EXECUTIVE SUMMARY

Sanitary Sewer Feasibility Study for the Wayne County Four Bay Area

Preface

Many of Wayne County's most treasured natural resources are found in and around four Lake Ontario embayments including Sodus Bay, Port Bay, East Bay and Blind Sodus Bay. As important as these bays are to residents and visitors alike, the water quality in these four bays has been deteriorating. All four bays suffer from accelerated eutrophication that has generated algae blooms, sedimentation and associated nutrient enrichment, contaminated water, and erosion. These conditions threaten the value of the bays as recreational attractions and critical habitats for wildlife. A significant contributor to this deterioration has been inadequate septic systems being used by the many seasonal and year-round dwellings that line the shores of the bays. Most of the septic systems in the Four Bay area are not adequate for effective treatment of wastewater and are in violation of State and local laws regarding wastewater disposal.

In response to various studies that have recommended reduction of nutrient sources to the bays, Federal, State, and local agencies as well as local planning groups and community associations have urged the development of a sanitary sewer feasibility study for the Four Bay Area. The Wayne County Water and Sewer Authority accepted sponsorship of such a study and secured funding through a grant from the Lake Ontario Coastal Initiative. MRB Group, P.C. was selected as the consultants for the feasibility study and a Four Bay Steering Committee comprised of representatives from local government, community groups and New York State was formed and charged with study oversight.

The specific purpose of the Four Bay study is to produce a "Master Plan" that will outline necessary improvements to provide sewage collection and treatment for the bays, along with recommended phasing of these improvements. The study utilizes a twenty (20) year planning period and projects present and future sanitary sewer flows. Assumptions regarding organic loads are presented and an examination is made of the existing infrastructure that will receive future loads. Alternative sewer collection systems are discussed and a proposed collection system is outlined along with a financial analysis of costs that will be associated with this system. Finally, a phased implementation plan is set forth with a review made of funding considerations and conclusions with recommendations.

Section I: Introduction

The four bays considered in this report are Sodus Bay, Port Bay, East Bay and Blind Sodus Bay. They are actually unique lakes that connect to Lake Ontario but are individual entities that are separate and distinct from Lake Ontario. They are individually and collectively threatened by pollution but there are opportunities to develop and implement regional solutions to common problems.

A number of community organizations and governmental entities are actively involved in efforts to improve water quality in the Four Bay area. The current Four Bay study builds upon previous studies that have addressed water quality and their causes in the area.

Section II: Purpose and Scope of Study

The study is intended to provide an optimal and realistic solution for wastewater management in the Four Bays area. The methodology employed involved review of existing studies, assemblage of necessary mapping, delineation of watersheds and wastewater treatment service areas, determination of flow characteristics, and a determination of the capability of existing treatment plants to accommodate project flows. Transmission/conveyance corridors were

determined for each watershed and a conceptual layout of the wastewater transmission/conveyance system was set forth.

The methodology also included the development of alternative collection systems for individual neighborhoods and communities, the generation of cost estimates with selected alternatives, and the development of a phased implementation plan. Community involvement was secured through various meetings and presentations. Finally, the methodology identified potential funding sources and resulted in the preparation of a comprehensive master plan report including supporting maps, tables and other information. The methodology utilized the *Recommended Standards for Wastewater Facilities*, also referred to as the "Ten States Standards", as its basis.

Section III: Description of Planning / Service Area

The planning area is located in the northeast sector of Wayne County and includes the Village of Sodus Point and portions of the Towns of Sodus, Huron, Wolcott, and Butler. At the request of the Wayne County Water and Sewer Authority the town of Rose and the hamlet of North Rose were also included in the study area.

Topography of the area ranges from steep slopes to rolling hills that slope at various grades to Lake Ontario. Freshwater wetlands are common in the area and various activities are subject to wetlands permits. Federal and state Coastal Zone Policies direct activities, funding and permits to ensure protection of the coastal area. Each bay in the study area has a variety of environmental and recreational assets.

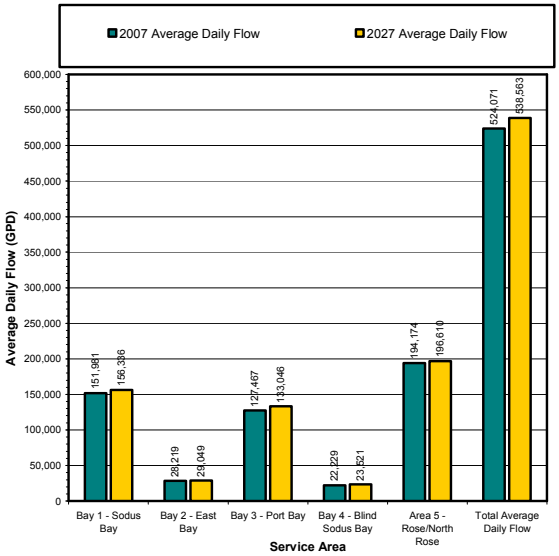
Section IV: Planning Period

A twenty (20) year planning period for the project was established and 20 year flow projections were made for modest population growth rates ranging from 1.25 % to 5.81% for the Towns and Villages in the study area.

Section V: Projected Present and Future Sanitary Sewer Flows

The average daily flow per unit within the study area was calculated based on a flow rate of 50,000 gallons per year or 137 gallons per day. Current average daily and peak flows were established for each of the four bays and projections were made of these flows for the planning period; through the year 2027. The following chart shows the sanitary sewer average daily flow rates and the total flow for the study area which were used as a basis for sewer system conceptual design.

Figure 1: 2007 and 2027 Average Daily Flow Rates



Section VI: Organic Load

The wastewater generated by the majority of properties in the Four Bay service area will consist of typical domestic sewage. The two wastewater plants that exist in the study area, Village of Sodus Point and Red Creek, have been designed to treat domestic sewage and have excess capacity to accommodate flows and the domestic organic loads generated by the service area.

Section VII: Existing Infrastructure

Both the Red Creek Area Regional Wastewater Treatment Facility and Village of Sodus Point Wastewater Treatment Plant were evaluated in regard to existing service areas and present capacity. Projected wastewater flows from a proposed Four Bay service area were then assigned to each plant using the following criteria:

- Geographical location of the service area
- Available capacity of the wastewater treatment plant
- Expansion potential for service areas

Flows from Sodus Bay and East Bay service areas would be conveyed to the Sodus Point Waste Water Treatment Plant. Wastewater generated by Port Bay, Blind Sodus Bay, and Rose/North Rose would go to the Red Creek plant. After connection of the Four Bay and Rose service areas, each receiving plant will still contain excess available capacity. Table – 1 provides the WWTP capacities, their current flows and the 2007 projected flows generated by the contributing service areas.

Table – 1 2007 Treatment Plant Excess Capacity

Service Area	Village of Sodus Point WWTP	Red Creek WWTP
2007 WWTP Design Capacity (GPD)	**570,000**	**500,000**
2007 Avg. Daily Demand	200,000	96,000
2007 Additional Projected Flows	180,200	343,871
2007 Excess Capacity	**189,800 GPD**	**60,129 GPD**

In 2027, the Village of Sodus Point wastewater treatment plant will still have excess capacity. However, the Red Creek treatment plant, even with a planned future upgrade to improve the capacity to 1,000,000 MGD, will have very little capacity and may require additional upgrades depending on the magnitude of future connections.

Section VIII: Sewer Collection Systems

Three alternative municipal sewer technologies were evaluated. These included conventional gravity sewer, low pressure sewer and vacuum sewer collection systems. The advantages of low pressure sewers overwhelmingly support their use within the Four Bay communities. The advantages of low pressure sewer systems are as follows:

- The diameters of the low-pressure mains are normally smaller than other systems which results in less disturbance during installation and a significant cost benefit.
- Low-pressure mains are typically installed at shallow depths and do not require installation at grade or with special profiles. The design of the collection system must be extremely flexible due to the topography, water table, lot/home configurations, existing utility locations and possible bedrock within the Four Bay area. Low pressure sewers provide this flexibility.
- Construction is easier at shallow depths and has far less impact on existing roadways and utility lines.
- Trenchless construction methods can be used to provide significant cost savings and minimal disruption of traffic and other utilities.
- Manufacturers of low-pressure systems have indicated that the installation cost of a low-pressure system is generally 60% less than the installation cost of a conventional sanitary sewer. The pilot study described in

Section VIII.A.4 suggests that, overall, the capital and operation and maintenance costs of low pressure sewers are approximately 75% less than those associated with conventional gravity sewers.

Section IX: Proposed Collection and Transmission Systems

The concept design of the Four Bay sanitary sewer system entails the construction of independent low-pressure systems for the collection of sewer flows within each bay community. Low pressure systems cannot extend the entire distance to the receiving wastewater treatment facilities, due to hydraulic limitations. Because of this, low-pressure systems eventually discharge into a conventional sanitary sewer pump station where sewer flows are then transmitted via a forcemain to the receiving treatment plant.

Concept designs are provided for each of the community collection systems proposed for the Four Bay service area including East Bay, Sodus Bay North East, Sodus Bay East Central, Sodus Bay South East, West Sodus Bay, Sodus Bay North West, Port Bay East, Port Bay West, and Blind Sodus Bay. Infrastructure costs, as shown in Table 2, were estimated for each sewer collection system under two scenarios: one which assumes the individual grinder pumps are provided by the sewer district, and the other which assumes that the grinder pumps will be purchased by homeowners as on one-time individual expense. Finally, concept designs and probable costs of construction, shown in Table 3, were developed for the transmission facilities serving the bay communities. For the purpose of this report the costs associated with the transmission systems are distributed among the communities which benefit from these improvements.

Table – 2 Probable Construction Cost Estimate for Community Collection Systems

Neighborhood Collection System	**Collection System Estimated Cost, (Homeowner Purchases Grinder Pumps)**	**Collection System Estimated Cost, (District Purchases Grinder Pumps)**
East Bay	$1,675,000	$3,114,000
Sodus Bay North East	$2,058,000	$4,490,000
Sodus Bay East Central	$510,000	$854,000
Sodus Port Bay South East	$741,000	$1,235,000
Sodus Bay South West	$879,000	$1,779,000
Sodus Bay North West	$749,000	$1,143,000
Port Bay East	$1,778,000	$3,655,000
Port Bay West	$1,854,000	$3,974,000
Blind Sodus Bay	$816,000	$1,510,000

Table - 3 Probable Cost of Construction for the Transmission Systems Sewering the Bay Communities

Transmission System	**Transmission System Estimated Cost**
East Bay Pump Station and Transmission Force main	$1,367,000
East Sodus Bay Pump Station and Transmission Force main	$2,439,000
West Sodus Bay Pump Station and Transmission Force main	$2,320,000
West Port Bay Pump Station and Transmission Force main	$615,000
Port Bay Pump Station and Transmission Force main	$2,684,000
Blind Sodus Bay Pump Station and Transmission Force main	$695,000

Section X: Financial Analysis

Section X includes a financial analysis to determine the estimated annual payment per dwelling unit. This analysis involved several steps including:

- Determining the maximum affordable annual payment that a single dwelling unit should be reasonably expected to pay. This study considers two criteria; the New York State Comptroller's average estimated costs for special districts and USDA Rural Development's (RD) "rule of thumb", based on

experience with a number of public water and sewer projects funded in whole or in part by RD. For the purposes of this report, a target of $883 has been established, based on the RD "rule of thumb".

- Developing cost sharing alternatives. Implementation of the program will necessitate improvements that not only benefit individual areas or neighborhoods, but provide regional benefits as well. For example, the recommended low pressure sewer systems are intended to serve specific neighborhoods along the bays; therefore the cost associated with these systems would naturally be shared by those properties that directly benefit. However, neighborhood collection systems must discharge to transmission systems which convey the wastewater to the treatment facilities. The transmission systems provide a regional benefit (i.e., they are used by multiple neighborhoods); therefore the cost of these systems must be shared among all the neighborhoods they serve.
- Developing probable costs of construction for the neighborhood collection systems and the regional transmission systems. The probable construction costs of the neighborhood collection systems considered two scenarios: one assuming that the grinder pumps would be provided by the sewer district with their cost to be included in the annual infrastructure debt service; and the other assuming that the grinder pumps would be purchased by the property owner as a one-time charge.
- Calculating the annual unit costs for repayment of the infrastructure debt service using both conventional financing and low interest loan financing.
- Determining the operation and maintenance costs, electrical costs, pump replacement fee, cost to treat the wastewater, and one-time costs associated with the construction of the proposed project for both the collection and transmission systems.

Table 4 summarizes the estimated annual unit cost per bay community provided the grinder pumps are paid for by the district. Table 5 provides similar information, assuming that the grinder pumps are purchased by property owners.

Table – 4 Annual Payment Per Unit, (Grinder Pumps Included In District Costs)

Bay Community	**Annual Payment based on Conventional Financing - 20 year term @ 5% APR**	**Annual Payment based on Rural Development Financing - 38 year term @ 4.5% APR**
East Bay	$2,343	$1,714
Sodus Bay North East	$1,706	$1,274
Sodus Bay East Central	$2.025	$1,495
Sodus Bay South East	$2,034	$1,500
Sodus Bay South West	$1,511	$1,140
Sodus Bay North West	$1,768	$1,317
Port Bay West	$1,736	$1,295
Port Bay East	$1,631	$1,222
Blind Sodus Bay	$1,812	$1,348

Table - 5 Annual Payment Per Unit, (Grinder Pumps Not Included In District Costs)

Bay Community	**Annual Payment based on Conventional Financing - 20 year term @ 5% APR**	**Annual Payment based on Rural Development Financing - 38 year term @ 4.5% APR**
East Bay	$1,841	$1,367
Sodus Bay North East	$1,204	$928
Sodus Bay East Central	$1,523	$1,149
Sodus Bay South East	$1,533	$1,155
Sodus Bay South West	$1,009	$793
Sodus Bay North West	$1,266	$971
Port Bay West	$1,234	$949
Port Bay East	$1,127	$875
Blind Sodus Bay	$1,340	$1,021

The financial analysis reveals that, in general the projected annual cost per unit exceeds the RD target of $883.

Section XI: Funding Considerations

Given that the total annual cost per unit generally exceeds the target value of $833 per year, grant assistance for the project will be required. Tables 6 and 7 lists the bay communities and the amount of grant funding that will be required to reach the target value of $883.

Table – 6 Required Grant Amount to Meet Annual Target Cost, (Grinder Pumps Included In District Costs)

Service Area	Units	Rural Development Projected Threshold	RD Threshold minus O & M costs	Maximum Project Capital Cost that can be financed based on RD Threshold - O & M 5% @ 20	Maximum Project Capital Cost that can be financed based on RD Threshold - O & M 4.50% @ 38	Required Collection System Grant Conventional Financing	Required Collection System Grant Rural Development Financing	Required Transmission System Grant Conventional Financing	Required Transmission System Grant Rural Development Financing	Total Grant, Conventional Financing	Total Grant, Rural Development Financing
Port Bay											
Port Bay West Collection System Infrastructure Costs	339	$883	$573	$2,421,338	$3,507,013	$1,552,662	$466,987	$2,684,000	$2,684,000	**$4,236,662**	**$3,150,987**
Port Bay East Collection System Infrastructure Costs	299	$883	$573	$2,135,635	$3,093,206	$1,519,365	$561,794	$2,684,000	$2,684,000	**$4,203,365**	**$3,245,794**
East Bay											
East Bay Collection System Infrastructure Costs	230	$883	$573	$1,642,796	$2,379,389	$1,471,204	$734,611	$6,126,000	$6,126,000	**$7,597,204**	**$6,860,611**
Sodus Bay											
Sodus Bay North East Collection System Infrastructure Costs	389	$883	$573	$2,778,468	$4,024,272	$1,711,532	$465,728	$4,759,000	$4,759,000	**$6,470,532**	**$5,224,728**
Sodus Bay East Central Collection System Infrastructure Costs	55	$883	$573	$392,843	$568,984	$461,157	$285,016	$4,759,000	$4,759,000	**$5,220,157**	**$5,044,016**
Sodus Bay South East Collection System Costs	79	$883	$573	$564,265	$817,269	$670,735	$417,731	$4,759,000	$4,759,000	**$5,429,735**	**$5,176,731**
N West Sodus Bay Collection System Infrastructure Costs	63	$883	$573	$449,983	$651,746	$693,017	$491,254	$0	$0	**$693,017**	**$491,254**
Sodus Bay South West Collection System Infrastructure Costs	144	$883	$573	$1,028,533	$1,489,705	$750,467	$289,295	$2,320,000	$2,320,000	**$3,070,467**	**$2,609,295**
Blind Sodus Bay											
Blind Sodus Bay Collection System Infrastructure Costs	118	$883	$573	$842,826	$1,220,730	$667,174	$289,270	$695,000	$695,000	**$1,362,174**	**$984,270**

Table – 7 Required Grant Amount to Meet Annual Target Cost, (Grinder Pumps Not Included In District Costs)

Service Area	Units	Rural Development Projected Threshold	RD Threshold minus O & M costs	Maximum Project Capital Cost that can be financed based on RD Threshold - O & M 5% @ 20	Maximum Project Capital Cost that can be financed based on RD Threshold - O & M 4.50% @ 38	Required Collection System Grant Conventional Financing	Required Collection System Grant Rural Development Financing	Required Transmission System Grant Conventional Financing	Required Transmission System Grant Rural Development Financing	Total Grant, Conventional Financing	Total Grant, Rural Development Financing
						negative number implies that the amount that can be financed exceeds the cost of the collection system. The excess money is subtracted from the grant to determine the required grant to pay for the transmission infrastructure.					
Port Bay											
Port Bay West Collection System Infrastructure Costs	339	$883	$573	$2,421,338	$3,507,013	($567,338)	($1,653,013)	$2,116,662	$1,030,987	**$2,116,662**	**$1,030,987**
Port Bay East Collection System Infrastructure Costs	299	$883	$573	$2,135,635	$3,093,206	($357,635)	($1,315,206)	$2,326,365	$1,368,794	**$2,326,365**	**$1,368,794**
East Bay											
East Bay Collection System Infrastructure Costs	230	$883	$573	$1,642,796	$2,379,389	$32,204	($704,389)	$6,126,000	$5,421,611	**$6,158,204**	**$5,421,611**
Sodus Bay											
Sodus Bay North East Collection System Infrastructure Costs	389	$883	$573	$2,778,468	$4,024,272	($720,468)	($1,966,272)	$4,038,532	$2,792,728	**$4,038,532**	**$2,792,728**
Sodus Bay East Central Collection System Infrastructure Costs	55	$883	$573	$392,843	$568,984	$117,157	($58,984)	$4,759,000	$4,700,016	**$4,876,157**	**$4,700,016**
Sodus Bay South East Collection System Costs	79	$883	$573	$564,265	$817,269	$176,735	($76,269)	$4,759,000	$4,682,731	**$4,935,735**	**$4,682,731**
N West Sodus Bay Collection System Infrastructure Costs	63	$883	$573	$449,983	$651,746	$299,017	$97,254	$0	$0	**$299,017**	**$97,254**
Sodus Bay South West Collection System Infrastructure Costs	144	$883	$573	$1,028,533	$1,489,705	($149,533)	($610,705)	$2,170,467	$1,709,295	**$2,170,467**	**$1,709,295**
Blind Sodus Bay											
Blind Sodus Bay Collection System Infrastructure Costs	118	$883	$573	$842,826	$1,220,730	($26,826)	($404,730)	$668,174	$290,270	**$668,174**	**$290,270**

Section XII: Implementation and Conclusions

As this study is conceptual only, considerably more work is needed to develop design data that can lead to definitive system recommendations. Due to the multitude of factors that will determine the actual sequence in which individual sewer improvement programs are implemented throughout the study area, the development of a detailed or "project by project" phasing plan is not practical. Therefore, the general phasing plan summarized in Table 8 was developed under the fundamental premise that construction of the neighborhood collection systems is dependent on the availability of a regional transmission system, or a portion thereof, being in place first.

Table – 8 General Phasing Plan

PHASE	DESCRIPTION
1	Based on the recommendations made in this report, municipal and County officials should formulate an overall strategy to distribute costs and administer the improvements to be undertaken in the Four Bay Service Area. Particular attention is required to the determine how the regional transmission infrastructure will be financed and managed. Alternatives to be considered include, County Wide Sewer District, Part County Sewer District(s), Town Sewer Districts with intermunicipal agreements to encompass areas within adjoining towns, and individual Town Sewer Districts. Development of the regional transmission infrastructure is the key element required to begin providing sewer service to the bays.
2	Implement a community participation program to secure public input on the need to install sewers for each of the Four Bays and the study area as a whole. Public meetings should be periodically scheduled to serve two primary purposes. First, to provide the public with the necessary information so they can develop informed opinions, and to answer any questions that they may have. Second, to provide a forum for public officials to gauge public sentiment and to gather suggestions on future options.
3	Identify the first phase of the regional improvements to be implemented. Generally, these improvements will be prioritized based on severity of need, and public support in the individual bay areas. The availability of funding and the associated cost per sewer unit will also be key elements. Therefore, investigation and indentification of potential grants should be completed at this stage.
4	Refine capital cost estimates for the first phase of the regional improvements and develop the documentation necessary to formally apply for grant funding. Coordinate with the participating municipalities and/or County to submit funding applications and to establish the legal improvement area or special district that is necessary to implement the improvements. The timing of establishment of the improvement district will depend upon the particular funding program being pursued.
5	Once grant funds and financing for the project are secured, develop design and construction documents and construct the first phase of the regional improvements.
6	Implement additional regional transmission infrastructure, and community collection system improvements based upon community support and participation. This implementation plan will parallel phases 1 thru 5 described above. Community collection system improvements could occur concurrently with portions of the regional transmission system.
7	Re-evaluate the program each year, based on previous progress and current public sentiment. Continue to follow the general phasing program to implement the balance of the regional transmission improvements and community systems.