	North Of Souza Rd., South of												
	Warren Ave., East of Main Road												
	West of Fish Rd.												
	Subsection VI (M)												
EW													
1	Harris Dr.	33	6,435	4	25,740	-	-	-	-	-	6,435	25,740	
2	Grinnell Ave.	30	5,850	4	23,400	-	-	-	-	-	5,850	23,400	
3	Pocasset Ave.	35	6,825	4	27,300	-	-	-	-	-	6,825	27,300	
4	Hambly Rd.	40	7,800	4	31,200	-	-	-	-	-	7,800	31,200	
5	Massey Rd.	40	7,800	4	31,200	-	-	-	-	-	7,800	31,200	
6	Hayden Rd.	38	7,410	4	29,640	-	-	-	-	-	7,410	29,640	
7	Laura St.	38	7,410	4	29,640	-	-	-	-	-	7,410	29,640	

SANITARY SEWER SYSTEM DATA

	STREET NAME UNITS	THEORETICAL FLOWS										REACH FLOWS	
		RESIDENTIAL				COMM. / INDUST.			INSTITUTIONAL			AVERAGE	PEAK
		SERV. #	AVG. FLOW GPD	PEAK FLOW GPD	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD
8	5	42	8,190	4	32,760		-				8,190	32,760	
9	6	42	8,190	4	32,760		-				8,190	32,760	
10	7	42	8,190	4	32,760		-				8,190	32,760	
11	Souza Rd.	50	9,750	4	39,000		-				9,750	39,000	
NS				4			-						
1	Grove St.	4	780	4	3,120		-				780	3,120	
2	Albert St.	4	780	4	3,120		-				780	3,120	
	Main Road Interceptor	438	85,410	4	341,640		-				85,410	341,640	
	Subsection VI (F)												
EW													
1	Harris Dr.	8	1,560	4	6,240		-				1,560	6,240	
2	Carl Dr.	10	1,950	4	7,800		-				1,950	7,800	
3	Frank Dr.	7	1,365	4	5,460		-				1,365	5,460	
4	Louise Dr.	27	5,265	4	21,060		-				5,265	21,060	
5	Beth Rd.	15	2,925	4	11,700		-				2,925	11,700	
6	Paul James Dr.	13	2,535	4	10,140		-				2,535	10,140	
7	Linda Rd.	22											
8		1	5,070	4	20,280		-				5,070	20,280	
9		2	5,070	4	20,280		-				5,070	20,280	
10		3	5,070	4	20,280		-				5,070	20,280	
11		4	5,070	4	20,280		-				5,070	20,280	
12	Souza Rd.	16	3,120	4	12,480		-				3,120	12,480	
NS													
1	Richard Dr.	24	4,680	4	18,720		-				4,680	18,720	
2	Cheryl Dr.	14	2,730	4	10,920		-				2,730	10,920	
3	Charles Dr.			4			-						
4	Sterling Dr.	4	780	4	3,120		-				780	3,120	
5	Ellen Ln.	7	1,365	4	5,460		-				1,365	5,460	
6	Fish Road	17	3,315	4	13,260	7	7,770	950			12,035	21,980	

SANITARY SEWER SYSTEM DATA

	STREET NAME	THEORETICAL FLOWS										REACH FLOWS			
		RESIDENTIAL					COMM. / INDUST.					INSTITUTIONAL	AVERAGE	PEAK	
		SERV. #	AVG. FLOW GPD	PEAK FLOW	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD
	Douglas Property											600,000		600,000	600,000
	Industrial Park - Fish Road											554,500		554,500	554,500
	Fish Road Interceptor	288	56,160	4	4	224,640	7	1,162,270	950			1,219,380		1,387,860	
	Subsection VII														
	North of Route 24, South of Careys Ln., West of Main Road														
EW															
1		22	4,290	4	4	17,160								4,290	17,160
2		20	3,900	4	4	15,600								3,900	15,600
3		20	3,900	4	4	15,600								3,900	15,600
4	Salisbury St.	4	780	4	4	3,120								780	3,120
5	Ames St.	8	1,560	4	4	6,240								1,560	6,240
6	John St.	10	1,950	4	4	7,800								1,950	7,800
7	Lowell St.	8	1,560	4	4	6,240								1,560	6,240
8	Williamson St.	10	1,950	4	4	7,800								1,950	7,800
9	Vale St.	8	1,560	4	4	6,240								1,560	6,240
10	Oakland St.	9	1,755	4	4	7,020								1,755	7,020
11		10	1,950	4	4	7,800								1,950	7,800
12		10	1,950	4	4	7,800								1,950	7,800
13	Cook St.	7	1,365	4	4	5,460								1,365	5,460
14	Cottage St.	10	1,950	4	4	7,800								1,950	7,800
15	Pierce Ct.	6	1,170	4	4	4,680								1,170	4,680
16	Evans Ave.	13	2,535	4	4	10,140								2,535	10,140
NS															
17	Shannon Ave				4	-									
18	Lewis St.	14	2,730	4	4	10,920								2,730	10,920
19	Pierce Ave.	10	1,950	4	4	7,800								1,950	7,800
20	Tucker Ave.	8	1,560	4	4	6,240								1,560	6,240
21	Steven St.				4	-									
22	Poplar Ave.	28	5,460	4	4	21,840								5,460	21,840

SANITARY SEWER SYSTEM DATA

		THEORETICAL FLOWS										REACH FLOWS					
		RESIDENTIAL					COMM. / INDUST.					INSTITUTIONAL		AVERAGE		PEAK	
STREET NAME	SERV. #	AVG. FLOW GPD	PEAK FLOW GPD	PEAK FACT.	PEAK FLOW GPD	SERV. #	FLOW GPD	SERV. #	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD	FLOW GPD
22 Riverside Dr.	48	9,360	37,440	4	37,440	-	-	-	-	-	-	-	-	9,360	37,440		
Horizon Bay				4	-	-	-	-	-	13,000	13,000			13,000	13,000		
Mount Hope Interceptor	283	55,185	220,740	4	220,740	-	-	-	-	13,000	13,000			68,185	233,740		
TOTAL - MAIN HOPE BAY INT	2,521	491,595	1,916,928		1,916,928	30	33,300			23,300	23,300			548,195	1,973,528		
TOTAL - FISH ROAD INT	1,126	219,570	878,280		878,280	7	1,162,270			950	950			1,382,790	2,041,500		
TOTAL FLOWS	3,647	711,165	2,795,208		2,795,208	37	1,195,570			24,250	24,250			1,930,985	4,015,028		

APPENDIX B
SUMMARY OF DESIGN ALTERNATIVES



COMMONWEALTH Engineers & Consultants, Inc.
 ▶ 260 W. Exchange Street
 Providence, RI 02903
 ▶ Tel. 401-273-6600
 Fax. 401-273-6674

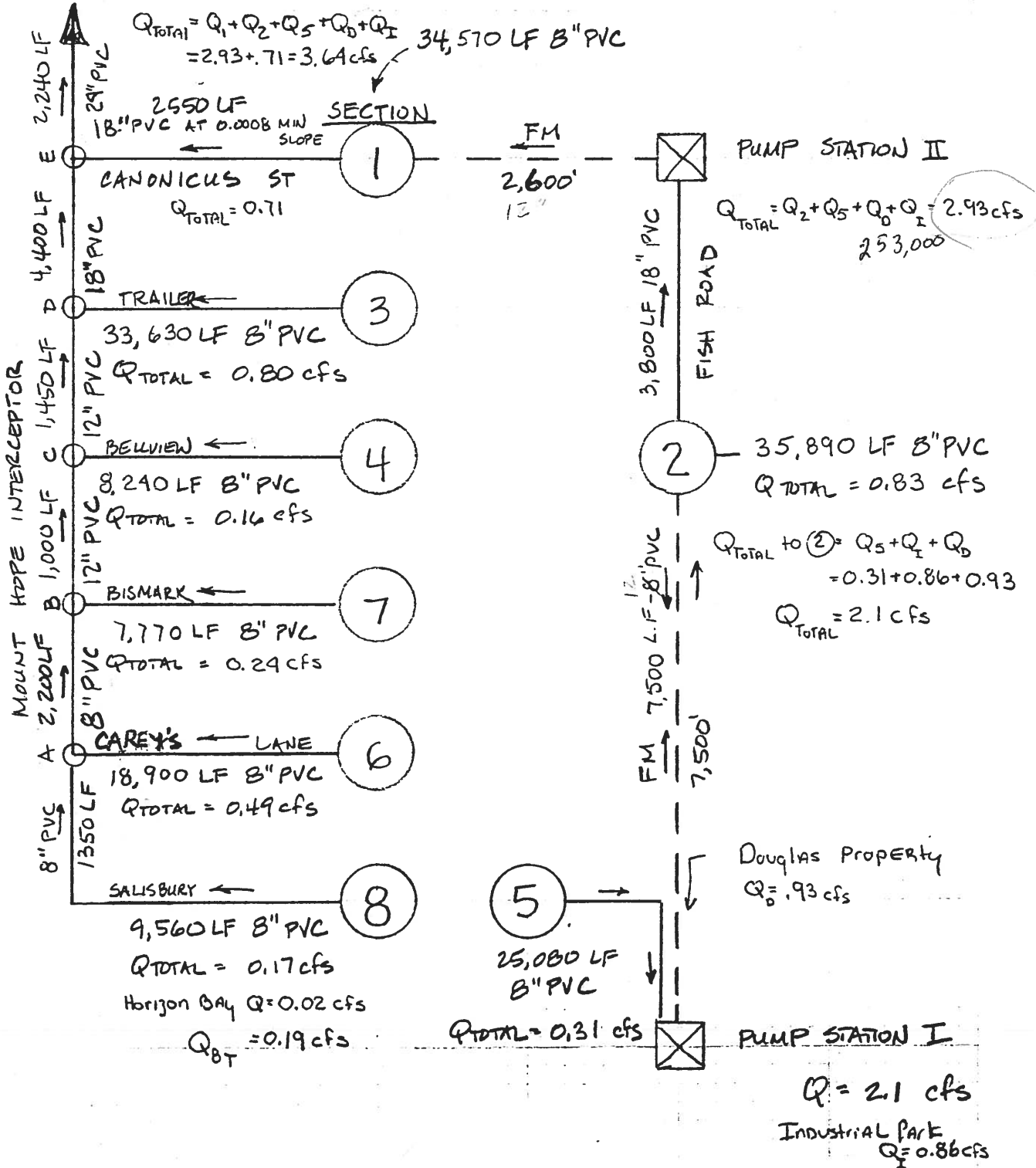
COMPUTATION SHEET

PROJECT NUMBER 96159
 SHEET NO. 1 OF 4
 CALCULATED BY RSS DATE 2/26/97
 CHECKED BY Tmc DATE 3-3-97
 PROJECT TIVERTON SEWERS

FLOW DIAGRAM

ALTERNATIVE NO. 1

TO
TREATMENT
PLANT





COMMONWEALTH Engineers & Consultants, Inc.
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 Providence, RI 02903
 ▶ Tel. 401-273-6600
 Fax. 401-273-6674

COMPUTATION SHEET

PROJECT NUMBER 96159
 SHEET NO. 2 OF 4
 CALCULATED BY RSS DATE 2/28/97
 CHECKED BY JMC DATE 3-3-97
 PROJECT TIVERTON SEWERS

ALTERNATIVE NO. 1

PIPE SIZING :

CANONICUS ST 2,550 LF USE 12" PVC

FROM HIGH POINT
 TO MOUNT HOPE
 INTERCEPTOR

$$Q_{TOTAL} = Q_1 + Q_2 + Q_5 + Q_I + Q_D$$

A 18" PVC AT 75% CAPACITY = 4.2 cfs > 3.64 cfs
 (at minimum slope of 0.0012)

FISH ROAD : (FROM HIGH POINT TO PUMP STATION II) 3,600 LF

$$Q_{TOTAL} = Q_2 + Q_5 + Q_D + Q_I = .83 + .31 + .86 + .93 = 2.93$$

2.93 cfs < 4.2 cfs @ 0.0012 min slope for 18" PVC

MOUNT HOPE INTERCEPTOR :

POINT (A) TO (B) (CAREY LANE TO BISMARCK) USE 8" PVC

$$Q_{TOTAL} = Q_B + Q_6 = 0.19 + 0.49 = 0.68 < 0.9 \text{ cfs @ } 0.004 \text{ min slope for } 8" \text{ PVC}$$

(B) TO (C) (BISMARCK TO BELLVIEW) USE 12" PVC

$$Q_{TOTAL} = Q_B + Q_6 + Q_7 = 0.19 + 0.49 + 0.24 = 0.92 < 1.8 \text{ cfs @ } 0.002 \text{ min slope for } 12" \text{ PVC}$$

(C) TO (D) (BELLVIEW TO TRAILER) USE 12" PVC

$$Q_{TOTAL} = Q_B + Q_6 + Q_7 + Q_4 = 0.19 + 0.49 + 0.24 + 0.16 = 1.08 < 1.8 \text{ cfs @ } 0.002 \text{ min slope for } 12" \text{ PVC}$$

(D) TO (E) (TRAILER TO CANONICUS) USE 18" PVC

$$Q_{TOTAL} = Q_B + Q_6 + Q_7 + Q_4 + Q_3 = 0.19 + 0.49 + 0.24 + 0.16 + 0.80 = 1.78 \text{ cfs} < 4.2 \text{ cfs @ } 0.0012 \text{ min slope for } 18" \text{ PVC}$$



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COMPUTATION SHEET

PROJECT NUMBER 96159
 SHEET NO. 3 OF 4
 CALCULATED BY TMC DATE 3-3-97
 CHECKED BY _____ DATE _____
 PROJECT TIVERTON SEWER

Ⓔ to treatment PLANT (CANONICUS to TREATMENT PLANT)

$$Q_{TOTAL} = Q_8 + Q_6 + Q_7 + Q_4 + Q_3 + Q_1 + Q_2 + Q_5 + Q_D + Q_I = 0.19 + 0.49 + 0.24 + 0.16 + 0.80 + 0.70 + 0.83 + 0.31 + 0.93 + 0.86 = 5.51 \text{ cfs}$$

5.51 cfs > 4.2 cfs @ 0.0012 min slope for 18" PVC
 USE 24" PVC

Summary:

Q TOTAL = 5.51 cfs.

- 8" PVC = Section 8 = 9,560
- Section 6 = 18,900
- Section 7 = 7,770
- Section 4 = 8,240
- Section 3 = 33,630
- Section 1 = 32,030
- Section 2 = 34,570

Point A to Point B = 2,200
 Section 5 = 25,080

Salisbury to ~~CAREY~~ LN = 1,350

 173,330 LF.

12" PVC = Point B to Point C = 1,000
 Point C to Point D = 1,450

 12" 2,450 L.F.

18" PVC = Point D to Point E = 4,400
 Section 1 (CANONICUS) = 2,550
 Section 2 (Fish RD) = 3,800

FORCE MAIN = 9,900 LF

 10,750 LF.

24" PVC Point E to TREATMENT PLANT
 = 2,240 L.F.



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COMPUTATION SHEET

PROJECT NUMBER 96159.0
SHEET NO. 4 OF 4
CALCULATED BY TMG DATE 3-3-97
CHECKED BY _____ DATE _____
PROJECT TIVERTON SEWER

PRELIMINARY Cost ALTERNATIVE No. 1

8" PVC 173,330 LF x \$185/LF = \$14,733,050

12" PVC 2,450 LF x \$110/LF = 269,500

18" PVC 10,750 LF x \$125/LF = 1,343,750

24" PVC 2,240 LF x \$140/LF = 313,600

FORCE MAIN 10,100 LF x \$40/LF = 404,000

TOTAL = 17,063,900

PUMP COST :
I \$350,000
II \$400,000

\$750,000

DETAILED REPORT - INDIVIDUAL ELEMENTS
 (System: TIV-A1I.FLO) @ flow = 940.00 gpm

#	Description	Fric	Dia (inches)	Vel (ft/s)	HL (feet)
1	Inlet Inward projecting Elev = 148.00 feet Press = 14.70 psia	0.78	6.00	10.67	1.38
2	Pump pump prescribed for system Elev = 148.00 feet Press = 14.70 psia				
3	Pipe To discharge manhole l=7500.00	110.00	12.00	2.67	23.28
4	Exit At manhole in gravity system Elev = 230.00 feet Press = 14.70 psia	1.00	12.00	2.67	0.11

SUMMARY OF PUMPING SYSTEM DATA (System: TIV-A11.FLO)

CONFIGURATION: Hazen-Williams Eq.
 Flow = 940.00 gpm

FLUID PROPERTIES:
 Specific Gravity = 1.000
 Vapor Pressure = 0.34 psia

STATIC HEADS:
 Suction Elev Lift = 0.00 feet
 Discharge Elev Head = 82.00 feet
 Exit - inlet press. = 0.00 feet
 Total Static Head = 82.00 feet

NPSHA CALCULATION:
 Supply pressure = 14.70 psia (abs)
 Vapor pressure = 0.34 psia (abs)
 Suction static lift = 0.00 feet
 Suction dynamic hd = 1.38 feet @ design flow
 NPSHA = 31.79 feet

HEAD LOSSES (in feet)

	470	940	1410
SUCTION SIDE			
MINOR LOSSES:			
Valves & fittings	0.34	1.38	3.10
MAJOR LOSSES:			
Pipe HL using Hazen-Williams Eq	0.00	0.00	0.00
STATIC SUCTION HEAD:			
Inlet - pump elev + pressures	0.00	0.00	0.00
TOTAL SUCTION HEAD:			
Head (+), lift (-)	-0.34	-1.38	-3.10
DISCHARGE SIDE			
MINOR LOSSES:			
Valves & fittings	0.03	0.11	0.25
MAJOR LOSSES:			
Pipe HL using Hazen-Williams	6.46	23.28	49.29
STATIC DISCHARGE HEAD:			
Exit - pump elev + pressures	82.00	82.00	82.00
TOTAL DISCHARGE HEAD:			
Static head plus friction losses	88.49	105.39	131.54
TOTAL SYSTEM LOSSES			
TOTAL SUCTION HEAD:			
Static head + friction losses	-0.34	-1.38	-3.10
TOTAL DISCHARGE HEAD:			
Static head + friction losses	88.49	105.39	131.54
TOTAL SYSTEM HEAD:			
Suction and discharge heads	88.83	106.77	134.64

Pump Prescription:
 Design operating point: FLOW = 940.00 gpm
 HEAD = 106.77 feet
 NPSHA = 31.79 feet

DETAILED REPORT - INDIVIDUAL ELEMENTS
 (System: TIV-A1II.FLO) @ flow = 1315.00 gpm

El.#	Description	Fric	Dia (inches)	Vel (ft/s)	HL (feet)
1	Inlet Inward projecting Elev = 168.00 feet Press = 14.70 psia	0.78	4.00	33.57	13.66
2	Pump pump prescribed for system Elev = 168.00 feet Press = 14.70 psia				
3	Pipe To discharge manhole l=2600.00	110.00	12.00	3.73	15.02
4	Exit At manhole in gravity system Elev = 230.00 feet Press = 14.70 psia	1.00	12.00	3.73	0.22

SUMMARY OF PUMPING SYSTEM DATA (System: TIV-A1III.FLO)

CONFIGURATION: Hazen-Williams Eq.
Flow = 1315.00 gpm

FLUID PROPERTIES:
Specific Gravity = 1.000
Vapor Pressure = 0.34 psia

STATIC HEADS:
Suction Elev Lift = 0.00 feet
Discharge Elev Head = 62.00 feet
Exit - inlet press. = 0.00 feet
Total Static Head = 62.00 feet

NPSHA CALCULATION:
Supply pressure = 14.70 psia (abs)
Vapor pressure = 0.34 psia (abs)
Suction static lift = 0.00 feet
Suction dynamic hd = 13.66 feet @ design flow
NPSHA = 19.51 feet

HEAD LOSSES (in feet)

		FLOW (gpm)	
		1315	1972
SUCTION SIDE			
MINOR LOSSES:	657	1315	1972
Valves & fittings	3.42	13.66	30.74
MAJOR LOSSES:			
Pipe HL using Hazen-Williams Eq	0.00	0.00	0.00
STATIC SUCTION HEAD:			
Inlet - pump elev + pressures	0.00	0.00	0.00
TOTAL SUCTION HEAD:			
Head (+), lift (-)	-3.42	-13.66	-30.74
DISCHARGE SIDE			
MINOR LOSSES:			
Valves & fittings	0.05	0.22	0.49
MAJOR LOSSES:			
Pipe HL using Hazen-Williams	4.17	15.02	31.80
STATIC DISCHARGE HEAD:			
Exit - pump elev + pressures	62.00	62.00	62.00
TOTAL DISCHARGE HEAD:			
Static head plus friction losses	66.22	77.24	94.29
TOTAL SYSTEM LOSSES			
TOTAL SUCTION HEAD:			
Static head + friction losses	-3.42	-13.66	-30.74
TOTAL DISCHARGE HEAD:			
Static head + friction losses	66.22	77.24	94.29
TOTAL SYSTEM HEAD:			
Suction and discharge heads	69.64	90.90	125.03

Pump Prescription:
Design operating point: FLOW = 1315.00 gpm
HEAD = 90.90 feet
NPSHA = 19.51 feet



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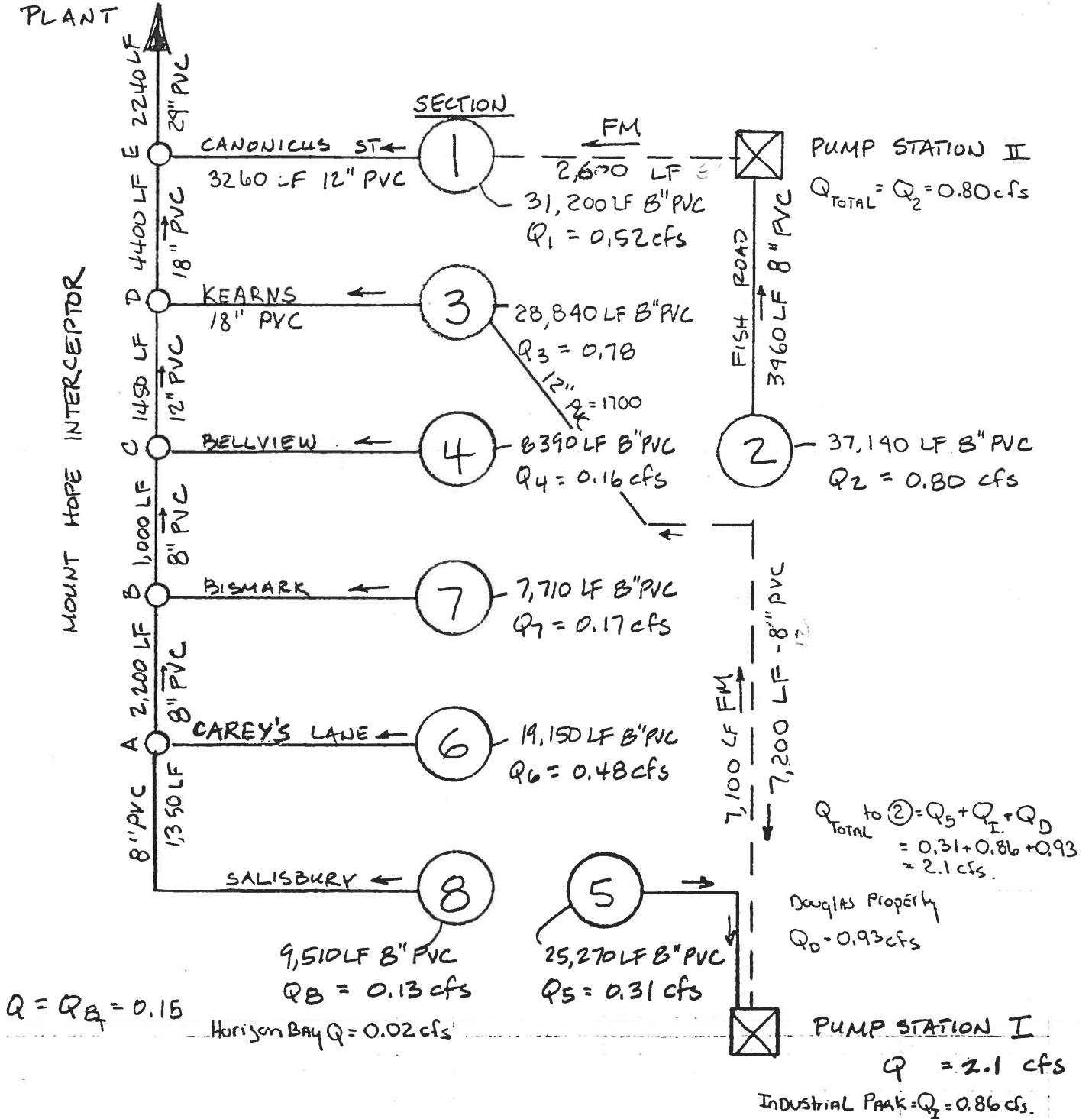
PROJECT NUMBER 96159.0
 SHEET NO. 1 OF 4
 CALCULATED BY RSS DATE _____
 CHECKED BY Tmc DATE 3-3-97
 PROJECT TYVERTON SEWER

FLOW DIAGRAM

ALTERNATIVE NO. 2

TO TREATMENT PLANT

MOUNT HOPE INTERCEPTOR





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 CALCULATED BY RSS DATE _____
 CHECKED BY TMC DATE 3-4-97
 PROJECT TIVERTON SEWER

ALTERNATIVE NO. 2

PIPE SIZING:

CANONICUS ST (HIGH POINT TO MOUNT HOPE INTERCEPTOR)

$$Q_{TOTAL} = Q_1 + Q_2 = 0.52 + 0.80 = 1.32 \text{ cfs}$$

A 12" PVC AT 75% CAPACITY AT MINIMUM SLOPE OF 0.002 =
 1.8 cfs > 1.32 cfs USE 12" PVC

FISH ROAD (FROM HIGH POINT TO PUMP STATION II)

$$Q_{TOTAL} = Q_2 = 0.80 \text{ cfs}$$

A 8" PVC AT 75% CAPACITY AT MINIMUM SLOPE OF 0.004 f/h =
 0.9 cfs > 0.8 cfs USE 8" PVC

MOUNT HOPE INTERCEPTOR:

POINT (A) TO (B) (CAREY'S LANE TO BISMARCK) USE 8" PVC

$$Q_{TOTAL} = Q_B + Q_6 = 0.15 + 0.48 = 0.63 < 0.9 \text{ cfs of an 8" PVC}$$

AT 75% CAPACITY AT MIN SLOPE OF 0.004

(B) TO (C) (BISMARCK TO BELLVIEW) USE 8" PVC

$$Q_{TOTAL} = Q_B + Q_6 + Q_7 = 0.15 + 0.48 + 0.17 = 0.80 < 0.9 \text{ cfs}$$

(C) TO (D) (BELLVIEW TO TRAILER) USE 12" PVC

$$Q_{TOTAL} = Q_B + Q_6 + Q_7 + Q_4 = 0.15 + 0.48 + 0.17 + 0.16 = 0.96 < 1.8 \text{ cfs}$$

(D) TO (E) (TRAILER TO CANONICUS) USE 18" PVC

$$Q_{TOTAL} = Q_B + Q_6 + Q_7 + Q_4 + Q_3 + Q_5 + Q_0 + Q_I = 0.15 + 0.48 + 0.17 + 0.16$$

$$+ 0.78 + 0.31 + 0.93 + 0.86 = 3.84 < 4.2 \text{ cfs}$$

(E) TO TREATMENT PLANT (CANONICUS TO TREATMENT PLANT) USE 24" PVC

$$Q_{TOTAL} = Q_B + Q_6 + Q_7 + Q_4 + Q_3 + Q_1 + Q_2 + Q_5 + Q_0 + Q_I =$$

$$0.15 + 0.48 + 0.17 + 0.16 + 0.78 + 0.52 + 0.80 + 0.31 + 0.93 + 0.86 = 5.16 \text{ cfs}$$

$$5.16 \text{ cfs} > 4.2 \text{ cfs}$$



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PROJECT NUMBER 96159
SHEET NO. 3 OF 4
CALCULATED BY TMC DATE 3-4-97
CHECKED BY _____ DATE _____
PROJECT TIVERTON SEWER

PIPE SIZING :

WARREN AVE (HIGH POINT to KEARNS AVE INTERCEPTOR)

$$Q_{TOTAL} = Q_S + Q_3 + Q_D + Q_I = 0.31 + 0.78 + 0.93 + 0.86 = 2.88 \text{ cfs}$$

A 18" PVC AT 75% CAPACITY AT MINIMUM SLOPE OF 0.0012 'ft =
4.2 cfs > 2.88 cfs USE 18" PVC

Summary:

$$Q_{TOTAL} = 5.16 \text{ cfs}$$

- 8" PVC = Section 8 = 9,510
- Section 6 = 19,150
- Section 7 = 7,710
- Section 4 = 8,390
- Section 5 = 25,270
- Section 3 = 28,840
- Section 2 = 37,140
- Section 1 = 31,200

Point A to Point B = 2,200

Point B to Point C = 1,100

Salisbury to ~~Garfield~~ GARFIELD = 1,350

171,860 LF.

12" PVC Section 3 = 1,700 (WARREN AVE)

Section 1 = 3,260 (CANONICUS, Foot & Cross country)

Point C to Point D = 1,450

6,410 L.F.

18" PVC Section 3 = 3,000

Point D to Point E = 4,400

7,400 LF



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COMPUTATION SHEET

PROJECT NUMBER 96159
 SHEET NO. 4 OF 4
 CALCULATED BY Tmc DATE 3-4-97
 CHECKED BY _____ DATE _____
 PROJECT TIVERTON SEWER

24" PVC Point E to TREATMENT PLANT = 2,240 LF

FORCE MAIN = 9,850 LF

PRELIMINARY COST: ALTERNATIVE No. 2

8" PVC 171,860 LF x \$85 / LF = \$ 14,608,100

12" PVC 6,410 LF x \$110 / LF = 705,100

18" PVC 7,400 LF x \$125 / LF = 925,000

24" PVC 2,240 LF x \$140 / LF = 313,600

FORCE MAIN 9.850 LF x \$40 / LF = 392,000

\$ 16,943,800

17,341,100

PUMP STA.	I	\$ 350,000
	II	\$ 250,000
		<u>\$ 600,000</u>

DETAILED REPORT - INDIVIDUAL ELEMENTS
 (System: TIV-A2I.FLO) @ flow = 940.00 gpm

l#	Description	Fric	Dia (inches)	Vel (ft/s)	HL (feet)
1	Inlet Inward projecting Elev = 148.00 feet Press = 14.70 psia	0.78	6.00	10.67	1.38
2	Pump pump prescribed for system Elev = 148.00 feet Press = 14.70 psia				
3	Pipe To discharge manhole l=7100.00	110.00	12.00	2.67	22.04
4	Exit At manhole in gravity system Elev = 250.00 feet Press = 14.70 psia	1.00	12.00	2.67	0.11

SUMMARY OF PUMPING SYSTEM DATA (System: TIV-A2I.FLO)

CONFIGURATION: Hazen-Williams Eq.
 Flow = 940.00 gpm

FLUID PROPERTIES:
 Specific Gravity = 1.000
 Vapor Pressure = 0.34 psia

STATIC HEADS:
 Suction Elev Lift = 0.00 feet
 Discharge Elev Head = 102.00 feet
 Exit - inlet press. = 0.00 feet
 Total Static Head = 102.00 feet

NPSHA CALCULATION:
 Supply pressure = 14.70 psia (abs)
 Vapor pressure = 0.34 psia (abs)
 Suction static lift = 0.00 feet
 Suction dynamic hd = 1.38 feet @ design flow
 NPSHA = 31.79 feet

HEAD LOSSES (in feet)

		FLOW (gpm)	
		940	1410
SUCTION SIDE			
MINOR LOSSES:			
Valves & fittings	0.34	1.38	3.10
MAJOR LOSSES:			
Pipe HL using Hazen-Williams Eq	0.00	0.00	0.00
STATIC SUCTION HEAD:			
Inlet - pump elev + pressures	0.00	0.00	0.00
TOTAL SUCTION HEAD:			
Head (+), lift (-)	-0.34	-1.38	-3.10
DISCHARGE SIDE			
MINOR LOSSES:			
Valves & fittings	0.03	0.11	0.25
MAJOR LOSSES:			
Pipe HL using Hazen-Williams	6.11	22.04	46.66
STATIC DISCHARGE HEAD:			
Exit - pump elev + pressures	102.00	102.00	102.00
TOTAL DISCHARGE HEAD:			
Static head plus friction losses	108.14	124.15	148.91
TOTAL SYSTEM LOSSES			
TOTAL SUCTION HEAD:			
Static head + friction losses	-0.34	-1.38	-3.10
TOTAL DISCHARGE HEAD:			
Static head + friction losses	108.14	124.15	148.91
TOTAL SYSTEM HEAD:			
Suction and discharge heads	108.49	125.53	152.01

Pump Prescription:
 Design operating point: FLOW = 940.00 gpm
 HEAD = 125.53 feet
 NPSHA = 31.79 feet

DETAILED REPORT - INDIVIDUAL ELEMENTS
 (System: TIV-A2II.FLO) @ flow = 375.00 gpm

E #	Description	Fric	Dia (inches)	Vel (ft/s)	HL (feet)
1	Inlet Inward projecting Elev = 168.00 feet Press = 14.70 psia	0.78	4.00	9.57	1.11
2	Pump pump prescribed for system Elev = 168.00 feet Press = 14.70 psia				
3	Pipe To discharge manhole l=2600.00	110.00	8.00	2.39	10.60
4	Exit At manhole in gravity system Elev = 230.00 feet Press = 14.70 psia	1.00	8.00	2.39	0.09

SUMMARY OF PUMPING SYSTEM DATA (System: TIV-A2II.FLO)

CONFIGURATION: Hazen-Williams Eq.
Flow = 375.00 gpm

FLUID PROPERTIES:
Specific Gravity = 1.000
Vapor Pressure = 0.34 psia

STATIC HEADS:
Suction Elev Lift = 0.00 feet
Discharge Elev Head = 62.00 feet
Exit - inlet press. = 0.00 feet
Total Static Head = 62.00 feet

NPSHA CALCULATION:
Supply pressure = 14.70 psia (abs)
Vapor pressure = 0.34 psia (abs)
Suction static lift = 0.00 feet
Suction dynamic hd = 1.11 feet @ design flow
NPSHA = 32.06 feet

HEAD LOSSES (in feet)

	187	375	562
SUCTION SIDE			
MINOR LOSSES:			
Valves & fittings	0.28	1.11	2.50
MAJOR LOSSES:			
Pipe HL using Hazen-Williams Eq	0.00	0.00	0.00
STATIC SUCTION HEAD:			
Inlet - pump elev + pressures	0.00	0.00	0.00
TOTAL SUCTION HEAD:			
Head (+), lift (-)	-0.28	-1.11	-2.50
DISCHARGE SIDE			
MINOR LOSSES:			
Valves & fittings	0.02	0.09	0.20
MAJOR LOSSES:			
Pipe HL using Hazen-Williams	2.94	10.60	22.45
STATIC DISCHARGE HEAD:			
Exit - pump elev + pressures	62.00	62.00	62.00
TOTAL DISCHARGE HEAD:			
Static head plus friction losses	64.96	72.69	84.65
TOTAL SYSTEM LOSSES			
TOTAL SUCTION HEAD:			
Static head + friction losses	-0.28	-1.11	-2.50
TOTAL DISCHARGE HEAD:			
Static head + friction losses	64.96	72.69	84.65
TOTAL SYSTEM HEAD:			
Suction and discharge heads	65.24	73.80	87.15

Pump Prescription:
Design operating point: FLOW = 375.00 gpm
HEAD = 73.80 feet
NPSHA = 32.06 feet



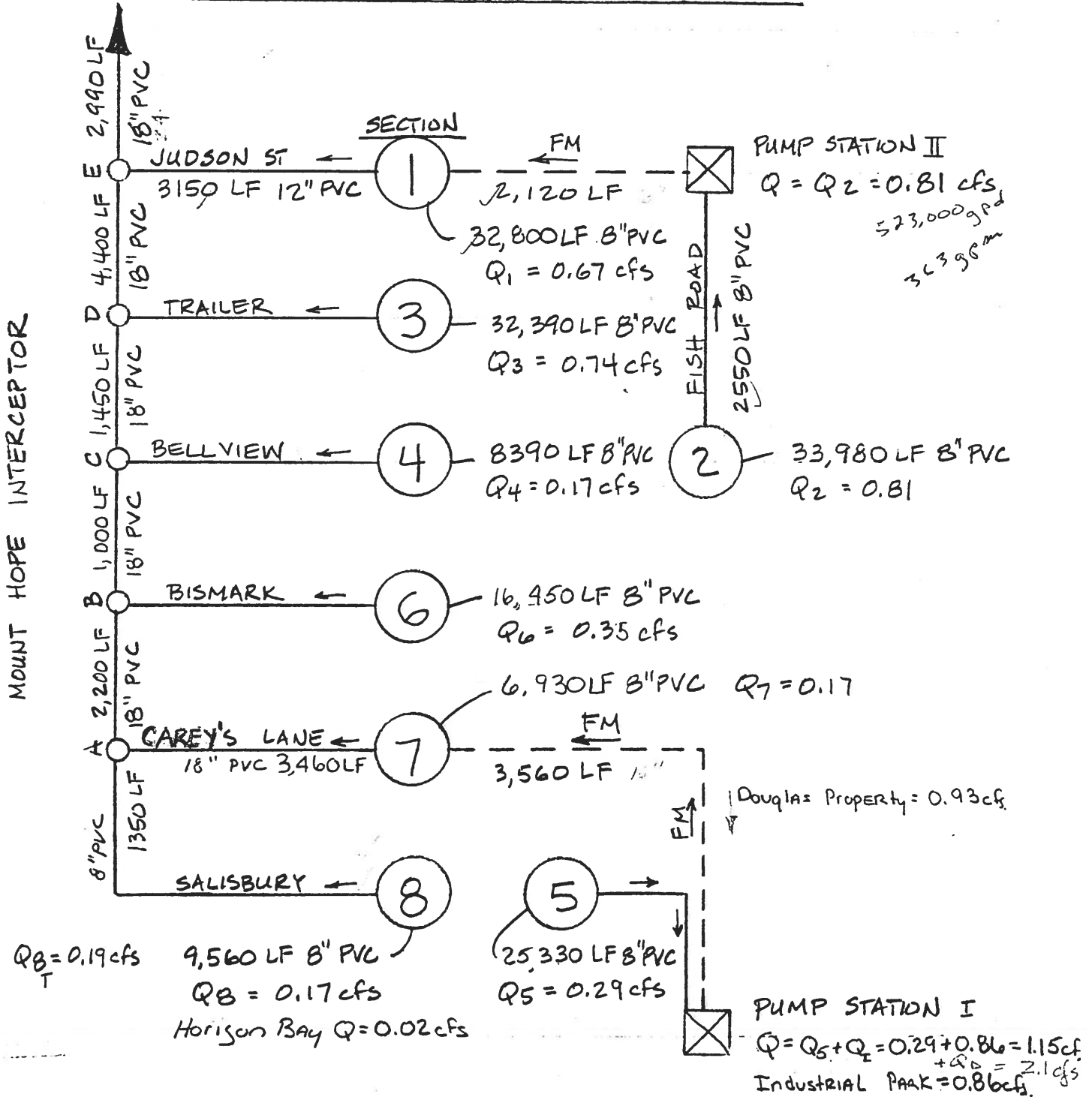
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PROJECT NUMBER 96159
SHEET NO. 1 OF 4
CALCULATED BY RSS DATE 2/28/97
CHECKED BY TMC DATE 3-3-97
PROJECT TIVERTON SEWERS

TO TREATMENT
PLANT

FLOW DIAGRAM

ALTERNATIVE NO. 3





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 CALCULATED BY RSS DATE 2/28/97
 CHECKED BY TMC DATE 3-3-97
 PROJECT TIVERTON SEWERS

ALTERNATIVE NO. 3

PIPE SIZING :

JUDSON ST. (HIGH POINT TO MOUNT HOPE INTERCEPTOR) 3,150 LF

$$Q_{TOTAL} = Q_1 + Q_2 = 0.67 + 0.81 = 1.48 \text{ cfs} < 1.8 \text{ cfs FOR 12" PVC}$$

USE 12" PVC

FISH ROAD (HIGH POINT TO PUMP STATION II) 2,550 LF

$$Q_{TOTAL} = Q_2 = 0.81 \text{ cfs} < 0.9 \text{ cfs FOR 8" PVC}$$

USE 8" PVC

MOUNT HOPE INTERCEPTOR :

POINT (A) TO (B) (CAREYS LANE TO BISMARCK) USE 18" PVC

$$Q_{TOTAL} = Q_8 + Q_5 + Q_7 + Q_I + Q_D = 0.19 + 0.29 + 0.17 + 0.86 + 0.93 = 2.44 \text{ cfs}$$

(B) TO (C) (BISMARCK TO BELLVIEW) USE 18" PVC

$$Q_{TOTAL} = Q_8 + Q_7 + Q_5 + Q_6 + Q_I + Q_D = 0.19 + 0.17 + 0.29 + 0.35 + 0.86 + 0.93 = 2.79 < 4.2 \text{ cfs}$$

(C) TO (D) (BELLVIEW TO TRAILER) USE 18" PVC

$$Q_{TOTAL} = Q_8 + Q_7 + Q_5 + Q_6 + Q_4 + Q_I + Q_D = 2.79 + 0.17 = 2.96 \text{ cfs}$$

2.96 < 4.2 cfs

(D) TO (E) (TRAILER TO JUDSON ST) USE 18" PVC

$$Q_{TOTAL} = Q_8 + Q_7 + Q_5 + Q_6 + Q_4 + Q_3 + Q_I + Q_D = 2.96 + 0.74 = 3.70 \text{ cfs}$$

3.70 < 4.2 cfs

(E) TO TREATMENT PLANT (JUDSON ST TO TREATMENT PLANT) USE 24" PVC

$$Q_{TOTAL} = Q_8 + Q_7 + Q_5 + Q_6 + Q_4 + Q_3 + Q_1 + Q_2 + Q_I + Q_D = 3.70 + 0.67 + 0.81 = 5.18 \text{ cfs}$$

5.18 > 4.2 cfs



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COMPUTATION SHEET

PROJECT NUMBER 96159
 SHEET NO. 3 OF 4
 CALCULATED BY TMC DATE 3-4-97
 CHECKED BY _____ DATE _____
 PROJECT TIVERTON SEWER

PIPE SIZING:

SOUSA RD. (HIGH POINT to MAIN RD)

$$Q_{TOTAL} = Q_S + Q_I + Q_D = 0.29 + 0.86 + 0.93 = 2.08 \text{ cfs}$$

AN 18" PVC AT 75% CAPACITY AT MINIMUM SLOPE OF 0.0012 F/A =
 4.2 cfs > 2.08 cfs USE 18" PVC

GARY LN (MAIN RD to ~~CAREY~~ LN INTERCEPTOR)

$$Q_{TOTAL} = Q_S + Q_I + Q_D + Q_7 = 2.08 \text{ cfs} + 0.17 \text{ cfs} = 2.25 \text{ cfs}$$

4.2 cfs > 2.25 cfs USE 18" PVC

SUMMARY:

$$Q_{TOTAL} = 5.18 \text{ cfs}$$

8" PVC = Section 8 = 9,560
 Section 5 = 25,330
 Section 7 = 6,930
 Section 6 = 16,450
 Section 4 = 8,390
 Section 3 = 32,390
 Section 2 = 33,980
 Section 1 = 32,800
 SALISBURY to Gary LN = 1,350

167,180 LF.

12" PVC = Section 1 = 3,150 (JUDSON ST)

18" PVC = Section 7 = 3,460 (SOUSA RD, GARY LN)

Point A to Point B = 2,200



COMPUTATION SHEET

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SHEET NO. 4 OF 4
CALCULATED BY TMC DATE 3-9-97
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PROJECT TIVERTON SEWER

18" PVC (continue)

Point B to Point C = 1,000

Point C to Point D = 1,450

Point D to Point E = 4,400

12,510 LF

24" PVC

Point E to TREATMENT PLANT = 2,990 LF

FORCE MAIN = 5,680 LF

PRELIMINARY COST: ALTERNATIVE No. 3

8" PVC 167,180 LF x \$85/LF = 14,210,300

12" PVC 3,150 LF x \$110/LF = 346,500

18" PVC 12,510 LF x \$125/LF = 1,563,750

24" PVC 2,990 LF x \$140/LF = 418,600

FORCE MAIN 5,680 LF x 40/LF 227,200

3560 x 10" \$50/LF

2120 x 6" \$35/LF

16,766,350

PUMP STA I : \$350,000 → \$410,000

II : \$250,000

\$600,000

DETAILED REPORT - INDIVIDUAL ELEMENTS
 (System: TIV-A3I.FLO) @ flow = 940.00 gpm

l#	Description	Fric	Dia (inches)	Vel (ft/s)	HL (feet)
1	Inlet Inward projecting Elev = 148.00 feet Press = 14.70 psia	0.78	6.00	10.67	1.38
2	Pump pump prescribed for system Elev = 148.00 feet Press = 14.70 psia				
3	Pipe To discharge manhole l=3560.00	110.00	10.00	3.84	26.83
4	Exit At manhole in gravity system Elev = 210.00 feet Press = 14.70 psia	1.00	10.00	3.84	0.23

SUMMARY OF PUMPING SYSTEM DATA (System: TIV-A3I.FLO)

CONFIGURATION: Hazen-Williams Eq.
 Flow = 940.00 gpm

FLUID PROPERTIES:
 Specific Gravity = 1.000
 Vapor Pressure = 0.34 psia

STATIC HEADS:
 Suction Elev Lift = 0.00 feet
 Discharge Elev Head = 62.00 feet
 Exit - inlet press. = 0.00 feet
 Total Static Head = 62.00 feet

NPSHA CALCULATION:
 Supply pressure = 14.70 psia (abs)
 Vapor pressure = 0.34 psia (abs)
 Suction static lift = 0.00 feet
 Suction dynamic hd = 1.38 feet @ design flow
 NPSHA = 31.79 feet

HEAD LOSSES (in feet)

		FLOW (gpm)	
		940	1410
SUCTION SIDE			
MINOR LOSSES:			
Valves & fittings	0.34	1.38	3.10
MAJOR LOSSES:			
Pipe HL using Hazen-Williams Eq	0.00	0.00	0.00
STATIC SUCTION HEAD:			
Inlet - pump elev + pressures	0.00	0.00	0.00
TOTAL SUCTION HEAD:			
Head (+), lift (-)	-0.34	-1.38	-3.10

		FLOW (gpm)	
		940	1410
DISCHARGE SIDE			
MINOR LOSSES:			
Valves & fittings	0.06	0.23	0.52
MAJOR LOSSES:			
Pipe HL using Hazen-Williams	7.44	26.83	56.81
STATIC DISCHARGE HEAD:			
Exit - pump elev + pressures	62.00	62.00	62.00
TOTAL DISCHARGE HEAD:			
Static head plus friction losses	69.50	89.06	119.32

TOTAL SYSTEM LOSSES			
TOTAL SUCTION HEAD:			
Static head + friction losses	-0.34	-1.38	-3.10
TOTAL DISCHARGE HEAD:			
Static head + friction losses	69.50	89.06	119.32
TOTAL SYSTEM HEAD:			
Suction and discharge heads	69.85	90.44	122.43

Pump Prescription:
 Design operating point: FLOW = 940.00 gpm
 HEAD = 90.44 feet
 NPSHA = 31.79 feet

DETAILED REPORT - INDIVIDUAL ELEMENTS
 (System: TIV-A3II.FLO) @ flow = 375.00 gpm

#	Description	Fric	Dia (inches)	Vel (ft/s)	HL (feet)
1	Inlet Inward projecting Elev = 168.00 feet Press = 14.70 psia	0.78	4.00	9.57	1.11
2	Pump pump prescribed for system Elev = 168.00 feet Press = 14.70 psia				
3	Pipe To discharge manhole l=2120.00	110.00	6.00	4.26	35.04
4	Exit At manhole in gravity system Elev = 230.00 feet Press = 14.70 psia	1.00	6.00	4.26	0.28

SUMMARY OF PUMPING SYSTEM DATA (System: TIV-A3II.FLO)

CONFIGURATION: Hazen-Williams Eq.
 Flow = 375.00 gpm

FLUID PROPERTIES:
 Specific Gravity = 1.000
 Vapor Pressure = 0.34 psia

STATIC HEADS:
 Suction Elev Lift = 0.00 feet
 Discharge Elev Head = 62.00 feet
 Exit - inlet press. = 0.00 feet
 Total Static Head = 62.00 feet

NPSHA CALCULATION:
 Supply pressure = 14.70 psia (abs)
 Vapor pressure = 0.34 psia (abs)
 Suction static lift = 0.00 feet
 Suction dynamic hd = 1.11 feet @ design flow
 NPSHA = 32.06 feet

HEAD LOSSES (in feet)

		FLOW (gpm)	
		375	562
SUCTION SIDE			
MINOR LOSSES:	187		
Valves & fittings	0.28	1.11	2.50
MAJOR LOSSES:			
Pipe HL using Hazen-Williams Eq	0.00	0.00	0.00
STATIC SUCTION HEAD:			
Inlet - pump elev + pressures	0.00	0.00	0.00
TOTAL SUCTION HEAD:			
Head (+), lift (-)	-0.28	-1.11	-2.50
DISCHARGE SIDE			
MINOR LOSSES:			
Valves & fittings	0.07	0.28	0.63
MAJOR LOSSES:			
Pipe HL using Hazen-Williams	9.72	35.04	74.20
STATIC DISCHARGE HEAD:			
Exit - pump elev + pressures	62.00	62.00	62.00
TOTAL DISCHARGE HEAD:			
Static head plus friction losses	71.79	97.33	136.83
TOTAL SYSTEM LOSSES			
TOTAL SUCTION HEAD:			
Static head + friction losses	-0.28	-1.11	-2.50
TOTAL DISCHARGE HEAD:			
Static head + friction losses	71.79	97.33	136.83
TOTAL SYSTEM HEAD:			
Suction and discharge heads	72.07	98.44	139.33

Pump Prescription:
 Design operating point: FLOW = 375.00 gpm
 HEAD = 98.44 feet
 NPSHA = 32.06 feet

THEORETICAL WASTEWATER FLOWS.

North Tiverton water usage for the
Year 1996.

Total - 117,006,168 Gallons.

- 68,824,228 (Purchase from Fall River)
- 48,181,940 (Purchase from Stone Bridge)

Housing units (from Census) 2,213 (HU)

usage per housing unit = 145 GPD

Assuming a 25% increase in
water usage due to sewers

water usage per HU = 181 GPD.

FINAL DESIGN ASSUMPTIONS:

- Assuming a conservative unit for the
water usage per HU as 195 GPD.

- Assume all the water used ends up
as wastewater.

WASTEWATER FLOWS

SOURCES

A. MOUNT HOPE BAY INTERCEPTOR

1. HORIZEN BAY PROPERTY
2. TANK FARM PROPERTY
3. LIGHT COMMERCIAL ON MAIN ROAD
4. RESIDENTIAL
 - 4a. EXISTING.
 - 4b. FUTURE
5. INSTITUTIONAL
 - 5a. MOUNT HOPE BAY SCHOOL
 - 5b. SENIOR CITIZEN CENTER.
 - 5c. FIRE STATION.

B. FISH ROAD INTERCEPTOR

1. TOWN'S INDUSTRIAL PARK.
2. DOUGLAS PROPERTY
3. LIGHT COMMERCIAL ON FISH ROAD
4. RESIDENTIAL
 - 4a. EXISTING
 - 4b. FUTURE
5. INSTITUTIONAL
 - 5a. POLICE STATION
 - 5b. KNIGHTS OF COLUMBUS CHURCH

WASTEWATER FLOWS

FLOWS — MAJOR SOURCES

A. MOUNT HOPE BAY INTERCEPTOR.

2. TANK FARM PROPERTY

Commercial/office Total area = 95,700 Sq. ft.

Assuming 2-Storey office Building Complex @ 30% Built-up
= 56,250 Sq. ft.

Assume flow @ 75 gpd/1000 Sq. ft. = 4,200 gpd.

5. Institutional

5a. Senior Citizen Ctr. 10 people @ 15 gpd = 150 gpd

5b. Fire Station " " = 150 gpd.

B. FISH ROAD INTERCEPTOR.

5. Institutional

5a. Police Station 25 people @ 20 gpd
= 500 gpd.

5b. Knights of Columbus = 150 @ Pk factor of 3
= 450 gpd.

Wastewater flows. (contd.)

A. Institutional

(5a) Pocasset School

Max capacity 500

Assuming per student flow (incl. showers) = 20 gpd

$$\begin{aligned} \text{Total flow} &= 500 \times 20 \\ &= 10,000 \text{ gpd.} \end{aligned}$$

Assuming a peaking factor of 4

$$\text{Total peak flow} = 40,000 \text{ gpd.}$$

1. Horizon Bay - 13,000 gpd.

B. Fish Road.

2. Douglas property (600 acres)

Ind. Wastewater flows assumed @ 1,000 gal/acre/yr
(Little or no wet processes / High Industrial dev)

$$600,000 \text{ gpd.}$$

1. Town's Industrial park:

a. Tiverton Power Associates = 250,000 gpd.

b. Muddock Systems 2-3 acres = 375 gpd

c. Fiber Glass Boat Manufacturing
10 acres = 15,000 gpd.

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS



APPENDIX C
PUBLIC HEARING AND RESPONSE TO COMMENTS

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

COUNTY OF NEWPORT

At a meeting of the Tiverton Town Council of the Town of Tiverton, County and State aforesaid held at the Tiverton Town Hall on the 10th day of March, 1997 A.D. at 7:30 p.m.

MEMBERS PRESENT

	Monroe K. Rowland, President	
Stephen E. Lane		Michael J. Carreiro
Mark DeMello		Donald Bollin
Paul E. Carroll		Joseph T. Gaspar

Town Administrator: Raymond W. Houle, Jr.

Town Solicitor: Kenneth R. Tremblay, Esq.

President Rowland opened the meeting with the Pledge of Allegiance.

MINUTES:

Regular Council Meeting held on February 24, 1997 -

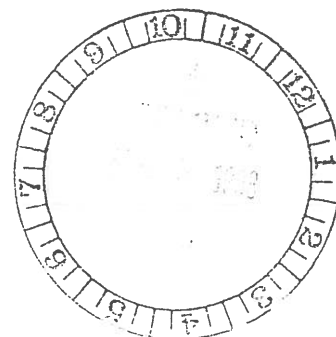
A motion was made by Mr. Lane, seconded by Mr. Carroll to approve the minutes.

Mr. Carreiro, referencing the deed transfer of a lot to Stone Bridge Fire District, on Page 239, felt more description was needed and he amended the motion to table the minutes. The motion carried unanimously.

Mr. Bollin made a motion to take the Minutes off the table to resolve the change prior to tabling. The motion was seconded by Mr. Demello and it passed 5-0. Mr. DeMello and Mr. Carreiro abstained.

Mr. Bollin made a motion to amend the Minutes of February 24th, to include in the Minutes, the Block and Card and price of the deed in question. The motion was seconded by Mr. DeMello and voted unanimously to approve the amendment.

It was moved by Mr. Bollin, seconded by Mr. Carroll and voted unanimously to table the amended Minutes.



Executive Session held on 2/24/96 -

A motion was made by Mr. DeMello, seconded by Mr. Lane and unanimously voted to approve the Minutes.

Special Council Meeting held on March 3, 1997 -

A motion was made by Mr. Lane, seconded by Mr. DeMello and it passed on a 6-0 vote to approve the Minutes. Mr. Bollin abstained.

Executive Session held on 3/3/97 -

A motion was made by Mr. Lane, seconded by Mr. Carroll and passed on a 6-0 vote to approve the Minutes. Mr. Bollin abstained.

LICENSING BOARD:

The Council was sitting as the Board of Licensing Commissioners.

B.THEBERGE & K.MONIZ D/B/A SOGKONATE CONEY ISLAND & SEAFOOD, 527 MAIN ROAD
REQUEST FOR VICTUALLING, SUNDAY SALES, AND CLASS "BVL" LIQUOR LICENSE

The Town Solicitor advised that the parties were not ready and withdrew their petitions.

D.M.AGNEW - RENEWAL OF PRIVATE INVESTIGATOR LICENSE

A motion was made by Mr. Lane, and seconded by Mr. Carroll to grant Mr. Agnew a renewal of his Private Investigator License. The motion passed unanimously.

P.J. LAMB - RENEWAL OF PRIVATE INVESTIGATOR LICENSE

A motion was made by Mr. Lane, seconded by Mr. DeMello to table the request for license renewal until paper work is complete.

A discussion ensued wherein Mr. Lane made a motion to take no action at this time. Mr. DeMello seconded Mr. Lane's motion and it passed on a vote of 4 - 3, opposed by Messrs. Rowland, Bollin and Carreiro.

BIDS:REQUEST TO SOLICIT BIDS FOR A.) PREMIUM UNLEADED GASOLINE, B.) NO.2 FUEL OIL AND SERVICE, C.) PREMIUM DIESEL FUEL

A motion was made by Mr. Carroll, seconded by Mr. Lane and unanimously voted to grant the solicitation of bids for the aforesaid fuel products.

REQUEST TO SOLICIT BIDS FOR TRASH RECEPTACLES - RECREATION

A motion was made by Mr. Bollin, seconded by Mr. Carroll and unanimously voted to grant the advertising for bids for trash receptacles for recreation areas, the funding to be by an Open Space Grant.

REQUEST TO SOLICIT BIDS FOR SENIOR BUS TRANSPORTATION

A motion was made by Mr. Bollin, seconded by Mr. Carroll and unanimously voted to grant the solicitation of bids for Senior Bus Transportation.

REQUEST TO SOLICIT BIDS FOR GRASS MOWING SERVICES - RECREATION AND OPEN SPACE

A motion was made by Mr. Lane, seconded by Mr. DeMello to table the request. The motion passed 6-0. Mr. Rowland abstained.

BID OPENING: TAX BILL PRINTING

Having been duly advertised, two (2) bids for Tax Bill Forms Printing were received as follows:

- | | |
|------------------------------------|------------|
| 1.) NASHVILLE BUSINESS FORMS | \$1,080.00 |
| Nashville, TN | |
| 2.) OPAL DATA TECHNOLOGIES | \$2,500.00 |
| Providence, RI | |

A motion was made by Mr. Carreiro, seconded by Mr. Carroll and unanimously voted to refer the bids to the Town Administrator and Tax Collector for their recommendation for award of bid.

BID OPENING: NORTH TIVERTON SITE IMPROVEMENTS

Having been duly advertised, three (3) bids for Site Improvements in North Tiverton were received as follows:

- | | |
|---------------------------------|-------------|
| 1.) CATALONO CONSTRUCTION | \$43,948.00 |
| Cumberland, RI | |
| 2.) MESQUITE CONSTRUCTION | \$46,004.50 |
| Tiverton, RI | |

- 3.) M.K. CONSTRUCTION\$66,463.00
Portsmouth, RI

A motion was made by Mr. Carreiro, seconded by Mr. Carroll and unanimously voted to refer the bids to the Town Administrator and Director of Public Works for their recommendation for award of bid.

BID OPENING - COMPUTER INFORMATION

having been duly advertised, two (2) bids for Computer Information were received as follows:

- 1.) COMP-U-SENSE\$108,500.00
Nashua, NH
- 2.) MUNIS COMPUTER SOFTWARE\$109,800.00
Falmouth, ME

A motion was made by Mr. Lane, seconded by Mr. Gaspar to refer the bids to the Town Administrator for his recommendation to award the bid. The motion passed unanimously.

BID OPENING - AUDIT SERVICES

Having been duly advertised, one (1) proposal for Audit Services was received as follows:

CAYER, PRESCOTT, CLUNE & CHATELLIER
Providence, RI

6/30/97: \$12,500.00 Town \$8,500.00 School Dept.
6/30/98: \$12,500.00 Town \$8,500.00 School Dept.
6/30/99: \$12,500.00 Town \$8,500.00 School Dept.

A motion was made by Mr. Carroll, seconded by Mr. Gaspar to refer the bid proposal to the Town Administrator and School Department for their review and recommendation to award. The motion passed unanimously.

BID OPENING - TIVERTON POLICE DEPARTMENT VOICE LOGGING SYSTEM

Having been duly advertised three (3) bids for the Voice Logging System in the Police Department were received as follows:

- 1.) SELTRONICS\$8,225.00
Landover, MD
- 2.) DICTRONICS\$8,637.28
Needham, MA \$9,037.28 installed
- 3.) A.A.T. COMMUNICATION\$8,526.19
Danbury, CT

A motion was made by Mr. Bollin, seconded by Mr. Lane to refer the bids to the Town Administrator and Police Chief for their review and recommendation for award of bid.

OLD BUSINESS:

COUNCIL SUBCOMMITTEE - STATUS REPORT ON DEVELOPMENT OF IMPACT FEE PROPOSAL

Mr. Rowland, a member of the Sub-Committee, gave a status report on Development impact fees. He acknowledged that the growth in the Town, along with the recommendation by Bacon & Edge for a new school, prompted the need to collect data from other Towns that have impact fees. The materials gathered indicate a number of techniques available dealing with impact fees, betterment fees, exactment of land, etc., and a probable combination of techniques will be used.

TOWN CLERK - PROPOSED ORDINANCE - TELECOMMUNICATIONS TOWER

The Town Administrator received a response from the Planning Board regarding the proposed Telecommunication Towers Ordinance and requested direction from the Council on whether they wished to incorporate the Board's suggestions.

A motion was made by Mr. Lane, seconded by Mr. Carroll to approve the changes as suggested by the Board.

After a brief discussion wherein the Town Solicitor advised that some of the suggestions needed rework, Mr. Lane and Mr. Carroll withdrew their motion and second respectively.

A motion was made by Mr. Bollin, seconded by Mr. Lane and voted unanimously to carry the matter to the March 17, Council Meeting.

TOWN ADMINISTRATOR - UPDATED REPORT ON TOWN HALL ADDITION COSTS

At the request of the Council, the Town Administrator submitted a memo detailing all past and pending invoices relating to the Town Hall addition.

After a brief discussion, a motion was made by Mr. Lane to charge A/C #10440 (Town Hall Repairs & Painting) for \$4,273.00, and charge the remaining balance to A/C #10291 (Council Contingency) for payment of the bills. The motion was seconded by Mr. Carroll and it passed unanimously.

//
Mr. Lane informed the Council of the Tax Collector's Office's anticipated move to their quarters in the new addition and made a motion to authorize Mrs. Mello to charge the Tax Collector's Computer Account and Supply Account for no more than \$500.00 to complete the move. The motion was seconded by Mr. DeMello and it passed unanimously.

TOWN SOLICITOR - LEGAL OPINION ON PUBLIC NOTICE OF GRIEVANCE FILED

The Town Solicitor advised that the Town Administrator had set up a procedure to handle grievances which is handled on a case by case basis. Minor grievances stay within the respective Departments. Any grievance referred to the Town Administrator will be discussed with the Town Solicitor to determine if a Labor Attorney is needed.

The Council took no action on the matter.

TREASURER - T.C.I. LEASE PAYMENTS REPORT

Town Treasurer Nancy Mello advised the Council that last year's lease payment for the T.C.I. tower is still outstanding.

The Town Administrator was requested to pursue the matter and report to the Council at the March 24, Council Meeting.

TOWN ADMINISTRATOR - LAWSON NUTS AND BOLTS INVOICE REPORT

Mr. Houle ordered curtailment of any purchasing from the Lawson Company until the Director of Public Works is on board. He will give a report at the March 24 Council Meeting.

TOWN SOLICITOR - U.S.T. ORDINANCE - PROPOSED AMENDMENT

The Town Solicitor suggested the following changes to the Residential Underground Storage Ordinance:

Under Section 4. Prohibition Against Use of Unregistered U.S.T.'s -
First paragraph, first line: "insert the word knowingly after
"No person shall"

Under Section 3. (5) (B) "delete fees after 'exempt from registration.'"

A motion was made by Mr. Lane, seconded by Mr. Gaspar and unanimously voted to approve the deletion of the word "fees".

A motion was made by Mr. Gaspar, seconded by Mr. Lane and unanimously voted to approve the insertion of the word "knowingly" as aforementioned.

NEW BUSINESS:

TOWN SOLICITOR - INDEMNIFICATION OF CURRENT AND FORMER PUBLIC OFFICIALS

As requested at a previous meeting, the Town Solicitor submitted a decision of the Town's Insurer with regard to the Lamb vs. Hart & Cotta claim. He stated that Interlocal will consider entering a defense after they receive a written verification from the defendants as to when the alleged statements were made.

A motion was made by Mr. Carreiro, seconded by Mr. DeMello to authorize the Town Solicitor to communicate with the defendants. The motion carried on a 6 - 1 vote, opposed by Mr. Lane.

The Town Solicitor further informed the Council regarding the decision by Interlocal on the Mulcahy case.

The Town's Insurer will consider the payment of any judgements against the defendants except for lost wages. The Town Solicitor is covered by mal-practice insurance. A discussion ensued.

A motion was made by Mr. Carroll, seconded by Mr. DeMello to authorize the Town Solicitor to communicate with the Town's Insurer regarding the former Town Solicitor's status as a public official under the Charter. The motion carried unanimously.

On further discussion the Town Solicitor informed the Council of the decision by Interlocal in the case of the former Town Moderator, Francis McGreavy.

The Town's Insurer will not reimburse his expenses because the suit was brought by a government entity, i.e. The Attorney General's Office. The Town Solicitor advised that his alternative would be to sue for a declaratory judgement.

A discussion ensued with regard to Mr. McGreavy being a Town official under the Charter and that an appeal should be made to the Insurer.

The Council tabled the issue until the March 24, Council Meeting for a report and recommendation by the Town Solicitor.

TIVERTON POLICE DEPARTMENT - RATIFICATION OF EMERGENCY REPAIRS, RADIO SYSTEM

A motion was made by Mr. Carroll, seconded by Mr. Lane and unanimously voted to ratify the decision by the Town Administrator to authorize emergency repairs on the radio system in the Police Department in the amount of \$2,950.00

TIVERTON POLICE DEPARTMENT - REQUEST TRANSFER OF FUNDS

Acting Police Chief, Lt. George Arruda requested a transfer of funds within the Police Department accounts as follows:

Transfer: \$4,794.89 from A/C #33368 (Equipment Replacement)
to A/C #33328 (Education)

A motion was made by Mr. Lane, seconded by Mr. Carroll and unanimously voted to approve transfer of funds.

RECREATION - AUTHORITY TO ADVERTISE - SUMMER RECREATION PROGRAM POSITIONS

The Town Administrator submitted a list of positions for the Summer Recreation Program and requested authorization to issue the Press Release for applications.

A motion was made by Mr. Carroll, seconded by Mr. Bollin and unanimously voted to issue the following Press Release:

TIVERTON PROGRAM HAS SUMMER JOBS
(for immediate release)

APPLICATIONS ARE NOW AVAILABLE FOR SUMMER JOBS FOR THE
RECREATION COMMISSION'S SUMMER PROGRAM.

THE COMMISSION IS SEEKING PEOPLE TO WORK AT GRINNELL'S BEACH
AND FOGLAND BEACH AS LIFEGUARDS, GATE ATTENDANTS AND BEACH
ATTENDANTS. A RED CROSS CERTIFIED WATER SAFETY INSTRUCTOR
AND A SWIMMING ASSISTANT ARE ALSO NEEDED.

ALSO AVAILABLE ARE TWO SUMMER RECREATION PARK SUPERVISORS
POSITIONS TO OVERSEE BOTH A MORNING AND AFTERNOON PROGRAM.
THERE IS ALSO A NEED FOR PARK COUNSELORS TO WORK A MORNING
AND AFTERNOON SHIFT. THE GYMNASTICS PROGRAM REQUIRES A
QUALIFIED GYMNASTICS INSTRUCTOR, AN EXPERIENCED ASSISTANT,
AND COMPETENT SPOTTERS. TWO TRAINED TENNIS INSTRUCTORS ARE
NEEDED TO TEACH TENNIS AT TOWN FARM. THERE IS ALSO A POSITION
OPEN FOR PARK MAINTENANCE.

THE PARK SUPERVISORS AND GYMNASTICS INSTRUCTOR MUST BE OVER
21, PARK COUNSELORS, GYMNASTICS ASSISTANT, AND TENNIS
INSTRUCTORS MUST BE 18. BEACH ATTENDANTS AND GYMNASTICS
SPOTTERS SHOULD BE 16.

APPLICATIONS, JOB DESCRIPTIONS, PROPOSED WAGES ARE AVAILABLE
AT THE TOWN CLERK'S OFFICE, AND THE GUIDANCE OFFICE AT THE
HIGH SCHOOL.

ALL APPLICATIONS MUST BE RETURNED TO THE TOWN CLERK'S OFFICE
IN A SEALED ENVELOPE NO LATER THAN 3:00 P.M. FRIDAY, MARCH
28.

FOR ADDITIONAL INFORMATION, CALL THE RECREATION NUMBER AT
625-6780.

TOWN SOLICITOR - SET DATE FOR MEETING WITH DOUGLASS INDUSTRIES INC.

The Town Solicitor was in receipt of a letter from Douglass Industries requesting a meeting with the Town Administrator and himself.

This matter was tabled until after March 28.

SEWER COMMISSION - PRESENTATION BY LOUIS BERGER & ASSOCIATES

The Town Administrator invited Mr. Charles McKinley, a Senior Environmental Engineer with Louis Berger & Associates, the awarded bidder on the Sewer Feasibility Study to make a brief presentation on the waste water sewer plan for the Town.

Mr. McKinley expounded on a Phase I project mapping out a sewer line to include the Industrial Park, Douglass property, Horizon Bay facility, and North Tiverton, and submitted preliminary cost estimates for the project approximating \$22 million.

APPOINTMENTS/RESIGNATIONS:PLANNING BOARD - APPOINTMENT OF MEMBER TO HARBOR COMMISSION

The appointment of the Harbor Commission member was made at a previous Special Meeting.

ECONOMIC DEVELOPMENT COMMITTEE - APPOINTMENT OF MEMBER

A motion was made by Mr. Carreiro, seconded by Mr. Carroll to appoint Ms Alice Clark-Smith, of 1703 Stafford Road, as a member of the Economic Development Committee, her term to expire 6/30/99. The motion carried 6-0. Mr. DeMello abstained.

COUNCIL MEMBER ITEMS:MR. CARREIRO - RE: EXPENDITURE OF GRANT FUNDS

Mr. Carreiro made a motion that before any grant funds are disbursed, Council approval shall be required on purchase orders that are to be charged to the Administrative part of said grant funds.

After a brief discussion, the motion was seconded by Mr. DeMello.

For the motion: Carreiro, Lane, Gaspar, DeMello.

Opposed: Carroll, Bollin, Rowland.

The motion passed 4 - 3.

MR. CARREIRO - RE: RESOLUTION ON AGENDA REQUEST DOCUMENTATION REQUIRED

Mr. Carreiro requested that any item that appears on the agenda have the necessary back up documentation stating the purpose including any Executive Session business.

After a brief discussion, a motion was made by Mr. Carreiro, seconded by Mr. Lane to table this matter for lack of information. The motion carried unanimously.

COUNCIL - FY/98 BUDGET REVIEW -A.) HARBOR MANAGEMENT - B.) LIBRARY SERVICES - C.) SENIOR CENTER

The Council reviewed the proposed budget for the aforesaid departments. No recommendations were made.

MR. LANE - COMMUNICATIONS/TOWERS - OPERATING DEPARTMENTS

The Town Administrator advised the Council of his communications system for Police, Fire, and Public Works Departments is forthcoming.

MR. LANE - PROPOSED ORDINANCE - RE: BUSINESS REGISTRATION - TAX ASSESSORS

Mr. Lane proposed adoption of an ordinance that would require all businesses in the Town to register with the Tax Assessors' Office.

After a brief discussion, a motion was made by Mr. Lane, seconded by Mr. DeMello to direct the Town Solicitor to draft an ordinance that addresses the issue. The motion carried unanimously.

BILLS/ABATEMENTS:BILLS

A motion was made by Mr. Carreiro, seconded by Mr. DeMello to approve the payment of bills as appears on the warrant with the exception of the Electrical Inspector's fees for the Month of February. The motion carried 5 - 0. Messrs. Bollin and Lane abstained.

ABATEMENTS:

A motion was made by Mr. Carroll, seconded by Mr. Gaspar to grant the abatements. The motion carried 5 - 0. Messrs. Rowland and Bollin abstained.

EXECUTIVE SESSION DISCUSSIONS:TOWN ADMINISTRATOR - LABOR NEGOTIATIONS MATTERS

A motion was made by Mr. Bollin, seconded by Mr. Gaspar and unanimously voted to go into Executive Session pursuant to Section 42-46-5(a)(2) of R.I.G.L. regarding labor negotiations matters.

Recessed to go into Executive Session: 10:20 p.m.

Resumed in Open Session approximately 10:47 p.m.

President Rowland announced that no action was taken in Executive Session.

A motion was made by Mr. Gaspar, seconded by Mr. DeMello to Seal the minutes of the Executive Session.

ADJOURNMENT

A motion was made by Mr. Bollin, seconded by Mr. Lane and unanimously voted to adjourn. The Council adjourned at approximately 10:48 p.m.

A true copy. C

Attest: 
Hannibal F. Costa
Town Clerk

TOWN OF TIVERTON, RHODE ISLAND

Raymond W. Houle, Jr.
Town Administrator

July 16, 1998

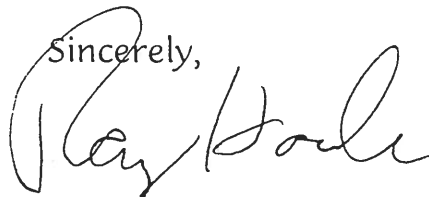
Mr. Charles McKinley
Louis Berger and Associates, Inc.
295 Promenade Street
Providence, Rhode Island 02908

Dear Charlie:

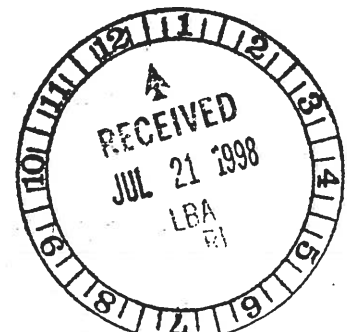
Enclosed please find the minutes of the meeting in which the Sewer Feasibility Study plan was approved.

Kindly contact me if you have any questions or if you require any further information.

Sincerely,



Raymond W. Houle, Jr.,
Town Administrator



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
COUNTY OF NEWPORT

At a meeting of the Tiverton Town Council of the Town of Tiverton, County and State aforesaid, held at the Tiverton Town Hall on the 13th day of July 1998 A.D. at 7:30 p.m.

MEMBERS PRESENT

Paul E. Carroll, President
Stephen E. Lane Michael J. Carreiro
Joseph T. Gaspar Donald Bollin
Claudette J. Linhares Mark DeMello

Town Administrator: Raymond W. Houle, Jr. and ...
Town Solicitor: James A. Donnelly, Esq. were present.

President Carroll opened the meeting with the Pledge of Allegiance.

MINUTES:

Regular Council Meeting held on June 22, 1998 -

A motion was made by Mr. Lane, seconded by Mr. DeMello to approve the minutes. The motion passed unanimously.

Excutive Session held on June 22, 1998 -

A motion was made by Mr. Lane, seconded by Mr. DeMello to approve the minutes. The motion passed unanimously.

OLD BUSINESS:

Cemetery Commission - Cemetery Rules Recommendation -

As requested by the Council at a previous meeting, the Cemetery Commission submitted their report regarding the rules and regulations pertaining to candles at the Pocasset Hill Cemetery. Their recommendation was to "not change any of the provisions of the Town Code pertaining to the cemetery at this time".

A motion was made by Mr. Bollin, seconded by Mrs. Linhares to accept the report.

Mr. Carreiro amended the motion to receive the report. The amendment passed on a vote of 6-1, opposed by Mr. Bollin.

Mr. Carreiro then made a motion to schedule a Public Hearing to amend the Code to allow candles as requested by the Cruz family. Mr. Gaspar seconded the motion and it failed on a 4-3 vote. Messrs. Lane, Gaspar and Carreiro in the affirmative, and Mrs. Linhares, Messrs. Carroll, Bollin, and DeMello in the opposition.

Administrator - Town Hall Roof Repair -

The Council was informed by the Administrator of the deteriorated condition of the Town Hall roof over the Town Clerk's office, based on an assessment by Bob Martin and the Building Official.

A motion was made by Mr. Lane to schedule a Council Workshop on the matter and to include the Building Official for his input. Mr. Gaspar seconded the motion and it passed unanimously. The Workshop was scheduled for Tuesday, July 21, 1998 at 7:30 p.m.

Town Clerk - Street Lights - Kaufman Road -

As requested at a previous Council Meeting, the Public Works Director inspected the area in question associated with the request made by Mr. Araujo and recommended that a streetlight be installed on Pole #3732 in the vicinity of Kaufman and Lepes Road. The Police Department concurred with the finding.

A motion was made by Mr. Lane, seconded by Mr. Bollin to approve the streetlight placement. The motion passed unanimously.

NEW BUSINESS :

R. Watts, Patsy Street - Fogland Beach -

Mr. Watts was before the Council requesting the restoration of the beach at Fogland to its original state. After a brief discussion, a motion was made by Mr. Lane, seconded by Mr. DeMello to direct the Public Works Director, through the Town Administrator to inspect the area to ensure that the area is in accordance with CRMC permitted Plan C. The motion was passed unanimously.

COUNCIL MEMBER ITEMS :

Mr. Lane - Re: Town Hall Addition -

Mr. Lane - Re: Signs on Telephone Poles -

Mr. Lane withdrew these items from the agenda.

Mr. Lane - Re: Drainage - Vicinity of Rock Street -

A motion was made by Mr. Lane, seconded by Mrs. Linhares to continue this item to the next Council Meeting. The motion passed on a vote of 6-1, opposed by Mr. Bollin.

Mr. Lane - Re: Drainage - Vicinity of John Duggan Road -

Mr. Lane introduced Ms Dori Hatzburger, of John Duggan Road, who requested the Council to address a water drainage problem on her property created by Bess Eaton Donuts, at 499 Main Road.

A discussion ensued regarding the fact that this matter involved privately owned real estate. A motion was made by Mr. DeMello to request a legal opinion of the Solicitor.

Mr. Lane then made a motion that the Town Administrator communicate with the business establishment explaining the situation and if it is their intention to alleviate the problem, and report back at the next meeting. The motion was seconded by Mr. Bollin and passed unanimously.

Mr. Bollin then made a motion to request of the Solicitor what if any action is available that the Council may use for future reference when drainage problems involve property that is privately owned. The motion was seconded by Mr. Lane and passed unanimously.

Mr. Lane - Re: Dangerous Intersections - Vicinity: Judson Street at Church Street and Main Road -

Mr. Lane requested that the Town Administrator direct the Public Works Director and Police Chief to investigate the aforementioned intersections as they relate to blinding overgrown grass and hedges. It was suggested that the Town take the corrective action necessary to bring it into compliance with the Zoning Ordinance.

BOARD OF LICENSING COMMISSIONERS :

The Council was sitting as the Board of Licensing Commissioners.

Robert and Simone Lafleur d/b/a Papa Jim's Clam Shack -

Robert and Simone Lafleur, of Fall River, MA, d/b/a Papa Jim's Clam Shack with its place of business located at 115 Stafford Road, requested a transfer of a Sunday and Victualling Licenses currently being held by Natalie and James Medeiros.

A motion was made by Mr. Lane, seconded by Mr. DeMello to grant the transfer of the aforementioned licenses subject to the applicants' fulfillment of all legal requirements associated therewith. The motion passed unanimously.

PUBLIC HEARINGS:

Sewer Feasibility Study Report -

The following Notice of Public Hearing was duly posted:

**TIVERTON, RHODE ISLAND
PUBLIC HEARING
SEWER FEASIBILITY STUDY**

Notice is hereby given that a PUBLIC BEARING on a consultant-prepared TOWN SEWER FEASIBILITY STUDY REPORT will be held on MONDAY, JULY 13, 1998 at 7:30 p.m. at the Town Hall, 343 Highland Road, Tiverton.

The Public Hearing and formal acceptance of this report is required as part of the grant and planning process. The Study Report is available for inspection and review in the Town Clerk's Office during normal business hours.

Hannibal F. Costa
Town Clerk

The Council President opened the Public Meeting.

The Town Administrator informed the Council that the Sewer Study Report prepared by Louis Berger & Associates, regarding the wastewater facility update for the Sewer Plan for the Town of Tiverton needed formal acceptance by the Council in order to file for grants. The Plan would entail a sewer line from the Tiverton Industrial Park, west on Souza Road into the area of the railroad track area by the Sakonnet Bay Manor Facility and north into the City of Fall River.

The Plan, endorsed by the present Sewer Commission is Step #1 of Phase I originated 2 years previous. Residents present asked questions on monetary amounts of the grants and the obligation by the Town for any expenditures. They were informed that none were required at this time and that any financial obligation by the Town would need the approval of residents of the Town.

Hearing no further comment, the Council President closed the Public Hearing.

Mr. Gaspar and the Administrator commended the Sewer Commission Director, Raul Fernandes for his initiative in video recording the digging of the sewer line installed by Sakonnet Bay Manor which will give the Town much knowledge of the terrain the Town would be dealing with.

A motion was made by Mr. DeMello, seconded by Mr. Gaspar to accept and adopt the Sewer Study Report. The motion passed unanimously.

BIDS & REQUESTS FOR PROPOSALS -

Opening of Bids - D.P.W. Sander -

Having been duly advertised, two bids for the 2.5 cubic yard Sander were received as follows:

- 1.) J. & J. GREGORY & SON, INC.\$4,555.00
East Providence, RI
- 2.) W.H. ROSE, INC.....\$4,798.00
Columbia, CT

A motion was made by Mr. Gaspar, seconded by Mr. Lane to refer the bids to the Administrator and Public Works Director for review and recommendation for award. The motion passed unanimously.

STATEMENT OF REQUIREMENTS

Utility Assessment

DRAFT

1/6/97

PROJECT: USP Gilmer County, West Virginia

1.0 General Description.

1.1 Identify all potential sources of water, sewer, natural gas, and electric services in the areas relative to the proposed site.

2.0 Requirement.

2.1 Document each utility's authority or jurisdiction to serve the proposed location.

2.2 Determine the ability of each provider to meet the facility's entire requirement of each utility. Document the source of supply.

2.3 Evaluate the cost effectiveness of extending each service to the site. To include, improving or adding capacity to existing infrastructure, if needed.

2.4 Obtain current rates, tariffs, and ordinances, which determine connection fees and cost of service.

2.5 Where capacity is currently available, solicit a letter of commitment from the provider indicating the terms by which the capacity could be made available to the Bureau.

3.0 Reporting Requirements.

3.1 In addition to the information above; all meetings, or other inquiries with company, state, and local officials shall be documented and included in the bound report.

3.2 A single line diagram for each utility showing direction of flow, areas of improvement, and reference points indicating distance or other significant landmarks.

3.3 Alternatives shall be evaluated where appropriate.

Opening of Bids – A.D.A. Compliance – Town Hall –

Having been duly advertised, two bids for A.D.A. Compliance for Town Hall were received as follows:

1.) BLUE LINE CONSTRUCTION	\$62,888.00	
Portsmouth, RI	\$ 4,800.00	Stamped Concrete Walk
	\$ 6,000.00	Brick Ramp
2.) DAMON CO.....	\$27,228.00	Total
Middletown, RI	Add Alt. 1.) \$ 3,409.00	
	Add Alt. 2.) \$ 1,696.00	
	Deduct Alt. 3.) \$ 3,385.00	

A motion was made by Mrs. Linhares, seconded by Mr. Lane to refer the bids to the Town Hall Building Committee for review and discussion at the scheduled Workshop on the 21st of July. The motion passed unanimously.

Solicitation – Proposals for Fire Department Turnout Gear –

The Administrator requested authorization to solicit itemized proposals for turnout gear for Tiverton Fire Fighters. It was noted that the F.T.M. had appropriated \$10,000.00 for this item.

A motion was made by Mr. Gaspar, seconded by Mr. DeMello and voted unanimously to approve the request.

Award of Bid – North Tiverton Site Improvements -

The Administrator requested a waiver of the bidding process to award the design work for North Tiverton Site Improvements to Urban Design Group, a firm familiar with the Gateway Project since its inception under C.D.B.G.

A motion was made by Mr. Lane, seconded by Mr. DeMello to proceed if not illegal. The motion passed unanimously.

Award of Bid – Radio Communication System –

As recommended by the Administrator, the Radio Systems Consultant, and all Departments involved, a motion was made by Mr. DeMello, seconded by Mr. Lane to award the contract for Communications System, with Analog only Mobiles, to Motorola Radio, of N. Scituate, MA, the only bidder, not to exceed \$163,800 plus interest for a combined total cost not to exceed \$175,000.

After further discussion an additional recommendation was made by the Administrator to lease/purchase with Municipal Leasing Services at 4.7% interest vice the Motorola quote of 6.8%.

Mr. Bollin amended the motion to not exceed the \$175,000 total as per the Financial Town Meeting, and to authorize the Town Administrator to negotiate this item in the best interests of the Town. The motion passed unanimously.

APPOINTMENTS & RESIGNATIONS:Town Administrator – Resignation etc. -

The Council received a communication from the Town Administrator giving notice of his resignation effective August 6, 1998.

A motion was made by Mr. Carreiro, seconded by Mr. DeMello to accept the resignation with regret. The motion passed on a 6-1 vote, opposed by Mr. Bollin.

A.) Appointment of Interim Town Administrator –

A motion was made by Mr. Bollin, seconded by Mr. DeMello to appoint Town Clerk, Hannibal F. Costa, as Interim Administrator at the pay rate of the Administrator's salary. The motion passed on a vote of 4-1-2. Mr. Gaspar opposed and Messrs. Carreiro and Lane abstained.

After a brief discussion concerning compensation, the Town Clerk informed the Council that he intended to retain his Town Clerk salary and charge only the difference to the Administrator's salary account. The vote on the motion then passed on a vote of 5-0-2. Lane and Carreiro abstaining.

B.) Recruitment Process to fill Vacancy -

Mr. Carroll requested that the Council authorize advertising for Town Administrator candidates and utilize the Personnel Board to form a search committee.

After a brief discussion, a motion was made by Mr. Lane to advertise for Town Administrator according to the Charter. Advertising was to be placed twice in the Sunday editions of the Providence Journal and the Boston Globe, and in the Sakonnet Times with a closing of some 10 days following the last advertisement. Mr. DeMello seconded with an amendment to the motion to include a residency requirement within 6 months if the candidate chosen is from out of Town.

The amended motion passed on a vote of 4-3, opposed by Bollin, Carroll and Linhares.

Recreation Commission – Reappointment of Two Members –

A motion was made by Mr. Lane, seconded by Mr. DeMello to reappoint Recreation Commission Members, Carl Ferreira and Gerald Featherstone, their terms to expire 6/30/2001. The motion passed unanimously.

COUNCIL MEMBER ITEM:Mr. DeMello – Re: Contract Negotiations –

Mr. DeMello requested in the form of a motion permission to place this matter on the agenda. The motion was seconded by Mr. Lane and passed 6-1, opposed by Mr. Bollin.

Mr. DeMello suggested in the form of a motion that the Administrator attempt to complete the pending projects before him, i.e. Sewer issue, Economic Development, Industrial Park, and leave the contract negotiations to the next Administrator. The motion was seconded by Mr. Lane and passed on a 4-3 vote, opposed by Mrs. Linhares, Mr. Carroll and Mr. Bollin.

ABATEMENTS:

Abatelements, received late, were continued to the next meeting.

EXECUTIVE SESSION DISCUSSIONS:

Town Administrator – Collective Bargaining Matters –

This matter was addressed in the above agenda item.

Town Administrator – Town-Owned Real Estate Matters –

A motion was made by Mr. Lane, seconded by Mr. Gaspar to enter into Executive Session for the purpose of discussing Town-Owned Real Estate matters pursuant to R.I.G.L. Section 42-46-5(a)(5). The motion passed on a vote of 6-1. Mr. Bollin was opposed.

The Council recessed at 8:45 p.m. They entered into Executive Session at approximately 8:50 p.m.

The Council returned to Open Session at approximately 9:50 p.m.

The Council President announced that no formal action had been taken in Executive Session.

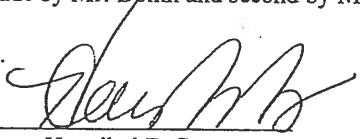
Mr. DeMello made a motion to Seal the minutes of the executive session. The motion was seconded by Mrs. Linhares and passed unanimously.

Mr. Bollin made a motion to enter into negotiations with Stone Bridge Fire District. Mr. Lane seconded the motion, which passed unanimously.

ADJOURNMENT:

On motion made by Mr. Bollin and second by Mrs. Linhares, the Council adjourned at approximately 9:52 p.m.

A True Copy.



ATTEST:

Hannibal F. Costa
Town Clerk

11.0 PUBLIC PARTICIPATION PROGRAM

This section summarizes the public participation program elements that were received through public and agency review of the Facilities Plan.

11.1 Summary of Program

The public participation program for the Tiverton Wastewater Facilities Plan consists of the following elements:

- A. *Informal public workshop* to review the draft Plan, conducted in a regularly scheduled Town Council meeting. The primary purpose of this workshop is to ensure that all of the town departments and officials have been able to provide input to the Plan prior to general public and agency distribution. Interested members of the public may also attend the workshop and provide preliminary comments according to the bylaws governing town council meetings.
- B. *Public review* of the draft plan will commence with a formal public hearing on the Plan, to be conducted in Tiverton after a public notice period. The public hearing record will include comments from members of the public, as well as local agencies.
- C. *Agency review* of the draft Plan will be conducted through the State Clearinghouse. All involved state agencies will be provided the opportunity to review and comment on the Plan. The public hearing record will be included in the draft Plan submitted for agency review.

11.2 Agency Comments

Agency comments will be summarized in this section once they are received.

11.3 Public Comments

A public workshop was held on March 10, 1997, as part of a regularly scheduled Town Council meeting. A presentation of the Wastewater Facilities Plan was made, with questions and comments following from the public and the Council.

A public hearing was held on July 13, 1998 in the Town Hall of Tiverton. A notification for the public hearing was duly posted. The Town Administrator summarized the sewer feasibility study and pointed out that the acceptance of the plan at the public hearing was necessary for grant application.

The residents of the Town accepted the proposed sewer design alternatives, but requested information on amounts of the grants and the obligation by the Town for any expenditures. The Town Council informed that although no financial obligation was required at the present time, it has to obtain approval of the residents of the Town. Minutes of the public hearing are presented in Appendix C.

11.4 Responsiveness Summary

A summary of the responses to all agency and public comments are compiled and presented in Appendix C.

The Town's Insurer will not reimburse his expenses because the suit was brought by a government entity, i.e. The Attorney General's Office. The Town Solicitor advised that his alternative would be to sue for a declaratory judgment.

A discussion ensued with regard to Mr. McGroavy being a Town official under the Charter and that an appeal should be made to the Insurer.

The Council tabled the issue until the March 24, Council Meeting for a report and recommendation by the Town Solicitor.

TIVERTON POLICE DEPARTMENT - RATIFICATION OF EMERGENCY REPAIRS, RADIO SYSTEM

A motion was made by Mr. Carroll, seconded by Mr. Lane and unanimously voted to ratify the decision by the Town Administrator to authorize emergency repairs on the radio system in the Police Department in the amount of \$2,950.00

TIVERTON POLICE DEPARTMENT - REQUEST TRANSFER OF FUNDS

Acting Police Chief, Lt. George Arruda requested a transfer of funds within the Police Department accounts as follows:

Transfer: \$4,794.89 from A/C #33368 (Equipment Replacement)
to A/C #33328 (Education)

A motion was made by Mr. Lane, seconded by Mr. Carroll and unanimously voted to approve transfer of funds.

RECREATION - AUTHORITY TO ADVERTISE - SUMMER RECREATION PROGRAM POSITIONS

The Town Administrator submitted a list of positions for the Summer Recreation Program and requested authorization to issue the Press Release for applications.

A motion was made by Mr. Carroll, seconded by Mr. Bollen and unanimously voted to issue the following Press Release:

TIVERTON PROGRAM HAS SUMMER JOBS
(for immediate release)

APPLICATIONS ARE NOW AVAILABLE FOR SUMMER JOBS FOR THE
RECREATION COMMISSION'S SUMMER PROGRAM.

THE COMMISSION IS SEEKING PEOPLE TO WORK AT GRIDWELL'S BEACH
AND FOGLAND BEACH AS LIFEGUARDS, GATE ATTENDANTS AND BEACH
ATTENDANTS. A RED CROSS CERTIFIED WATER SAFETY INSTRUCTOR
AND A SWIMMING ASSISTANT ARE ALSO NEEDED.

ALSO AVAILABLE ARE TWO SUMMER RECREATION PARK SUPERVISORS
POSITIONS TO OVERSEE BOTH A MORNING AND AFTERNOON PROGRAM.
THERE IS ALSO A NEED FOR PARK COUNSELORS TO WORK A MORNING
AND AFTERNOON SHIFT. THE GYMNASTICS PROGRAM REQUIRES A
QUALIFIED GYMNASTICS INSTRUCTOR, AN EXPERIENCED ASSISTANT,
AND COMPETENT SPOTTERS. TWO TRAINED TENNIS INSTRUCTORS ARE
NEEDED TO TEACH TENNIS AT TOWN PARK. THERE IS ALSO A POSITION
OPEN FOR PARK MAINTENANCE.

THE PARK SUPERVISORS AND GYMNASTICS INSTRUCTOR MUST BE OVER
21. PARK COUNSELORS, GYMNASTICS ASSISTANT, AND TENNIS
INSTRUCTORS MUST BE 18. BEACH ATTENDANTS AND GYMNASTICS
SPOTTERS SHOULD BE 16.

APPLICATIONS, JOB DESCRIPTIONS, PROPOSED WAGES ARE AVAILABLE
AT THE TOWN CLERK'S OFFICE, AND THE GUIDANCE OFFICE AT THE
HIGH SCHOOL.

ALL APPLICATIONS MUST BE RETURNED TO THE TOWN CLERK'S OFFICE
IN A SEALED ENVELOPE NO LATER THAN 3:00 P.M. FRIDAY, MARCH
28.

FOR ADDITIONAL INFORMATION, CALL THE RECREATION NUMBER AT
625-6780.

TOWN SOLICITOR - SET DATE FOR MEETING WITH DOUGLASS INDUSTRIES INC.

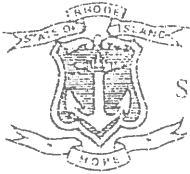
The Town Solicitor was in receipt of a letter from Douglass Industries requesting a meeting with the Town Administrator and himself.

This matter was tabled until after March 28.

SEWER COMMISSION - PRESENTATION BY LOUIS BERGER & ASSOCIATES

The Town Administrator invited Mr. Charles McKinley, a Senior Environmental Engineer with Louis Berger & Associates, the awarded bidder on the Sewer Feasibility Study to make a brief presentation on the waste water sewer plan for the Town.

Mr. McKinley expounded on a Phase I project mapping out a sewer line to include the Industrial Park, Douglass property, Horizon Bay facility, and North Tiverton, and submitted preliminary cost estimates for the project approximating \$22 million.



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration
STATEWIDE PLANNING PROGRAM
One Capitol Hill
Providence, RI 02908 - 5872

December 7, 1998

Mr. Charles B. McKinley, P.E.
Louis Berger & Associates, Inc.
295 Promenade Street
Providence, RI 02908

Dear Mr. McKinley:

This agency has completed the review of the "Wastewater Facilities Plan Update" for the Town of Tiverton, RI. Based on our review, we have determined that the project is generally consistent with the State Guide Plan. The Intergovernmental Review Process resulted in the enclosed comments from the Department of Transportation and the Historical Preservation & Heritage Commission.

Yours very truly,

Victor Parmentier
Supervising Planner

Enclosures
xc: Arthur Zeman, DEM wo encl.



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
HISTORICAL PRESERVATION & HERITAGE COMMISSION

Old State House • 150 Bennett Street • Providence, R.I. 02903-1209

Preservation (401) 222-2678 FAX (401) 222-2968
Heritage (401) 222-2669 TDD (401) 222-3700

1 December, 1998

Kevin Nelson
Rhode Island Statewide Planning Program
1 Capitol Hill
Providence, RI 02908

RE: SRF-98-331, Tiverton Wastewater Facilities

Dear Mr. Nelson:

This office has reviewed the above-referenced application in accordance with Section 106 of the National Historic Preservation Act. It is our conclusion that the proposed project might affect significant archaeological and historical properties.

Based on the location of known sites, and on environmental models developed by this office, this general project area has a high likelihood of containing archaeological sites associated with the pre-colonial and colonial use of the area. It is possible, however, that the development of roads and houses has disturbed some, perhaps most, of this area, destroying its archaeological integrity.

In order to establish if this is the case, a Phase I assessment study should be conducted to determine if any intact land surfaces have survived. Based on the results of this assessment, it may be necessary to proceed to intensive Phase I subsurface testing in undisturbed areas, to determine if there are archaeological resources within the project area.

A portion of the project area, the area along the abandoned railroad tracks adjacent to Mount Hope Bay, was surveyed in the early 1980s. Although no sites of National Register significance were identified by that project, the reported data should be reassessed in the recommended Phase I survey, to ensure that the standards applicable today are met.

If you have any questions or comments, please contact Paul Robinson, Archaeologist, or Richard E. Greenwood, Project Review Coordinator for this office.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Edward F. Sanderson".

Edward F. Sanderson
Executive Director
Deputy State Historic
Preservation Officer

cc: James Goncalo, Town of Tiverton
John Brown, Narragansett Indian Tribe
Matthew Thomas, Narragansett Indian Tribe

RHODE ISLAND STATEWIDE PLANNING PROGRAM

1 Capitol Hill
Providence, Rhode Island 02908-5871
(401) 222-2093 fax (401) 222-2083
NOV 21 PM 9:48

PROJECT NOTIFICATION AND REVIEW SYSTEM

J. Michael Bennett
Department of Transportation
2 Capitol Hill
Providence, RI 02908

NOV 1 1998

Dear Mr. Bennett:

Referral Number: SRF-98-331

This agency has been notified of the project described on the attached page in conformance with Federal Executive Order 12372 and R.I. Executive Order 83-11. We request your comments on this project, taking into consideration: a) is it consistent with state, area, and local plans? b) does it duplicate or need to be coordinated with other projects? c) might it be revised to improve effectiveness? d) does it contribute to balanced development patterns and service delivery? e) how does it affect the environment? and f) any other aspect your agency considers important.

The enclosed material may not constitute the full application package. If you have any questions or require further information please address the contact person listed on the application or call this office.

Your response must be received by this office no later than **December 1, 1998.**

If additional time is needed, please contact the Review Coordinator at the address above.

Please return this copy and retain a copy for your files.

- Recommend support for this project.
- The commentary below is provided for applicant's information.
- Oppose the project for the reasons below.

Comment (use additional sheets if necessary):

Any work on a State highway will require a utility permit through the DOT's Maintenance Division.

Submitted by: J. Michael Bennett 11/24/98

Title: Maneuver Engineer Date: _____
Highways Environmental Engr'ng



RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

235 Promenade Street, Providence, RI 02908-5767

TELEPHONE 401-831-5508

February 22, 1999

Charles B. McKinley, P.E.
Louis Berger & Associates, Inc.
295 Promenade Street
Providence, RI 02908

RE: Review of Tiverton's Wastewater Facilities Plan Update (DEM file #98-H)
Tiverton, Rhode Island

Dear Mr. McKinley:

The Department of Environmental Management, Office of Water Resources (OWR) has completed its review of the above referenced Facilities Plan Update (FPU), which was received by this office on November 6, 1998. Prior to approval, please address the following comments and revise the document as necessary:

1.) GENERAL COMMENT -The Selected Plan consists of sewerage industrial developments and Horizon Bay and constructing the related interceptors/pump station to convey those flows to the Fall River WWTF as Phase 1. The FPU then indicates that Phase 2 will only be implemented as funds become available. This office doesn't agree with the phasing of the proposed wastewater collection system. Our basis is that the 1976 report indicated areas of Tiverton which demonstrated a need for sewers based on poor soils and existing information (at the time) on ISDS failures. In the 1976 report, the proposed residential flows were 1.54 MGD vs. the FPU's estimate of 0.71 MGD. The proposed industrial/commercial flows were 0.68 MGD vs. the FPU's estimate of 1.2 MGD. It appears that the Town has basically shifted its priorities to sewer industrial properties, while the residential areas that were problematic over 20 years ago will remain unsewered until some future time. The Stafford Pond Road, Bulgarmarsh Road and Stone Bridge areas, which were identified in the 1976 report as areas to be sewerage, have been deleted, either in whole or part, in this FPU. Assuming that the problem with failed ISDS systems still exists today, these areas should receive priority for sewerage since the need was identified in the original report and has not been addressed. While it is understandable that the town wants to be able to provide sewer service for future industrial development, this should not take precedent over providing service to areas of documented need. At a minimum, please provide a schedule in this FPU indicating specific timeframes for implementation of Phase 1 and Phase 2. Phase 1 should include sewerage the existing residential areas with the most pressing need as well as the proposed industrial areas. Relying on revenues from future industrial development to determine when *and if* sewers can be economically extended to residential areas with long-standing problems, is unacceptable.

2.) In the Executive Summary, revise the text to indicate that the study area is the whole town, not just North Tiverton. Also, revise Figure 2-1 to include the whole town in the study area.

- 3.) In Chapter 3, provide a more detailed description of the recommended plan in the 1976 report and a map showing the areas that were going to be sewerred, including the interceptors and pump stations. As mentioned in the text on page 3-6, please delineate each of the four stages on this map.
- 4.) On page 4-5, Section 4.6, revise the text in the 1st paragraph, second sentence from "October 1994" to "July 1997." In addition, please revise Tables 4-3 and 4-4, if necessary, to reflect any changes made to the 303(d) list and the *State of the State's Waters*. For updated information on these documents, you can contact Connie Carey of the OWR Standards Section at 222-3961, x7239.
- 5.) In Chapter 4, provide information on the problems that have been experienced with the existing ISDS's in town (i.e., # of times tanks are being pumped, # of failures reported/in what areas, # of repair applications in to RIDEM/in what areas, etc.). This information should be presented in the FPU in order to reaffirm, substantiate and/or justify the problem areas in town. If ISDS problems are still occurring in the Stone Bridge, Bulgarmarsh or Stafford Pond areas, then those areas should be included as future sewer service areas, as they were in the 1976 document. Please also include a Land Use Map in this chapter.
- 6.) On page 4-8, the text states that Figure 4-5 shows the watershed basins for Stafford Pond. However, the Figure does not appear to show any watershed basins. Please revise the text and/or Figure 4-5 accordingly.
- 7.) Chapter 5, Section 5.3 concerns future wastewater flows and Table 5-1 provides a summary. This section should refer to mapping which shows where these future service areas are. Include the areas referred to as Mount Hope Bay and Fish Road.
- 8.) On page 6-1, the 1st paragraph indicates the planning period to extend to the year 2015. However, the 1st paragraph of the Executive Summary states that the FPU will be the planning tool to the year 2020. Please revise as necessary.
- 9.) As indicated in comment #2, please add text to discuss the southern portion of Tiverton in Section 7.1 Unsewered Areas on page 7-1. At a minimum, this discussion should focus on the establishment of a Wastewater Management District for those areas of town (in both the northern and southern areas) which will retain ISDS's as the means of wastewater disposal. Your attention is directed to the OWR Facilities Plan Checklist Section VI.C (copy enclosed). Please follow the checklist when compiling this discussion. Addressing these issues during facilities planning will guarantee Tiverton eligibility for state-assisted funding for repair/replacement of failed ISDS's through the Community Septic System Loan Program (CSSLP). For information on the CSSLP, you can contact Jim Riordan of the OWR Watersheds Section at 222-3961, x4421.
- 10.) In Chapter 7, add a section on the environmental impacts of all three alternatives. The additional Section should be structured like Section 8.2, except there would be a discussion of *Wetlands, Flood Hazard Areas*, etc. for each alternative. In addition to the information provided in Section 8.2, please also mention traffic impacts and adverse economic impacts to existing businesses under the *Temporary Construction Impacts* section. Proper planning requires that all impacts, not just cost, be evaluated in

determining the selected alternative. Also, in Section 7.4, please revise the cost estimates to include O & M costs and present the overall cost on a Present Worth or Equivalent Annual basis. Please also provide an ENR construction cost index that can be associated with the costs presented. On Figures 7-1 through 7-3, please indicate which facilities will be constructed under which phase.

11.) In Chapter 8, Section 8.2, provide a brief recap of the environmental impacts of the selected alternative. Also, include a map in this chapter that shows the selected plan, including Phases 1 and 2 and all associated wastewater collection facilities.

12.) In Chapter 9, Section 9.2, what is meant by "The Town will confirm the intermunicipal agreement..." in Step 2? The Executive Summary indicates that Tiverton already has an intermunicipal agreement with Fall River to treat up to 2 MGD. Is there a chance that Fall River will not be able to accept this amount in the future? Confirming the agreement should be done now, as part of the facilities planning process, not as a future step once the FPU is approved. A copy of the intermunicipal agreement should be included in the Appendices.

13.) In Chapter 9, Section 9.3, add language indicating that an O & M manual for the proposed collection system will be compiled and submitted to RIDEM for review and approval.

14.) In Chapter 10, the 2nd paragraph states that project financing will be a key issue during the public participation phase. However, it appears that the Public Hearing was already held on July 13, 1998. The meeting minutes in Appendix C indicate that there was some discussion about project financing. Update the text in Chapter 10 to indicate that the Public Hearing was already held and briefly discuss the results of that Hearing. In addition, the O & M costs must be included in the overall project costs. Also, on page 10-5, Section 10.2.2, 3rd bullet, change the permitted peak flow to 6.0 MGD. In addition, the text in this section mentions the Fall River CSO project. Is there information available from Fall River that can be used in estimating the additional cost to the ratepayers of Tiverton as a result of implementing the CSO project? Will Fall River expect Tiverton to share the cost of CSO corrections? If information is available, it should be presented in this section as well as in Section 7.4.

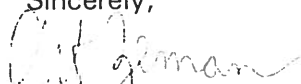
15.) On page 11-2, the text indicates that a Public Meeting was held on March 10, 1997. Please provide all relevant information from that meeting, including prior notification of the meeting, copy of the agenda, meeting minutes, copies of handouts, etc. in Appendix C. In addition, provide a copy of any Hearing notes (i.e., notes on who from the public asked questions, etc.) in Appendix C. On December 7, 1998, this office received a consistency with the State Guide Plan determination letter from the RI Statewide Planning Program. They did, however, state that there were comments from both RIDOT and the Historical Preservation & Heritage Commission. Please include copies of all correspondence with state and/or federal agencies in Appendix C.

Please address the above comments in narrative form and resubmit any revised pages as necessary. Once these comments are satisfactorily addressed and the necessary revisions are made, the OWR will be in a position to complete the evaluation of the FPU for final action.

Charles B. McKinley, P.E.
February 22, 1999
Page 4 of 4

If you have any questions, please call me at 222-6820, x7251.

Sincerely,



Arthur G. Zeman, P.E.
Principal Engineer

AGZ/az

enclosure

pc: Jim Riordan, RIDEM
Raul Fernandes, Tiverton Sewer Commission

APPENDIX D
INTERMUNICIPAL AGREEMENT

AGREEMENT FOR WASTEWATER TREATMENT
BETWEEN
CITY OF FALL RIVER, MASSACHUSETTS
AND TOWN OF TIVERTON

THIS AGREEMENT, made and entered into this 25th day of June, 1996, by and between the City of Fall River, a Municipal Corporation within the Commonwealth of Massachusetts, in the County of Bristol, acting through its Sewer Commission, hereinafter called the "City", party of the first part, and the Town of Tiverton, a Municipal Corporation, in the County of Newport, State of Rhode Island, acting through its Tiverton Sewer Commission, hereinafter called the "Town", party of the second part, and

WHEREAS, the City owns and operates a wastewater treatment works in order to treat wastewater originating in the Town and the City, and

WHEREAS, the Town intends to discharge into the City wastewater collection and/or treatment system sanitary and/or industrial wastewaters for treatment in City's wastewater treatment works, and

NOW THEREFORE, in consideration of these premises and mutual benefits to be derived by the parties hereto, an Agreement is prepared in the following form:

SECTION 1. DEFINITIONS

Section 1.1 - For the purpose of this Agreement, the following terms are defined:

1.1.1 "Average Daily Flow" shall mean the total annual flow as measured at the metering station, divided by the number of days in the year.

1.1.2 "Biochemical Oxygen Demand" (abbreviated BOD) shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20 degrees Centigrade (68 degrees Fahrenheit) expressed in milligrams per liter by weight (or pounds per day).

1.1.3 "Industrial Wastes" are the liquid wastes, other than sanitary sewage, resulting from manufacturing and/or industrial operations or processes or drains.

1.1.4 "Maximum Daily Flow" shall mean the maximum flow recorded at the metering station during a 24-hour period during any calendar year.

1.1.5 "Metering Station" shall mean a suitable facility for measuring, recording, and totalizing the flow of wastewater from the Town to the Fall River Sewer System.

1.1.6 "Sanitary Sewage" shall mean sewage discharging from the sanitary conveniences such as toilets, washrooms, urinals, sinks, showers, drinking fountains and from kitchens, restaurants, cafeterias and floor drains from industrial, manufacturing or process areas essentially free of industrial wastes or toxic materials.

1.1.7 "Shall" is mandatory; "may" is permissive.

1.1.8 "Total Suspended Solids" (abbreviated TSS) shall mean solids that either float on the surface of, or are in suspension in water, or sewage, or wastewater, or other liquids and which are removable by laboratory filtering, expressed in milligrams per liter by weight (or pounds per day).

1.1.9 "User Charges" shall mean a charge levied on users of the wastewater facilities for the cost of operation and maintenance.

1.1.10 "Wastewater" shall mean the spent water of the participating municipalities and may be a combination of the liquid and water carried wastes from residences, commercial buildings, industrial plants and institutions, together with any infiltration/inflow that may be present.

1.1.11 "Wastewater Treatment Facilities" shall mean all facilities for collection, conveying, pumping, treating and disposing of wastewater.

1.1.12 "Town Flow" means the amount of average daily flow of wastewater flowing into the City from the Town.

SECTION 2. RESPONSIBILITIES OF CITY

Section 2.1

The City shall operate and maintain the City's wastewater treatment facility.

Section 2.2

The City shall receive, transport and dispose of the Town's sanitary and industrial wastewater provided the Town agrees to adopt such rules, regulations and/or by-laws as are necessary to secure compliance by system users with the standards provided for within this agreement or as otherwise may be amended or in accordance with any applicable local, State or Federal regulations.

Section 2.3

The City shall receive the Town's wastewater at a location or locations mutually agreeable to both parties, the physical connection being subject to the approval of the City.

Section 2.4

The City, on behalf of and as an agent for the Town, will perform technical and administrative duties necessary to implement and enforce the Town's sewer use ordinance. The City will: (1) update the industrial waste survey; (2) issue permits to all users required to obtain a permit; (3) conduct inspections, sampling, and analysis; (4) take all appropriate enforcement action as outlined in the City's enforcement response plan; and (5) perform any other technical or administrative duties the parties to this agreement deem appropriate. In addition, the City may, as an agent of the Town, take emergency action to stop or prevent any discharge which presents or may present an imminent danger to the health or welfare of humans, which reasonably appears to threaten the environment, or which threatens to cause interference, pass through, or sludge contamination. The Town shall provide the necessary support to enforce the applicable regulations.

SECTION 3. RESPONSIBILITIES OF TOWN

Section 3.1

The Town shall maintain the existing wastewater collection facilities including a Metering Station which shall be installed when a sewer interceptor is built prior to entering the City limits. If the Town plans to expand sewer services to other areas of the Town, the Town shall be responsible for financing, planning, constructing and maintaining such wastewater collection facilities. Expansion of sewer services to other areas of the Town would require approval by the City if Town flow exceeds the Town's allotted flow.

Section 3.2

Characteristics of wastewater delivered to the City wastewater treatment facilities by the Town and any users of the system within the Town shall conform to the requirements of wastewater permitted by the City, under its sewer use ordinance as issued and amended from time to time and all applicable local, State and Federal regulations.

Section 3.3

The Town agrees to adopt such rules, regulations and/or by-laws as are necessary to secure compliance by systems users with

the standards provided for within this Agreement, or as otherwise may be amended and to ensure conformity with the requirements of any agency of the City, the Commonwealth of Massachusetts, or any other governmental agency which might have jurisdiction covering the system. The Town agrees to enforce such rules, regulations and/or by-laws. The City shall have the right to require the Town to take appropriate legal action against any system user to enforce compliance with the terms of this Agreement and user fees owed the City. The Town agrees that the City shall be the lead enforcement agent, as noted in Sections 2.4 and 3.4 in matters relating to the Federally Approved Industrial Pretreatment Program.

Section 3.4

As the City has implemented a federally approved Industrial Pretreatment Program and retains the responsibility to protect the Treatment Facility and receiving waters from industrial interference, the Town shall convey the right to the City to take appropriate legal action against any system user to enforce compliance with the Town's Sewer Use Ordinance. This includes, but is not limited to requiring industrial users to self monitor their discharge and report to the City; install the proper pretreatment systems if necessary; to submit to inspections for the purpose of compliance; to allow the City to issue industrial discharge permits; and to levy fines or terminate discharge rights for continued non compliance. All significant industrial users must obtain and maintain an industrial discharge permit with the City and any other applicable permits.

Section 3.5

The Town agrees that the discharge of sanitary and/or industrial wastes containing heavy metals, cyanide and/or toxicity will not be allowed. All wastes to be discharged must be in accordance with the City's industrial pretreatment guidelines presently in effect or any other which may take effect in the future.

Section 3.6

The Town hereby agrees that at no time will they intentionally allow the discharge of wastewaters which are economically and/or technically more burdensome to treat than those described in this Section.

Section 3.7

The Town hereby agrees that stormwater will not be allowed to enter the sewer system, and inflow and infiltration will be reasonably controlled and minimized.

SECTION 4. TERM

The term of this Agreement shall continue from the date of execution until terminated by mutual agreement.

SECTION 5. IMPLEMENTATION

Section 5.1

The City agrees to provide wastewater treatment facilities with a portion of the capacity allocated to handle waste from the Town. The capacity allocated is 2.0 MGD with an instantaneous peaking factor of 3 for an instantaneous limit of 6.0 MGD. This capacity limit can be adjusted by mutual agreement and addenda to the agreement.

Section 5.2

The portion of the average capacity allocated to Tiverton is 2 million gallons per day, 4,170 pounds per day of BOD and 4,170 pounds per day of TSS.

SECTION 6. PAYMENT - CAPITAL INVESTMENT

Section 6.1

All new connections to the collection system shall pay a one time fee to the City of \$5.00 per gallon of the projected flow. Appendix A identifies standard flow projections. Non standard facility flow projections not outlined in Appendix A shall be subject to reasonable engineering practices and estimates. The City retains the right for final approval of flow projections. A summary of said payments shall be included in the quarterly statement identified in Section 7.1.4 for City invoicing.

SECTION 7. PAYMENTS: OPERATION AND MAINTENANCE

Section 7.1

7.1.1 The Town shall make quarterly payments towards the costs of operation and maintenance of the wastewater treatment facilities on the following basis: Until the Town of Tiverton constructs and installs its main metering chamber on State Avenue as part of its construction of a public sewer system, the Town shall pay for the total flow received quarterly on a per gallon basis at a rate of \$1.50 /CFF. If user charges identified in Section 19-99 of the Fall River Revised Ordinances are increased, the Town rate shall be increased by the same proportionate percent increase.

7.1.2 Any costs associated with the operation and maintenance and/or capital repair in the Town of Tiverton connection shall be borne 100% by the Town.

7.1.3 The Town is responsible for assuring that all sources of discharge from the Town to the City are properly accounted for.

7.1.4 Upon completion of each quarter (September 30, December 31, March 31 and June 30), or at reasonable intervals as agreed by both parties, the Town shall submit to the City a summation of the total flow for the quarter from the Town along with the necessary support documentation. The City shall invoice the Town by calculating the total flow by the applicable rate. Invoices are due and payable within 30 days of receipt.

7.1.5 Upon approval of the agreement, the City will continue the direct billing of customers until the proper Town billing system is in place, for a period not to exceed 180 days. The Town is responsible for any unpaid invoices through this period.

SECTION 8. MEASUREMENT OF FLOW AND SAMPLING OF WASTEWATER

Section 8.1

The volume of flow used in computing the Town's quarterly invoices shall be based upon readings obtained by suitable flow measurements and recording devices operated and maintained by the Town of Tiverton, all costs to be borne by the Town of Tiverton, said devices subject to approval by the City. It is also agreed that, in the event of flow into the City before a metering station is installed, then invoices shall be based upon water consumption charges of the North Tiverton Fire District, Stone Bridge Fire District and/or Tiverton Water Authority, and in the event there are users who are not within such Fire Districts or Water Authority, then flow shall be based upon the number of bedrooms in such dwelling(s) and computed at a rate of usage of 110 gallons per bedroom. If such latter users are not residential, then an arrangement mutually satisfactory to the City and Town shall be negotiated and struck.

8.1.1 The Town of Tiverton shall be responsible for checking the accuracy and reliability of the flow metering and recording equipment. The City shall be advised of the results of any test on the equipment and the methods employed.

8.1.2 The volume of flow in computing the operating and maintenance costs shall be based upon readings directly from the metering station or other approved site. The collecting of flow meter readings for the purpose of computing and distribution charges shall be the responsibility of the Town of Tiverton. Once every month, the Town will provide the City with the wastewater volume for that period, based upon the meter readings.

Section 8.2

The City and Town hereby agree that the determination of character and concentration of wastewater and the associated sampling technique shall be in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater" published jointly by the Public Health Association, the American Water Works Association and the Water Pollution Control Federation, or any other method mutually agreed upon by the City and Town.

8.2.1 The sampling and determination of the character and concentration of Town's wastewater shall be performed by the Town of Tiverton. The sampling location will be mutually agreed upon by the Town and the City. The cost for sampling and analysis shall be the responsibility of the Town of Tiverton.

8.2.2 Samples shall be collected by the Town in such a manner as to be representative of the actual quality of the wastewater. Representative proportional composite samples shall be collected monthly and analyzed accordingly as required by the City's Industrial Pretreatment Program.

8.2.3 The results of the wastewater sampling and analytical program shall be reported to the City upon request and in accordance with the City's Industrial Pretreatment Program.

8.2.4 The City shall be given full and free access to the Town of Tiverton's wastewater metering station(s) as required for the purposes of inspection, measurement, sampling and testing.

8.2.5 In the event the metering equipment is temporarily out of order or service for any reason the volume of wastewater and strength will be based on the period representing the highest volume and strength unless otherwise agreed by both parties on the basis of past experience.

8.2.6 The Town of Tiverton shall notify the Sewer Commission immediately in the event that the metering equipment is out of order or service.

8.2.7 The Town of Tiverton shall be responsible for facilitating repairs of the metering equipment and the costs associated with said repairs.

Section 8.3

For the purpose of compliance with the Industrial Pretreatment Program, the City will at least annually sample, inspect and analyze the wastewater from all significant industrial users within the Town. The industry is responsible for and will be invoiced directly for the costs associated with sampling and analysis.

SECTION 9. TRUCKED WASTES

Section 9.1

The City agrees to accept and treat at its treatment facility wastes from the Town's septic tanks, seepage pits, and cesspools. The Town will maintain its priority status as a neighboring community as it has in the past. All persons operating vacuum or "cesspool" pump trucks desiring to discharge these wastes to the facility must be approved by the Sewer Commission and the Fall River Health Department, make payment for treatment costs at the same rates fixed from time to time by the City for waste from Out of Town accounts, and comply with the conditions of the City's sewer use ordinance and the Rules and Regulations for the Disposal of Septage.

Section 9.2

Should the Town desire to reserve a portion of daily septage capacity at the treatment facility to assure that their needs are met, such reservations must be negotiated with and approved by the City as to logistics and payment schedules.

SECTION 10.1 CAPITAL IMPROVEMENTS

In the event that the City must undertake major repairs, replacement, or add to the joint wastewater collection and treatment facilities or is directed or ordered to provide a higher degree of treatment in the future, or to otherwise modify the process from that contemplated at the time of execution of this Agreement, the net capital cost of such replacement or additional facilities shall be apportioned between all the parties using the facility as follows:

1. The primary mechanism anticipated for such costs is to include such debt directly into the sewer user fee structure. As such all customers of the system would be equally assessed by the user fee system.

2. The Town shall not be obligated to pay for separate fines or penalties for legal actions of which the Town has no control. This, however, cannot be used as a mechanism to adjust user fees.

3. If treatment facility improvements are planned to be financed via non user fee assessments, then the Town shall be responsible for their apportionate share using the approved flow, BOD and TSS allotments as agreed by both parties. This provision is subject to the Town of Tiverton installing its main metering chamber on State Avenue as part of its construction of a public sewer system.

SECTION 11. RECORDS AND ACCESS

Section 11.1

The City and Town shall maintain complete and accurate books and records concerning all matters relative to this Agreement. Such records shall be open for inspection and making copies or extracts thereof to accountants and other duly authorized representatives of the other party.

The Town records shall include, but not be limited to, as built plans of all sewers and storm drains, schematics of all connections to sewer and storm drains, building permits for all facilities connected to sewer, and documents regarding proper operation and maintenance of the Town's sewers.

Section 11.2

Both the City and the Town agree to make available to representatives and agents of the other for purposes of inspection all facilities and equipment related to the wastewater system of each.

SECTION 12. SEPARATE AGREEMENTS

Any separate agreements relating to wastewater collection and treatment between the Town and adjacent municipalities which would result in additional discharges to the City's sewer system must be reviewed and approved by the City. In any event, the Town shall in the aggregate be restricted to the wastewater strengths and flows, and any increase must be formally contracted for between the Town and City.

SECTION 13. NOTIFICATION OF CHANGE

The Town agrees to notify the City in writing as far in advance as possible of anticipated or planned significant increases or decreases in the quantity and/or quality of the wastes to be discharged to the City's wastewater treatment facilities.

SECTION 14. TERMINATION

Section 14.1

For any material breach of this Agreement, continued for three months after notice thereof in writing by other party, either party may terminate this Agreement. Upon receipt of said notice, both parties will enter into discussion within thirty (30) days to assure proper termination of the Agreement.

Section 14.2

There shall be no circumstance under which the City will be obligated to return to the Town any portion of the Town's capital investment.

Section 14.3

The City maintains the right of refusal to accept the Town's waste if any section or subsection of this Agreement is materially violated. The Town shall be notified in writing, and the Town shall be granted ninety (90) days to respond to a purported violation of this Agreement. If the matter is of immediate danger to the treatment facilities, public health or the environment, the City retains the right of immediate refusal.

Section 15. AMENDMENTS

Section 15.1

No amendments to this agreement shall be effective until adopted by the Fall River City Council.

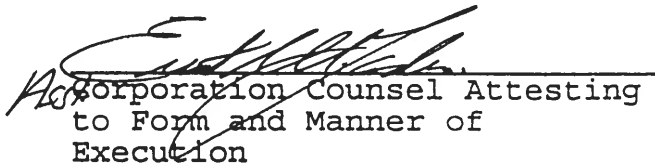
IN WITNESS WHEREOF, the respective parties hereto have caused this Agreement to be signed by them and have affixed their hands and seals on the day and year referred to above written.

WITNESS

CITY OF FALL RIVER

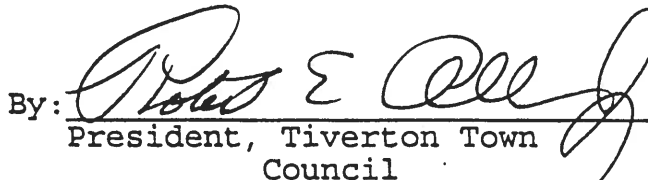


Mayor



Corporation Counsel Attesting
to Form and Manner of
Execution

TOWN OF TIVERTON

By: 

President, Tiverton Town
Council

APPENDIX A

Calculation of Flows

Unless a variance is authorized by the Director in writing, applicants applying for a sewer extension or connection permit shall use the following figures in calculating daily sewage flow in completing the application:

SEWAGE FLOW ESTIMATES:

<u>Type of Establishment</u>	<u>Gallons per Person per day</u>
Boarding Schools, Colleges	65
Nursing Home and Rest Home	100
School, without cafeteria, gymnasium or showers	10
School, with cafeteria, but not gymnasium or showers	15
School, with cafeteria, gymnasium and showers	20
Swimming Pool	10
Camp, resident - washroom and toilets	25
Camp, resident - mess hall	10
Camp, day - washroom and toilets	10
Camp, day - mess hall	3
Camp Ground - showers and toilets - per site	75
Gymnasium - per spectator	3
Gymnasium - per participant	25
Theater, Auditorium	3
Public Park - toilet wastes only	5
Public Park - bathhouse, showers and flush toilets	10
Factory or Industrial Plant, without cafeteria	15
Factory or Industrial Plant, with cafeteria	20
Work or Construction Camp	50

	<u>Gallons per Day</u>
Single and multiple dwelling units - per bedroom motels, hotels, boarding houses	110
Tennis Club - per court	250
Bowling Alley - per alley	100
Country Club - dining room - per seat	10
Country Club - snack bar or lunch room - per seat	10
Country Club - locker and showers - per locker	20
Church - per seat	3
Church - vestry/kitchen - per person at capacity	5
Trailer, dump station - per site or per trailer	50
Mobile Home Park - per site	200
Office Building - per 1,000 sq. ft.	75
Dry Goods Stores - per 100 sq. ft.	5
Drive-in - per stall	5
Non-single family, Automatic clothes washer per washing machine	400
Hospital - per bed	200

Service Station, excluding thruway - per island	300
Skating Rink - 3,000 gallons per day plus 5 gallons per seat	300
Dog Pounds - Veterinary Clinics - per pen	50

Type of Establishment

Gallons per Seat
or Chair per day

Restaurant, food service establishment, lounge, tavern	35
Restaurant, thruway service area	150
Restaurant, kitchen flow	15
Barber Shop/Beauty Salon per chair	100

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Louis Berger Group, Inc.

295 Promenade Street, Providence, RI 02908