Village of Southampton

Southampton, NY

MAP AND PLAN FOR THE FORMATION OF THE INC. VILLAGE OF SOUTHAMPTON SEWER SYSTEM

Prepared for:

Mayor Epley and Board of Trustees
Inc. Village of Southampton
23 Main Street
Southampton, New York 11968

Prepared by:

H2M architects + engineers
538 Broad Hollow Road, 4th Floor East
Melville, New York 11747

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H2M architects + engineers

In Association with
Cameron Engineering & Associates, LLP

Executive Summary

This Map & Plan has been prepared in accordance with the engineering requirements contained in Article 14 of New York State Village Law to establish a municipal sewer system within the Incorporated Village of Southampton. A "sewer system" is the legal terminology, in accordance with New York State Law, that is used to define sanitary infrastructure servicing a Village.

The Incorporated Village of Southampton Sewer System will encompass all properties within the Village. The "service area" is a subset of the entire sewer system and is comprised of 204 tax lots located within the core commercial area. The term "service area" is interchangeable with "sewer district" for purposes of this report. The existing onsite sanitary wastewater disposal systems within the core commercial area are impacted by shallow groundwater and are identified as a contributor to the degradation of Lake Agawam. Establishing a sewer system to collect and treat the sanitary wastewater generated within this core commercial area will help improve the quality of Lake Agawam and the South Shore Estuary, protect public health, and also allow change of use and business expansion to occur within the Village. Storm water runoff and fertilizer usage also contribute to the degradation of the lake and will have to be acted upon by the Village as part of an overall program to improve water quality.

This Map & Plan presents the service area boundaries, sanitary flow projections, engineering analyses and investigations, cost opinions, and associated tax implications for the residents and businesses within the sewer district to construct, operate, and maintain the sanitary infrastructure.

Sanitary flow projections and analyses are prepared in accordance with the *Recommended Standards for Wastewater Facilities 2004 Edition* (*Ten States Standards*) and Suffolk County Department of Health Services (SCDHS) Standards. The total project cost opinion is based on the preliminary infrastructure requirements and has been escalated to reflect inflation to the anticipated date of construction. The cost is representative of the planning stage of the project and may be subject to change as this project progresses through the next phases.

This report must be approved by the Village Board, the New York State Commissioner of Health and Suffolk County Department of Health Services (SCDHS) in order to establish the official boundaries and identify the financial burden to benefitted properties.

The process to form the Village of Southampton Sewer System is a legal process and this Map & Plan is just one step in the formation procedure. It is incumbent of the Village Board to authorize legal counsel to seek NYS approval in accordance with NYS Law and to follow the procedure required by law.

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1. BACKGROUND

The Village of Southampton (Village) was originally settled in 1640 and later incorporated in 1894. The Village encompasses a total area of 7.2 square miles (4,608 acres) and is located in the southeast corner of the Town of Southampton. The Village includes approximately seven miles of oceanfront as well as Lake Agawam (Lake), a 60 acre fresh water lake that has been a long standing focal point within the Village. The Lake has played an important role throughout the history of the Village by providing residents with a recreational site for activities such as boating and fishing. Historical reports of fish kill events and water quality monitoring initiated in 2003 have verified Lake Agawam to be "a biologically stressed, hyper-eutrophic ecosystem which experienced high algal growth, varying levels of bacteria and low levels of oxygen (hypoxia)…" [1]

A *Comprehensive Management Plan for Lake Agawam* was prepared by Nelson, Pope & Voorhis, LLC in June 2009 for the Village. This document identified excessive nutrient loading to be the primary cause of poor water quality within the Lake. The sources of nutrient loading were identified to be storm water drainage direct to the Lake, benthic fluxes from bottom sediment, groundwater inflow, atmospheric deposition and surface runoff from adjacent properties and roadways. The *Comprehensive Management Plan for Lake Agawam* specifically identified groundwater to be a large contributor of nutrients into the Lake, which could be mitigated by the installation of sanitary sewers and/or increased maintenance of existing sanitary systems within the Lake Agawam watershed. Additional recommended corrective actions included sediment dredging from the lake bed and diversion of storm water runoff to areas outside the Lake's watershed.

The Suffolk County Comprehensive Water Resources Management Plan [2] (Plan), prepared in 2015, acknowledged that continued use of onsite sanitary wastewater disposal systems and fertilizer application are the two largest contributors of nitrogen loading to groundwater within Suffolk County. Other contaminants such as pathogens, volatile organic compounds (VOCs), phosphates, pharmaceuticals, and personal care products were also identified as constituents of concern from onsite sanitary disposal systems. The Plan concluded that proper management of all water resources will be necessary to improve groundwater quality, surface water quality, potable supply and coastal resiliency. The Plan also indicated that successful implementation of the protective measures for the County's water resources would heavily rely on the involvement of all stakeholders. For this reason, the Village of Southampton

[1] Nelson, Pope & Voorhis, LLC. Comprehensive Management Plan for Lake Agawam. June 2009. Prepared for the Village of Southampton, Village Board of Trustees.

[2] The Suffolk County Comprehensive Water Resources Management Plan, 2015, was prepared as a joint effort between Suffolk County Department of Health Services, Suffolk County Department of Public Works, Suffolk County Department of Economic Development and Planning, Suffolk County Water Authority and CDM-Smith to develop one document that identified the current impairments to all water resources within the County and recommend corrective actions that must be taken to prevent further degradation.

has taken the lead in addressing the protection of water resources on a local level by commissioning this Map and Plan.

This Map and Plan is the first step toward mitigating nitrogen contamination to groundwater and the down gradient Lake Agawam due to continued use of onsite sanitary wastewater disposal systems within the Village. This report defines the Village of Southampton Sewer System and identifies the boundary of the sanitary sewer service area. The sanitary sewer service area is intended to encompass properties located within the core commercial area of the Village. The core commercial area of the Village is impacted by shallow groundwater and located immediately up-gradient of the Lake. This portion of the Village has been identified as a significant contributor to the degradation of the Lake's water quality. Future expansion of the service area will require additional planning and the preparation of other Map & Plans to expand the proposed service area boundary. By providing sanitary infrastructure to the core commercial area, the Village will substantially reduce the overall nitrogen load to the contributing groundwater into the Lake, and will enable businesses within the downtown commercial center to expand, thus increasing the tax base so that future expansion continues to be affordable.

1.1. Purpose of Forming the Village of Southampton Sewer System

All properties located within the Village, except for the Southampton Hospital, discharge their wastewater to individual on-site sanitary systems consisting of either leaching pools or a septic tank with leaching pools. In order to minimize the discharge of contaminants to the environment, Suffolk County Department of Health Services (SCDHS) enacted Article 4, Article 6, Article 7 and Article 12 of the Suffolk County Sanitary Code to form the rules and regulations on which to protect groundwater and public health in Suffolk County. Article 6 of Suffolk County Sanitary Code was enacted in 1980 to limit development density in Suffolk County based on location relative to water resources. Any development initiated after 1980 that would exceed the density limitations specified in Article 6 would be required to install onsite sanitary wastewater treatment system(s) or connect to an existing treatment system to ensure compliance with local regulatory requirements.

The existing make up within the Village is diverse, and consists of a mix of residential, commercial and recreational properties. The core commercial area of the Village is generally located between Main Street, Windmill Lane, Jobs Lane and Nugent Street, north of Lake Agawam. This portion of the Village was developed prior to 1980 and is non-conforming to the density limitations specified in Article 6. In addition to this issue, many of the existing onsite sanitary wastewater disposal systems are not constructed in accordance with current standards and do not function properly. Shallow groundwater conditions impact the ability for the existing systems to accommodate current sanitary loads and require routine pump outs to avoid potential wastewater back-ups and overflows to the ground. These conditions also negate the potential for in-situ nitrogen reduction from bacterial consumption and vegetative root

uptake, resulting in high concentration nitrogen loading direct to groundwater. Local regulatory agencies will not allow property owners to increase the capacity of their existing onsite systems since their existing build-out does not comply with the current Sanitary Code.

Environmental contamination from continued use of onsite sanitary wastewater disposal systems is of significant concern to the Village of Southampton because of its negative impact on groundwater, Lake Agawam and the greater South Shore Estuary. Excessive nutrient loading (combined nitrogen and phosphorus) to groundwater up-gradient of the Lake have resulted in recurring fish kills and algal blooms. Construction of a central sanitary collection, conveyance and treatment plant infrastructure will provide an opportunity for the Village to reduce the overall nutrient load. As stated previously, the formation of the Village of Southampton Sewer District is only one of the corrective measures that will help minimize continued degradation of Lake Agawam.

The sanitary infrastructure associated with the sewer district will also provide commercial property owners with the ability to expand their existing businesses and allow changes of use. Expansion of businesses and enabling change of use within the Village's core commercial area will support the Southampton Village Center Vision Plan.[3] A revitalized commercial core within the Village of Southampton will increase its desirability as a year-round destination for Village residents, Suffolk County residents with disposable incomes, and tourists. The expansion of businesses will provide additional employment opportunities and result in increased property valuations. The increase in property valuation within the commercial core will provide additional property tax revenues to the Village while the increased business activity will provide additional sales tax and income tax revenue, thus increasing the overall valuation of the Village of Southampton.

For these reasons, the Village has commissioned this Map and Plan to establish the framework on which to initially provide sanitary sewer service to properties within the Village's commercial core area. The expansion of the service area will occur overtime to eventually include the entire Village at a schedule dictated by the Board of Trustees.

1.2. Current Regulatory Statutes

Article 6 of the Suffolk County Sanitary Code limits wastewater generation in un-sewered areas of Suffolk County based on a tax lot's location relative to eight (8) groundwater management zones (GMZ). Each GMZ was created to separate the Suffolk County watershed based on differences in hydrogeology and groundwater quality. The flow limitations for each GMZ were based on maintaining a maximum total

[3] Ehrenkrantz, Eckstut & Kuhn Architects. Southampton Village Center Vision Plan. June 2009. Prepared for the Village of Southampton, Village Board of Trustees.

nitrogen concentration in groundwater of 10 mg/L. The 10 mg/L limit was based on the current SCDHS maximum allowable concentration for nitrogen in groundwater.

The Village of Southampton is located within GMZ IV, which comprises the North Fork and eastern part of the South Fork, and GMZ V, which encompasses the southwestern portion of the South Fork not included in GMZ IV. The boundary between the zones runs through the proposed sewer district along Hill Street, Windmill Lane, Nugent Street, and Hampton Road, with GMZ IV on the south side of the border. The sanitary flow limitation associated with GMZ V is 300 gpd/acre, which is equivalent to limiting zoning to a 40,000 square foot (1 acre) lot for each single family residence. The sanitary flow limitation associated with GMZ IV is 600 gpd/acre, or a 20,000 square foot lot (0.50 acres) for each single family residence. Since development within the Village of Southampton occurred prior to existing Suffolk County Sanitary Code regulations, the existing build-out within the Village exceeds the current density limitations in many areas.

1.3. Sewer Area and Service Area Boundary Description

The sewer system boundary encompasses the entire Village as shown in **Figure 1-1**. The proposed sewer service area (sewer district) is comprised of a subset of properties located within the Village sewer system boundary. The sewer service area encompasses 204 Suffolk County tax lots consisting of approximately 129 acres. The tax lots located within the service area are contiguous and presented in **Figure 1-2**. These properties are primarily comprised of commercial lots, with some residential and vacant parcels. The commercial properties consist mainly of restaurants, store fronts, and municipal buildings, consistent with a typical Long Island main street business area. The properties encompassed by the service area have been confirmed by the Village of Southampton Planning Commission and have been modified several times to accommodate the vision of the Village.

The service area boundary does not include all properties located within the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) zones and where shallow groundwater conditions exist (i.e. <11 feet below grade surface). [4] The densely developed commercial area located up-gradient of Lake Agawam was prioritized. This was done to keep the project affordable and improve the feasibility of moving forward practical, while still providing a reduction to the overall nutrient load to groundwater and Lake Agawam.

The proposed service area boundary includes municipally owned parcels located at the northwestern corner of the service area to construct a treatment facility and a final recharge area for disposal of highly treated wastewater. The municipally owned parcels are occupied by the Village of Southampton Police

[4] Depth-to-groundwater information was obtained from the commercially available web-based United States Geological Survey (USGS) Long Island Depth to Water Viewer. http://ny.water.usgs.gov/maps/li-dtw10/

Department. The existing use for this property includes a police precinct building, paved parking lot and municipal dog park. A new ambulance center is also proposed on the site, adjacent to Windmill Lane in between the police precinct building and dog park. The parcels include space for a wastewater treatment facility that will accommodate the projected flow from the proposed service area as well as additional space for future expansion. Three (3) vacant parcels located along Coopers Farm Road, also owned by the Village, are reserved for subsurface recharge of treated effluent from the treatment facility.

2. SANITARY FLOW PROJECTIONS

2.1. Introduction

Sanitary wastewater flow must be identified in order to determine the appropriate size and type of infrastructure necessary to provide wastewater collection, conveyance and treatment. There are several different methods that can be used to estimate wastewater flow for a given area. As cited in an industry textbook - "Commercial wastewater flow rates are generally expressed in gal/acre/day and are based on existing water use records for developed properties or estimated flows for future development based on anticipated zoning. Comparative data from similar areas could also be used to estimate hydraulic loadings."[5] In areas that are already developed, where significant changes of use are not expected, existing water usage records can be used to project wastewater generation rates. In areas where development is expected to occur and/or where land use and build-out are known, density loading rates and design sewage flow rates stipulated by the local regulatory agency are typically used to project wastewater flows. Since existing build-out is known and change of use is expected, following the availability of sanitary infrastructure, wastewater generation rates for the Village of Southampton Sewer District service area are based on Suffolk County Department of Health Services (SCDHS) design flow criteria.

Current land use information for properties within the service area was made available by the Village's Tax Receiver. Existing build-out of these properties was primarily based on property information obtained through a web-based search of each property address. Supplemental property information was obtained from site visits to the service area and conversations with representatives of the Village Planning Commission. The property information that was obtained provided the necessary building usage, occupancy and/or square footage information necessary to project sanitary wastewater generation rates based on SCDHS design criteria. [6]

2.2. Sanitary Flow Analysis

As previously stated in Section 1.3, the proposed service area boundary is comprised of two hundred four (204) Suffolk County tax lots; fourteen (14) are zoned for residential use and one hundred ninety (190) are zoned for commercial or other uses. The commercial properties vary from low-flow dry uses, such as office space, retail and places of worship, to high-flow wet uses, such as restaurants and bars. There are eight (8) vacant parcels located within the service area. There are fifteen (15) tax lots within the service area that were not projected to generate sanitary flow. These lots consisted mainly of paved parking lots,

[5] Metcalf & Eddy, third edition, Wastewater Engineering, pg. 26

[6] Suffolk County Department of Health Services (SCDHS) design criteria are found in Table 1 of the Standards for Approval of Plans and Construction for Sewage Disposal systems for Other Than Single-Family Residences.

roads, recharge areas and the cemetery located north of Nugent Street. One of these parcels, located at 29 North Sea Road (SCTM ID: 3-1-46), is a vacant lot owned by the local electric utility supplier.

The average daily flow (ADF) for the proposed service area is projected to be approximately 131,000 gallons per day (gpd) based on SCDHS design criteria. This flow is representative of existing build-out within the service area and does not account for potential development and changes of use that can occur following the availability of sanitary infrastructure. In order to account for potential development and/or change of use within the service area, the Village has decided to increase the baseline design flow from 131,000 gpd to 200,000 gpd. The 69,000 gpd flow increase will support future growth within the service area and provide additional capacity to extend the service area boundary to properties located outside of the service area without needing to readily expand the treatment facility. By adding this additional capacity during the initial planning stage, the Village will be able to reduce their future capital expenditures for infrastructure improvements that would otherwise be necessary if the sewer district was constructed to only accommodate the existing build-out.

Refer to **Table 1** for the derivation of the anticipated sanitary flow projections for the proposed service area.

Table 1 - Sanitary Flow Derivation

NYS Land Use Classification	ADF (gpd)
200 – Residential	3,817
300 – Vacant Land	4,500
400 – Commercial	103,176
500 – Recreation and Entertainment	4,755
600 – Community Services	13,385
800 – Public Services	816
Total . . .	130,449
SAY . . .	131,000
Average Daily Design Flow	***200,000***

The sanitary flow density for existing build-out within the commercial core area is 1,016 gpd/acre (i.e. 131,000 gpd ÷ 129 acres). Therefore, the existing flow density exceeds Suffolk County Sanitary Code limitations for Groundwater Management Zone IV and V by 416 gpd/acre and 716 gpd/acre, respectively. In order to comply with current sanitary code, the Village would need to either reduce density in the commercial core area or provide sanitary wastewater treatment infrastructure. Since the Village desires to promote growth and change of use within the commercial core area, a reduction of density is not feasible, and the Village's only option is to provide sanitary collection, conveyance and treatment facilities.

3. TECHNICAL INFORMATION

3.1. Collection System Options

Sanitary wastewater collection systems are used to collect wastewater generated from individual properties and provide conveyance to either an intermediate pump station or directly to a centralized wastewater treatment facility. The layout and design of collection systems in Suffolk County are done in accordance with Ten States Standards, and the regulatory requirements of SCDHS.

Several different collection system options were evaluated to identify the appropriate alternative for the Village of Southampton. The main drivers for the type of system to be used are local topography and cost. Construction costs and operation and maintenance requirements are considerations. The minimization of construction disturbance is also of particular concern to the Village. The collection system must be designed to handle both the average daily flow and peak hourly flow that will be generated by properties within the proposed sewer district.

The three different types of collection systems considered for the Village of Southampton are:

- **Option 1: Gravity Sewers**
- **Option 2: Vacuum Sewers**
- **Option 3: Low Pressure Sewers**

Each of these collection system options has a range of applicability as discussed below.

3.1.1. Option 1: Gravity Sewers

Gravity sewers are designed to use gravity to convey sanitary wastewater from its source to a treatment facility. Gravity sewers are typically configured with one main sewer line running the length of a street with branch laterals connecting each abutting property to the main line. Gravity sewers are appropriate for areas where the sewer pipe installation can follow the natural inclines of the terrain so that wastewater can flow to a treatment facility or intermediate pump station strategically located at a low point in the landscape. The gravity sewer main is situated such that wastewater flow follows the pitch of the pipe all the way to the treatment facility and/or intermediate pump station; the major advantage of this collection system option is its autonomous operation – once in place, the system does not require pumping or other energy inputs to operate. The slope of the gravity sewer must be steep enough to maintain a “self-cleansing velocity” in order to prevent clogging and decay of untreated wastewater within the sewer pipe. Periodic cleaning and pipe inspections are the only routine maintenance activities necessary.

Gravity sewers can also be installed in areas with varying terrain. This is accomplished by locating pump stations at intermediate low points to convey the collected wastewater to another gravity-flow segment of the collection system or directly to a treatment facility via submersible pump station and force main.

These pump stations are powered by electricity and therefore provisions must be made so that continuous operation can be maintained during periods of power outage.

Installing gravity sewers in areas with varying terrain increases the capital and operational costs of the system, both due to the deep excavations that are required as well as the cost of constructing and operating intermediate pump stations. Another major disadvantage of gravity sewers is the need to open-cut the entire length of roads where the pipe installation is to occur which can result in increased excavation, dewatering and site restoration costs. Additionally, gravity sewers do not have any integrated flow control built-in to the drainage piping, which results in the piping to be oversized to accommodate the peak flow contributions associated with the diurnal water-use cycle. This characteristic of gravity sewers also impacts the size of the intermediate pump stations to ensure peak flow conditions are met.

3.1.2. Option 2: Vacuum Sewers

Vacuum sewers are a second option for the Village of Southampton to collect sanitary wastewater. As of present date, no vacuum sewers are currently used in Suffolk County. Vacuum sewers rely on a pressure differential to convey wastewater from individual properties to the collection station. This pressure differential is created by vacuum pumps located at a centralized pump station. The vacuum pumps are connected to an enclosed wet-well (collection tank), which is directly connected to the collection system piping, thereby inducing the negative pressure necessary to convey wastewater flow from all properties. Vacuum sewers have been successfully implemented in other parts of the country and the world; they can be cost effective in areas with a high water table or where the terrain is relatively flat.

The wastewater generated from each property within the collection system flows by gravity into an individual onsite storage tank. Once a certain fill level is reached within each individual storage tank, a pneumatic valve opens and the vacuum suction induced within the collection system empties the tank and conveys the wastewater through the collection system piping to the enclosed wet well (collection tank). Wastewater collected in the enclosed wet well is then conveyed to a treatment facility via dry-pit sewage pump(s) and force main(s).

Because vacuum sewers do not rely on gravity, they can be installed at shallow depths and do not need to follow the natural grade of the terrain. Directional drilling can be used to install vacuum sewers, which is advantageous in developed areas because of the reduced road excavation and restoration efforts.

Vacuum sewer collection systems require the installation of at least one ‘vacuum station’ to sustain the required negative pressure on the sewer line. More than one station may be required depending on size and topography of the collection area. These vacuum stations are powered by electricity and therefore provisions must be made so that continuous operation can be maintained during periods of power outage.

Since wastewater is temporarily stored at the site where it is generated, the peak flows typical of gravity collection systems are not prevalent in a vacuum sewer system. Peak flows associated with diurnal water use tend to be dampened through flow equalization that occurs within each property's storage tank.

Vacuum sewer systems typically incur relatively high capital costs and high operation and maintenance costs. The high capital costs are associated with the vacuum pumps, associated piping and system controls as well as the need for an enclosed wet-well (collection tank). The high operation and maintenance costs are attributed to the vacuum equipment necessary to operate the collection system as well as the issues associated with grease build-up inside of the individual onsite storage tanks. Grease build-up is a common issue with wastewater generated by food service users in high-density commercial areas; grease can impede the proper operation of the pneumatic valves causing potential vacuum leaks. These vacuum leaks can directly result in failure of the collection system to convey wastewater to the central vacuum station.

3.1.3. Option 3: Low Pressure Sewers

Low pressure sewer systems are another collection system option that is applicable in relatively flat areas or where the groundwater table is high. The Village of Patchogue is served by low pressure sewer systems in areas where both the groundwater table is shallow and topography does not lend itself to the use of gravity sewers. Low pressure sewer collection systems require each property within the collection area to operate and maintain an on-site grinder pump station. All grinder pump stations are connected to a pressurized sewer main, which conveys wastewater generated within the collection area to either a treatment facility directly, a gravity sewer or to an intermediate centralized pump station.

The wastewater generated from each property flows by gravity into an onsite storage tank. The onsite storage tank is fitted with level sensing equipment and a submersible grinder pump. The grinder pumps are typically positive displacement type to achieve near constant flows at a wide range of head conditions that are prevalent in low pressure sewer collection systems. Some applications allow the use of submersible centrifugal pumps.

The grinder pumps are turned on when a pre-set fill level is sensed in the storage tank, and turned off after the storage tank is drained to a low level condition. The pump cycles are controlled by the capacity of the onsite wet well, the real-time pressure within the common sewer main and the daily wastewater generation rate of the property.

The sewer mains used in a low pressure collection system are sized based on flow and head requirements and to maintain a "self-cleansing velocity." Typical low pressure sewer main sizes range from 2-inch diameter to 4-inch diameter piping. Pipe materials used in these applications are typically fabricated from high density polyethylene (HDPE) resin; polyvinylchloride (PVC) pipe material is also

used. Similar to vacuum sewers, low pressure sewers can be installed at shallow depths and do not need to follow the natural grade of the terrain.

Directional drilling can be used to install low pressure sewers, which is advantageous in developed areas and locations with shallow depths to groundwater so as to minimize road excavation, restoration, and dewatering. Similar to vacuum sewers, peak flow conditions typical of gravity collection systems are not prevalent in a low pressure sewer network. Flow equalization of the diurnal water use pattern occurs within the low pressure grinder station on each property; the maximum flow from a low pressure sewer system is a function of head loss within the system, which limits the number of pumps that can simultaneously operate.

Typical low pressure sewer collection systems require the installation of at least one centralized pump station. More than one station may be required depending on size and topography of the collection area. The function of this pump station is similar to that used in a gravity collection system. However, some low pressure collection systems can be piped directly to a treatment facility without the need for an intermediate pump station if the system head and flow conditions remain within the operating range of the onsite grinder stations.

Low pressure sewer systems typically become less and less cost effective in sewer districts that convey large volumes of flow. These situations result in the need to install numerous parallel low pressure sewer mains in order to meet the head and scouring requirements of the system; intermediate pump stations also become required in these instances. Low pressure sewers, similar to vacuum sewers, are typically used in hybrid configurations with gravity sewers when the service areas become large scale, requiring numerous intermediate pump stations.

3.1.4. Selected Collection System Option

Topographical information and groundwater data obtained from the United States Geological Survey (USGS) was used to evaluate the physical characteristics of the service area to recommend a collection system option. USGS topography maps show grade within the proposed service area to generally slope from north to south and inwards from the west and east towards Lake Agawam. Depth-to-groundwater information obtained from the USGS indicates that groundwater levels range from less than 11 feet below grade for the area generally encompassed by Lake Agawam to the south, Nugent Street to the north, Windmill Lane to the west and Main Street to the east. The remaining properties within the service area have typical groundwater depths between 11-20 feet below grade.

Based on a preliminary evaluation of the USGS datasets in conjunction with the design flow (i.e. 200,000 gallons per day ≈ 139 gallons per minute); the selection of a hybrid sewer system consisting of gravity and low pressure sewers is the recommended option for wastewater collection in the Village of

Southampton. Vacuum sewers were eliminated from consideration due to the relatively high operation and maintenance costs associated with these systems, as well as lack of local operator experience. A purely gravity sewer system was rejected, because the relatively flat terrain in the proposed service area coupled with relatively shallow groundwater conditions and the proposed treatment facility located at a high point in the service area would require intermediate pump stations and deep trenching for the installation of sewer mains. The proposed collection system will be designed in accordance with Ten States Standards.

3.1.5. Preliminary Collection System Design

Forty-four (44) grinder pump stations will be required to convey the full flow from the service area to the treatment facility via interconnected force mains. Unlike a typical low pressure sewer collection system, the proposed "hybrid" collection system will require each pump station to handle flow generated by multiple parcels; a "typical" low pressure sewer system requires each pump station to handle flow from an individual tax lot. This plan will be allowed by Suffolk County because all of the pump stations will be owned, operated and maintained by the Village. Sanitary flow generated within each drainage zone will be conveyed to each pump station via gravity sewers. The drainage zone boundaries were based on the following four (4) items; 1) minimized excavation depth required for gravity sewers; 2) no gravity sewers would cross major roadways; 3) tributary flow from each drainage zone could be accommodated by the high-head positive displacement-type and centrifugal-type pumps typical of low pressure sewer grinder pump stations; and 4) reduction to the overall quantity of pump stations needed when compared to a "typical" low pressure sewer system installation. These criteria were important to the Village to minimize the construction disturbance to the community, in particular disturbances to traffic and businesses during the warm weather seasons.

This "hybrid" collection system will eliminate the need for each individual property owner to install and maintain a grinder station on their private property; rather the grinder stations in the "hybrid" system will be installed on either municipally owned property or within an easement and be operated and maintained by the Village. This configuration will eliminate the legal liability concerns associated with more than one property sharing a privately-owned grinder station. Refer to **Figure 3-1** for the preliminary locations of the pump stations within the service area.

The gravity sewer network will consist of approximately 7,100 linear feet of 8-inch diameter PVC DR-18 pipe with 68 pre-cast concrete sanitary manholes. Each property serviced by a gravity sewer will be connected to the sewer main by a 6" diameter PVC building connection. The low pressure sewer pipe network will consist of approximately 16,600 linear feet of DR-11 HDPE piping. 2, 3, and 4-inch diameter piping will be used. Pipes were sized at the largest diameter to provide sufficient capacity for the design

flow while maintaining the necessary minimum scouring velocity of 2.0 feet/second as required by governing regulations.

Each pump station will be connected to the low pressure sewer pipe network by either a 1 ¼-inch or 2-inch diameter HDPE pump station connection with a lateral assembly consisting of a buried check valve and curb stop (shut-off isolation valve) located upstream of the point of connection to the low pressure sewer pipe network. The low pressure lateral assemblies eliminate potential backflow from the sewer mains into each grinder station, and in the case of the pump stations serving only one property, provide a way to shut individual property services off from the rest of the collection system. Refer to **Figure 3-2** for a preliminary layout of the collection system.

Each low pressure grinder station is sized based on the estimated tributary average and peak daily wastewater generation rates expected from the drainage area that it will serve. The proposed pump stations will be configured to operate with one, two, three or four duty pumps; the selected configuration is based on the average daily and peak hourly flows expected from the properties in the drainage area. On-line standby spare pumps will be included within each grinder station to satisfy SCDHS redundancy requirements, and onsite emergency stand-by power generation systems will be provided at stations that serve more than one property. Pump stations that serve only one property will be provided with a portable generator hook-up connection and require operations and maintenance personnel to bring a portable generator to these sites during power outage events. Sufficient holding capacity exists within the pump station to allow sewage to accumulate before it has to be connected to a portable generator.

The pumps used within the on-site low pressure grinder stations will consist of positive displacement or centrifugal grinder type. All pumps will operate on a single speed controller and be capable of running off of portable emergency power back-up generator during utility power outages. Each pump station will be located below grade near a relative low point in the drainage area. Minimizing the disturbance to property owners and visitors to the Village while minimizing the required modifications to existing internal building plumbing configurations were also considered when locating each pump station. Whenever possible, pump stations have been sited on municipally owned land.

Low pressure sewer cleanouts will be located approximately 300 feet apart along each stretch of low pressure sewer main installed. Air release manholes and drain manholes will be located at all relative high and low points throughout the low pressure sewer network, respectively. Parallel force mains will be installed along Windmill Lane to provide a built-in by-pass during maintenance activities and also provide additional capacity for future expansion of the service area. The built-in by-pass capability will require the installation of cross-over manifolds similar to the systems approved previously by Suffolk County.

The proposed low-pressure collection system piping will be installed within right-of-ways and in the areas behind commercial properties. In the northern part of the proposed service area, this is not feasible, and parts of the low pressure sewer network are routed through private property, which will require temporary construction and permanent maintenance easements. Twenty foot wide temporary construction easements and ten foot wide permanent maintenance easements will be required.

The final locations of all sewer mains, service laterals, valves, manholes, cross-over manifolds, and low pressure grinder stations will be determined during the engineering design phase of this project so that they can be coordinated with existing utility locations and site conditions to avoid potential conflicts. Easements will be outlined in the Engineering Design Report.

3.2. Wastewater Treatment Alternatives

Un-developed areas within the Village of Southampton service area and the nearby privately owned Southampton Hospital treatment facility were identified as options to either construct a new wastewater treatment plant or expand the existing facility to accommodate sanitary flow generated by the Village of Southampton sewer system. Following a preliminary evaluation of these two options, it was determined that expansion of the existing hospital facility was not a viable solution due to outdated process technology, insufficient area for expansion of the treatment and effluent recharge areas and existing tank structures that are not suitable for retrofit. Therefore, it was determined that construction of a new wastewater treatment plant is required. The new facility would be owned and operated by the Village. The plan includes contractual operations and maintenance of the plant and sewer system, as preferred by the Village Board.

3.2.1. Preliminary Wastewater Treatment Facility Design

The area needed to construct a wastewater treatment facility is directly related to the design flow, level of treatment, technology selected and effluent disposal methods. The property on which a treatment facility is constructed must have sufficient space for process tankage, control and equipment buildings, access areas, parking for staff, space for leaching, set-backs and buffer from property lines and off-site structures. The area must be large enough to accommodate 100% expansion of the treatment process and 200% of the area required for effluent recharge for disposal of treated effluent. For the purposes of this report, the name of the treatment plant is the *Lake Agawam Water Resources Protection Facility* (a.k.a. *Lake Agawam WRPF*) or similar name approved by the Village Board.

The selected process technology is a Membrane Biological Reactor (MBR). The MBR process was selected based on its small footprint requirements and ability to achieve the limit of technology for nutrient removal (nitrogen and phosphorus), which is the primary objective for the Village. The capability of MBRs to achieve the limits of technology in terms of nutrient removal is of great importance to the Village to

reduce the overall nutrient load to groundwater and Lake Agawam from sanitary wastewater underflow. The relatively small footprint requirement for MBRs is also a key factor in their selection since there is very limited available space within the service area to construct a treatment facility.

The site selected to construct a MBR capable of treating the design flow is located on the properties of the Village of Southampton Police Department Justice Center along the west side of Windmill Lane. The site is comprised of two tax lots (i.e. SCTM Parcel ID: 6.-1-1 and 6.-1-3.1) that are 2.4 are 4.0 acres, respectively. These tax lots are municipally owned and partially developed with the police precinct building, the police impound lot, a dog park, and a parking lot. A new ambulance center is also proposed to be constructed on these lots. The *Lake Agawam WRPF* is proposed to be sited along the western boundary of both properties to not interfere with existing uses of the properties and adhere to SCDHS set-back requirements (buffer distances).

Treated effluent from *Lake Agawam WRPF* will be recharged back into the ground via subsurface leaching pools. Area for the effluent recharge site has been identified by the Village to be on the municipally-owned properties located west of the treatment facility site. These properties are comprised of three (3) tax lots, two of which are located on the north side of Coopers Farm Road and the remaining lot is located on the south side of Coopers Farm Road. The total area encompassed by the parcels located north of Coopers Farm Road equals approximately 2.3 acres; the total area encompassed by the parcel located south of Coopers Farm Road equals approximately 1.2 acres. A preliminary design analysis for effluent recharge area requirements has resulted in a total area requirement of less than 1 acre. The calculated area requirement is based on SCDHS design standards using 8-foot diameter leaching pools with effective depths of 16-feet, a recharge through-put of 10 gpd per square foot of leaching area and includes the necessary buffer and 200% leaching area requirements. Refer to **Figure 3-3** for an overview of the sites for the treatment facility and effluent recharge area.

4. LEGAL CONSIDERATIONS AND MAP & PLAN

4.1. Formation Requirements

The Village must follow the legal procedures outlined by New York State (NYS) Village Law in order to establish the Village of Southampton Sewer System. The formation of this entity is contingent upon the Village Board accepting this Map and Plan according to Article 14, Section 14-1400 of NYS Law. This section of NYS Law requires the Village Board to determine by resolution that all property and property owners within the service area are benefitted; the establishment of the sewer system is in the best interest of the public; and to identify the apportionment of costs of facilities. This Map and Plan must also be approved by the state commissioner of health.

Table 2 provides a listing of the Village of Southampton Parcel IDs for properties proposed to be within the sewer service area. These properties are required to be reported to the New York State Comptroller's office. The State may require a metes and bounds description of the sewer system boundary.

Table 2 - SCTM Properties within the Proposed Sewer system

Parcel Count	Parcel ID
1	5.-1-15
2	5.-1-16
3	5.-1-17
4	5.-1-18
5	5.-1-19
6	5.-1-20
7	5.-1-21
8	5.-1-22
9	5.-1-23
10	5.-1-28.1
11	5.-3-40.1
12	5.-3-42
13	5.-3-43
14	6.-1-4.7
15	6.-1-7
16	6.-1-8
17	6.-1-9
18	6.-1-10
19	6.-1-13.1
20	6.-1-16
21	6.-1-20.1
22	6.-1-21.1
23	6.-1-23.1

Parcel Count	Parcel ID
24	6.-2-2
25	6.-2-4.1
26	6.-2-4.2
27	6.-2-5
28	6.-2-6
29	6.-2-7.2
30	6.-2-7.3
31	6.-2-7.4
32	6.-2-8.1
33	6.-2-8.2
34	6.-2-9
35	6.-2-10
36	6.-2-11
37	6.-2-13.2
38	6.-2-14
39	6.-2-15
40	6.-2-16
41	6.-2-18
42	6.-2-19
43	6.-2-21
44	6.-2-22
45	6.-2-23
46	6.-2-24
47	6.-2-25
48	6.-2-27
49	6.-2-28
50	6.-2-29.1
51	6.-2-30
52	6.-2-31
53	6.-2-33
54	6.-2-37.1
55	6.-2-38
56	6.-2-39
57	6.-2-40
58	6.-2-41
59	6.-2-42
60	6.-2-43
61	6.-2-44
62	6.-2-45

Parcel Count	Parcel ID
63	6.-2-46
64	6.-2-47
65	6.-2-48
66	6.-2-50.1
67	6.-2-51.1
68	6.-3-13
69	6.-3-17.1
70	6.-3-17.4
71	6.-3-17.5
72	6.-3-17.6
73	6.-3-19.1
74	6.-3-20
75	6.-4-1
76	6.-4-2
77	6.-4-3
78	6.-4-5
79	6.-4-6
80	6.-4-7
81	6.-4-8
82	6.-4-9
83	6.-4-10
84	6.-4-11
85	6.-4-12
86	6.-4-13
87	6.-4-14
88	6.-4-15
89	6.-4-16
90	6.-4-17
91	6.-4-18
92	6.-4-19.1
93	6.-4-19.2
94	6.-4-20
95	6.-4-21
96	6.-4-30.1
97	6.-4-32
98	6.-4-33
99	6.-4-34
100	6.-4-35
101	6.-4-36

Parcel Count	Parcel ID
102	6.-5-1
103	6.-5-3.1
104	6.-5-4
105	6.-5-5
106	6.-5-7
107	6.-5-22
108	6.-5-23
109	6.-5-24.1
110	6.-5-24.2
111	6.-5-25
112	6.-5-26
113	6.-5-27
114	6.-5-28
115	6.-5-29
116	7.-1-27
117	7.-1-28.1
118	7.-1-28.2
119	7.-1-28.3
120	14.-3-1
121	14.-3-3
122	14.-3-4
123	14.-3-7.2
124	14.-3-8
125	14.-3-9
126	14.-3-10
127	14.-3-11
128	14.-3-12
129	14.-3-13
130	14.-3-15
131	15.-1-4
132	15.-1-6
133	15.-1-7
134	15.-1-8.3
135	15.-1-9
136	15.-1-10
137	15.-1-14.1
138	15.-1-15
139	15.-1-16
140	15.-1-17

Parcel Count	Parcel ID
141	15.-1-18
142	15.-1-20.1
143	15.-1-21
144	15.-1-22
145	15.-1-23
146	15.-1-25
147	15.-1-26
148	15.-1-27
149	15.-1-28
150	15.-1-29
151	15.-1-30
152	15.-1-33
153	15.-1-36
154	15.-1-38
155	15.-1-39.4
156	15.-1-39.5
157	15.-1-39.6
158	15.-1-39.7
159	15.-2-4
160	15.-2-5
161	15.-2-6
162	15.-2-7
163	15.-2-8
164	15.-2-9
165	15.-2-10
166	15.-2-11
167	15.-2-12
168	15.-2-13
169	15.-2-14
170	15.-2-15.1
171	15.-2-16.1
172	15.-2-17
173	15.-2-18
174	15.-2-19
175	15.-2-20
176	15.-2-21
177	15.-2-22.1
178	15.-2-40
179	3.-1-46

Parcel Count	Parcel ID
180	6.-1-11
181	5.-1-32
182	6.-1-1
183	6.-1-3.1
184	6.-1-5.4
185	6.-1-5.5
186	6.-1-5.6
187	6.-1-5.7
188	6.-1-5.26
189	6.-1-15.1
190	6.-2-1
191	6.-2-3
192	6.-2-13.3
193	6.-2-17
194	6.-3-11
195	6.-4-22
196	6.-5-21
197	6.-5-30
198	14.-3-14
199	15.-1-24.1
200	15.-1-32
201	15.-1-37
202	15.-2-1
203	15.-2-22.2
204	15.-3-1

4.2. Regulatory Requirements

The following bulleted items identify the regulatory requirements that must be considered during the creation of a Village sewer system.

- State Environmental Quality Review Act (SEQRA) compliance
- State Historic Preservation Office (SHPO) Compliance
- State Pollutant Discharge Elimination System (SPDES) Permitting
- Other construction-related permitting

4.3. SEQRA & SHPO Compliance

SEQRA is required by the NYSDEC to consider environmental factors early in the planning stages for projects undertaken by local, regional and state agencies. The SEQRA process is intended to identify

potential impacts to the environment that would result from proceeding with the project as planned. Submission of the plan to the State Historic Preservation Office is a significant part of the initial SEQRA process to identify areas where sites of historical significance could potentially be affected by the implementation of the proposed plan. Should the SEQRA review result in a negative determination, the project plan and associated environmental review process will need to be re-evaluated and additional environmental impact studies and reporting may be required.

The Village would be designated as the lead agency.

4.4. SPDES Permitting

A State Pollutant Discharge Elimination System (SPDES) permit is required to regulate all point source storm water and wastewater discharges to both groundwater and surface waters under New York State law. The SPDES permit is to be filed with the New York State Department of Environmental Conservation as part of the Engineering Design Report.

4.5. Other Construction Related Permits

Based on the locations where the proposed sanitary infrastructure will be constructed, it is anticipated that road opening permits may be required from Suffolk County Department of Public Works Division of Highways, Town of Southampton and Village of Southampton. Permitting from the New York State Department of Environmental Conservation (NYSDEC) may also be necessary in areas where infrastructure may encroach on classified wet lands and or require significant dewatering. Storm Water Pollution Prevention Plans (SWPPP) will also be required.

Additional permitting requirements may become necessary following the SEQRA compliance portion of this project.

5. ANTICIPATED PROJECT SCHEDULE

A preliminary and aggressive schedule for implementation of the project is provided in **Table 3**.

Table 3 – Preliminary & Aggressive Project Schedule

Milestone	2015	2016	2017	2018	2019	2020
Map & Plan Finalized						
SEQRA and SHPO completed (Assumes EIS not required)						
Public Hearings/Referendum to Establish the Sewer District (May Be Required)						
Engineering Design Report Preparation (Includes State Approval) *						
New York State Comptroller Approval Process (Sewer District Formed)						
Project Funding, Grants and Loan Process						
Plans & Specifications Prepared for Construction						
Suffolk County & NYSDEC Review of Construction Documents						
Project Advertisement, Bidding, Award & Contract Execution						
Construction						
Procure Contract Operator						
Start-up & Training						

* Assumes design engineer retained without RFP

The schedule represents an aggressive timeline and assumes the Village can procure grants by the time the project is advertised for bids. Additional assumptions have also been integrated into this schedule such as the time allocated for review and approvals by state agencies. Should these assumptions prove accurate and the Village acts to keep the project moving forward, then it is expected that the system will be on-line in the first quarter of 2021.

6. TOTAL PROJECT COST OPINION

6.1. Introduction - Capital Construction and Soft Costs

Capital costs associated with the project are shown in **Table 4**. The cost opinion is based on the preliminary conceptual plan for the sewer district presented in Section 3 of this report and includes the following:

- Construction and Engineering costs for the proposed sanitary infrastructure;
- Planning costs including utility mark-out, survey, soil borings, bond attorney, permitting and funding assistance;
- Engineering during construction, construction inspection, O & M Manual for the new facilities, finance charges.

The cost opinion presented in this document is based on assumptions relating to the final scope of design, unknown subsurface conditions, and unknown subsurface utility locations. Unknown locations of existing subsurface utilities and groundwater can significantly impact overall project cost and anticipated schedule. Also, market conditions as they pertain to inflation, public bidding environment, and delays in the project related to project funding is another potential concern when projecting project costs.

The cost opinion includes the construction and soft costs for a hybrid gravity/low pressure sewer collection system, the installation of forty-four grinder pump stations, and the construction of a treatment facility at 151 Windmill Lane. Estimated costs for restoration do not account for any special restoration that may be required by the governing municipality and assume only areas disturbed by work are restored. Trench restoration is assumed, not curb-to-curb paving.

The soft costs include survey, soil borings, legal and bond counsel, applications for grants, the O&M manual and Sewer Use Code, the purchase of utility trucks, a trailer-mounted emergency back-up generator, and spare parts/maintenance equipment and tools. The costs associated with the abandonment of on-site septic tanks and sewer hook-up are included in the scope of Contract S –Hybrid Gravity/Low-Pressure Sewer System Construction. The total cost opinion for the sewer district does not include remediation of contaminated soils identified during close-out sampling of the existing onsite sanitary disposal systems, modifications to internal building plumbing, and the replacement of inadequate grease traps. The costs associated with the previously stated items not included in the total project cost opinion would be borne by each property where this work would be required as an additional upfront cost determined prior to the start of construction.

Table 4 summarizes the project cost opinion based on providing sanitary infrastructure to the properties within the initial service area. These costs do not reflect installation of collection, conveyance and treatment facilities to accommodate flow from the entire Village of Southampton. The cost opinion

assumes four (5) prime construction contracts; four (4) for the treatment plant and a one (1) for the collection and conveyance system.

The line item costs presented in **Table 4** depict present-day value and escalation to the mid-point of construction in 2020, based on the aggressive project schedule presented in **Table 3**. The escalation factor is calculated based on the 10-year compounded interest rate referenced from the 20 Cities Construction Cost Index (CCI) that is published by Engineering News-Record (ENR). The average annual compounded rate at which the CCI increased over the last 10 years is 3.34%.

Table 4 - Total Project Cost (Present Day – 2015 versus Escalation – 2020)

Item	Cost $ (2015)	Cost $ (2020)
Contract S - Hybrid Gravity/Low-pressure Sewer System Construction	$10,120,000	$ 11,960,000
Contract G – General Construction (Treatment Facility)	$9,020,000	$ 10,660,000
Contract P – Plumbing Construction (Treatment Facility)	$1,920,000	$ 2,260,000
Contract E – Electrical Construction (Treatment Facility)	$2,310,000	$ 2,720,000
Contract H – HVAC Construction (Treatment Facility)	$540,000	$ 629,000
Total Estimated Construction Cost . . .	**$23,910,000**	**$ 28,229,000**
Total Engineering Fee for Design and Construction Administration (ASCE Curve)	$1,970,000	$ 2,290,000
Total Construction Inspection Fee	$1,850,000	$2,190,000
Total Soft Costs[7]	$520,000	$ 610,000
Total Estimated Project Cost . . .	**$28,250,000**	**$ 33,320,000**
Net Increase Due to Escalation . . .		**$5,070,000**

6.2. Estimated Operation and Maintenance Costs

Annual operation and maintenance (O&M) responsibilities for the Sewer District can be performed one of the following two ways; 1) either directly by staff employed by the Sewer District; or 2) by a private operations contractor hired by the Sewer District. The cost to operate and maintain a sewer district is typically higher when performed directly by the municipality than if it were out-sourced to a private contractor. There are many factors that contribute to the typical cost savings realized under private contract operations. Some of the key factors attributed to the cost savings include more predictable

[7] Includes costs for soil borings/geotechnical investigations budget, topographic survey, O&M Manual, Sewer Use Code, General Consultation and Grant Application Assistance, Legal & Bond Council, Utility Truck Purchase, Spare Parts and Maintenance Tool Purchase and Trailer Mounted Back-Up Power Generator Purchase.

operations budgeting, greater incentive driven accountability for operations performance, elimination of salaries and benefits that would otherwise be paid directly by the Village for the additional staff required under municipal O&M, and the opportunity for the local municipality to shift surplus finances into other capital investments.

Preliminary operating budgets were evaluated to determine the relative cost difference between municipal versus contract operations. The costs used to develop this comparative analysis were based on data shared by other existing sewer districts of similar size on Long Island. The estimated cost for O&M was based on an opinion of administrative effort, labor, equipment, materials (including consumable chemicals), and laboratory analyses that would be necessary to properly operate a facility of the size and complexity proposed for the project. Additional funds were added to account for sludge disposal and utility usage expenses. These expenses were based on the preliminary infrastructure design and current disposal and utility rates. **Table 5** provides a comparative summary of the annual operation and maintenance costs associated with the municipal versus contract O&M for the Village of Southampton Sewer District.

Table 5 - Operation and Maintenance Cost Comparison

Description	Municipal O&M Cost ($)	Contract O&M Cost ($)
Administrative Support Staff Budget	$165,000/year	$20,000/year
General Engineering and Legal Consultation Budget	$30,000/year	$30,000/year
Operations & Maintenance (O&M) Contract	$260,000/year	$270,000/year
Additional Expenses Not Included in O&M Contract	$15,000/year	$15,000/year
Sludge Hauling and Tipping Expense	$250,000/year	$250,000/year
Utilities Expense	$460,000/year	$460,000/year
Annual O&M Budget . . .	**$1,180,000/year**	**$1,045,000/year**
Sewer District User Charge ($/gallon per day annual usage) . . .	**$5.90/gpd**	**$5.23/gpd**

As shown in **Table 5** above, the cost opinion for municipal O&M is approximately 13% higher than the cost opinion for private contract O&M for the Village of Southampton Sewer District. Additional savings could be realized under private contract O&M based on the actual contract requirements stipulated in the professional services agreement between the municipality and contractor. For these reasons, it is recommended that the Village procure the services of a private contractor to perform the routine operation and maintenance of the sewer district facilities.

The Village will also collect a fund, termed “sinking fund”, in addition to the Sewer District User Charge (a.k.a. “rent) to pay for future equipment replacement and/or maintenance work that is not covered under the contracted O&M services. The sinking fund is considered a component of the sewer district tax assessment and is not reflected in the Sewer District User Charge. The budgeted sinking fund is $75,000/year. The sinking fund can function as interest accruing savings account that can create a surplus for the sewer district when funds are not withdrawn. Refer to Section 7 for a comprehensive summary of the tax assessment.

7. FINANCIAL IMPACTS TO DISTRICT USERS

7.1. Total Project Cost Debt Service

Article 14, Section 22-2200 of NYS Law gives the Village Board the authority to apportion the annual capital debt service incurred by the sewer district (service area) across all properties within the Village (sewer system) regardless of whether or not they are located within the benefitted service area. In accordance with NYS Law, the Village has decided to distribute the capital cost for the sewer district across all properties within the Village. This decision was made on the premise that groundwater contamination and poor water quality within Lake Agawam are a Village-wide problem that all properties are responsible to protect via initial sewering of the commercial core area. The Village also realizes that by sewering the commercial core area they will create an improved downtown that will add value to all properties located within the Village.

Since properties located inside of the service area will have the added benefit of connecting to the sanitary infrastructure, the Village has decided to distribute the debt service differently to properties located inside of the service area relative to properties located outside of the service area. The exact distribution was determined by the Village. 75% of the debt service will be paid by properties inside of the service area and 25% of the debt service will be paid by properties located outside of the service area.

7.2. Apportionment of Costs for Village of Southampton "Sewer System"

Section 14-1416 of NYS Law requires the Map and Plan to identify the actual apportionment of debt service for a sewer system. The Map and Plan must identify the area of local assessment and the apportionment based on the benefit received by each property within the benefitted service area. The recommended apportionment method for the costs of the sewer system is based on "ad valorem." An ad valorem based debt service distributes the project costs across the assessed value of benefitted properties using the assessed property values as the proportion across which the debt will be serviced.

The multiplier used to determine the annual debt service is referred to as the capital recovery factor (CRF). The CRF is calculated using the following formula:

$$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$$

- i = interest rate
- n = payback period

The CRF is dependent upon the interest rate and payback period associated with the bond used to fund the capital cost of the district.

Funding for this project is based on a Village bond to determine the anticipated annual debt service for the Village of Southampton sewer system. The presumed bond is based on a 3.5% interest rate over a 30 year term. The CRF associated with a loan comprised of a 3.5% interest rate over a 30 year term is equal to 0.0544.

The total annual debt service is determined by multiplying the bond amount by the CRF. This is termed the amortized cost. The bond amount is based on the 2020 project costs summarized in **Table 4**. The budgeted annual sinking fund amount equal to $75,000 does not get compounded by the interest rate and is added directly to the amortized cost. The assessment rate for the district is calculated by dividing the annual debt service by the total assessed value of taxable properties within the benefitted area (e.g. inside the service area versus outside the service area). **Table 6** provides a summary of the tax rates for property owners located both inside and outside of the service area boundary.

Table 6 – Sewer District Assessment (Tax) Summary

Location	Bond Amount[8]	Debt Service[9]	Sinking Fund[10]	Total Assessed Value[11]	Sewer District Assessment (Per $1,000 A.V.)
Inside Service Area	$33,320,000	$1,358,740	$56,250	$4,599,510	$307.64
Outside Service Area		$452,920	$18,750	$107,211,273	$4.40

The debt service analysis was also evaluated based on the Village receiving an assumed grant equal to $10,000,000 to depict the impacts of a grant supplement to the overall sewer district assessment. The $10,000,000 grant accounts for 30% of the total project cost, which is representative of recent grant allocations distributed during the last round of the Suffolk County Infrastructure Program grants offered in 2013 for similar type sewer projects. **Table 7** provides a summary of the adjusted sewer assessment rates assuming $10,000,000 in grant money was awarded to the Village of Southampton for this project.

[8] Bond amount is based on the 2020 total project cost identified in Table 4.

[9] The Total debt service ($1,811,653) for the sewer district has been distributed 75% to properties inside the service area and 25% to properties outside the service area.

[10] The total $75,000 sinking fund has been divided by the same ratio as the debt service (i.e. 75% to properties inside the service area and 25% to properties outside the service area).

[11] Total assessed value is based on the Village of Southampton 2014 assessment roll.

Table 7 – Sewer District Assessment (Tax) Summary with $10,000,000 Grant

Location	Bond Amount[12]	Debt Service[13]	Sinking Fund[14]	Total Assessed Value[15]	Sewer District Assessment (Per $1,000 A.V.)
Inside Service Area	$23,320,000	$950,960	$56,250	$4,599,510	$218.98
Outside Service Area		$316,990	$18,750	$107,211,273	$3.13

The sewer district assessments summarized in **Table 6** and **Table 7** are directly related to the grant amount and show a 30% reduction in sewer district assessment (tax) rate for all properties if the Village were awarded $10,000,000 in grant.

Table 8 and **Table 9** depict total annual sewer district costs for properties ***inside*** the service area. **Table 8** summarizes sewer assessment rates without grant subsidy and **Table 9** summarizes sewer assessment rates with grant subsidy. Since the NYS land Use Code for properties identified as residential within the core commercial area were identified to consist of other uses via field survey (i.e. professional offices, retail spaces, and multi-family rental units), these properties are not representative of "typical" residential use; and the total sewer system costs for residential properties inside the service area are listed as "n/a" in **Table 8** and **Table 9**. These examples are intended to provide an overview and be representative of the range of total annual costs expected under this plan.

Table 8 – Annual Charges for Properties "Inside" Sewer District Service Area (Without Grant)

Property Type	2014 Assessed Value[16]	2014 Market Value	Flow Allocation (gpd)	2014 Village Tax	Sewer Assessment (Tax)	User Charge (Rent)	Total (Tax + Rent)
Restaurant	$24,759	$618,957	2,400	$4,565	$7,617	$12,552	$20,169
Retail	$24,946	$623,650	100	$4,600	$7,674	$523	$8,197
Hotel[17]	$125,760	$3,144,000	20,000	$23,188	$38,689	$104,600	$143,289
Residence	$21,064	$526,600	n/a	n/a	n/a	n/a	n/a

[12] Bond amount is based on the 2020 total project cost identified in Table 4 less $10,000,000 for grant.

[13] The Total debt service ($1,242,130) for the sewer district has been distributed 75% to properties inside the service area and 25% to properties outside the service area.

[14] The total $75,000 sinking fund has been divided by the same ratio as the debt service (i.e. 75% to properties inside the service area and 25% to properties outside the service area).

[15] Total assessed value is based on the Village of Southampton 2014 assessment roll.

[16] 2014 Assessed Values are based on information provided by the Village Assessor's office and represent the arithmetic average values for the property types listed.

[17] The hotel example is representative of the Southampton Inn.

Table 9 - Annual Charges for Properties "Inside" Sewer District Service Area (With Grant)

Property Type	2014 Assessed Value[18]	2014 Market Value	Flow Allocation (gpd)	2014 Village Tax	Sewer Assessment (Tax)	User Charge (Rent)	Total (Tax + Rent)
Restaurant	$24,759	$618,957	2,400	$4,565	$5,422	$12,552	$17,974
Retail	$24,946	$623,650	100	$4,600	$5,463	$523	$5,986
Hotel[19]	$125,760	$3,144,000	20,000	$23,188	$27,539	$104,600	$132,139
Residence	$21,064	$526,600	n/a	n/a	n/a	n/a	n/a

Table 10 and **Table 11** depict total annual sewer district costs for properties ***outside*** the service area. The property types summarized in **Table 8** and **Table 9** are replicated in **Table 10** and **Table 11** to illustrate the hypothetical total annual charges that the same properties would pay if they were located outside the service area. **Table 10** summarizes the sewer assessment rates without grant subsidy and **Table 11** represents sewer assessment rates with grant subsidy. These examples are intended to provide an overview and be representative of the range of total annual costs expected under this plan.

Table 10 - Annual Charges for Properties "Outside" Sewer District Service Area (Without Grant)

Property Type	2014 Assessed Value[18]	2014 Market Value	Flow Allocation (gpd)	2014 Village Tax	Sewer Assessment (Tax)	User Charge (Rent)[20]	Total (Tax + Rent)
Restaurant	$24,759	$618,957	2,400	$4,565	$109	$0	$109
Retail	$24,946	$623,650	100	$4,600	$110	$0	$110
Hotel[19]	$125,760	$3,144,000	20,000	$23,188	$553	$0	$553
Residence	$21,064	$526,600	300	$3,884	$93	$0	$93

Table 11 - Annual Charges for Properties "Outside" Sewer District Service Area (With Grant)

Property Type	2014 Assessed Value[18]	2014 Market Value	Flow Allocation (gpd)	2014 Village Tax	Sewer Assessment (Tax)	User Charge (Rent)[20]	Total (Tax + Rent)
Restaurant	$24,759	$618,957	2,400	$4,565	$77	$0	$77
Retail	$24,946	$623,650	100	$4,600	$78	$0	$78
Hotel[19]	$125,760	$3,144,000	20,000	$23,188	$394	$0	$394
Residence	$21,064	$526,600	300	$3,884	$66	$0	$66

[18] 2014 Assessed Values are based on information provided by the Village Assessor's office and represent the arithmetic average values for the property types listed.

[19] The hotel example is representative of the Southampton Inn.

[20] User Charges do not get paid by properties outside the Sewer District Service Area.

8. AFFORDABILITY SUMMARY

The United States Environmental Protection Agency (USEPA) published guidance documents in 1995, which outlined methods to determine what would be affordable for a wastewater project within a particular community. These guidance documents identified two screening mechanisms to determine a projects' affordability. The first mechanism, referred to as the *Residential Indicator* (RI), compares the average annual per household cost within a special district to the median household income. When the RI is determined to be 2% or greater of the median household income, the project is anticipated to cause an economic hardship on the community, and deemed not affordable. The second mechanism, referred to as the *Financial Capability Indicator* (FCI), evaluates the community's bond rating, net debt, median household income, local unemployment rate, service area tax burden and property tax collection rate. For purposes of this Map and Plan, the RI is used to determine the annual affordability limit for the single family residential properties within the Village.

The median household income data for the Village of Southampton was documented to be $92,868 for 2013.[21] The rate at which the median household income for the Village has increased between 2000 and 2012 was 67.32%.[22] The total percent increase in median household income over this 13 year period equates to an annual rate of increase equal to 4.38% per year. This rate was used to project the 2013 median household income to the midpoint of construction (2020) to correlate the RI with the escalated construction costs. The adjusted 2020 median household income was calculated to equal $115,068 (i.e. $[1 + 0.0438]^5 \times \$92,868$).

Applying this adjusted median household income to the USEPA methodology described above results in an RI for the Village of Southampton Sewer District equal to approximately $2,301 per year. Therefore, the annual cost for a residential property is two orders of magnitude less than the RI for the Village. The RI method for affordability was deemed not appropriate to evaluate the affordability for properties located inside the service area since properties located inside the service area are commercial uses.

The Village has indicated properties with restaurant uses inside the service area are currently paying $20,000 - $25,000 annually for maintenance of their existing onsite sanitary disposal systems. As such, these properties will not experience a significant change to their annual expenditure; dry-use properties used primarily for retail space will experience an increase in annual expenses. However, the increased annual expenses associated with the sewer district do not outweigh the potential financial benefits that property owners can realize due to possible change of use and the ability to expand their existing rentable square footage.

[21] Data was obtained from http://www.pediacities.com/city/southampton-ny-16000US3668462/
[22] Data was obtained from http://www.usa.com/southampton-ny.htm

Maps Follow This Page

A: NFB, FMR | PM: FMR | LSB: FRANK M. RUSSO, P.E. |
LSD: 5/26/2015 3:16 PM | LPD: 5/26/2015 3:16 PM | 19 NOV. 2015| R#: 2 | P: 43 |
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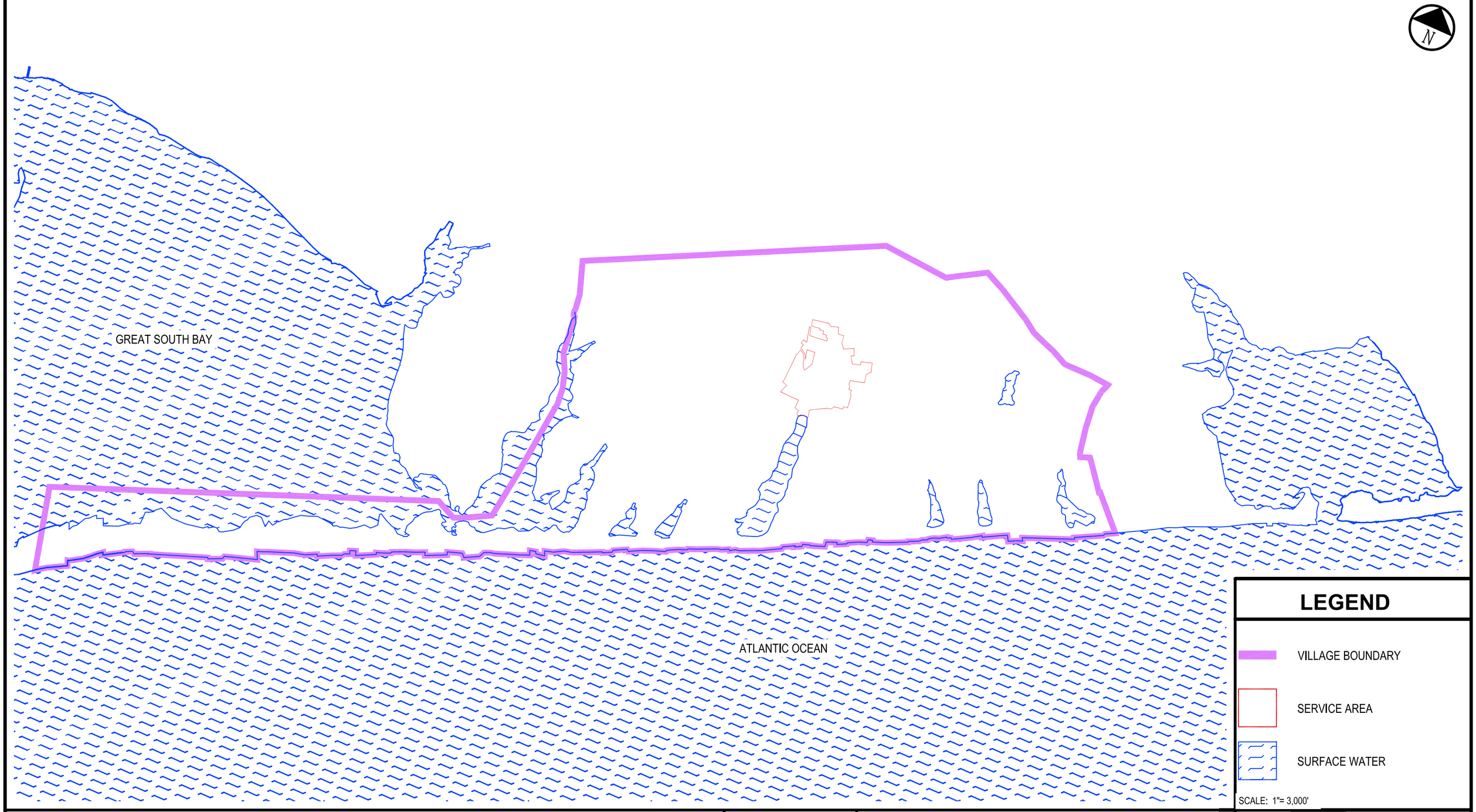
MAP & PLAN | DEPT 5100

Figure 1-1
Village of Southampton Sewer Area Boundary Map



LEGEND

- VILLAGE BOUNDARY
- SERVICE AREA
- SURFACE WATER

SCALE: 1"= 3,000'

Client

INC. VILLAGE OF SOUTH HAMPTON

MAP AND PLAN FOR THE FORMATION OF THE INCORPORATED VILLAGE OF SOUTHAMPTON SEWER DISTRICT

PROJECT # **SHPV 14-01**

DATE: **MAY 2015**

FIGURE 1-1

Village of Southampton Sewer District Boundary Map

H2M architects + engineers
Melville, NY
New City, NY
Albany, NY
Parsippany, NJ

Figure 1-2
Village of Southampton Sewer Service Area
Boundary Map

LEGEND

SERVICE AREA

TAX LOTS

SCALE: 1"= 400'

Client

INC. VILLAGE OF SOUTH HAMPTON

MAP AND PLAN FOR THE FORMATION OF THE INCORPORATED VILLAGE OF SOUTHAMPTON SEWER DISTRICT

PROJECT #
SHPV 14-01

DATE:
MAY 2015

FIGURE 1-2

Village of Southampton
Sewer District Service Area
Boundary Map

H2M architects + engineers

Melville, NY
New City, NY
Albany, NY
Parsippany, NJ

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Figure 3-1
Preliminary Pump Station Location Map

LEGEND

- BOUNDARY OF SEWERED AREA
- TAX LOTS
- PUMP STATION

SCALE: 1" = 400'

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INC. VILLAGE OF SOUTH HAMPTON

MAP AND PLAN FOR THE FORMATION OF THE INCORPORATED VILLAGE OF SOUTHAMPTON SEWER DISTRICT

PROJECT # SHPV 14-01

DATE: MAY 2015

FIGURE 3-1

Preliminary Pump Station Location Map

H2M architects + engineers
Melville, NY
New City, NY
Albany, NY
Parsippany, NJ

Figure 3-2
Preliminary Collection System Map

Client

INC. VILLAGE OF SOUTH HAMPTON

MAP AND PLAN FOR THE
FORMATION OF THE INCORPORATED VILLAGE OF
SOUTHAMPTON SEWER DISTRICT

PROJECT #
SHPV 14-01

DATE:
MAY 2015

FIGURE 3-2

Preliminary
Collection System
Layout Map

H2M
architects + engineers
Melville, NY
New City, NY
Albany, NY
Parsippany, NJ

Figure 3-3
Preliminary Treatment Facility and Effluent
Recharge Area Map

LEGEND

- BOUNDARY OF SEWERED AREA
- TAX LOTS
- PROPOSED AMBULANCE CENTER
- STP (50' x 100' MBR IN A BUILDING)
- STP (100% EXPANSION AREA)
- PROPOSED EFFLUENT RECHARGE AREA

SCALE: 1" = 125'

Client

INC. VILLAGE OF SOUTH HAMPTON

MAP AND PLAN FOR THE
FORMATION OF THE INCORPORATED VILLAGE OF
SOUTHAMPTON SEWER DISTRICT

PROJECT # SHPV 14-01

DATE: MAY 2015

FIGURE 3-3

Preliminary
Treatment Facility and
Effluent Recharge Area Map

H2M architects + engineers

Melville, NY
New City, NY
Albany, NY
Parsippany, NJ

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H2M architects + engineers
538 Broad Hollow Rd, 4th Floor East, Melville, NY 11747
tel 631.756.8000 fax 631.694.4122
www.h2m.com