Village Area Sewer Study
Southampton, MA

TO: Scott Szczebak, Town Administrator
Southampton Select Board
Brett Simmons, Water Department Superintendent

FROM: Joseph Popielarczyk, Tighe & Bond
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DATE: November 13, 2024

1 Introduction

Through a railbanking agreement, the Town of Southampton (the Town) acquired the rights to develop the Southampton Greenway Rail Trail along the former Pioneer Valley Railroad right-of-way, which will allow for construction of the Greenway Rail Trail from Coleman Road at the Manhan Rail Trail to Route 10 at Brickyard Road. The Town requested that Tighe & Bond assess whether a new sewer could be constructed along the Greenway Rail Trail to serve as a "trunk" sewer that would receive wastewater flow from sewers that would be constructed in the Village Area. In this analysis, the "Greenway Trunk Sewer" would connect to the southwest end of the existing gravity sewer in Easthampton that is located adjacent to the Manhan Rail Trail and conveys wastewater to Easthampton's Wastewater Treatment Facility (WWTF). The end of this existing Manhan Rail Trail sewer is located approximately 76 feet northeast of the Southampton town line.

This memorandum describes our evaluation of providing sewer service to the Village Area in Southampton and conveying the wastewater flow from this area to the City of Easthampton's sewer system.

1.1 Background

Southampton does not have a public sewer system or a publicly-owned WWTF. The majority of the Town's residents and businesses rely on individual septic systems, with the following exceptions:

1. Private sewers were constructed on Route 10 and connect to Easthampton's sewer system at the southwest end of Easthampton's Route 10 sewer. Southampton's private sewers serve Walgreens Pharmacy, Cooley Dickinson Urgent Care and Rehabilitation Facility, Big Y Supermarket, Smitty's Package Store, the Tractor Supply Company, Queen Bee Car Wash, the Red Rock Shops, Peanuts Day Care, and O' Reilly Auto Parts.
2. A recent residential development on Gunn Road is also connected to Easthampton's sewer system per the *2021-2028 Southampton Open Space and Recreation Plan Update*, dated January 2021 and prepared by the Pioneer Valley Planning Commission (PVPC).

The *Southampton Master Plan*, dated June 2013 and prepared by the Southampton Master Plan Committee with assistance from the PVPC, indicates that providing sewer service to the "Pomeroy Meadow/Glendale/College Highway" area is a high priority due to the presence of

numerous multi-unit housing complexes with septic system failures and the anticipated development in this area, and because it is a well recharge area. The noted area is part of the Village Area, which is described below.

The Village Area is defined in this study as the area that is generally bounded by Pomeroy Meadow Road, Parsons Way, Rosalie Lane, and Courtney Lane to the west; Pomeroy Meadow Road Extension to the southwest; Gunn Road Extension and Gunn Road to the north; and the Greenway Rail Trail to the southeast. The Village Area includes most of the parcels adjacent to and between the noted streets and the Greenway Rail Trail. The Village Area is shown on Map A-1 in Appendix A.

The Village Area is zoned primarily as "Residential-Village", although there are portions of the Village Area along College Highway (Route 10) that are zoned "Commercial-Village". The Village Area is also zoned as a "Water Supply Protection Overlay District". The Village Area includes parcels designated as "Protected and Recreational Open Spaces". The parcels with protected or recreational open spaces include:

1. 34 Pomeroy Meadow Road - This open space is adjacent to the William E. Norris (elementary) School and is used for recreation (athletic fields).
2. Between 26 and 30 Gunn Road Extension – This parcel is owned by the Easthampton Fish and Game Association and has been designated as Chapter 61B Open Space and Recreational Land.
3. Between College Highway and 25 Gunn Road, North of Gunn Road – This parcel has been designated as Agricultural Preservation Restriction (APR) land (Fletcher Farm).
4. Between 2 Gunn Road and 26 Gunn Road, South of Gunn Road – This parcel has been designated as APR land (Fletcher Farm).

A large portion of the Village Area is developed and includes primarily residential homes, apartment complexes, condominium complexes, and a few commercial facilities (e.g, Paisano's Restaurant, Subway Restaurant, and Cumberland Farms). The Village Area also includes the William E. Norris (elementary) School, which is located at the intersection of Pomeroy Meadow Road and Gunn Road Extension, the Christ Community Church of Hampshire County, which is located at 169 College Highway (across from Pomeroy Meadow Road), and the Southampton Post Office, which is located at 8 Pomeroy Meadow Road.

The largest undeveloped, developable parcel in the Village Area is located south of College Highway, between Lynn Drive and Gunn Road (0 College Highway). The Town has recently purchased this 41.5-acre parcel, which is being considered for a new Public Safety Complex and Senior Center.

1.2 Scope of Services

We performed the following tasks as part of this study:

1. Reviewed background information related to providing sewer service to the Village Area.
2. Estimated current and projected wastewater flows from the Village Area.
3. Provided a conceptual sewer layout that includes gravity sewers, municipal wastewater pump stations (where needed), and low pressure sewers with individual homeowner grinder pump stations (where low pressure sewers appear to be more cost-effective/ feasible than gravity sewers).

4. Performed a limited assessment of whether Easthampton's sewer system can accommodate the projected future wastewater flow from the Village Area in Southampton.
5. Estimated the capital costs to provide new sewers and pump stations to serve the Village Area.
6. Estimated the annual costs to operate and maintain the proposed Village Area sewer system.
7. Developed this technical memorandum.

2 Wastewater Flow Projections

2.1 General

Current and projected future wastewater flows from each parcel within the Village Area were estimated as part of this study and used to size proposed sewers and pump stations to serve the Village Area. Future wastewater flows were developed based on a 50-year planning period, current zoning, and Town input on planned development. A 50-year planning period is recommended for the design of interceptor sewers in *TR-16, Guides for the Design of Wastewater Treatment Works*, 2011 edition, as revised in 2016, prepared by the New England Interstate Water Pollution Control Commission (TR-16). This document is often used as a guide for sewer planning, design and construction in Massachusetts.

Wastewater flow is typically comprised of residential, commercial, industrial, institutional, and municipal sanitary flows and infiltration/inflow (I/I). Infiltration is groundwater that enters the sewer system through leaky pipes and manholes, while inflow is extraneous water (typically rainwater or groundwater) discharged directly into the sewer system from a distinct source, such as a sump pump, roof leader, foundation drain, yard drain, manhole cover, or catch basin. Inflow is often directly related to the quantity of rainfall that a sewer system experiences. Although I/I was considered in this evaluation, it is typically a relatively small component of the total wastewater flow within a new wastewater collection system.

2.2 Village Area Properties

There are a total of 201 properties in the Village Area that can be separated by use as shown in Table 2-1. Note that 13 of these parcels are undeveloped (vacant) properties.

TABLE 2-1
No. of Properties by Use

Use of Property	No. of Properties	Percent of Total
Residential[1]	175	87%
Commercial[2]	9	5%
Mixed Use (Residential/Commercial)	2	1%
Institutional[3]	2	1%
Vacant[4]	13	6%
TOTAL	**201**	**100%**

[1]Includes single-family homes, multi-family homes, apartment complexes, and condominium complexes.

[2]Includes the Southampton Post Office.

[3]The institutional facilities include the Christ Community Church of Hampshire County and the William E. Norris (Elementary) School.

[4]Some of these parcels are not developable, primarily because development would not meet current zoning requirements, or the parcels are protected or recreational open spaces.

The breakdown of properties by use illustrates that the majority of the properties are residential (87%). Note that there are apartment/condominium complexes on several of the residential properties (e.g., the Longhill Gardens Apartments and the Pomeroy Meadow Condominiums).

The institutional facilities in the Village Area include the Christ Community Church of Hampshire County and the William E. Norris (Elementary) School.

There are 13 vacant parcels in the Village Area, which are shown on Map A-1 in Appendix A.

The commercial properties in the Village Area include:

- Parker & O'Grady, Attorneys at Law
- Midtown Motors/The Hair Station
- Paisano's Restaurant/Dunkin Donuts/ Southampton Liquors
- Southampton Chiropractic/Yellow Quilt Shop
- 6 Parc Place Offices
- Southampton Post Office
- Cumberland Farms
- FPS, Inc.
- Subway
- Party Patrol Rentals
- Fletcher Farm

Note that the Southampton Post Office was considered a commercial facility for the purposes of this study.

2.3 Current Wastewater Flows

We estimated the current average daily sanitary flow from each customer within the Village Area using quarterly water use data collected from June 2021 to May 2024 (3 years of data). Customers' water meters are read quarterly by Town staff, and those readings are used to determine water use during that quarter. Customers are billed quarterly based on that water use. The quarterly periods are listed below:

Quarter	Approximate Period[1]
1	June - August
2	September - November
3	December - February
4	March - May

[1]Because the meter readings are typically collected over several days, the exact billing period for each customer varies.

Because only a portion of the water used would be discharged to the sewer system, especially during the summer when outdoor water use is more prevalent, we used the third quarter water use (winter months) to estimate average daily sanitary flows. The water use during this period is expected to best approximate the average daily flow that would be discharged to the sewer system.

The largest water users in the Village Area include:

- The Greenbriar Estates Apartments at 114 College Highway
- The Southampton Meadows Apartments at 128 College Highway
- The Longhill Gardens Apartments at 134 College Highway
- Paisano's Restaurant, Dunkin Donuts, and Southampton Liquors at 138 College Highway
- Hampton South Condominiums at 146 College Highway
- Pomeroy Village Condominiums at 22 Pomeroy Meadow Road

There are 14 developed parcels within the study area that are not served by the municipal water distribution system (shown on Map A-1 in Appendix A). These residential parcels are

served by private wells. We estimated the average daily sanitary flow from these parcels as the average of the residential water use in the Village Area, excluding outliers (those residential customers with very low water use were excluded from the calculation of the average residential water use). The average residential water use for a single-family home was calculated as approximately 130 gallons per day (gpd).

We observed that the third quarter water use at Fletcher Farm was zero in 2021 and 2022 and approximately 2,050 gpd in 2024. Based on this data, we assumed that the water delivered to the farm was for outdoor use and would not be discharged to the proposed sewer system.

Because the sanitary flow estimates are based on water use data collected over a relatively short time period (3 years), we included a 20% contingency to the total estimated average daily sanitary flow.

Using the approach described above, the estimated average daily sanitary flow in the study area is approximately 50,000 gpd.

We added to this average daily sanitary flow estimate an allowance for infiltration based on recommendations included in TR-16. TR-16 suggests that an infiltration rate of 250 to 500 gpd per inch of pipe diameter per mile of pipe length (gpd/idm) be added to sanitary flow estimates when sizing new sewers. This allowance is meant to account for infiltration that may occur due to "normal aging of piping systems". For this study, we added 375 gpd/idm of infiltration where new gravity sewers are proposed (the average value within the noted range of 250 to 500 gpd/idm). For the 17,600± feet of 8-inch diameter gravity sewers proposed and the 700± feet of 10-inch diameter gravity sewers proposed, the infiltration rate would be approximately 10,500 gpd. The sewer layout details are presented in Section 3.

A summary of the average daily wastewater flow in the Village Area, based on current conditions, is shown below in Table 2-2.

TABLE 2-2
Estimated Average Daily Wastewater Flow in Village Area-Current Conditions

Flow Component	Average Daily Flow Rate (gpd)
Sanitary	50,000
Infiltration[1]	10,500
Total	**60,500**

[1]Includes the estimated infiltration into the 10-inch diameter sewer proposed from Coleman Road to the connection to Easthampton's sewer system.

The current peak hourly sanitary flow rate from the Village Area was estimated by multiplying the estimated current average daily sanitary flow rate by a peaking factor that was graphically determined from *Figure 2-1, Ratio of Extreme Flow to Average Daily Flow*, included in TR-16. This graph is shown in Figure 2-1 of this memorandum. At an average daily sanitary flow of 50,000 gpd, the peaking factor is 5.6. The peak hourly wastewater flow rate was calculated by adding the estimated infiltration to the peak hourly sanitary flow rate.

The estimated peak hourly wastewater flow rate from the Village Area under current conditions is shown below in Table 2-3.

TABLE 2-3
Estimated Peak Hourly Wastewater Flow in Village Area-Current Conditions

Flow Component	Average Daily Flow Rate (gpd)	Peaking Factor	Peak Hourly Wastewater Flow (gpd)[1]
Sanitary	50,000	5.6	280,000
Infiltration[2]	10,500	1.0	10,500
TOTAL	**60,500**	**---**	**290,500**

[1]The peak hourly sanitary flow was calculated by multiplying the average daily sanitary flow by a peaking factor that was graphically determined from *Figure 2-1, Ratio of Extreme Flow to Average Daily Flow*, included in TR-16 (Figure 2-1 below).

[2]Includes the estimated infiltration into the 10-inch diameter sewer proposed from Coleman Road to the connection to Easthampton's sewer system.

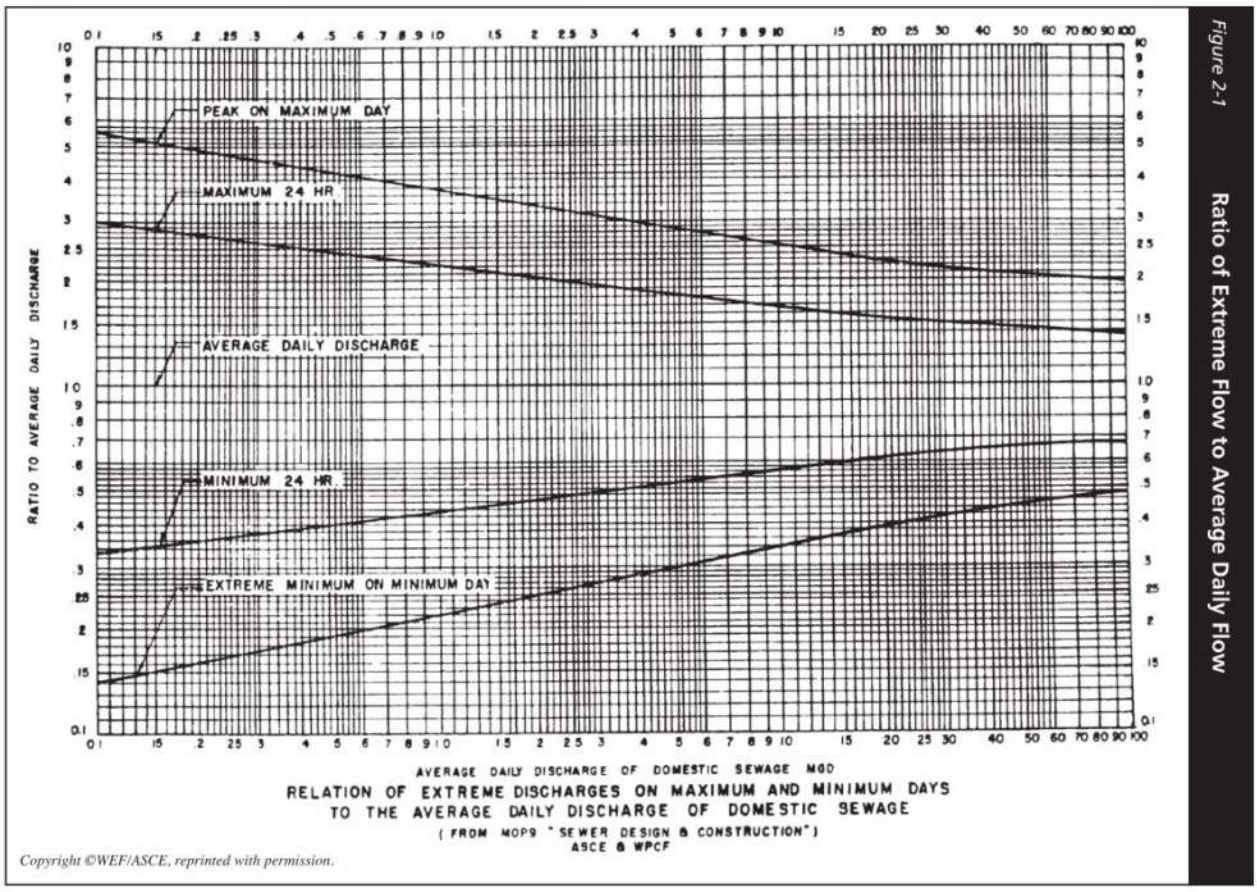


FIGURE 2-1
Ratio of Extreme Flow to Average Daily Flow

(Figure from *TR-16, Guides for the Design of Wastewater Treatment Works*, published by the New England Interstate Water Pollution Control Commission (NEIWPCC), 2011 edition, as revised in 2016)

2.3.1 Future Wastewater Flows

2.3.1.1 General

The projected future average daily wastewater flow over the 50-year planning period was estimated based on Town input on planned development within the Village Area, a determination of which parcels are developable, and current zoning. We assumed that the Village Area would be fully developed within the next 50 years. The estimated future wastewater flows from new developments were added to the total wastewater flow under current conditions in order to develop a future wastewater flow estimate.

For this study, we focused on the potential for new developments on vacant parcels. We did not consider the sub-division of developed parcels in this analysis (few parcels, if any, appear large enough to be sub-divided while still meeting current zoning requirements). In addition, we did not consider redevelopment on existing developed parcels.

There are 13 vacant parcels within the Village Area, the largest of which is the parcel at 0 College Highway. This parcel was reviewed in detail as described below.

2.3.1.2 0 College Highway

Development is planned on the 41.5-acre parcel at 0 College Highway, which the Town has recently purchased. This parcel is located between 115 and 127 College Highway and is on the south side of the road. Massachusetts geographic information system (MassGIS) mapping shows that no wetlands or waterbodies have been identified on this parcel. In addition, MassGIS elevation contour data shows that:

1. The northwest portion of this parcel is relatively flat.
2. The eastern portion of the parcel slopes gradually to the east.
3. The southern portion of the parcel slopes steeply to the south towards the Greenway Rail Trail.

We understand that the Town is considering the construction of a new Senior Center and a new Public Safety Complex on this parcel. In addition, we have assumed that residential housing would be constructed on the remainder of the developable portion of the parcel.

<u>Senior Center</u>

A Senior Center feasibility study was performed for the Town and is documented in the report titled *Southampton Senior Center Feasibility Study Report*, dated April 11, 2023. The feasibility study report documents the following relevant information:

1. A building floor area of 12,300 square feet was recommended.
2. The feasibility study report determined that a minimum lot size of 3 acres would be needed to accommodate the building, parking area, green space, and other site features (excluding the land needed for on-site wastewater disposal).
3. A minimum lot size of 4.2 acres was recommended to accommodate the proposed Senior Center and an on-site wastewater disposal system. This recommendation was included in a civil due diligence evaluation that is documented in the report titled *Civil Due Diligence Findings for Town of Southampton Senior Center Study, Southampton, MA*, prepared by Langan Engineering and Environmental Services, Inc. and dated April 5, 2023. The due diligence report was included as an appendix to the Southampton Senior Center feasibility study report noted above.

4. The civil due diligence evaluation estimated that the wastewater flow from the Senior Center would be approximately 1,850 gpd and noted that a 2,804 square foot leachfield would be needed to accommodate this wastewater flow with a 2,804 square foot reserve area. This flow rate was used in this evaluation as the average daily sanitary flow rate from the Town's proposed Senior Center.

Public Safety Complex

A Public Safety Complex (PSC) feasibility study is currently underway that has reviewed alternate sites for the facility, the building size needed, and the lot size needed. Preliminary information on the PSC is provided below and is based on information found in recent presentations available on the Town's website:

1. 0 College Highway was identified as the preferred site for the PSC.
2. The building floor area proposed in an April 10, 2024 presentation was approximately 26,900 square feet. The Town has indicated that the size of the facility may be reduced to 20,000 to 22,000 square feet.
3. The lot size needed for the PSC was reported to be approximately 5.1 acres in the April 10, 2024 presentation.
4. A February 26, 2024 presentation indicated that the proposed PSC would require a 6,000 square foot leachfield and reserve area.
5. A detailed floor plan, based on a 26,900± square foot facility, was provided by the Town.

The Town's architect for the PSC indicated that the estimated wastewater flow rate for this facility is 1,890 gpd. This flow rate was used in this evaluation as the average daily sanitary flow from the Town's proposed PSC.

Residential Housing

As noted earlier in this section, we assumed that the remaining developable portion of the 0 College Highway parcel would be sub-divided to allow for the development of single-family homes. The number of homes that may be able to be constructed on this parcel was determined using the following approach:

1. The portion of the parcel that is unlikely to be developable was determined. For this study, we assumed that ground slopes greater than 15% would not be developable.
2. The remaining developable area was estimated as approximately 23.2 acres by subtracting from the total parcel area of 41.5 acres the lot size needed for the Senior Center (4.2 acres), the lot size needed for the PSC (5.1 acres), and the estimated undevelopable area due to steep slopes (9.0± acres).
3. The developable area was reduced by 20% (from 23.2 acres to 18.6 acres) to reflect that some of the land area would be taken up by infrastructure such as roads and stormwater retention basins, and to account for odd lot shapes and sizes.
4. The remaining developable area of 18.6 acres was divided by the minimum lot area required by current zoning for a single-family dwelling. An approximately 250-foot wide strip of land adjacent to College Highway is zoned Commercial-Village. The remainder of the parcel is zoned Residential-Village. For this study, we assumed that the majority of the remaining developable area would be within the area zoned as Residential-Village, which requires a minimum lot size of 30,000 square feet. Based on this criteria, we estimate that 27 single-family homes could potentially be built on this parcel.

Using a unit flow rate of 130 gpd/home, which is based on average water use from single-family homes, the estimated additional future wastewater flow from homes built on this parcel is approximately 3,510 gpd.

0 College Highway Wastewater Flow Summary

The total future wastewater from new development on the 0 College Highway parcel is summarized in Table 2-4.

TABLE 2-4
Estimated Future Average Daily Wastewater Flow from 0 College Highway

Facilities	Average Daily Flow Rate (gpd)
Senior Center	1,850
Public Safety Complex	1,890
Residential Homes	3,510
Total	**7,250**

2.3.1.3 Future Wastewater Flows Summary

As noted earlier in this section, the potential for development on each of the vacant parcels in the Village Area was considered. The vacant parcels and the estimated sanitary flow from future development on the developable parcels is presented in Table 2-5 (some of these parcels were determined to be undevelopable).

A 20% contingency was added to the total projected future flow from new developments (shown in Table 2-5) to reflect that actual sanitary flow values may vary from the estimates and that redevelopment may occur on some parcels that results in an increase in sanitary flow.

TABLE 2-5
Future Average Daily Wastewater Flow From Vacant Parcels in Village Area

Address/Location	Zoning	Developable?	Average Daily Flow Rate (gpd)
Fletcher Farm-north of Gunn Rd, between College Highway and 25 Gunn Rd.	Residential-Village	No-APR land[1]	0
Fletcher Farm-south of Gunn Rd., between 2 and 26 Gunn Rd.[2]	Residential-Village	No-APR land[1]	0
0 College Highway[3]	Residential-Village/ Commercial Village	Yes	7,250
118 College Highway	Residential-Village	Yes	130
122 College Highway	Commercial Village	Yes	130
173 College Highway	Residential-Village	Yes	130
175 College Highway	Residential-Village	Yes	130
16 Gunn Rd. Ext.	Residential-Village	Yes	130
36 Gunn Rd. Ext.	Residential-Village	Yes	130
North of Gunn Rd. Ext., between 26 and 30 Gunn Rd. Ext.	Residential Village	No-Chapter 61B land	0
0 Helen Dr.	Residential Village	No-No street frontage	0
Helen Dr.-South of 12 Helen Dr.	Residential Village	No-Park	0
0 Lynn Dr.	Residential Village	Yes	130
Pomeroy Meadow Rd. Ext., between 5 and 9 Pomeroy Meadow Rd. Ext.	Commercial-Village	No-inadequate undeveloped area	0
Subtotal			**8,160**
20% Contingency			1,630
TOTAL			**9,790**
SAY			**9,800**

[1]APR=Agricultural Preservation Restriction.

[2]There are barns on this property, but not a residential dwelling.

[3]Includes the estimated average daily sanitary flow rates from a proposed Senior Center, a proposed Public Safety Complex, and proposed residential housing on this parcel.

A summary of the total projected future average daily flow in the Village Area is presented in Table 2-6.

TABLE 2-6
Estimated Future Average Daily Wastewater Flow in Village Area

Flow Component	Average Daily Flow Rate (gpd)
Current Sanitary Flow	50,000
Future Sanitary Flow-New Developments	9,800
Total Sanitary Flow	**59,800**
Infiltration[1]	10,500
Total	**70,300**

[1]Includes the estimated infiltration into the 10-inch diameter sewer proposed from Coleman Road to the connection to Easthampton's sewer system.

The future peak hourly wastewater flow from the Village Area was calculated by multiplying the future average daily wastewater flow by a peaking factor determined from TR-16, similar to the approach to estimating the peak hourly wastewater flow under current conditions. At a future average daily sanitary flow rate of 59,800 gpd, the peaking factor is 5.6. The projected future peak hourly wastewater flow from the Village Area is shown in Table 2-7 below.

TABLE 2-7
Estimated Future Peak Hourly Wastewater Flow in Village Area

Flow Component	Average Daily Flow Rate (gpd)	Peaking Factor	Peak Hourly Wastewater Flow (gpd)[1]
Sanitary Flow	59,800	5.6	334,900
Infiltration[2]	10,500	1.0	10,500
TOTAL	**70,300**	**---**	**345,400**
SAY			**346,000**

[1]The peak hourly sanitary flow was calculated by multiplying the average daily sanitary flow by a peaking factor that was graphically determined from *Figure 2-1, Ratio of Extreme Flow to Average Daily Flow*, included in TR-16 (Figure 2-1 above).

[2]Includes the estimated infiltration into the 10-inch diameter sewer proposed from Coleman Road to the connection to Easthampton's sewer system.

The projected future peak hourly wastewater flow was used to size the proposed sewers in the Village Area, as described in the next section.

3 Preliminary Sewer Layout

3.1 General

Details of the preliminary sewer layout developed as part of this study are provided in this section of the memorandum, including:

1. General information on the sewer and pump station types that were considered.
2. The criteria used to layout and size the proposed sewers and pump stations.
3. A description of the preliminary layout, including a preliminary pump station site location.
4. Layout aspects of special note.
5. A description of the sewer and pump station sizing methodology.
6. Information on permits and approvals that may be needed in order to construct the proposed sewer system.

The layout criteria are generally in accordance with TR-16.

3.2 Sewer and Pump Station Types

3.2.1 Sewers

Both gravity sewers with municipal pump stations (where needed) and low pressure sewers with homeowner grinder pump stations are commonly used to provide sewer service to communities and were considered in this evaluation. Other sewer types, such as vacuum sewers, are less common and were not considered.

3.2.1.1 Gravity Sewers

Gravity sewers are the most prevalent type of sewers and they have been constructed in the United States since the late 1850s. Gravity sewers are installed at a constant downward gradient with a sufficient slope to prevent solids from settling in the pipe. In most cases, buildings along a gravity collector sewer connect into it using gravity building service pipes. However, buildings below the street elevation may need grinder pumps to convey the flow from the building to the collector sewer. The need for grinder pumps along the proposed gravity sewers would need to be determined during design based on more detailed topographic data, a finalized sewer layout, and data provided by the building owners on their existing fixtures and septic system sewer piping.

The construction costs associated with the installation of gravity sewers depend upon local topography. In areas where the topography is constantly increasing or decreasing, the sewer can often be installed at the minimum depth required to serve the buildings along the sewer. However, where there is hilly or rolling terrain, deep excavation and/or pump stations may be needed, which can significantly increase construction costs. This is especially true in areas where ledge may be encountered or where there are high groundwater levels.

Gravity sewers are typically preferred over low pressure sewers because:

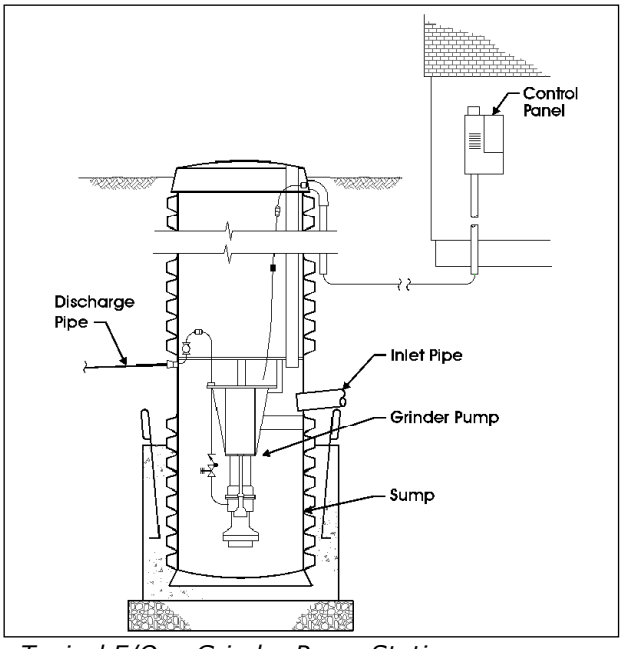
- The required maintenance is relatively low, although maintenance needs increase if pump stations are proposed/required.
- The gravity sewers can be easily designed to accommodate future growth and sewer system expansion.
- There is a low potential for odors, although odor potential increases if pump stations are proposed.
- A gravity sewer system is typically more reliable since there is no reliance on mechanical equipment or power. If pump stations are needed, standby generators would be required to supply power in the event of power loss and standby pumps would be provided to ensure continuous, uninterrupted operation in the event of a pump failure.

3.2.1.2 Low Pressure Sewers

Low pressure sewer systems have been constructed in the United States since the early 1970s. In a low pressure sewer system, wastewater flows by gravity from the building(s) being served into a sump, where the wastewater is subsequently shredded and then pumped through a pressure pipe to a low pressure collector sewer. The low pressure collector sewer then discharges the wastewater flow into a downstream gravity sewer or force main. Because the collector sewers are pressure pipes, they may be installed to more closely follow the existing topography, allowing excavation depths to be minimized. Typical operating pressures are less than 80 pounds per square inch (psi) within the low pressure collector sewers.

Low pressure sewers are well-suited for areas with hilly or rolling terrain because the deep excavation and/or pump stations that would be required for gravity sewer systems can be avoided. Low pressure sewer piping is sized small enough to provide a velocity sufficient to assure that the pipe will be self-cleansing while large enough to avoid excessive headlosses that would impact grinder pump operation. Because pipe velocity and headloss must be balanced, a low pressure sewer system is sized for a specific flow range and cannot as readily accommodate significant future expansion as can gravity sewer systems.

A typical residential home grinder pump would operate over a short duration (5± minutes) once or twice per day. As such, only a percentage of the total number of grinder pumps in a service area would be operating at the same time. A common approach used to determine the size of the low pressure sewers needed to serve an area is to assume that a certain percentage of the grinder pumps would be active. For example, E/One (a well-known grinder pump manufacturer) indicates that if there are 19-30 upstream grinder pumps, typically no more than 5 of these grinder pumps will be active at the same time.



Typical E/One Grinder Pump Station

One grinder pump station would typically be installed at each home or business/commercial property. The grinder pump station typically consists of a semi-positive displacement or centrifugal pump, a below-grade prefabricated wetwell (constructed of polyethylene or

fiberglass reinforced plastic) to store wastewater flow from the building, high water level alarm instrumentation, and pump controls housed in an above-grade panel located either inside or outside the building.

Pump operation is normally initiated by a water level in the sump and a visual local high water alarm is normally provided. An audible alarm is also available and can be provided at each control panel.

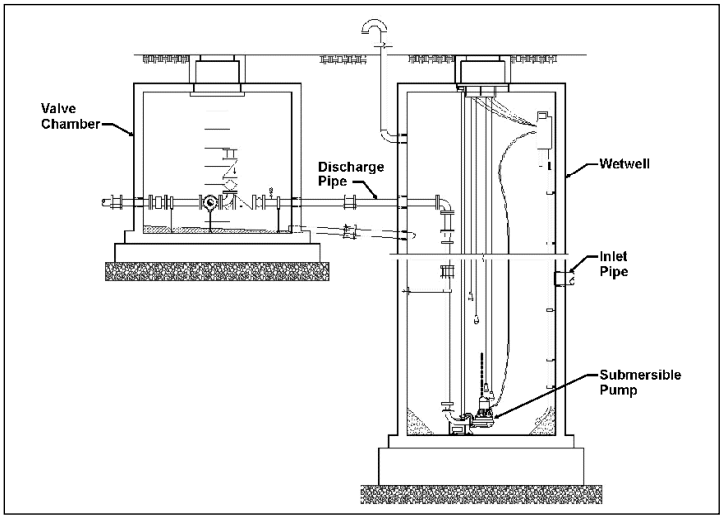
For the purposes of this evaluation, we have assumed that there will be one grinder pump for every building connected to a low pressure sewer. We have also assumed that each grinder pump will be provided with a connection for a portable generator that can be connected and engaged in the event of a power failure.

In some communities that have installed low pressure sewers, the grinder pump stations are owned, operated, and maintained by the individual property owners while in others the community owns, operates, and maintains the grinder pump stations. If the Town proceeds with the construction of a sewer system in the Village Area that includes grinder pump stations, it will have to determine who will own, operate and maintain the grinder pump stations.

3.2.2 Pump Stations

Where pump stations are determined to be necessary, the pump station type would need to selected; pump station types that are expected to be considered include:

- Submersible
- Suction lift
- Wetwell/drywell

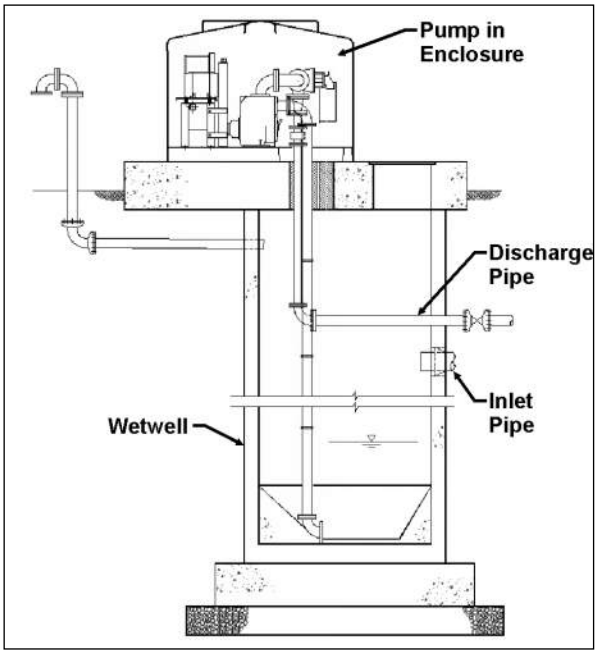


Typical Submersible Pump Station

Submersible pump stations offer the advantage of being relatively low in cost and often have a less significant aesthetic impact than suction lift or wetwell/drywell pump stations since most of the facility components, with the exception of the control panel and a permanent standby generator, if needed, would be located below grade. A submersible pump station typically consists of two or more submersible pumps, a concrete wetwell, wastewater level monitoring instrumentation, and pump controls. The pumps at these facilities must be removed and disassembled for inspection and maintenance, requiring a hoist or crane. The submersible pumping facilities, which can accommodate a wide range of flows, are often package facilities where the pumps, instrumentation, and controls are provided as an integrated system. The submersible pump stations can be provided with or without a building, depending on owner preferences, and, for the larger facilities, are typically provided with a permanent generator to provide standby power. If a permanent generator is needed and a building is planned, the generator can be housed within the building, along with the pump instrumentation and controls. Otherwise, the generator could be provided within a weather-proof enclosure. A separate buried valve

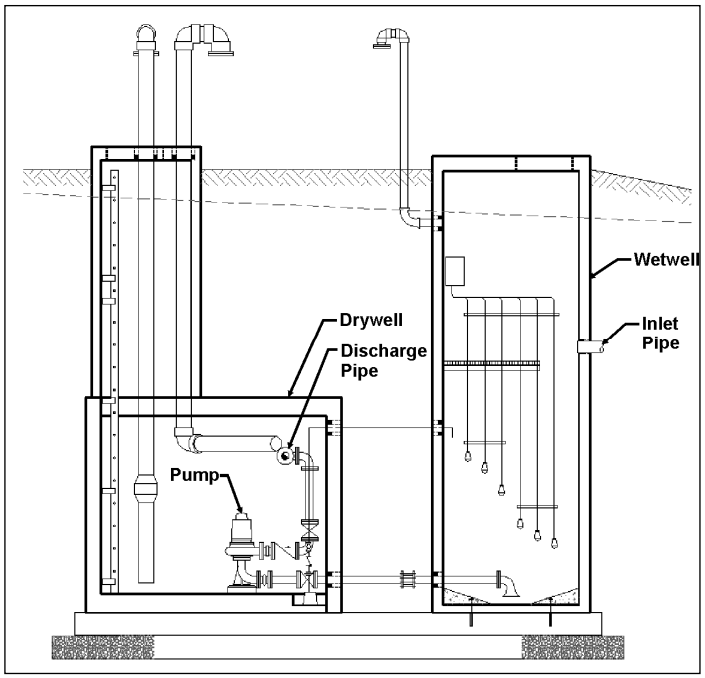
chamber is often constructed just downstream of the submersible pump station to facilitate maintenance of the valves on the discharge side of the pumps.

Suction lift pump stations, which can accommodate a similar flow range to the submersible pumping facilities, may also be considered. The suction lift pump station components are similar to the submersible pump station components with the exception that the pumps would be located above the wetwell and at grade, if possible, to facilitate pump maintenance. The pumps are often located in a fiberglass enclosure or a building. Typical suction lift pumps have the capability to lift wastewater approximately 20 feet. If the wetwell operating levels are greater than 20 feet below grade, then either a different type of pump would be needed, or the suction lift pumps would need to be installed below grade. The suction lift pump stations are often package-type facilities, similar to the submersible pumping facilities. A building and/or an above-grade enclosure can be provided, similar to the submersible pumping facilities, to house pump controls, instrumentation, and a generator to provide standby power, if needed.



Typical Suction Lift Pump Station

Wetwell/drywell pumping stations consist of a wetwell, a drywell where the pumps are located, solids-handling pumps, and pump controls/instrumentation. These facilities are typically more expensive than the submersible or suction lift facilities because of the added cost to construct the below-grade drywell. The pumps and piping would be located in the drywell, which would be located adjacent to the wetwell and at the bottom level of the facility. The station controls, instrumentation, and standby generator would be located in a building or an above-grade enclosure. The drywell would be provided with appropriate lighting and ventilation to avoid confined space safety concerns. Pumps are typically more easily maintained at this type of pumping facility.



Typical Wetwell/Drywell Pump Station
(above-grade building or enclosure not shown)

3.3 Sewer Layout and Sizing Criteria

Sewer layout and sizing criteria were established at the beginning of this evaluation in order to determine appropriate pipe sizes, pipe slopes (for gravity sewers), pipe layouts, and installation depths. The layout and sizing criteria used are listed below:

1. Gravity sewers are a minimum of 8-inches in diameter, in accordance with TR-16.
2. Gravity sewers greater than 8-inches in diameter were determined based on the peak flow projections in Section 2 and the sewer sizing criteria described below.
3. The flow depth of each gravity sewer would not exceed two thirds of the pipe diameter at the projected peak flow rate, which results in a design flow capacity that is approximately 66% of the sewer's hydraulic capacity when flowing full.
4. Gravity sewer slopes were selected to attain a minimum velocity of 2 feet per second when flowing full to minimize solids deposition, in accordance with TR-16.
5. Gravity sewer depths are a minimum of 8 feet below grade (to the pipe invert) in an effort to accommodate fixtures at the typical finished floor level of a building (depths would be refined during design based on the collection of information on building service piping depths in the project area).
6. Gravity sewer depths are a maximum of 25 feet below grade.
7. Municipal pump stations and low pressure sewers with individual homeowner grinder pump stations were considered to avoid deep sewer excavations.
8. The quantity of low pressure sewers was minimized and low pressure sewers were only considered as a means to avoid deep sewer excavations and municipal pump stations in relatively small sewer service areas.
9. Force main diameters were selected to attain a minimum flow velocity of 3 feet per second at the average pumping rate in order to re-suspend solids deposited in the force main between pumping cycles, in accordance with TR-16.
10. Force mains would be installed at depths of approximately 5 feet below grade, to the extent possible.
11. Manholes are located at changes in sewer direction, diameter, and slope and at street intersections. Distances between manholes are no greater than 400 feet in accordance with TR-16.
12. Proposed sewers are shown in existing right-of-ways or along the rail trail, to the extent feasible, except for the sewer to the Longhill Gardens apartments and the sewer to the Parc Place South Condominiums.

The preliminary sewer layouts developed in this evaluation do not consider:

1. The location of other utilities. The sewer alignments will need to be refined during design to avoid conflicts with existing utilities, both horizontally and vertically.
2. Soil and groundwater conditions, which may impact the cost of the preliminary layout.
3. The presence of ledge, which would increase the cost of the preliminary layout.
4. House sill elevations, basement elevations, and the presence of basement fixtures. Survey data, in conjunction with basement inspections, are commonly performed during design to determine whether the proposed gravity sewers are deep enough to provide gravity sewer service to the buildings in the project area. This data would be used to refine the gravity sewer depths.
5. Land ownership/availability for siting pump stations and obtaining sewer easements.

6. The ability of Easthampton's sewer system to accommodate Southampton's wastewater flows. A limited assessment of Easthampton's sewer system was performed as part of this study. A more extensive evaluation could indicate that modifications to Easthampton's sewer system are required to accommodate Southampton's wastewater flow from the Village Area.

3.4 Sewer Layout Description

The proposed sewer layout includes new sewers on the following streets in the Village Area:

Gravity Sewers

- College Highway
- Courtney Ln.
- Gunn Rd.
- Gunn Rd. Ext.
- Helen Dr.
- Karen Ln.
- Lynn Dr.
- Mountain View Cir.
- Parc Pl.
- Parsons Way
- Pomeroy Meadow Rd.
- Pomeroy Meadow Rd. Ext.
- Rosalie Ln.

Low Pressure Sewers

- College Highway
- Helen Dr.
- Lynn Dr.
- Pomeroy Meadow Rd. Ext.

The proposed layout includes approximately 17,600 feet of 8-inch diameter polyvinyl chloride (PVC) gravity sewers and 3,000 feet of 2-inch diameter high density polyethylene (HDPE) low pressure sewers in the Village Area. The proposed layout is shown on Map A-1 in Appendix A. Each building along the low pressure sewers would be served by a grinder pump station that would receive wastewater flow from the building's sewer service and pump that flow into the low pressure collector sewer in the street.

The gravity and low pressure sewers would convey wastewater flow to a proposed municipal pump station located near the intersection of Gunn Road and Riverdale Road (the Gunn Road Pump Station). Wastewater entering the Gunn Road Pump Station would be discharged through a 4,900±-foot long, 6-inch diameter ductile iron (DI) force main that would be installed from the pump station to the Greenway Rail Trail, and then along or adjacent to the Greenway Rail Trail to a proposed gravity sewer at Coleman Road. The Village Area's wastewater flow would then be conveyed through a proposed 700±-foot long 10-inch diameter PVC gravity sewer that would be installed along the Manhan Rail Trail from Coleman Road to the existing gravity sewer located along the Manhan Rail Trail in Easthampton. A 10-inch diameter sewer is proposed at this location to provide additional capacity in the event that Southampton's sewer system is expanded beyond the Village Area in the future to provide sewer service to more residents/businesses (e.g., on Coleman Road, Riverdale Road, and/or Gunn Road).

The sewers and pump station proposed to serve the Village Area are detailed on the drawings in Appendix B. We recommend that the pipe materials noted above be reviewed during the design phase if the project proceeds.

The approximate location of the proposed Gunn Road Pump Station is shown in Figure 3-1 and Photograph 3-1, below, and on Sheet C-110 in Appendix B.



FIGURE 3-1
Proposed Gunn Road Pump Station Location
Source: Google Maps



PHOTOGRAPH 3-1
Proposed Gunn Road Pump Station Location

3.5 Layout Aspects of Special Note

3.5.1 Rail Trail Bridge Crossing

The preliminary layout requires that the proposed force main cross the existing 134±-foot long railroad bridge that will be improved to address deficiencies and used as the future Greenway Rail Trail bridge. This bridge is a built-up, riveted steel stringer bridge that crosses both the Manhan River and Gunn Road, as shown in Photograph 3-2, below.

The proposed force main would be insulated and hung from the existing bridge using supports specifically made for this purpose. In addition, the pipe type would be selected to accommodate this above-ground installation.

The cost associated with this special construction was considered in the development of the total cost to provide sewer service to the Village Area.



PHOTOGRAPH 3-2
Existing Railroad Bridge

3.5.2 Steep Ground Slopes

The proposed force main from the pump station to the Rail Trail bridge noted above will need to be constructed up a relatively steep embankment over a distance of approximately 55 feet, as shown on Sheet C-110 in Appendix B. We estimate that the ground slope at this location is approximately 31%. In order to minimize the potential for movement of this pipe and the separation of pipe joints, the force main may need to be anchored in place and the joints may need to be restrained. TR-16 indicates that sewers installed at a 15% slope or greater should be securely anchored to prevent displacement.

3.5.3 Deep Sewers

This preliminary layout includes the construction of deep sewers in some areas in order to avoid additional municipal pump stations or low pressure sewers with grinder pump stations. Generally, the proposed sewers may be constructed using readily available and relatively inexpensive excavation support systems (such as single and stacked trench boxes) when excavation depths are less than approximately 18 feet, depending on soil and groundwater

conditions. When excavation depths exceed approximately 18 feet, excavation support systems that are more expensive and less readily available are typically necessary, such as conventional sheeting, soldier piles and lagging, or slide rail systems.

Based on our preliminary layout, it appears that deep sewer construction will be required on College Highway and Lynn Drive. A summary of the deep sewers included in the preliminary layout is presented in Table 3-1.

TABLE 3-1
Summary of Deep Sewers

Street	Length >18 ft. Deep (ft.)	Maximum Depth (ft.)
College Highway	990	21
Lynn Drive	90	19
TOTAL	**1,080**	**---**

The cost of these deep sewers was considered in the development of the total construction cost to provide sewer service to the Village Area.

3.5.4 Odor Control

Sewer odors are caused by a combination of gases that are produced when organic materials break down in sewer pipes. The most common odor associated with sewers is hydrogen sulfide, which smells like rotten eggs. Hydrogen sulfide can form where anaerobic (low or no oxygen) conditions exist in a sewer, as is often found in long pressure sewers because of the long wastewater detention times. Because the proposed 6-inch diameter force main is relatively long (nearly a mile in length), conditions may be suitable for hydrogen sulfide formation.

The release of hydrogen sulfide gas is also a concern because it can lead to the formation of sulfuric acid, which can deteriorate concrete structures. Significant hydrogen sulfide generation (and subsequently sulfuric acid) can also occur in gravity sewers with long wastewater detention times, although this is less common.

Odor control is often provided through the construction of facilities that discharge chemicals into the wastewater flow that oxidize the hydrogen sulfide, changing it to a less concerning form, and/or inhibit the formation of hydrogen sulfide.

We recommend that if the Town proceeds with the construction of sewers to serve the Village Area that the need for odor control related to the long force main proposed be assessed as part of the sewer system design. The cost of odor control has not been included in this evaluation.

3.6 Sewer and Pump Station Sizing Methodology

3.6.1 Pump Station Sizing

The proposed pump station pumps would be sized to accommodate the current and projected future peak flows while attaining a minimum flow velocity through the proposed force main of 3 feet per second, as recommended in TR-16. The proposed pump station wetwell would be sized to avoid storage periods that are so long that they cause septic conditions or so short that the pump starts per hour are excessive under either the current or projected future flow conditions.

We have proposed a 6-inch diameter ductile iron force main, which would require a pump rate of 290 gpm in order to achieve a flow velocity of 3 feet per second. In comparison, the projected future peak flow rate to the pump station is 240± gpm (346,000 gpd).

If this project moves forward, we recommend that a more detailed assessment be performed during the design phase to confirm that the pump and force main sizes are the most appropriate to serve the proposed sewer system.

3.6.2 Sewer Sizing

3.6.2.1 Gravity Sewers

Proposed gravity sewer diameters were calculated using the Manning Equation and were based on the projected future peak hourly wastewater flows. The Manning Equation calculates the pipe diameter needed based on flow rate, pipe interior roughness, and pipe slope. The pipe slopes were no less than the minimum values recommended in TR-16 to minimize the potential for solids deposition and were also selected in an effort to minimize the depth of excavation required (refer to the preliminary drawings in Appendix B). The pipe interior roughness is based on the gravity sewer pipe material selected for this evaluation (PVC). Note that the pipe slopes are preliminary and may need to be adjusted during design.

Gravity sewers are typically designed so that they do not flow full at the estimated peak flow conditions. For this evaluation, we sized each proposed gravity sewer so that the flow depth would not exceed two thirds of the pipe diameter at the projected peak flow rate, which results in a design flow capacity that is approximately 66% of the sewer's hydraulic capacity when flowing full. For an 8-inch diameter PVC gravity sewer constructed at the minimum slope recommended by TR-16 (4 feet/1,000 feet), the design hydraulic capacity is approximately 472,200 gpd. In comparison, the projected peak flow from the Village Area is approximately 346,000 gpd. As such, we conclude that an 8-inch diameter PVC gravity sewer constructed at minimum slope would have sufficient hydraulic capacity to accept the peak flow rate from the Village Area.

3.6.2.2 Low Pressure Sewers

Low pressure sewer diameters are typically sized based on the pumping rate of the upstream grinder pumps, the number of grinder pumps assumed to be active at the same time, and the calculated pressure within the pipeline. Environment One Corporation (E/One) is a well-known manufacturer of grinder pumps and provides guidance on sizing low pressure sewer systems. Based on preliminary information obtained from E/One guidance documents, the low pressure sewers proposed are expected to be 2-inch diameter or smaller (the low pressure collector sewer serving 173 and 175 College Highway could be 1.5-inch diameter). The low pressure sewer sizes should be confirmed during design if the Town proceeds with this project, considering both current and projected future wastewater flows.

3.6.2.3 Force Main

A 6-inch diameter force main was estimated for the proposed Gunn Road Pump Station based on the current and projected future peak hourly flow rates and the flow velocity criteria described in TR-16. As noted earlier, TR-16 recommends that a minimum force main flow velocity of 3 feet per second be provided at the average pumping rate in order to re-suspend solids deposited in the force main between pumping cycles. In order to meet this criteria, the pumping rate would be slightly higher than the projected future peak flow rate, as noted

above under the pump station sizing section. The force main diameter should be confirmed during design if the Town proceeds with this project.

3.7 Permitting/Approvals

This section outlines the anticipated permitting and approval requirements of the various federal, state, and local agencies and authorities that would have jurisdiction over the construction of the proposed sewer system.

3.7.1 Federal Permit Programs

3.7.1.1 EPA Phase II Stormwater Program

The construction of the proposed sewer system is expected to result in an overall disturbance of greater than 1 acre and is therefore under the jurisdiction of the Environmental Protection Agency's (EPA's) Phase II Stormwater Program. The EPA Phase II Stormwater Program requires the submittal of a Construction General Permit. The General Permit requirements include:

1. The preparation of a Storm Water Pollution Prevention Plan (SWPPP). A copy of the SWPPP would need to be kept on site throughout the construction period. The SWPPP would also need to be kept current and amended according to the conditions described in the permit.
2. The submittal of a Notice of Intent (NOI) 14 days prior to commencement of earth disturbing work.
3. Posting a sign or other notice of permit coverage.
4. Compliance with the SWPPP, including control of stormwater and non-stormwater discharges through the use of structural and non-structural best management practices, inspections, maintenance and corrective action activities, spill prevention and emergency response.
5. The submittal of a Notice of Termination following completion of all construction activities.

Note that the SWPPP requirements are expected to also be subject to local stormwater ordinances.

3.7.1.2 Federal Endangered Species Act of 1973 (16 U.S.C. 1531)

In the event that a permit is required from a federal agency (such as the U.S. Army Corps of Engineers or U.S. EPA), the permit will not be valid unless the U.S. Fish and Wildlife Service issues a letter stating that the project is not likely to jeopardize the continued existence of any federally listed endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. Federal Endangered Species Act (ESA) review is not triggered if no federal permits are required by another agency.

Because a federal permit will be needed for the project (e.g., NPDES Construction General Permit, NPDES Dewatering and Remediation General Permit, Section 404 authorization), the U.S. Fish and Wildlife would need to be contacted to obtain their input on whether there are any federally listed endangered species in the project area.

3.7.1.3 National Historic Preservation Act of 1966 (16 U.S.C. 470)

In the same fashion as above, the need for a federal permit requires the need for project review under this statute. If the project is likely to occur within the proximity of historic, cultural or archaeological features listed in the *National Register of Historic Places*, letters from the Massachusetts Historical Commission (MHC) and geographically-pertinent Tribal Historic Preservation Officer(s) will be needed stating no adverse effects to these resources will occur as a result of the project.

As noted above, because a federal permit will be needed for this project (the General Stormwater Permit), the MHC and the THPO(s) will need to be contacted to determine if any historic, cultural or archaeological features will be impacted by the proposed work.

3.7.2 State Permit Programs

3.7.2.1 Major WWTF Modification

Because a new municipal pump station is proposed, this would be considered by the Massachusetts Department of Environmental Protection (MassDEP) to be a Major Modification to Easthampton's Treatment Works and, as such, would require MassDEP approval. The City of Easthampton/Town of Southampton would need to submit to MassDEP Form BRP WP 68, which would provide project details.

3.7.2.2 Sewer Extension Permit

In accordance with 314 CMR 7:00, Sewer System Extension and Connection Permit Program, the proposed work may require a permit from MassDEP. This permit application, if determined by MassDEP to be necessary, must be filed at least 90 days prior to the date when the sewer construction is to commence. In general, the application must describe the location of the extension, type of piping system to be used, the design capacity of the proposed extension, the estimated flow to be collected by the proposed extension, the type of wastewater to be collected, and the ultimate treatment point for the wastewater and the availability of capacity at that treatment facility.

3.7.2.3 Massachusetts Environmental Policy Act (MEPA)

The Massachusetts Environmental Policy Act (MEPA; M.G.L. Chapter 30, Section 61-62H) requires applicants of proposed projects to study the potential environmental consequences of their proposed project, and take measures to avoid, minimize and mitigate damage to the environment.

MEPA applies to projects that exceed certain thresholds outlined in their regulations and that also require a permit (or funding) from a state agency. The MEPA review process is not a permitting process, but rather a public review process intended to act as a "clearing house" for public agencies. The MEPA process is administered through the Executive Office of Energy and Environmental Affairs (EEA) and regulatory authority for the MEPA process is under Massachusetts regulation 301 CMR 11.00.

MEPA review is required for a project if impact thresholds are triggered for a number of separate categories, which are listed below:

- Land
- Rare Species
- Wetlands, Waterways and Tidelands

- Water
- Wastewater
- Transportation
- Energy
- Air
- Solid and Hazardous Waste
- Historical and Archaeological Resources
- Areas of Critical Environmental Concern
- Regulations

Under the category of Wastewater, one review threshold for an Environmental Notification Form (ENF) is the construction of 5 miles or more of new sewers for the collection of wastewater; the sewer length review threshold for an Environmental Impact report (EIR) is the construction of 10 miles or more of new sewers for the collection of wastewater. The preliminary sewer system layout developed in this study includes approximately 5 miles of new sewers, which would trigger the need to prepare and ENF.

Under the category of Transportation, one review threshold is the cutting of five or more living public shade trees of 14 or more inches in diameter at breast height. There is the potential that 5 or more trees will be cut between the proposed pump station and the Greenway Rail Trail although, based on a preliminary review, it appears that the trees in this area are smaller than 14 inches in diameter at breast height.

Additional thresholds are established for Wetlands (e.g., ½ or more acres of floodplain or Riverfront Area alteration) and Rare Species (i.e., greater than two acres of disturbance of designated Priority Habitat).

Based on our preliminary review, it appears that at least one MEPA review threshold will be triggered. However, we recommend that the need for a MEPA review be re-assessed during design, if the project moves forward.

3.7.2.4 Chapter 91, The Massachusetts Public Waterfront Act

The Massachusetts Public Waterfront Act (Chapter 91) regulates activities within "trust lands" within the Commonwealth, which are inclusive of all waterways, including all flowed tidelands and all submerged lands lying below the high water mark of Great Ponds, the Connecticut River, the section of the Westfield River in Agawam and West Springfield up to the bridge at Suffield Street (in Agawam), the non-tidal portion of the Merrimack River, and any non-tidal river or stream on which public funds have been expended for stream clearance, channel improvement, or any form of flood control or prevention work, either upstream or downstream, within the river basin, except for any portion of any such stream which is not normally navigable during any season, by any vessel including canoe, kayak, raft, or rowboat. Jurisdiction also extends to structures (e.g., bridges) that span over trust lands (e.g., the Manhan River).

Minor repairs or changes can typically be presented as "minor modification" of existing authorized (or unauthorized; e.g., structures without valid Chapter 91 licenses) public service projects as set forth at 310 CMR 9.05(3)(c). Minor modifications are limited to structural alterations confined to the existing footprint of the fill or structures being altered which represent an insignificant deviation from the original specifications in terms of size,

configuration, materials, or other relevant design or fabrication parameters, as set forth at 310 CMR 9.22(3). This process entails notification of the Massachusetts Department of Environmental Protection (MassDEP) with a description of the history and physical dimensions of the existing structure, as well as the proposed repairs, and how the activities qualify for this regulatory provision. No such modifications can be undertaken until MassDEP has determined compliance with the provisions of 310 CMR 9.05(3) and 310 CMR 9.22(3) or does not object within 30 days of receipt of the written notice.

Based on our preliminary review, it appears the construction of new sewer across existing spans of the Manhan River would require at least the preparation and submittal of a Notification of Minor Modification to MassDEP. However, we recommend that the need for, and scope of, Chapter 91 jurisdiction be re-assessed during design, if the project moves forward.

3.7.2.5 Massachusetts Department of the State Secretary (M.G.L. Chapter 9, Sections 26-27D)

No state permit from any other agency will be valid before the Massachusetts Historical Commission (MHC) is consulted to determine potential impacts on any historical or archaeological resources. Notification of the project impacts would need to be sent to MHC during the MEPA review process. MHC will review the project and make a determination as to whether it may or may not have any impacts on significant State cultural, historic, or archaeological assets.

3.7.2.6 Massachusetts Endangered Species Act (M.G.L. Chapter 131A)

No state permit from any other agency will be valid before the Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP) is consulted to determine potential impacts on state-listed rare species. Notification will be sent to the NHESP describing the potential project impacts during the MEPA review process. The Massachusetts Natural Heritage Atlas (15th edition, released August 1, 2021) indicates that Priority Habitats of Rare Species are located in the vicinity of the proposed municipal pump station and a portion of the downstream force main. All construction-related activities for the project will be included as part of the ENF and, as such, will be subject to NHESP review.

NHESP also has jurisdiction under the Massachusetts Weltands Protection Act (MAWPA) when a Notice of Intent (NOI) is filed and activities are proposed within Estimated Habitats of Rare Wildlife. Please note that all Estimated Habitat is Priority Habitat, but not all Priority Habitat is Estimated Habitat. NHESP can conduct a streamlined review under both MESA and the MAWPA when an NOI is filed.

Note that endangered species impacts are also expected to be considered as part of the construction of the Greenway Rail Trail.

3.7.2.7 Massachusetts Department of Transportation

The Massachusetts Department of Transportation (MassDOT) requires that a permit be obtained for any work performed in the right-of-ways under its jurisdiction. This permit is to ensure that any work performed in the MassDOT right-of ways does not have any negative effects on the integrity and therefore the safety, presently provided by the Highway in question. A gravity sewer is proposed along College Highway (Route 10), which is a state highway. Therefore, a MassDOT permit would need to be obtained for the construction of this project.

In addition, if the design of the proposed sewers along the Greenway Rail Trail is incorporated into the rail trail design, then aspects of the sewer design may be subject to MassDOT approval since MassDOT is providing funding for the rail trail project. In particular, MassDOT may wish to review the sewer design across the rail trail bridge since the proposed sewer would be hung off of the bridge and would require pipe supports fastened to the bridge.

3.7.3 Local Permits

3.7.3.1 Street Opening and Trench Permits

The Town of Southampton requires that a Permit to Open a Public Way and a Trench Permit be obtained for any work performed in Town streets. These permits are issued by the Town's Highway Department. Since the majority of the proposed sewers would be constructed within Town streets, these permits would be required.

3.7.3.2 Massachusetts Wetlands Protection Act (M.G.L. Chapter 131, Section 40)

Wetland resource areas, such as Bordering Land Subject to Flooding (BLSF), Isolated Land Subject to Flooding (ILSF), Bordering Vegetated Wetlands (BVWs), and Riverfront Area would need to be considered during the design of the proposed sewers and pumping station. The majority of the proposed sewers would be constructed within existing roadways, the Greenway Rail Trail, or the Manhan Rail Trail, and would not impact nearby wetland areas, assuming that standard good construction practices are employed (e.g., proper placement of erosion control barriers and appropriate dewatering methodologies).

However, because new sewers in the study area are expected to be constructed within a 100-foot wetlands Buffer Zone, the sewer construction work will be regulated by the Massachusetts Wetlands Protection Act (MAWPA) and a wetlands permit (Order of Conditions) will be required. As part of the permitting process, the Town will need to file Notices of Intent with the local Conservation Commissions having jurisdiction (in Southampton and Easthampton) and the MassDEP. The local Conservation Commissions are responsible for determining whether construction would be allowed in areas under the jurisdiction of the WPA and whether the construction is subject to conditions/ restrictions to protect these areas.

Wetlands delineation would need to be performed in accordance with guidelines established by MassDEP and Massachusetts Regulation 310 CMR 10.00 (the MAWPA regulations) and, based on that information, the appropriate resource area designations would need to be assigned.

It is important to note that this project may proceed under the Limited Project provisions of the MAWPA, as outlined in 310 CMR 10.53(3)(d):

> *". . . The construction, reconstruction, operation and maintenance of underground and overhead public utilities, such as electrical distribution or transmission lines, or communication, sewer, water, and natural gas lines, may be permitted, in accordance with the following general conditions and any additional conditions deemed necessary by the reserving authority.*
>
> 1. *the reserving authority may require a reasonable alternative route with fewer adverse effects for a local distribution or connecting line not reviewed by the Energy Facilities Siting Council;*
> 2. *best available measures shall be used to minimize adverse effects during construction;*

3. *the surface vegetation and contours of the area shall be substantially restored; and*
4. *all sewer lines shall be constructed to minimize inflow and leakage . . .”*

Activities that proceed under the Limited Project provisions of the MAWPA are recognized as generally being beneficial to public welfare, or those that otherwise may not be able to meet the general performance standards of resource areas due to temporary impacts. It is important to note that granting of Limited Project status is subject to the discretion of the Issuing Authority (e.g., Southampton Conservation Commission, Easthampton Conservation Commission) and is not guaranteed.

Under the MAWPA, a general wildlife habitat evaluation would need to be conducted in the event the following impact thresholds are exceeded:

- Bank: greater than 50 linear feet.
- BVW: any alteration.
- BLSF: greater than 5,000 square feet (or 10 percent of the total BLSF within the Project Locus).
- Riverfront Area: greater than 5,000 square feet (undeveloped Riverfront Area).

The need for a wildlife habitat evaluation would need to be determined during design once the areas that will be disturbed are better defined.

3.7.3.3 Southampton Conservation Commission

In conjunction with the MAWPA, described above, the Town of Southampton also has its own Wetlands Protection Bylaw (Chapter 264, Wetlands Protection). Application for a permit under this ordinance would need to be made in conjunction with the application under the MAWPA for the proposed work in Southampton.

3.7.3.4 Easthampton Conservation Commission

As of the date of this memorandum, the City of Easthampton has not promulgated a local wetlands protection ordinance or other similar Conservation Commission policies. We recommend that status of a local wetlands ordinance and/or policies be re-assessed during design, if the project moves forward.

4 Surplus Capacity of Easthampton's Sewers

4.1 Sewers Included in Assessment

A limited assessment of Easthampton's sewer system was performed to determine if it can accommodate the estimated future wastewater flow from Southampton's Village Area. As discussed earlier in this memorandum, the wastewater flow from Southampton's Village Area would be discharged into Easthampton's sewer system at the upstream terminal manhole adjacent to the Manhan Rail Trail, which is located approximately 76 feet northeast of the Southampton town line. Wastewater flow from this point would be conveyed through Easthampton's sewer system as described below:



PHOTOGRAPH 4-1
Manhan Rail Trail Terminal Manhole, Looking Northeast

1. Through 1,010± feet of 8-inch diameter sewers along the Manhan Rail Trail to Wemelco Way.
2. Through 5,700± feet of 10-inch diameter sewers along the Manhan Rail Trail from Wemelco Way to West Lake Street.
3. Through 1,890± feet of 15-inch diameter sewers along West Lake Street, Lake Street, and Williston Avenue to Union Street.
4. Through 270± feet of 12-inch diameter sewers along Union Street to the driveway of Building 123-133 (the Button Building).
5. Through 1,530± feet of 18-inch and 24-inch diameter sewers from Union Street to the New Railroad Interceptor on Mechanic Street; these sewers are located primarily off of City roads and between buildings.
6. Through 5,930± feet of 30-inch and 36-inch diameter sewers (the New Railroad Interceptor) to Easthampton's Wastewater Treatment Facility (WWTF). The majority of these sewers are located along the Manhan Rail Trail.

This assessment included only the existing 8-inch and 10-inch diameter sewers along the Manhan Rail Trail (6,710± feet of sewers) shown on Map C-1 in Appendix C. The assessed sewers are located between the terminal manhole at the southwest end of the Manhan Rail Trail sewers and West Lake Street. Map C-1 also shows the 9,620± feet of downstream sewers whose surplus hydraulic capacities were not assessed as part of this study.

The larger diameter sewers described above (greater than 10-inch diameter) were not assessed in this preliminary evaluation because we believe that they are less likely to be of concern since the projected future wastewater flow from the Village Area is a smaller percentage of the hydraulic capacities of these pipes. For example, the projected future peak flow from the Village Area is less than 15% of the hydraulic capacity of a 15-inch diameter sewer at minimum slope and less than 4% of the hydraulic capacity of a 36-inch diameter sewer at minimum slope. In comparison, the projected future peak flow from the Village Area

is 48% and 32% of the hydraulic capacities of 8-inch diameter and 10-inch diameter sewers at minimum slope, respectively.

4.2 Assessment Methodology

We estimated the current average daily sanitary flow from each building that is currently served by the 8-inch and 10-inch diameter sewers along the Manhan Rail Trail using Easthampton's 2014 annual water use data. Although more current water use data could not be obtained, we believe that the 2014 data provides a reasonable estimate of current water use for the purposes of this limited assessment. Conservatively, we assumed that all of the water used is discharged to the sewer system. However, it is likely that at least a small portion of the billed water use is not discharged to the sewer system (e.g., water for outdoor use). In addition, we added a 20% contingency to the wastewater flow estimates since the water use data is 10 years old and we have only one year of data.

The peak hourly sanitary flows within the existing 8-inch and 10-inch diameter Manhan Rail Trail sewers were estimated using the approach described in Section 2 for estimating the peak sanitary flows within Southampton's Village Area (i.e., using the peaking factor obtained from TR-16). The peak hourly wastewater flows within the existing 8-inch and 10-inch diameter Manhan Rail Trail sewers were estimated by adding to the peak hourly sanitary flow values an allowance for infiltration that may be entering the Manhan Rail Trail sewers and the sewers tributary to it, similar to the approach for estimating the peak wastewater flow in the Village Area. Note that the estimated infiltration rates varied depending on the pipe type, as shown below in Table 4-1. Newer PVC pipes that have gasketed joints were estimated to have a relatively low infiltration rate of 375 gpd/idm, based on information included in TR-16. Older VC and AC pipes were assumed to have a higher infiltration rate of 1,000 gpd/idm. It is important to note that the actual infiltration rates may vary from the estimated values.

TABLE 4-1
Infiltration Rate Estimates

Pipe Type	Infiltration Rate (gpd/idm)
PVC	375
VC or AC[1]	1,000

[1]VC=vitrified clay; AC=asbestos cement

The hydraulic capacities of the 8-inch and 10-inch diameter Manhan Rail Trail sewers were calculated using the Manning Equation based on the pipe types, diameters, and slopes included on available design drawings. The characteristics of these sewers (i.e., type, diameter, and length) were not field-verified.

A summary of the estimated wastewater flows along the 8-inch and 10-inch diameter Manhan Rail Trail sewers is presented in Table 4-2 along with the total capacities and the remaining capacities of these sewers. These wastewater flows rates include our estimates of sanitary flow and infiltration entering each sewer segment, as described above. The sewer segments assessed were divided into sewer sections in Table 4-2 based on the tributary sewer connection locations along the Manhan Rail Trail sewers. The sewer capacities and peak flow rates presented are for the sewer segments that have the lowest remaining sewer capacities within each sewer section.

TABLE 4-2
Wastewater Flows Along Manhan Rail Trail Sewers

Sewer Section	Pipe Dia. (in)	Pipe Length (ft)[1]	Sewer Capacity (gpd)[2]	Peak Hrly Flow Rate (gpd)[2]	Remaining Sewer Capacity (gpd)[2]
Southwest end to Wemelco Way	8	1,010	623,200	400	622,800
Wemelco Way to Sunset Ave.	10	2,030	1,030,600	2,700	1,027,900
Sunset Ave. to South St.	10	150	1,120,900	117,900	1,003,000
South St. to LaPlant Cir.	10	1,210	1,084,700	193,100	891,600
LaPlant Cir. To Dewey St.	10	500	1,085,200	223,700	861,500
Dewey St. to West Lake St.	10	1,810	1,088,000	230,400	857,600
TOTAL	**---**	**6,710**	**---**	**---**	**---**

[1]Length of piping along the noted sewer section.

[2]The Peak Hourly Flow Rate, Sewer Capacity, and Remaining Sewer Capacity for each Sewer Section are based on the sewer segment within the Sewer Section under review with the lowest Remaining Sewer Capacity when flowing full. Sewer characteristics are based on available design drawings and were not field-verified.

Table 4-2 shows that the 8-inch diameter sewers between the terminal manhole at the southwest end of the Manhan Rail Trail sewers and Wemelco Way have the lowest remaining sewer capacity of 622,800 gpd. In comparison, the projected peak wastewater flow from Southampton's Village Area is approximately 346,000 gpd. As such, it appears that the existing Easthampton sewers assessed can accommodate the projected future wastewater flow from Southampton's Village Area. However, this assessment does not consider future development in Easthampton or sewers downstream of the 8-inch and 10-inch diameter Manhan Rail Trail sewers, and is based on available sewer design drawings (sewer characteristics were not field-verified).

5 Sewer System Costs

5.1 Opinion of Probable Construction Cost

An Opinion of Probable Construction Cost (OPCC) was developed based on the preliminary sewer system layout detailed in this technical memorandum. This cost is based on the October 2024 Engineering News Record Construction Cost Index (ENR CCI) of 13632. The construction cost includes the following general components, which are listed in the detailed construction cost summary included in Appendix D:

- Gravity sewer piping (main line pipe and service laterals to the property line)
- Manholes
- Pump station
- Pump station force main
- Low pressure sewer piping (main line pipe and service laterals to the property line)
- Grinder pump stations
- Air release manholes/structures
- Cleanout manholes/structures

Unit prices for the sewer system components were developed based on construction bid prices from recent, similar projects.

The OPCC includes the cost of materials, equipment, installation, testing, mobilization/ demobilization, and the contractor's overhead and profit. The piping unit costs vary depending on the pipe diameter and the depth of construction anticipated. Where low pressure sewers are proposed, we have assumed that there would be a grinder pump station for each house, rather than a grinder pump station serving two or more houses.

The cost of odor control, if determined to be necessary, has not been included in this cost estimate.

In addition to the sewer system components listed above, where special construction conditions exist, they were also considered in determining the total construction cost. For example, the proposed force main would need to be constructed across an existing railroad bridge located along the Greenway Rail Trail. The cost of this special construction was included in the OPCC.

An allowance for design, permitting, bidding, and construction phase engineering services was added to the OPCC in the cost summary in Appendix D.

The construction cost of the proposed sewer system was estimated as approximately $16.4 million, including a 30% construction contingency. The total capital cost, which includes the estimated construction cost, the construction contingency, and the engineering allowance, was estimated as approximately $20.5 million.

Note that the construction costs developed do not include:

1. Building service piping on private property
2. The decommissioning of septic systems
3. Police for traffic control

4. The replacement or relocation of existing utilities
5. The removal and disposal of ledge, if encountered
6. The cost of odor control, if determined to be necessary

The total capital cost also excludes a connection charge that may be imposed by the City of Easthampton for the connection of Southampton's sewers to Easthampton's sewer system.

5.2 Operation and Maintenance Costs

The annual operation and maintenance (O&M) cost that would be incurred have been estimated for the proposed layout and includes the following components:

- Labor costs to maintain the sewer system and operate and maintain the pump station (we have assumed that grinder pump operation and maintenance would be the responsibility of the property owner)
- Pump station electricity costs
- Pump station equipment/parts replacement costs
- Sewer maintenance costs

5.2.1 Labor Costs

In order to estimate sewer system labor costs, we have developed an estimate of the sewer system staff that would be needed to operate and maintain the Village Area's future sewer system. The following documents provide guidance on manpower requirements for operating and maintaining wastewater collection systems and were used for this analysis:

- The document titled *Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems*, prepared by EPA and dated January 2005.
- The document titled *Manpower Requirements for Wastewater Collection Systems in Cities and Towns up to 150,000 in Population* (MRWCS), prepared by EPA, and dated June 1973.
- The document titled *The Northeast Guide for Estimating Staffing at Publicly and Privately Owned Wastewater Treatment Plants*, prepared by New England Interstate Water Pollution Control Commission (NEIWPCC) and dated November 2008.

5.2.1.1 Sewers

The 1973 EPA report noted above, which is referenced in the 2005 EPA CMOM report (also referenced above), provides guidance on wastewater collection system staffing levels and includes the maintenance of sanitary sewers, storm drains, and pumping stations. The 1973 EPA document bases estimated staffing levels on population, but also indicates the estimated pipe lengths that were assumed for each population estimate. For this analysis, we used the estimated pipe lengths in the guidance document and the length of sewers included in the proposed Village Area sewer system layout to estimate staffing needs to maintain the proposed sewers in the Village Area.

EPA provides estimated staffing levels for a sewered population of 5,000 people that are served by 30 miles of sewer mains. In comparison, the proposed Village Area sewer layout has approximately 3.5 miles of gravity sewers. Using the ratio of the proposed Village Area sewer lengths to the length of sewer mains serving a population of 5,000 people predicted by

EPA, and the estimated number of staffing hours required for a sewer system with 30 miles of sewer mains (5,000 people), we estimated the staffing hours required to maintain the Village Area sewer system, which is summarized in Table 5-1.

TABLE 5-1
Estimated Sewer O&M Staffing Needs[1]

Staff category	No. of Staff Hours Required Annually
Superintendent	30
Foreman	90
Maintenance Person II	90
Maintenance Person I	67
Construction Equipment Personnel[2]	22
Laborer	90
TOTAL	**389**

[1]In accordance with the "Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems", prepared by the EPA and dated January 2005.

[2]This value was reduced based on the assumption that outside contractors would be used for some construction activity.

Based on the 2005 EPA CMOM document, 389 hours/year would be needed to maintain the Village Area sewers.

5.2.1.2 Pump Stations

One pump station is proposed to serve the Village Area. Massachusetts Regulation 314 CMR 12.00 requires daily inspection of those pump stations designed to pump peak flows of 100,000 gpd (69± gallons per minute (gpm)) or greater and weekly inspection of those pump stations designed to pump peak flows less than 100,000 gpd.

Based on the estimated size of the Village Area pump station, daily inspection would be required for this pumping facility. We estimate an average duration of 1 hour to inspect and perform routine maintenance activities at this pump station, or 365 hours/year. In addition, we estimated that an average of 4 hours/month is needed by a two-person crew to periodically perform more significant maintenance activity at the pump station (8 person-hours/month or 96 person-hours/year). In total, we estimate 461 person-hours/year are needed to inspect, operate, and maintain the Village Area's proposed wastewater pump station.

5.2.1.3 Labor Costs Summary

The total Village Area wastewater collection system staffing hour estimates are presented in Table 5-2.

TABLE 5-2
Wastewater Collection System Staffing

O&M Category	Collection System O&M Staffing (hrs/yr)
Sewers	389
Pump Station	461
TOTAL	**850**

Assuming an average hourly staff rate of $25/hour, the annual wastewater O&M labor cost would be approximately $21,300, excluding the cost of benefits.

5.2.2 Electricity Costs

The annual electricity cost at the Village Area's proposed pump station was estimated based on projected power consumption. Power consumption was estimated by calculating the required pumping rate, the required discharge pressure, and pump run times, based on average daily flow projections. An electricity use unit cost of $0.35/kilowatt-hour was used to calculate the annual electricity cost for the proposed wastewater pump station. The current and projected future annual electricity costs were estimated as approximately $3,600 and $4,300, respectively.

We assumed that the grinder pump electricity costs would be paid for by the grinder pump owners (the property owners).

5.2.3 Pump Station Equipment/Parts Replacement Costs

The cost to periodically replace equipment/parts at the pump station were also considered for the Village Area Pump Station and were estimated as 3% of the equipment construction costs per year. The estimated annual equipment O&M cost is approximately $1,200, based on an estimated cost for the pump station equipment of $40,000.

5.2.4 Sewer Maintenance Costs

Sewer maintenance costs were considered in the development of the O&M costs for the proposed sewer system and typically include:

- Periodic inspection and cleaning of the sewer lines
- Repair/rehabilitation of pipe sections

Because the Village Area sewer system will be new, repair/rehabilitation costs are expected to be minimal in the near term. However, there may be a need for periodic cleaning and inspection using a closed-circuit television (CCTV) camera. We assumed that sewer cleaning would be performed by Town staff while CCTV inspections would be performed by a contractor hired by the Town. We also assumed that approximately 10% or 1,800± feet of sewer main would be inspected annually, at a cost of approximately $3,600.

5.2.5 Summary of Sewer System O&M Costs

A summary of the Village Area sewer system annual O&M costs is presented in Table 5-3.

TABLE 5-3
Wastewater Collection System Annual O&M Costs

O&M Category	Annual O&M Cost[1]
Labor	$21,300
Electricity	$3,600
Pump Station Equipment O&M	$1,200
Sewer Maintenance	$3,600
TOTAL	**$29,700**

[1]Based on current day conditions and costs/rates.

We observe that the largest component of the estimated sewer system O&M cost is the additional labor that would be required. Note that these O&M costs are approximate and may be impacted by:

1. The final layout of the Village Area sewers
2. The pump station type selected
3. The size and efficiency of the pumps selected
4. Actual labor rates
5. Actual electricity costs per kilowatt-hour
6. The need for odor control

We anticipate that the Town would enter into an intermunicipal agreement (IMA) with the City of Easthampton for the conveyance and treatment of Southampton's wastewater flows. The IMA would likely include a mechanism through which Easthampton would be reimbursed for its operation and maintenance costs associated with Southampton's wastewater flows. Our estimated Southampton wastewater O&M costs do not include annual payments to Easthampton, which we expect will be paid for by Southampton's sewer users (similar to other communities).

6 Conclusions/Recommendations

6.1 Conclusions

Based on water use data provided by the Town and the estimated infiltration from the proposed sewers, we developed the wastewater flow estimates for the Village Area shown in Table 6-1.

TABLE 6-1
Wastewater Flow Summary

Conditions	Average Daily Flow (gpd)	Peak Hourly Flow (gpd)
Current	60,500	290,500
Future[1]	70,300	346,000

[1]Based on a 50-year planning period.

A sewer layout was developed to accommodate both the current and projected future peak wastewater flow rates and is shown on Map A-1 in Appendix A and on the preliminary drawings in Appendix B. The proposed sewer system includes:

- 17,600± feet of 8-inch diameter PVC gravity sewers in the Village Area
- 700± feet of 10-inch diameter PVC gravity sewers downstream of the proposed 6-inch diameter force main
- 3,000± feet of 2-inch diameter high density polyethylene (HDPE) low pressure sewers on College Highway, Helen Drive, Lynn Drive, and Pomeroy Meadow Road Extension
- 35 grinder pump stations
- 4,900± feet of 6-inch diameter force main
- 1 municipal wastewater pump station

We performed an assessment of the existing 8-inch and 10-inch diameter gravity sewers in Easthampton that would convey the estimated wastewater flow from Southampton's Village Area towards Easthampton's WWTF (6,700± feet of piping). These sewers are located along the Manhan Rail Trail, from the terminal manhole at the southwest end of the Manhan Rail Trail sewers to West Lake Street. This assessment did not include the 15-inch to 36-inch diameter sewers downstream of the assessed sewers (9,600± feet of piping). We concluded from the assessment that the sewers reviewed have sufficient remaining hydraulic capacity to accommodate the Village Area's wastewater flows.

The estimated capital cost to construct the proposed sewer system, including the estimated construction cost, a 30% contingency, and an allowance for design, permitting, bidding, and construction phase engineering services, is $20.5 million.

6.2 Recommendations

We recommend the follow-up actions described below if the Town decides to proceed with providing sewer service to the Village Area:

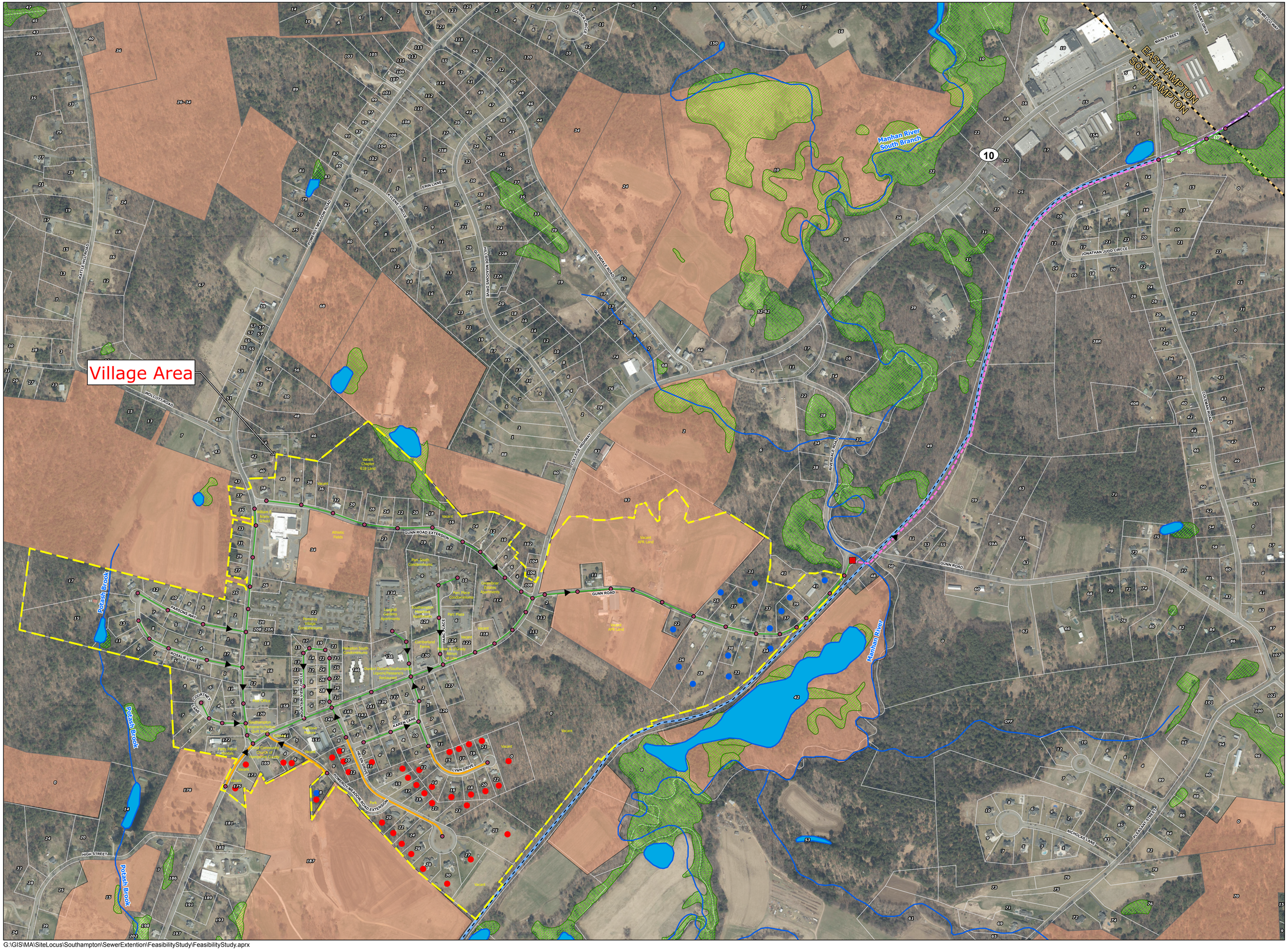
1. Perform wastewater flow monitoring within Easthampton's sewer system to:
    a. Confirm the surplus capacity estimates within the 8-inch and 10-inch diameter Manhan Rail Trail sewers, including the infiltration estimates.

   b. Determine if there is sufficient surplus hydraulic capacity within the sewers downstream of the 8-inch and 10-inch diameter Manhan Rail Trail sewers, to the Easthampton WWTF.

2. Confirm that the proposed pump station site is available for construction of the proposed municipal wastewater pump station.
3. Establish the method of funding the project, with input from Town residents.
4. Educate Town residents in the Village Area regarding the proposed project and the associated costs.
5. Negotiate an intermunicipal agreement with Easthampton that establishes wastewater fees and limits.
6. Proceed with the design of the new sewers, grinder pump stations, and municipal pump station to serve the Village Area.
7. Determine whether a sewer utility should be established to fund and perform sewer system O&M.

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Appendix A
Village Area Sewer System Map



LEGEND

- Proposed Municipal Pump Station
- Proposed Grinder Pump Station
- Proposed Manhole
- Proposed Gravity Sewer
- Proposed Low Pressure Sewer
- Proposed Force Main
- Proposed Sewer Service Area Boundary
- Proposed Greenway Rail Trail
- Private Well
- Existing Gravity Sewer
- Hydrologic Connection
- Existing Manhan Rail Trail
- Water Body
- MassDEP Wetlands
- Protected Open Space
- Town Boundary

LOCUS MAP



N

0 200 400
Feet
1:4,800

NOTES

1. Based on MassGIS Color Orthophotography (2023).
2. Existing Rail Trail data courtesy of MassGIS.
3. Proposed gravity sewers are 8-inch diameter, unless noted otherwise. Proposed LP sewers are 2-inch diameter. The proposed force main is 6-inch diameter.

MAP A-1
PROPOSED VILLAGE AREA SEWERS

Village Area Sewer Study
Southampton, Massachusetts

November 2024

Tighe&Bond

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Appendix B
Preliminary Sewer Drawings

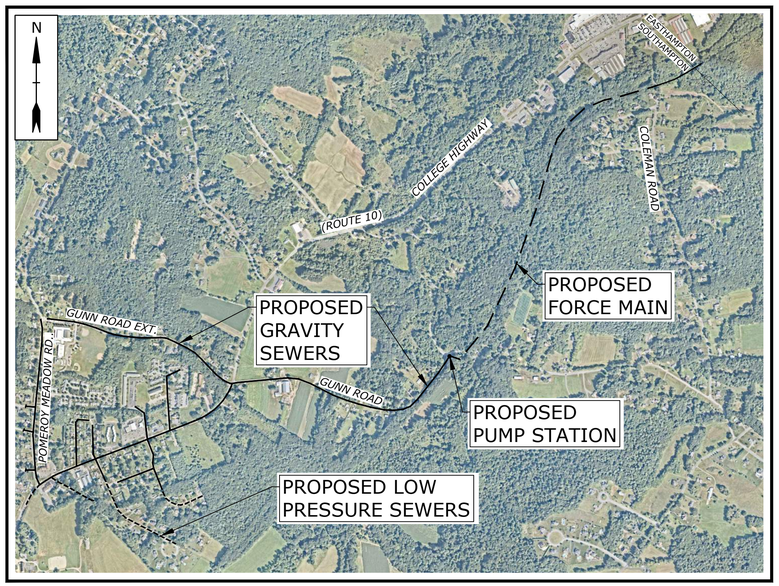
TOWN OF SOUTHAMPTON, MASSACHUSETTS

VILLAGE AREA SEWER STUDY

OCTOBER 2024

DRAWING LIST	
Sheet Number	Sheet Title
G-001	COVER
C-101	POMEROY MEADOW ROAD STA 0+00 TO STA 10+00
C-102	POMEROY MEADOW ROAD STA 10+00 TO STA 17+00
C-103	POMEROY MEADOW ROAD STA 17+00 TO STA 23+00
C-104	COLLEGE HIGHWAY (ROUTE 10) STA 0+00 TO STA 10+00
C-105	COLLEGE HIGHWAY (ROUTE 10) STA 10+00 TO STA 21+00
C-106	COLLEGE HIGHWAY (ROUTE 10) STA 21+00 TO STA 31+00
C-107	GUNN ROAD STA 0+00 TO STA 10+00
C-108	GUNN ROAD STA 10+00 TO STA 20+00
C-109	GUNN ROAD STA 20+00 TO STA 30+00
C-110	GUNN RD. STA 30+00 TO STA 33+00 RAIL TRAIL STA 0+00 TO STA 7+00
C-111	RAIL TRAIL STA 7+00 TO STA 15+00
C-112	RAIL TRAIL STA 15+00 TO STA 25+00
C-113	RAIL TRAIL STA 25+00 TO STA 35+00
C-114	RAIL TRAIL STA 35+00 TO STA 45+00
C-115	RAIL TRAIL STA 45+00 TO STA 56+00
C-116	POMEROY MEADOW ROAD EXT. STA 0+00 TO STA 7+00
C-117	MOUNTAIN VIEW CIRCLE - WEST STA 0+00 TO STA 8+00
C-118	MOUNTAIN VIEW CIRCLE - EAST STA 0+00 TO STA 5+00
C-119	HELEN DRIVE STA 0+00 TO STA 9+00
C-120	HELEN DRIVE STA 9+00 TO STA 16+40
C-121	LONGHILL GARDENS STA 0+00 TO STA 5+00
C-122	LYNN DRIVE STA 0+00 TO STA 7+00
C-123	LYNN DRIVE STA 7+00 TO STA 14+00
C-124	KAREN LANE STA 0+00 TO STA 7+00
C-125	PARC PLACE STA 0+00 TO STA 9+40
C-126	GUNN ROAD EXT. STA 0+00 TO STA 11+00
C-127	GUNN ROAD EXT. STA 11+00 TO STA 20+00
C-128	GUNN ROAD EXT. STA 20+00 TO STA 27+35

CONCEPTUAL LAYOUT
NOT FOR CONSTRUCTION



LOCATION MAP
SCALE: 1" = 1000'

PREPARED BY:

Tighe&Bond

PREPARED FOR:
TOWN OF SOUTHAMPTON

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COMPLETE SET 29 SHEETS

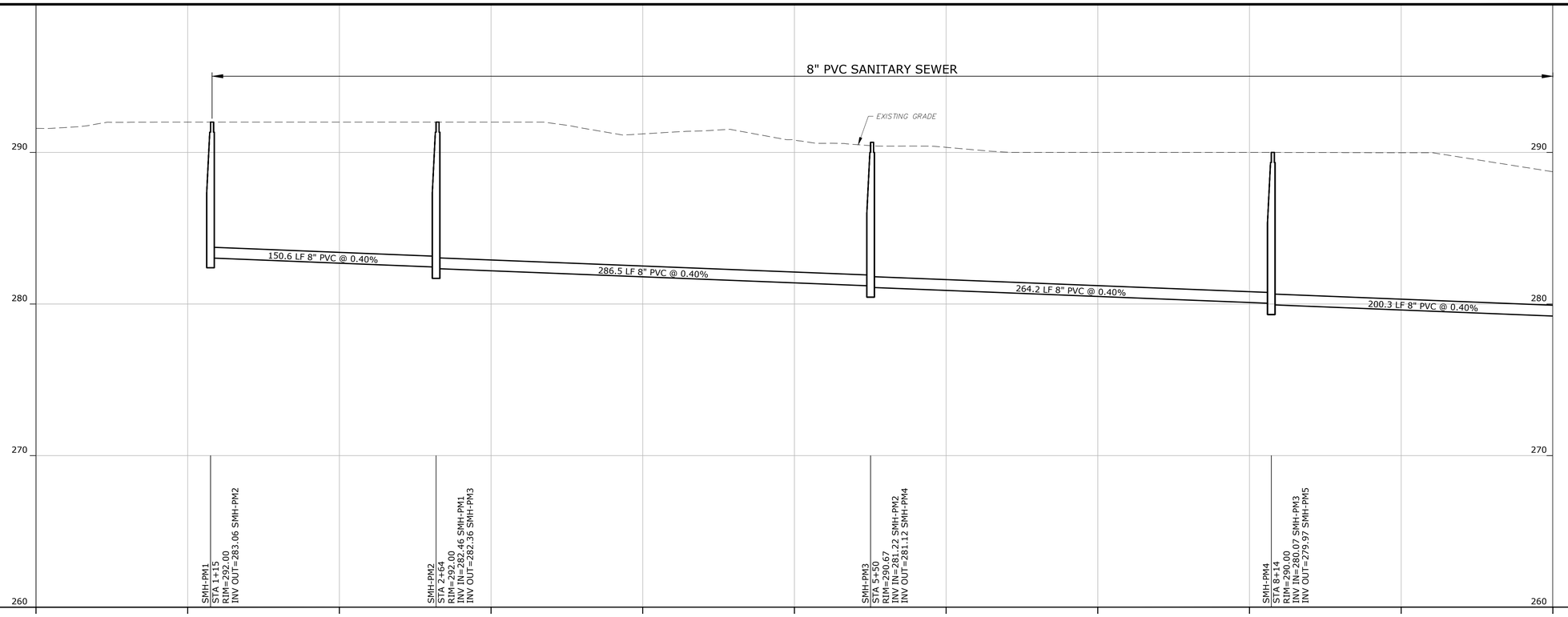
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SEE SHEET C-126



SEE SHEET C-102

HORIZONTAL SCALE 1" = 40'
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VERTICAL SCALE 1" = 4'
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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

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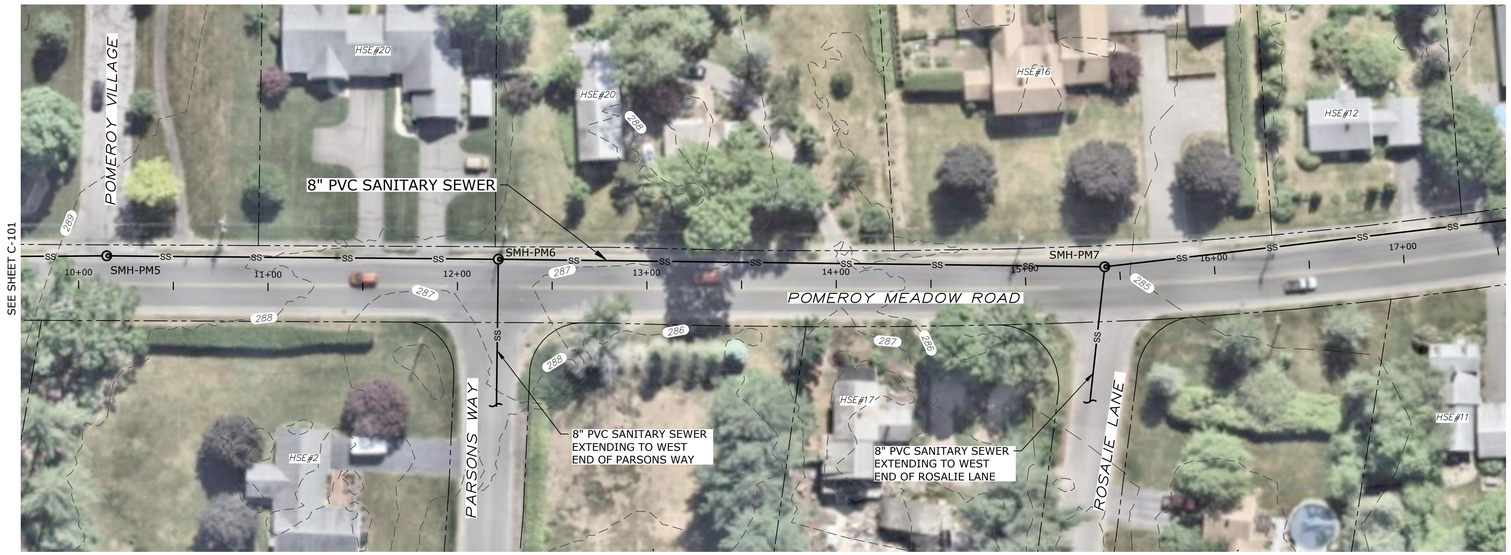
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DATE:	OCTOBER 2024
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DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

POMEROY MEADOW ROAD
STA 0+00 TO STA 10+00

SCALE: AS SHOWN

C-101

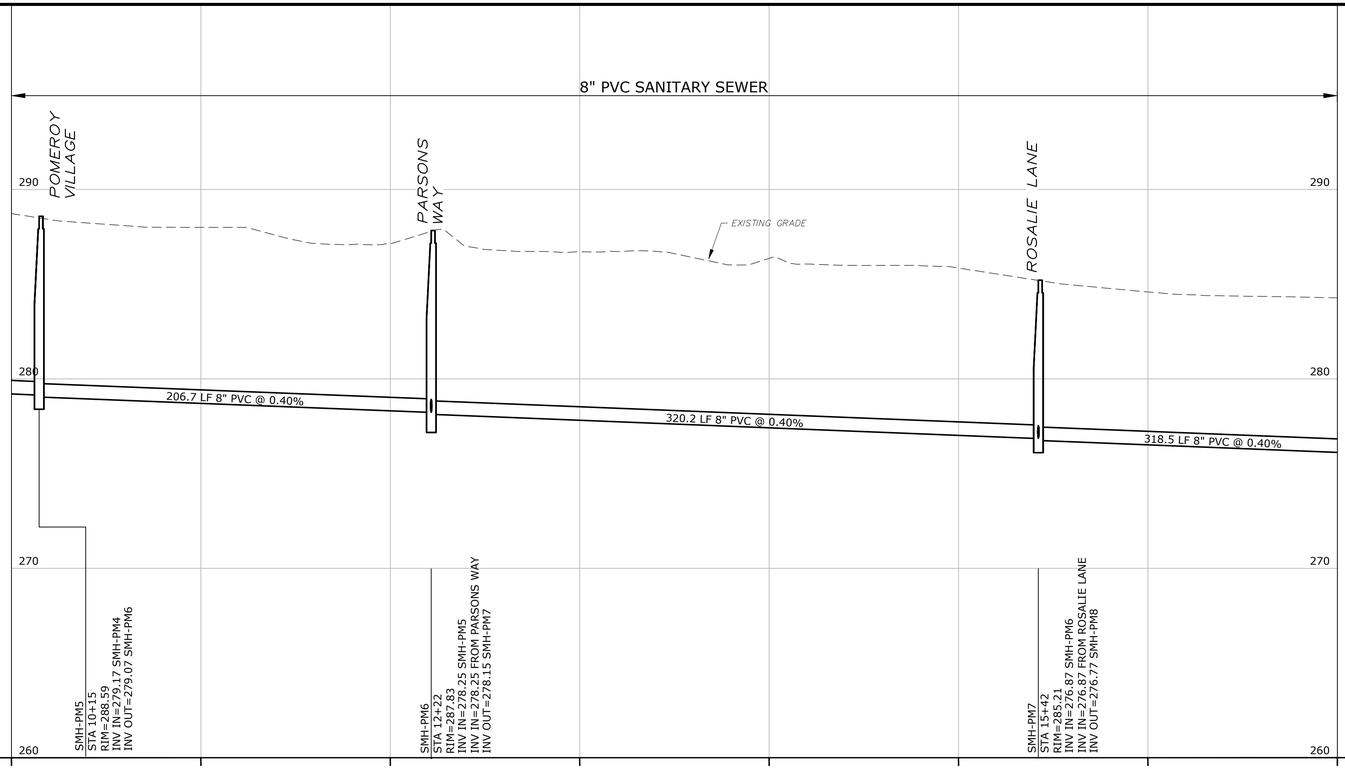
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NOTES:

1. DETAILED SEWER LAYOUTS WERE NOT DEVELOPED FOR PARSONS WAY, ROSALIE LANE, OR COURTNEY LANE.

HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 4'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

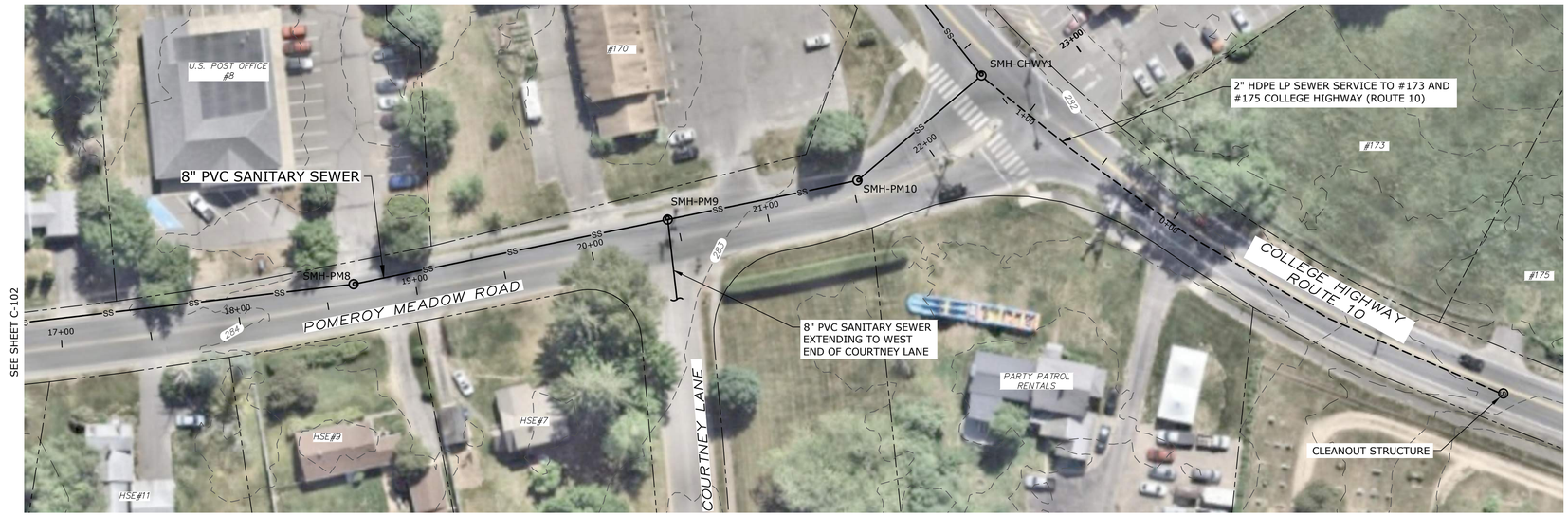
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DATE:	OCTOBER 2024
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APPROVED BY:	TTL

POMEROY MEADOW ROAD
STA 10+00 TO STA 17+00

SCALE: AS SHOWN

C-102

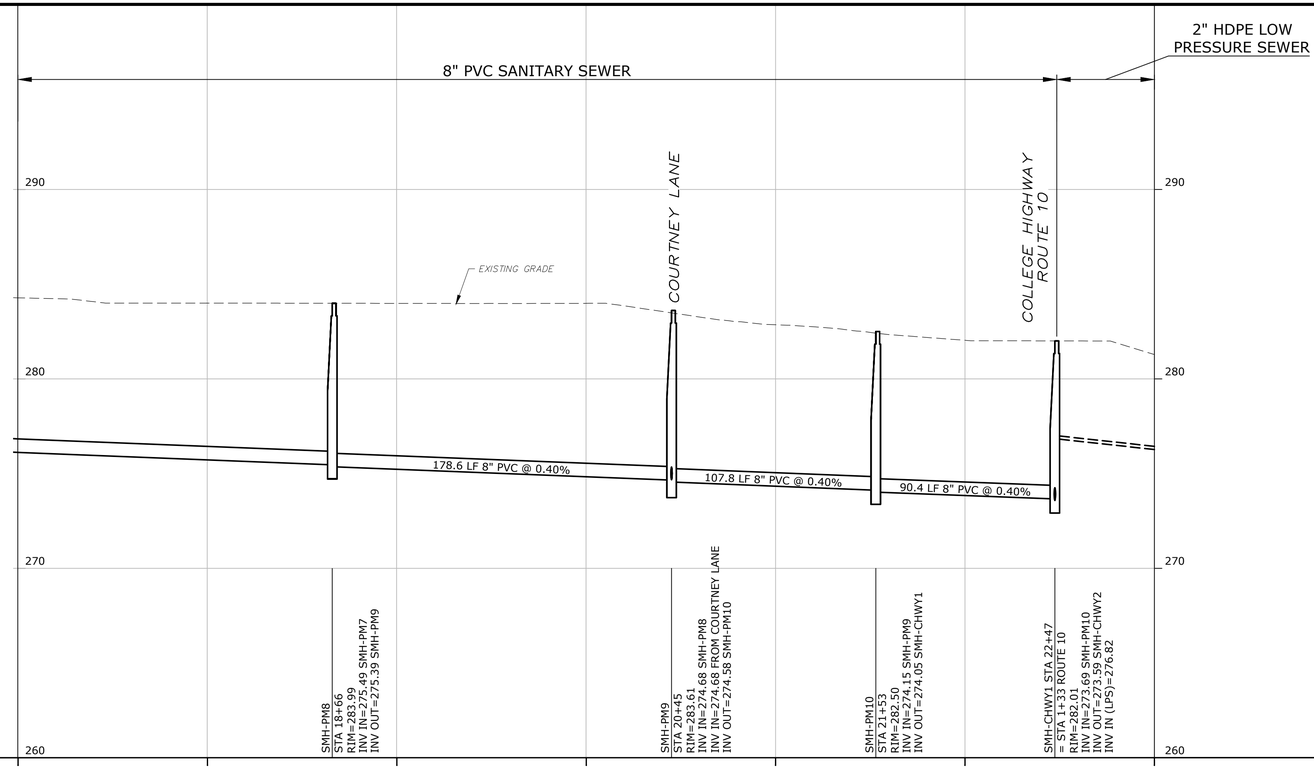
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NOTES:

1. DETAILED SEWER LAYOUTS WERE NOT DEVELOPED FOR PARSONS WAY, ROSALIE LANE, OR COURTNEY LANE.

HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

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DATE:	OCTOBER 2024
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APPROVED BY:	TTL

POMEROY MEADOW ROAD
STA 17+00 TO STA 23+00

SCALE: AS SHOWN

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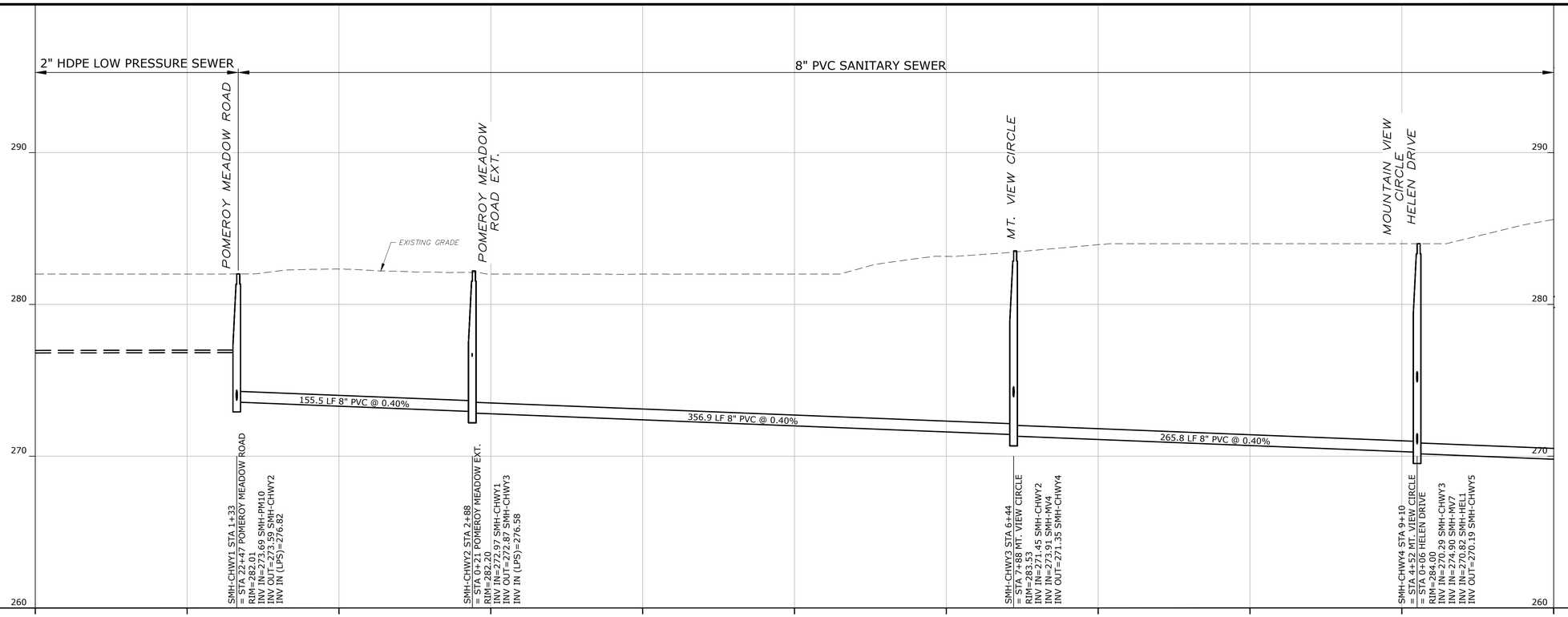


NOTES:

1. A DETAILED LAYOUT WAS NOT DEVELOPED FOR THE LOW PRESSURE COLLECTOR SEWERS FROM #173 AND #175 COLLEGE HIGHWAY.

HORIZONTAL SCALE 1" = 40'

VERTICAL SCALE 1" = 4'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

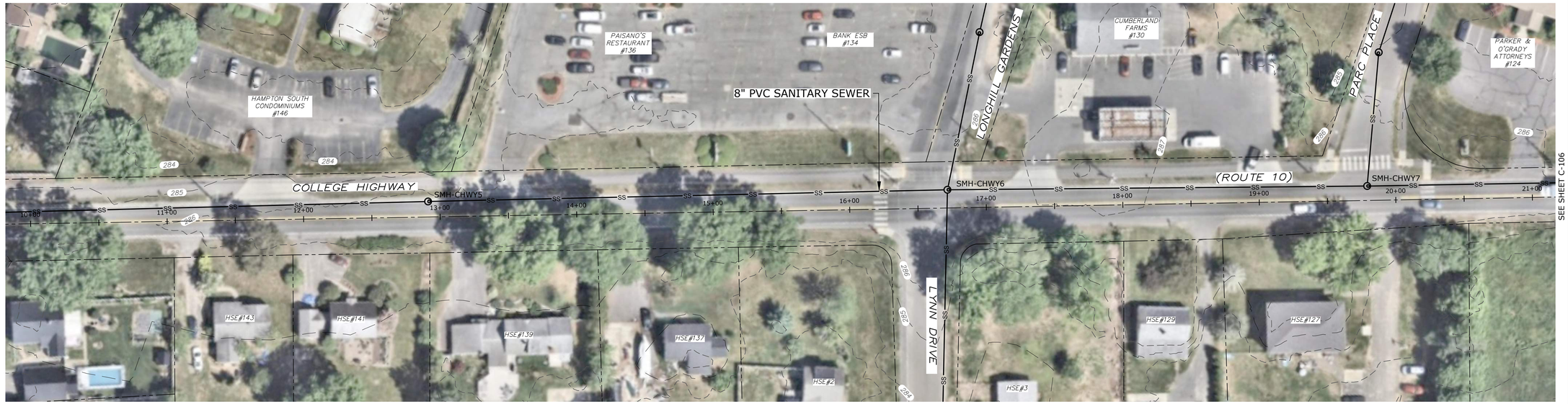
PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Route 10.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

COLLEGE HIGHWAY (ROUTE 10) STA 0+00 TO STA 10+00

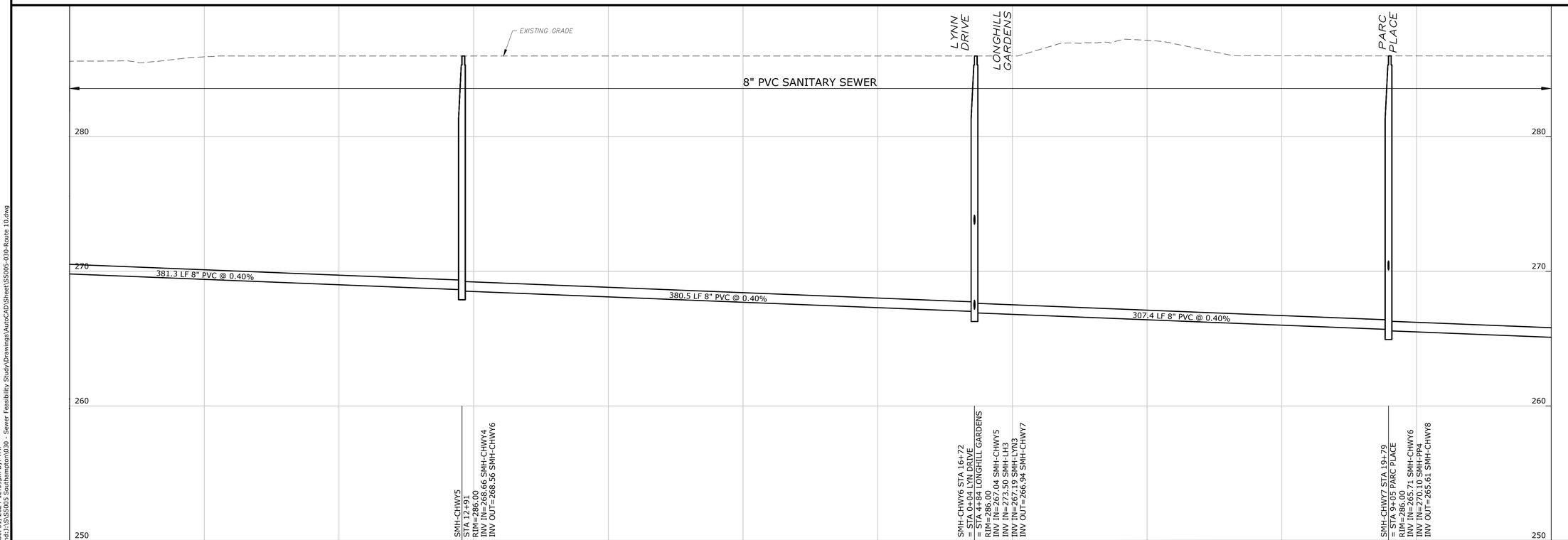
SCALE: AS SHOWN

C-104

Last Saved: 11/1/2024
Plotted: 11/01/2024 8:59am By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Route 10.dwg



HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Route 10.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

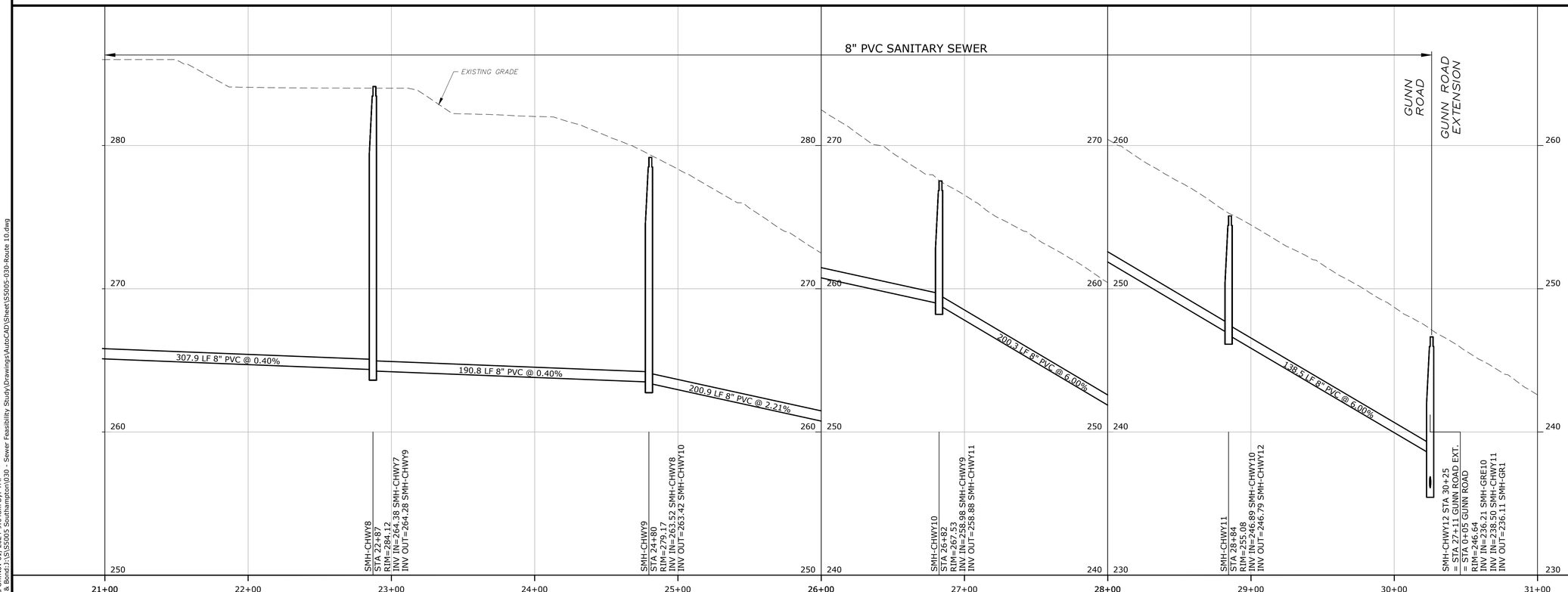
COLLEGE HIGHWAY (ROUTE 10) STA 10+00 TO STA 21+00

SCALE: AS SHOWN

C-105

Last Saved: 10/31/2024
Plotted: Oct 31, 2024 12:39pm By: TMP
Tighe & Bond:J:\S\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Route 10.dwg





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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Route 10.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

COLLEGE HIGHWAY (ROUTE 10) STA 21+00 TO STA 31+00

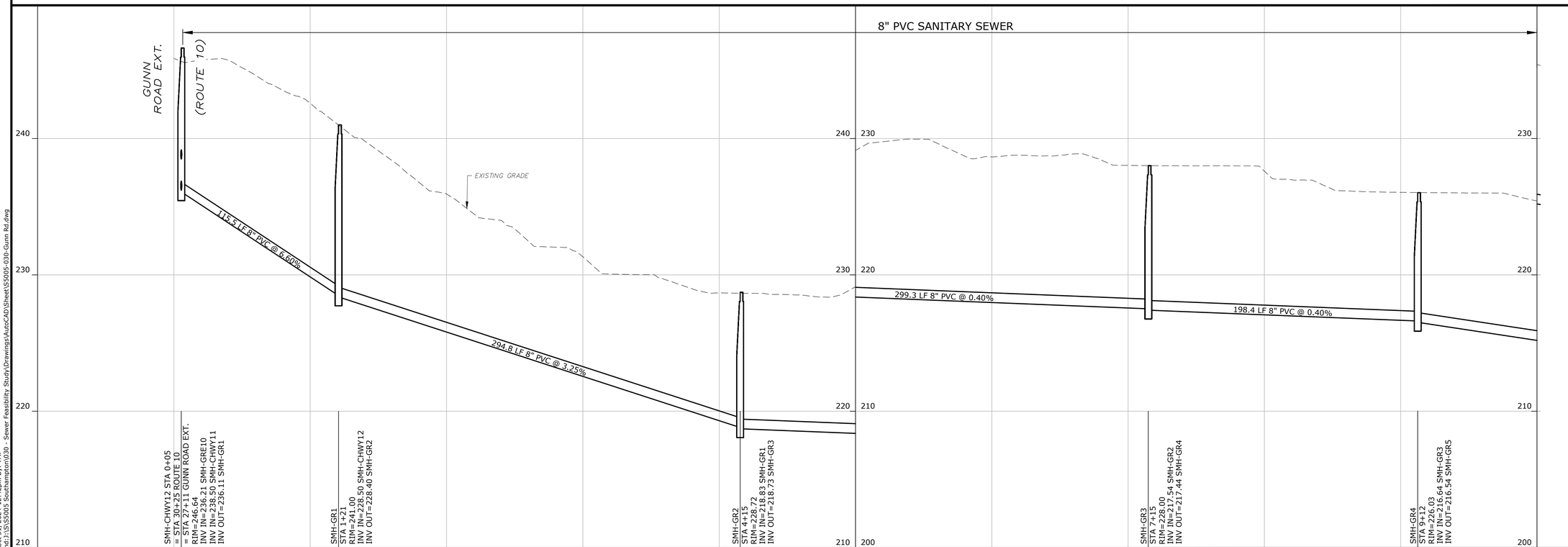
SCALE: AS SHOWN

C-106

Last Saved: 11/1/2024
Plotted: 10/31/2024 9:04am By: TMP
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HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 4'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Gunn Rd.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

GUNN ROAD STA 0+00 TO STA 10+00

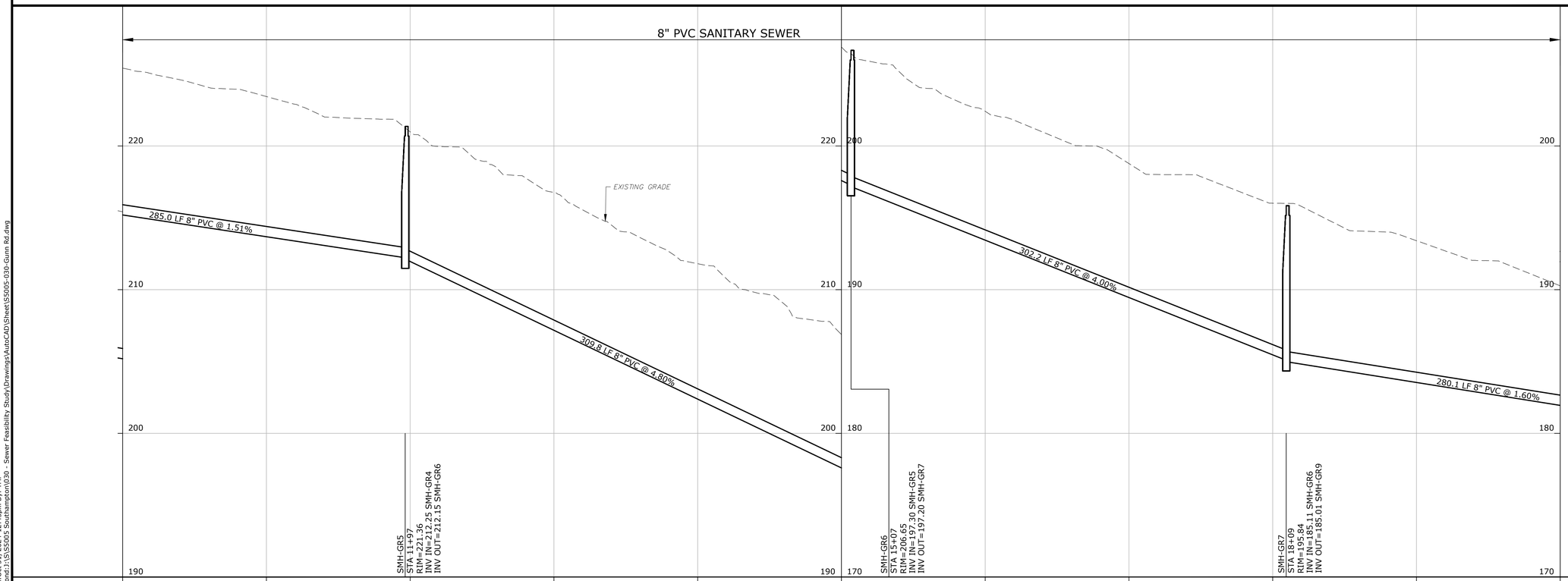
SCALE: AS SHOWN

C-107

Last Saved: 10/31/2024
Plotted: 10/31/2024 12:42pm By: TMP
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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

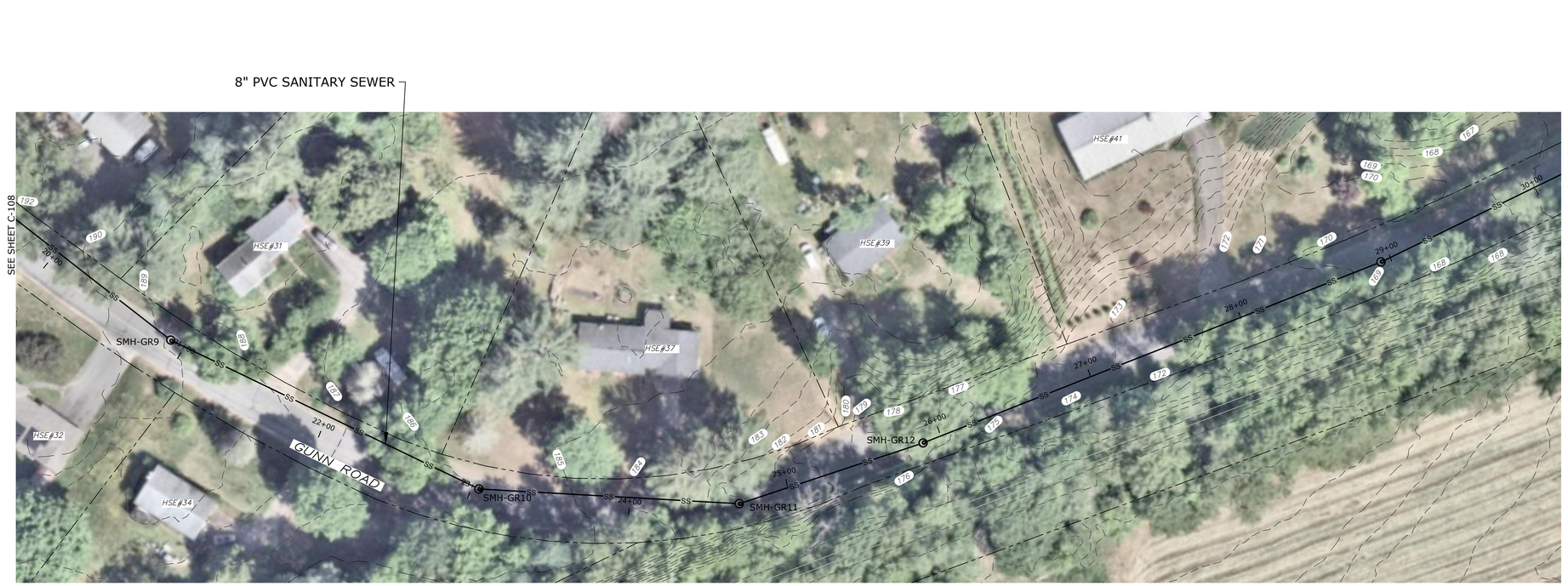
PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Gunn Rd.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

GUNN ROAD STA 10+00 TO STA 20+00

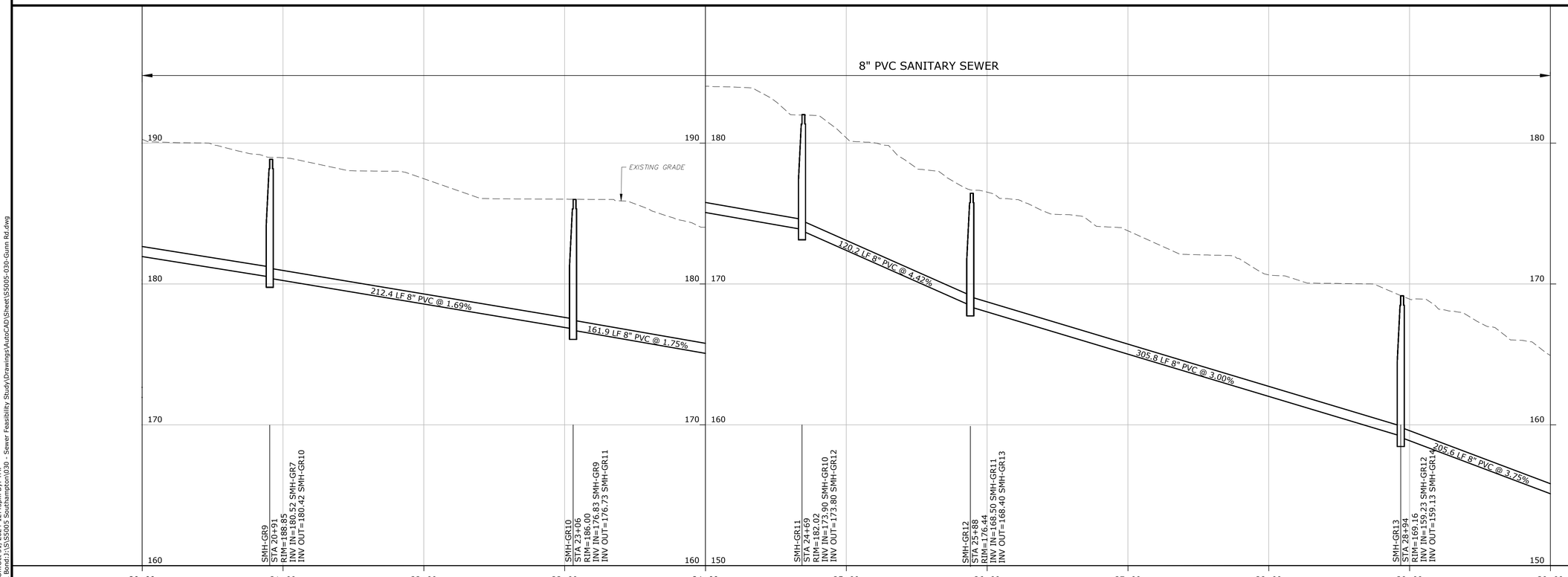
SCALE: AS SHOWN

C-108

Last Saved: 10/31/2024
Plotted: Oct 31, 2024 - 12:43pm By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Gunn Rd.dwg



HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Gunn Rd.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

GUNN ROAD STA 20+00 TO STA 30+00

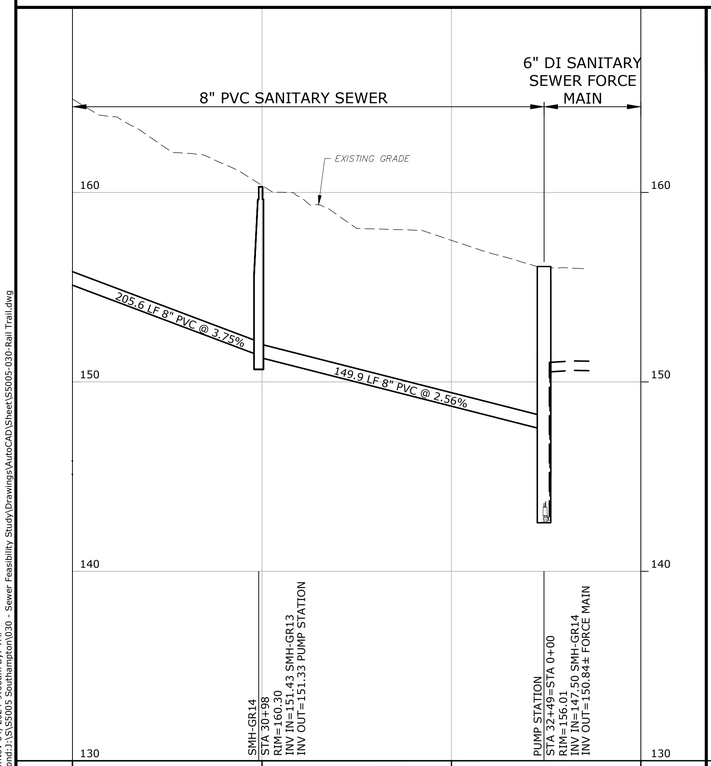
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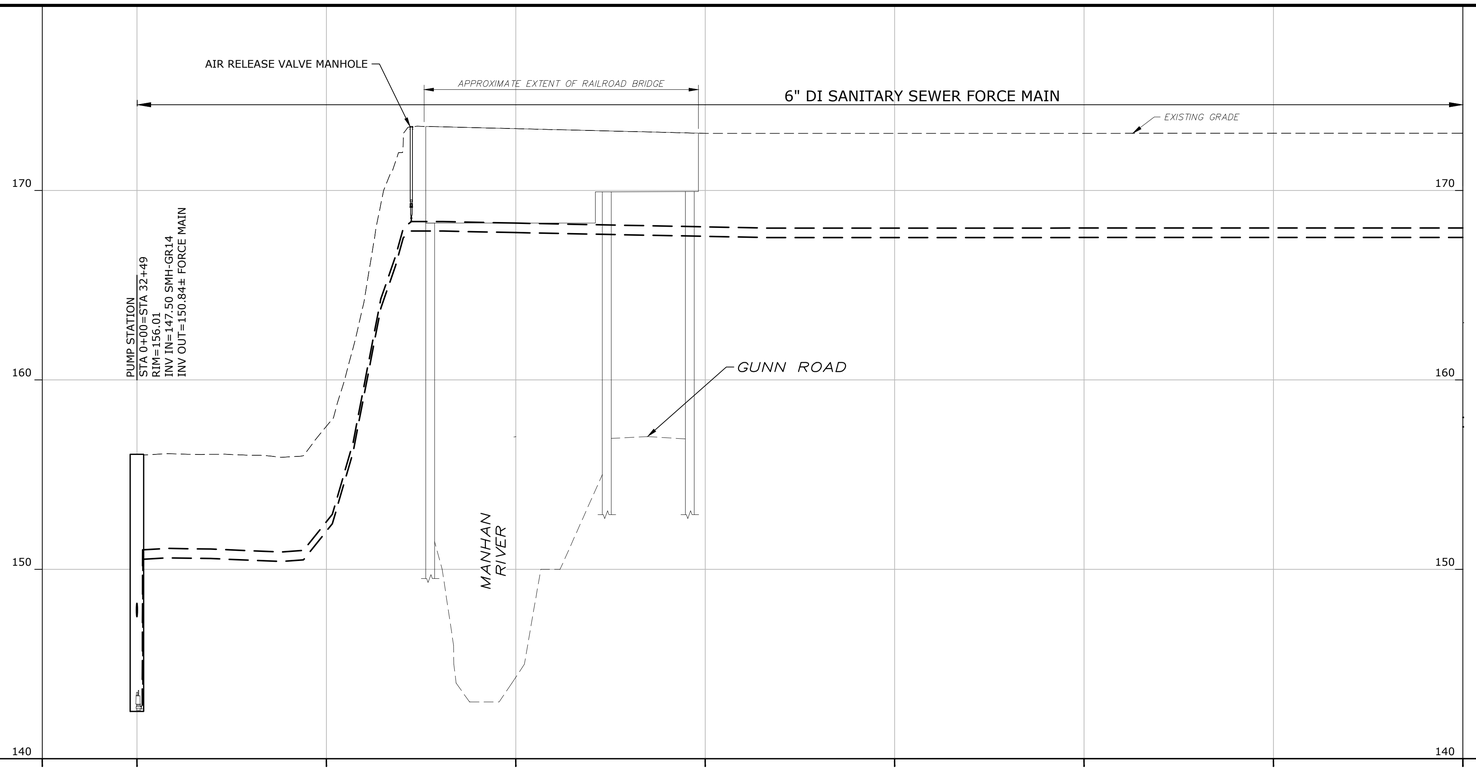
C-109

Last Saved: 10/31/2024
Plotted: 10/31/2024 12:43pm By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Gunn Rd.dwg



HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 4'





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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Rail Trail.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

GUNN RD. STA 30+00 TO STA 33+00 RAIL TRAIL STA 0+00 TO STA 7+00

SCALE: AS SHOWN

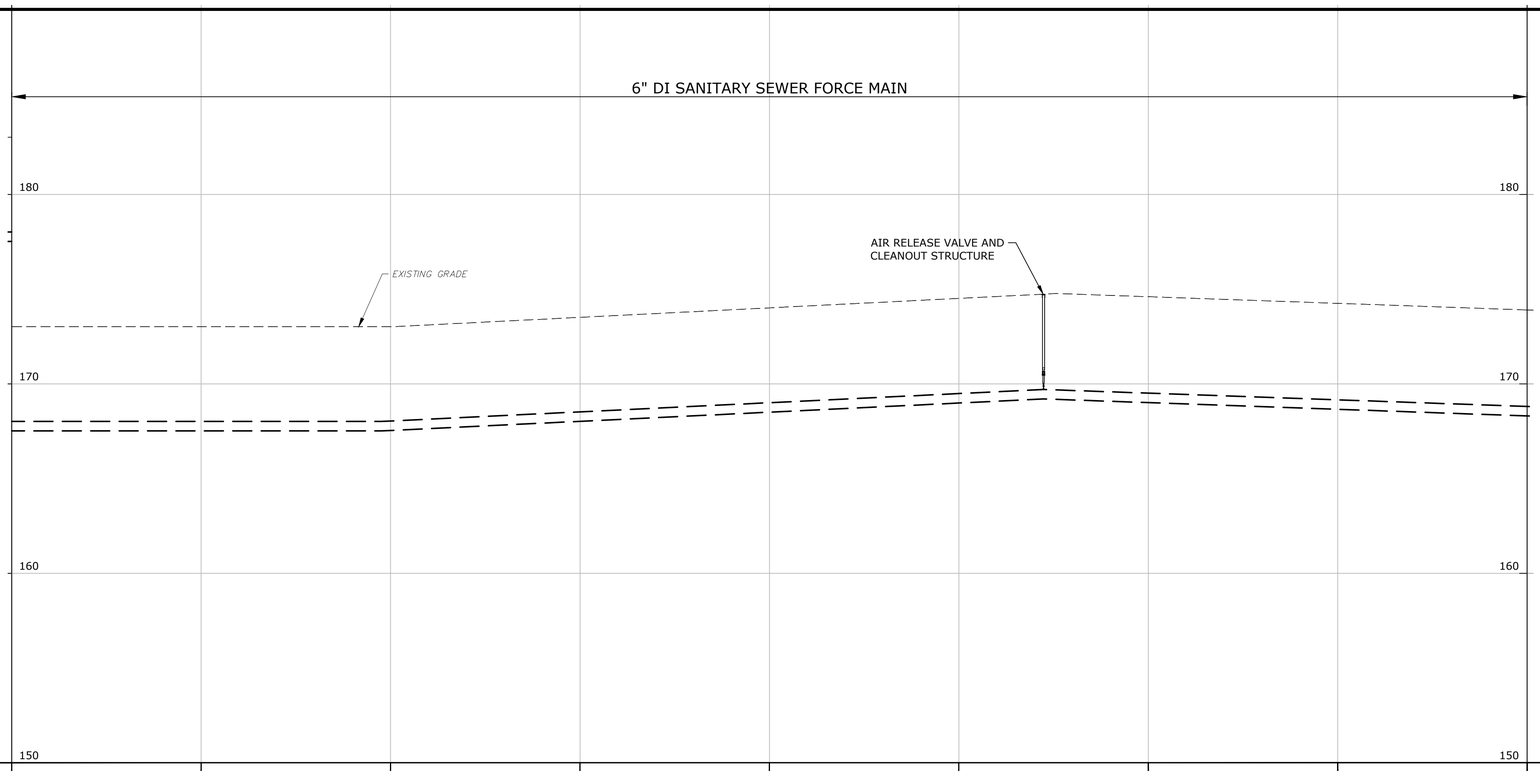
C-110

Last Saved: 11/4/2024
Plotted: 11/04/2024 9:06am By: TMP
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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION



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Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Rail Trail.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

RAIL TRAIL STA 7+00 TO STA 15+00

SCALE: AS SHOWN

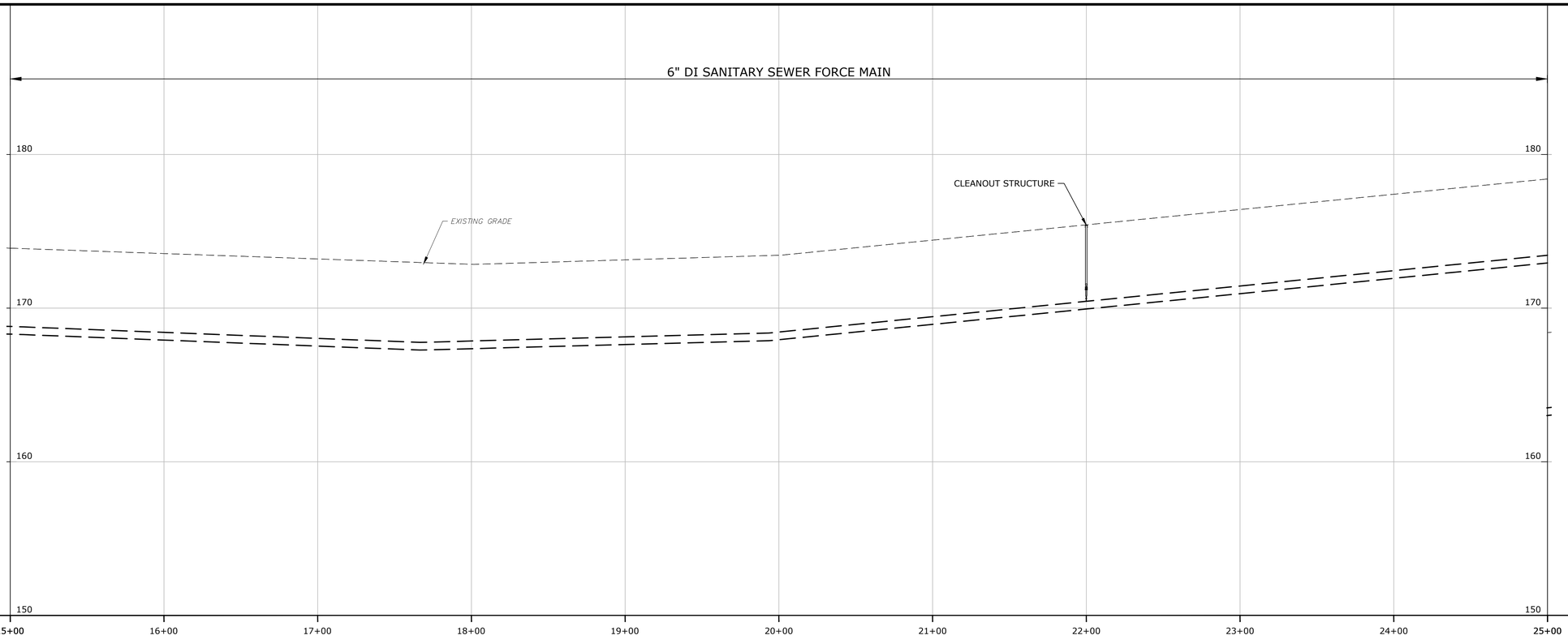
C-111

Last Saved: 10/31/2024
Plotted: Oct 31, 2024 - 9:27am By: TMP
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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION



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Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Rail Trail.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

RAIL TRAIL STA 15+00 TO STA 25+00

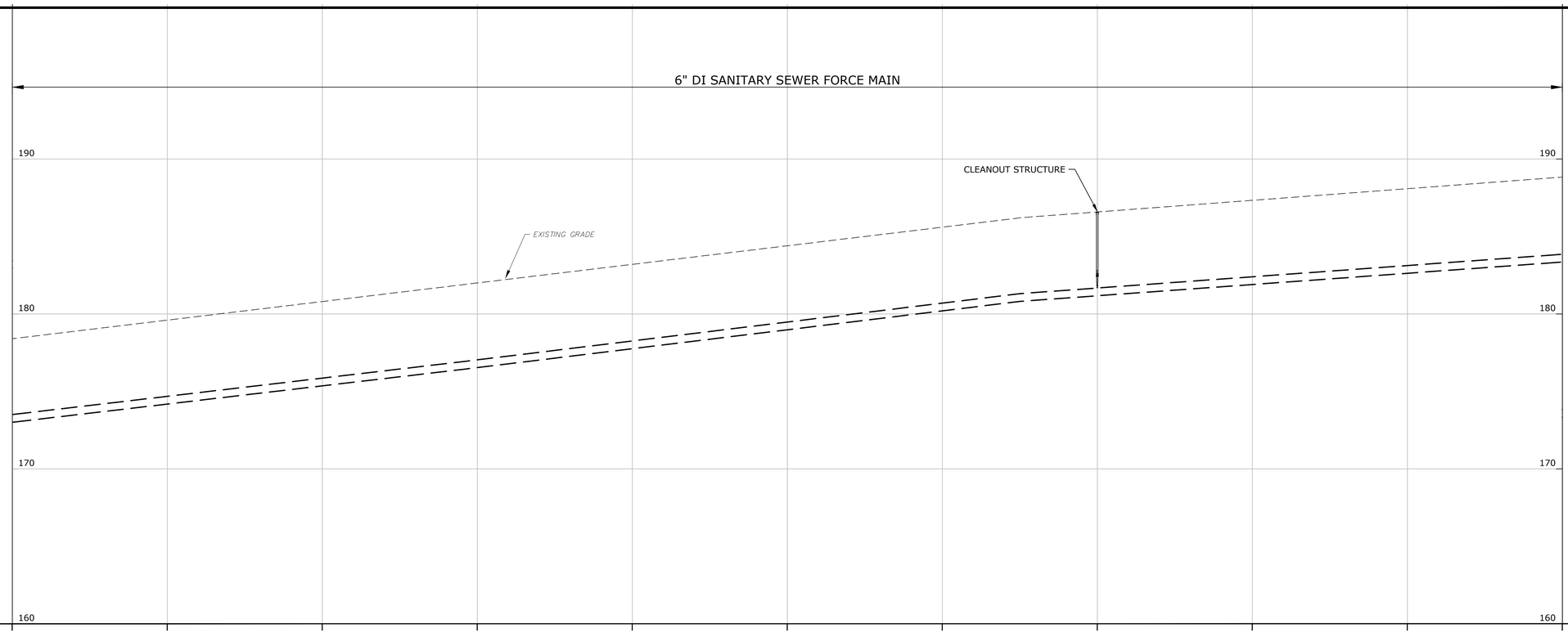
SCALE: AS SHOWN

C-112

Last Saved: 11/1/2024
Plotted: 10/31/2024 4:30pm By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Rail Trail.dwg



HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



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Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Rail Trail.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

RAIL TRAIL STA 25+00 TO STA 35+00

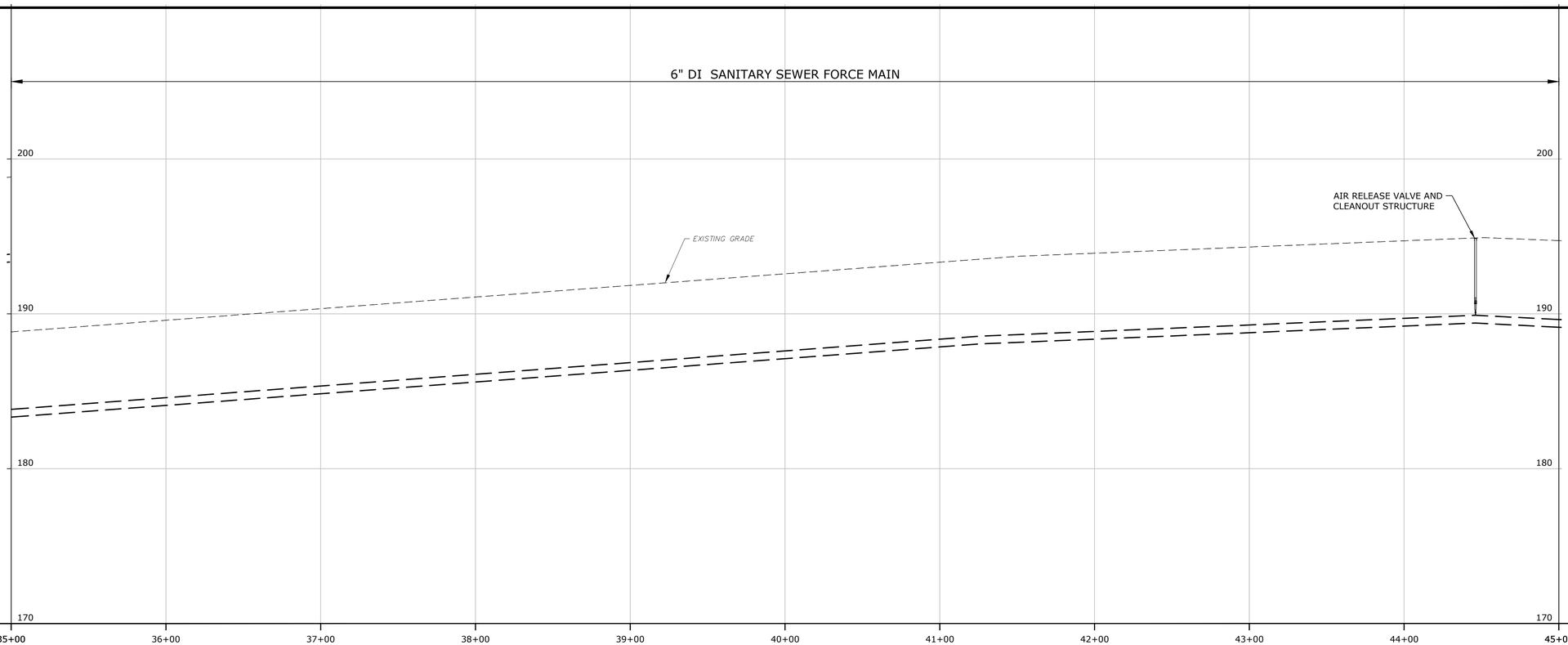
SCALE: AS SHOWN

C-113

Last Saved: 11/1/2024
Plotted: 10/31/2024 4:32am By: TMP
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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Rail Trail.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

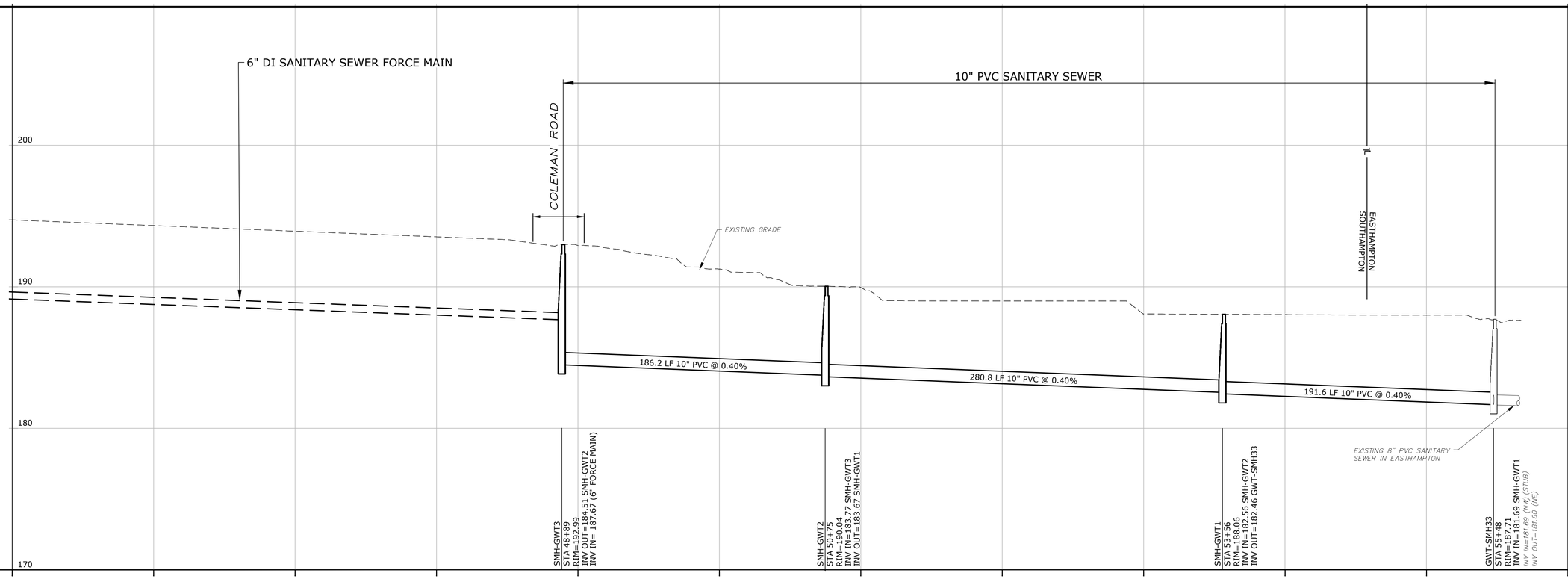
RAIL TRAIL STA 35+00 TO STA 45+00

SCALE: AS SHOWN

C-114

Last Saved: 11/1/2024
Plotted: 10/31/2024 9:35am By: TMP
Tighe & Bond J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Rail Trail.dwg





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Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Rail Trail.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

RAIL TRAIL STA 45+00 TO STA 56+00

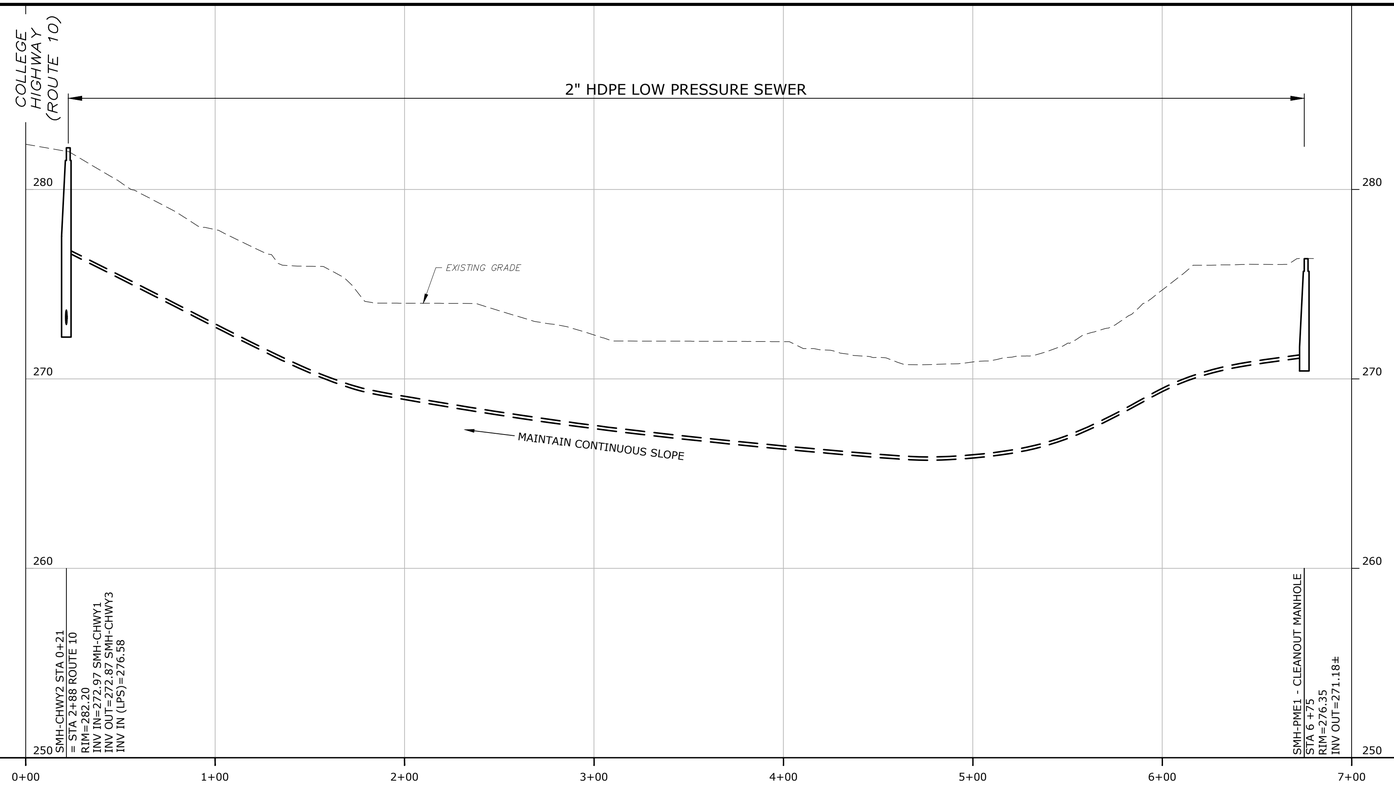
SCALE: AS SHOWN

C-115

Last Saved: 11/1/2024
Plotted: 11/1/2024 8:37am By: TMP
Tighe & Bond:J:\S\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Rail Trail.dwg



HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

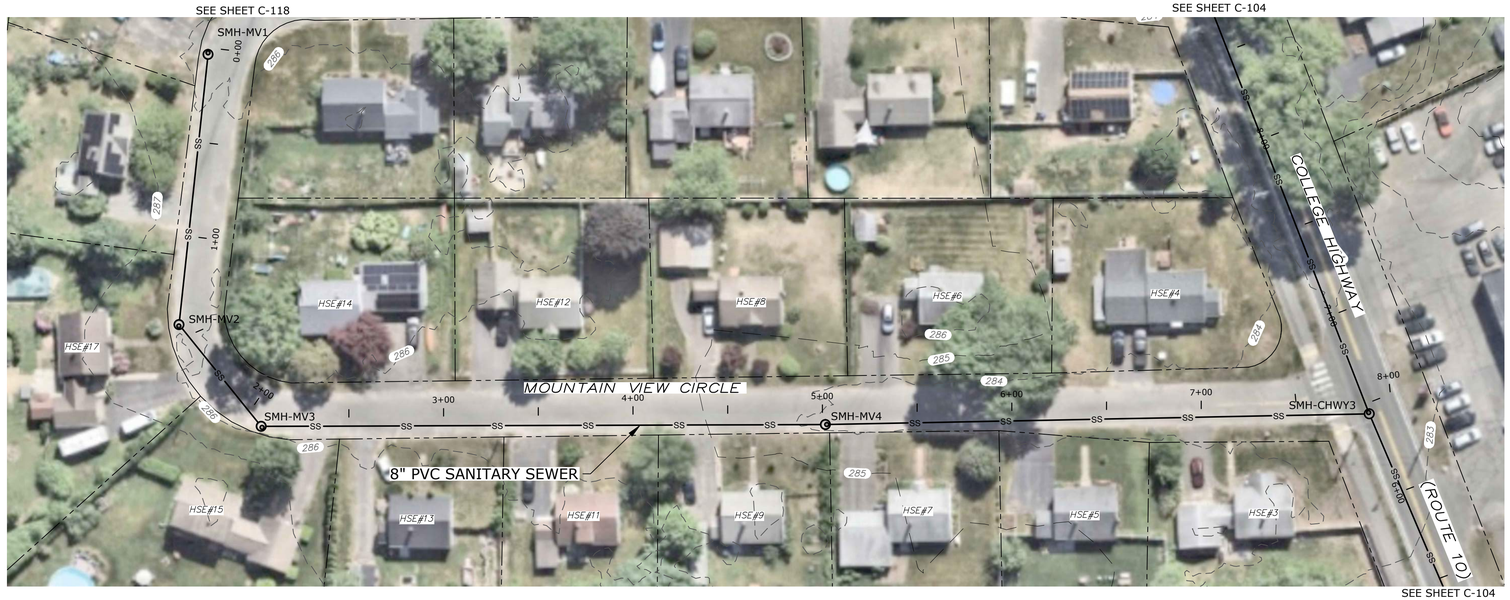
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DATE:	OCTOBER 2024
FILE:	S5005-030-PomRdExt.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

POMEROY MEADOW ROAD EXT. STA 0+00 TO STA 7+00

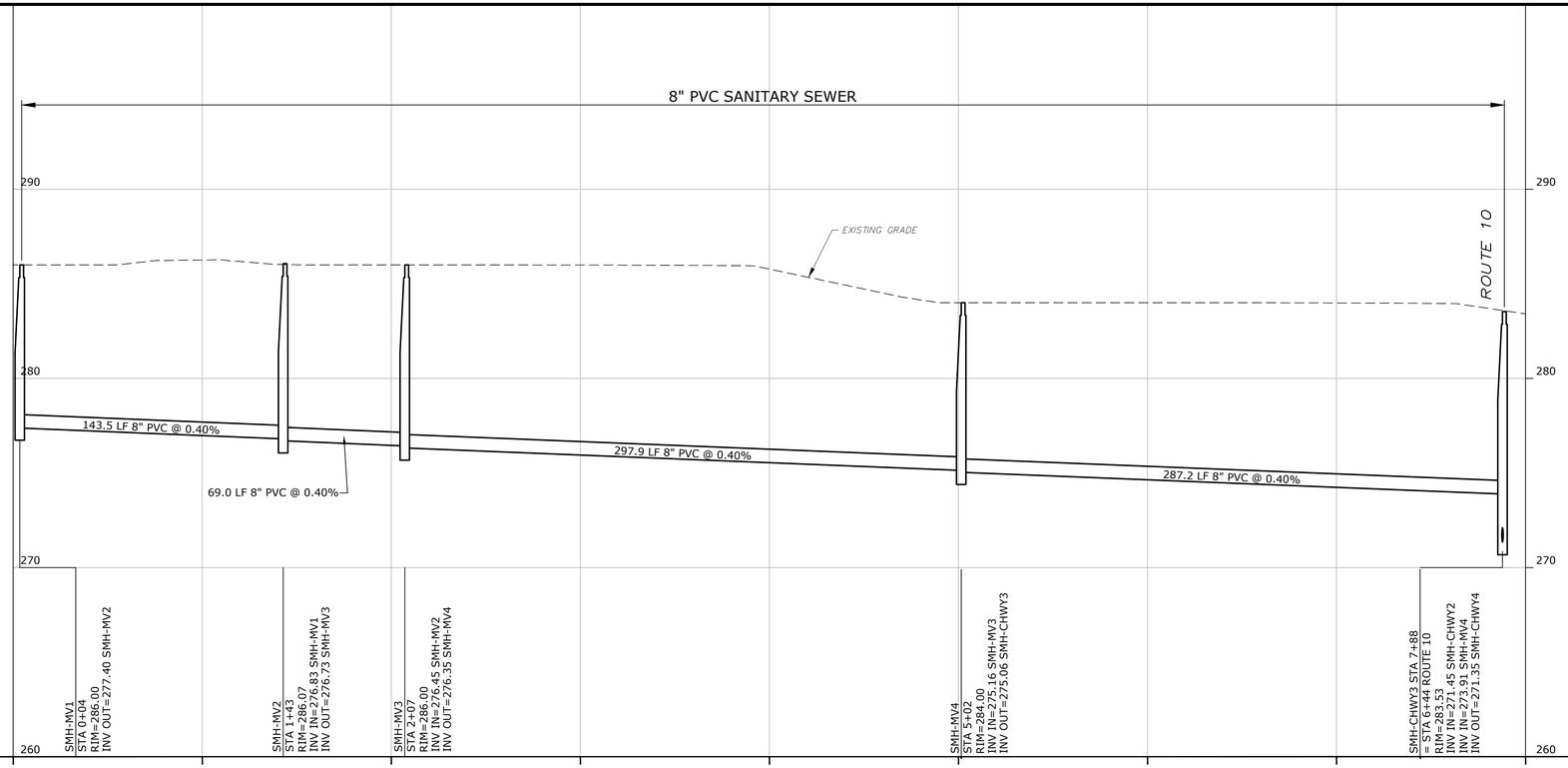
SCALE: AS SHOWN

C-116

Last Saved: 11/1/2024
Plotted: 11/01/2024 9:45am By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-PomRdExt.dwg



HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 4'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Mt View.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

MOUNTAIN VIEW CIRCLE - WEST STA 0+00 TO STA 8+00

SCALE: AS SHOWN

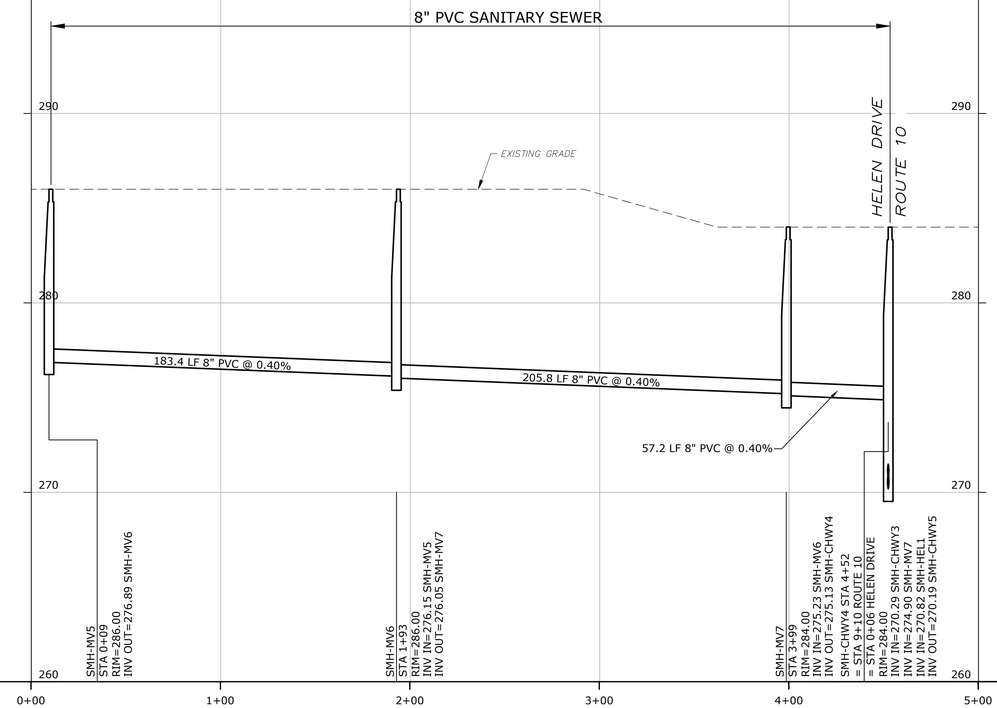
C-117

Last Saved: 11/1/2024
Plotted: 11/01/2024 10:49am By: TMP
Tighe & Bond:J:\S\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Mt View.dwg



HORIZONTAL SCALE 1" = 40'

VERTICAL SCALE 1" = 4'



Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Mt View.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

MOUNTAIN VIEW CIRCLE - EAST STA 0+00 TO STA 5+00

SCALE: AS SHOWN

C-118

Last Saved: 11/1/2024
Plotted: 01/06/2025 - 7:24:49:50am By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Mt View.dwg

SEE SHEET C-105

SEE SHEET C-124

SEE SHEET C-120

SEE SHEET C-118

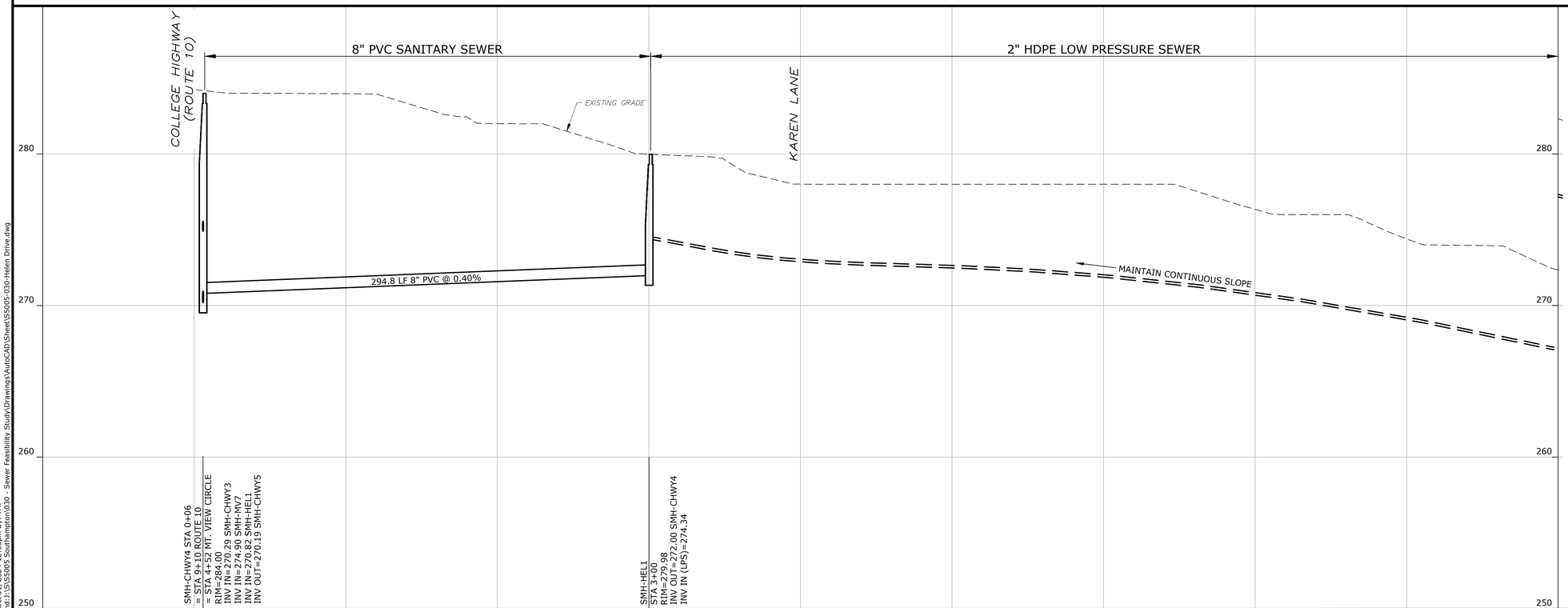


SEE SHEET C-104

8" PVC SANITARY SEWER

2" HDPE LOW PRESSURE SEWER

HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Helen Drive.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

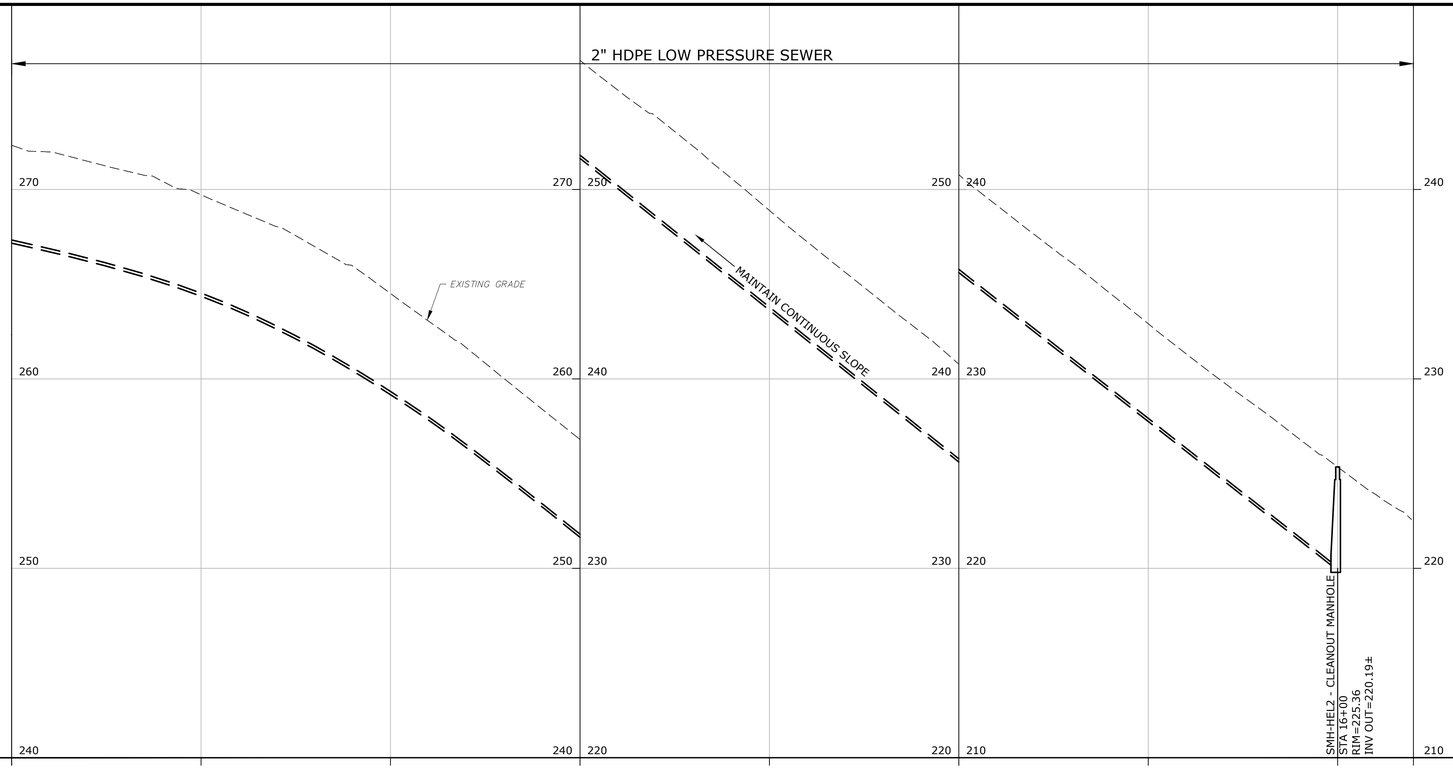
HELEN DRIVE STA 0+00 TO STA 9+00

SCALE: AS SHOWN

C-119

Last Saved: 10/31/2024
Plotted: Oct 31, 2024 - 12:53pm By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Helen Drive.dwg





HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 4'

Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

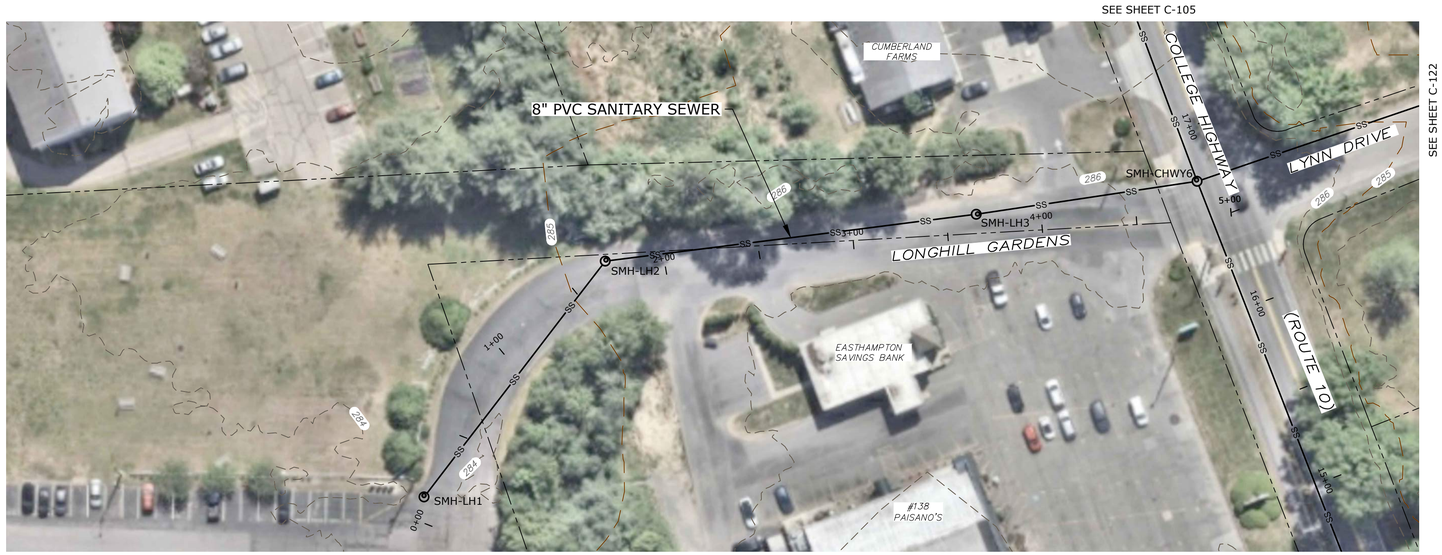
PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Helen Drive.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

HELEN DRIVE STA 9+00 TO STA 16+40

SCALE: AS SHOWN

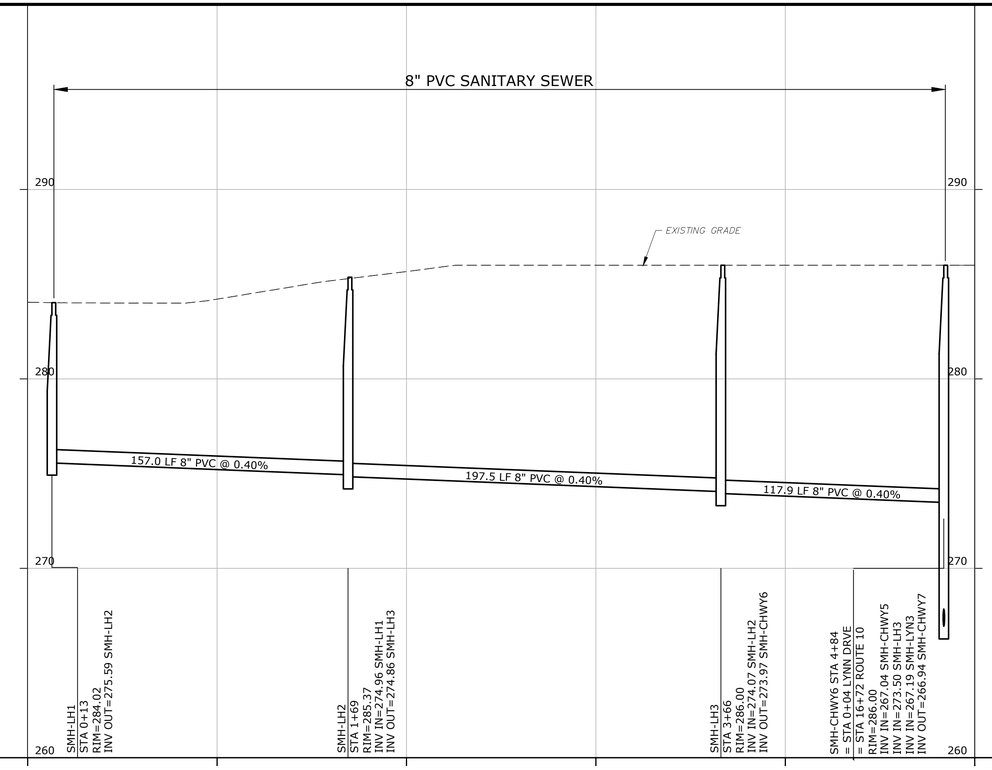
C-120

Last Saved: 10/31/2024
Plotted: 10/31/2024 10:00am By: TMP
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HORIZONTAL SCALE 1" = 40'

VERTICAL SCALE 1" = 4'



CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Tighe&Bond

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Longhill.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

LONGHILL GARDENS
STA 0+00 TO STA 5+00

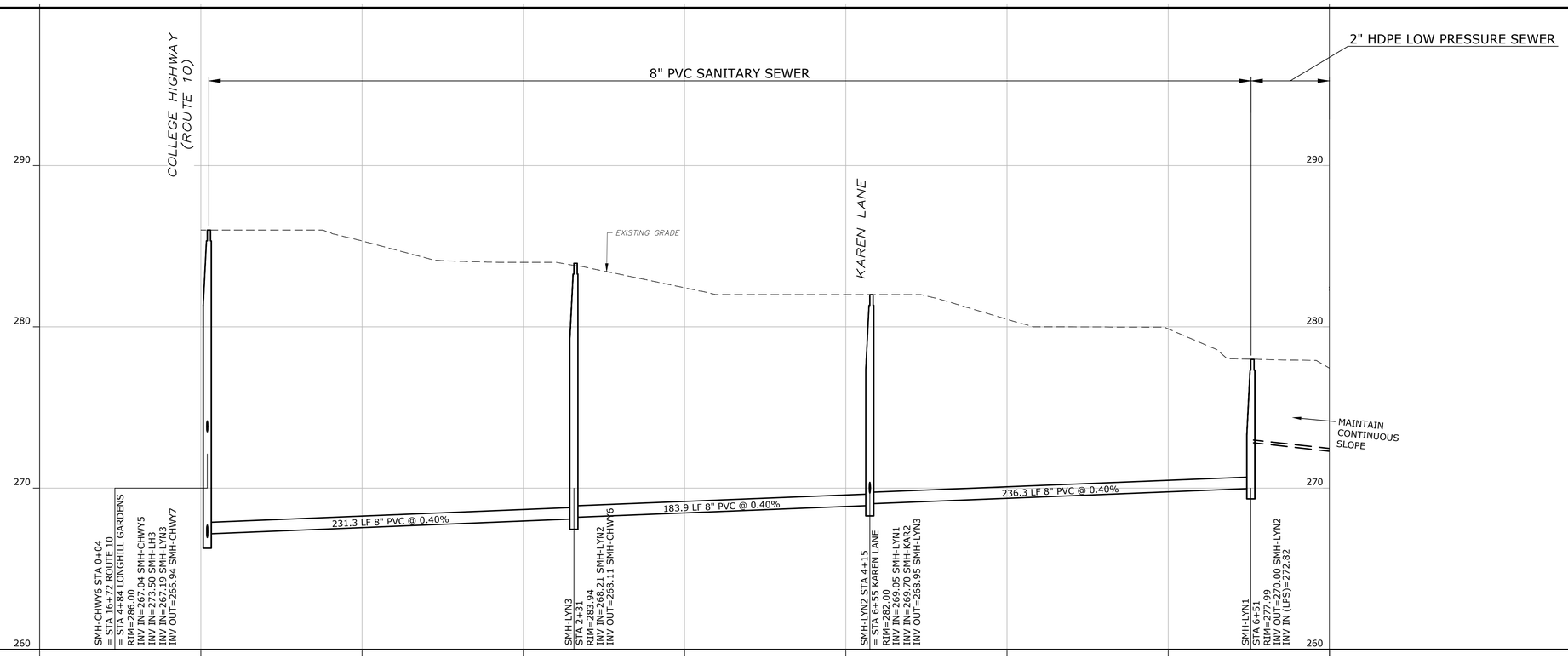
SCALE: AS SHOWN

C-121

Last Saved: 10/31/2024
Plotted: 10/31/2024 12:55pm By: TMP
Tighe & Bond:J:\S5005 Southampton\030 - Sewer Feasibility Study\Drawings\AutoCAD\Sheet\S5005-030-Longhill.dwg



HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'



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CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Lynn.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

LYNN DRIVE STA 0+00 TO STA 7+00

SCALE: AS SHOWN

C-122

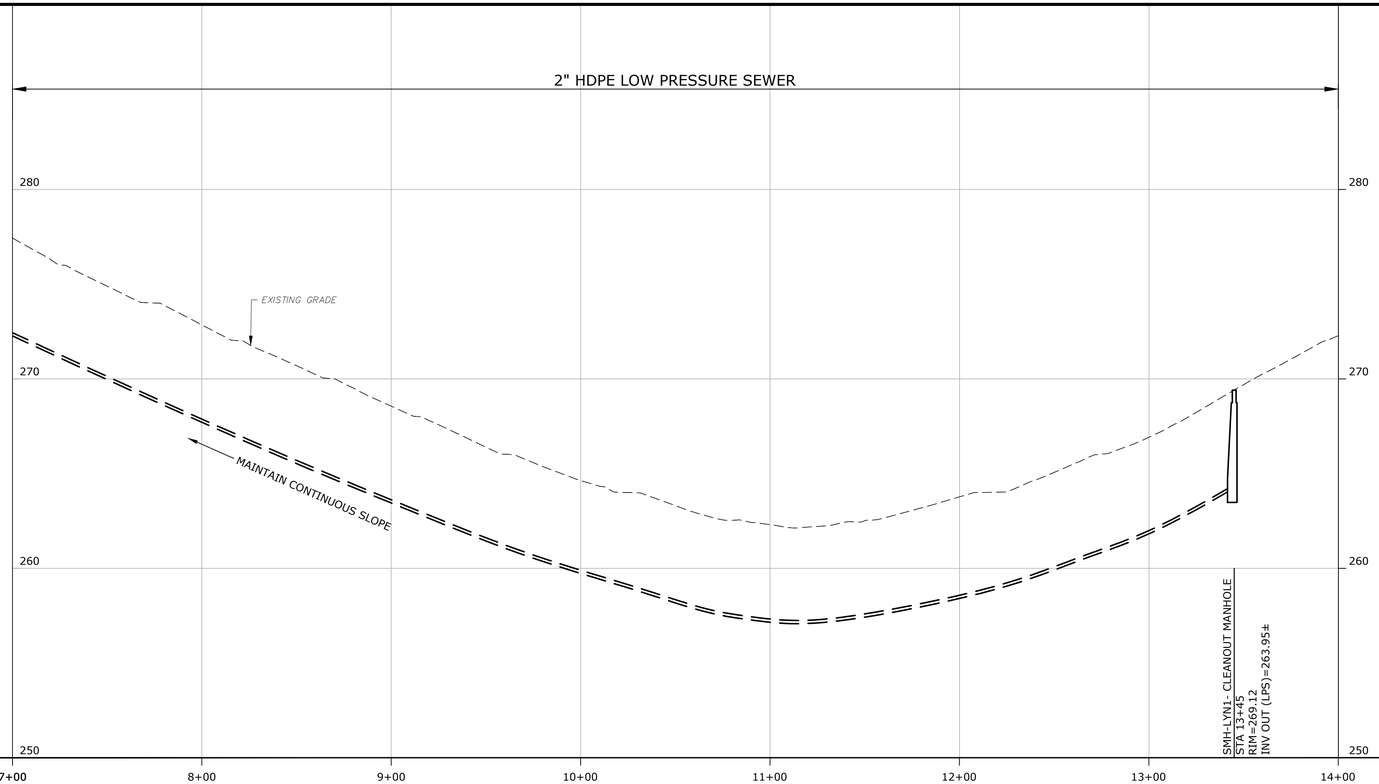
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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION



Tighe&Bond

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Lynn.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

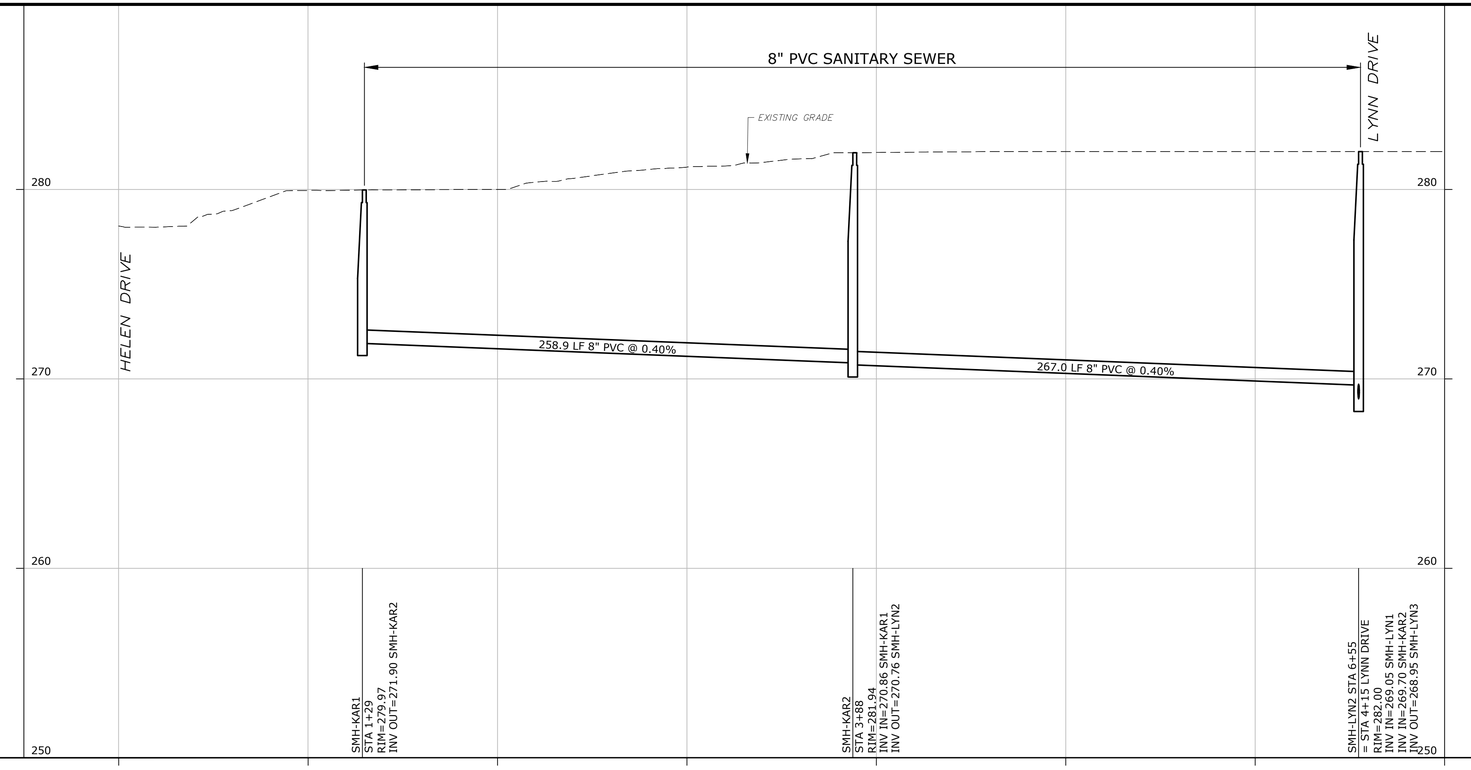
LYNN DRIVE STA 7+00 TO STA 14+00

SCALE: AS SHOWN

C-123

Last Saved: 10/31/2024
Plotted: Oct 31, 2024 12:57pm By: TMP
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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'

Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Karen Lane.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

KAREN LANE STA 0+00 TO STA 7+00

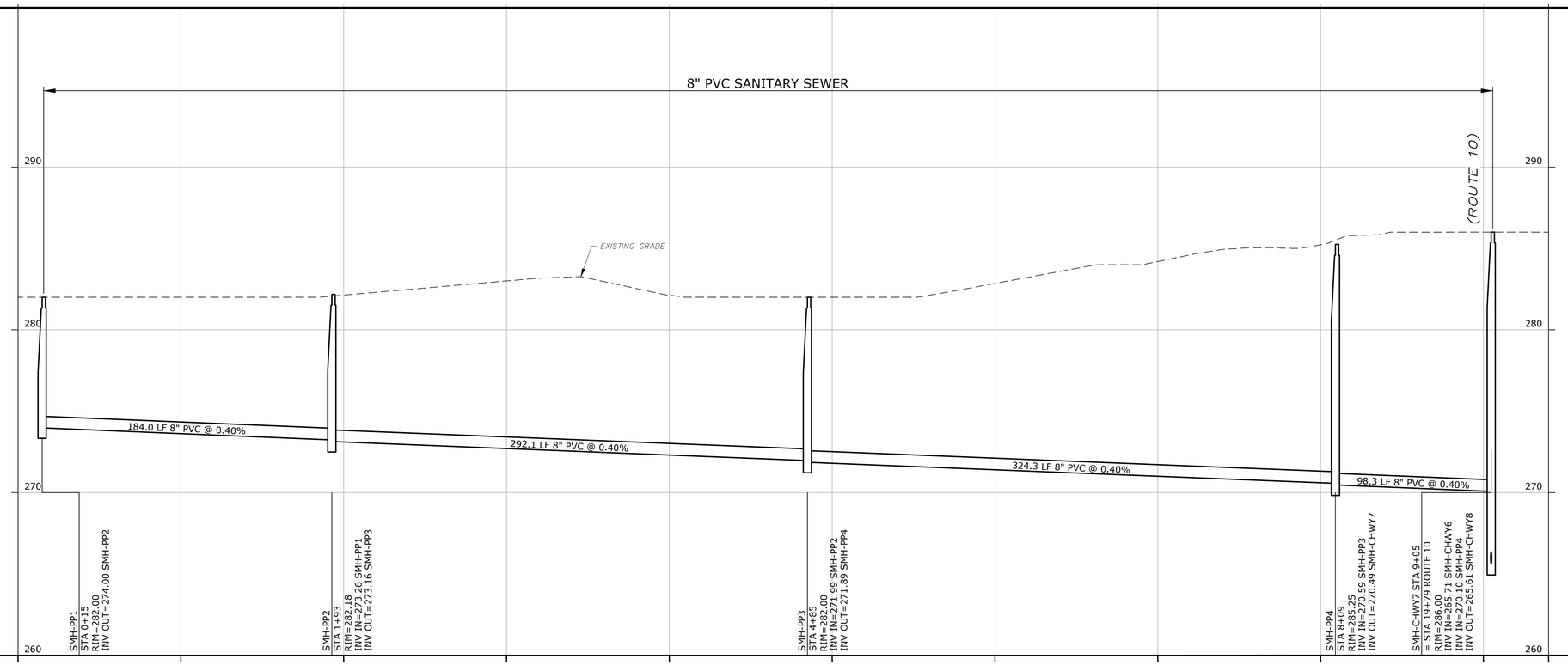
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C-124

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HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 4'



Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Parc.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

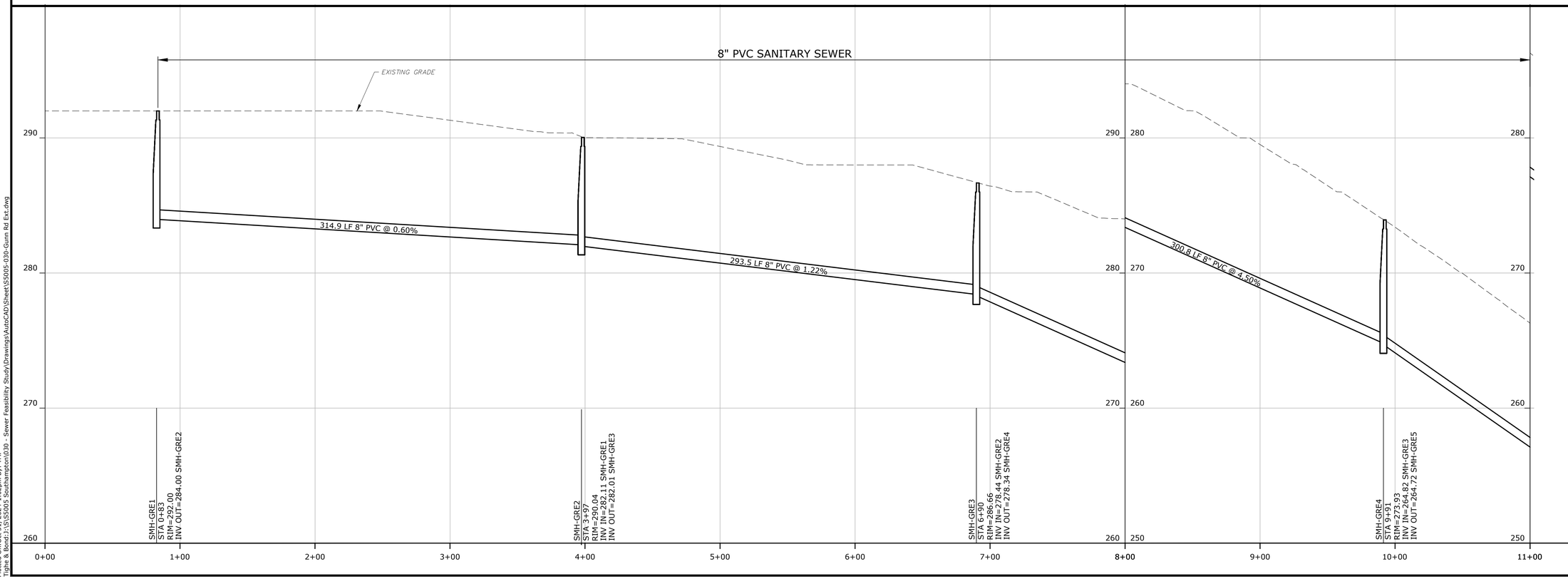
PARC PLACE STA 0+00 TO STA 9+40

SCALE: AS SHOWN

C-125

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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'

Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
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DRAWN BY:	DJP, TMP
DESIGNED/CHECKED BY:	JMP
APPROVED BY:	TTL

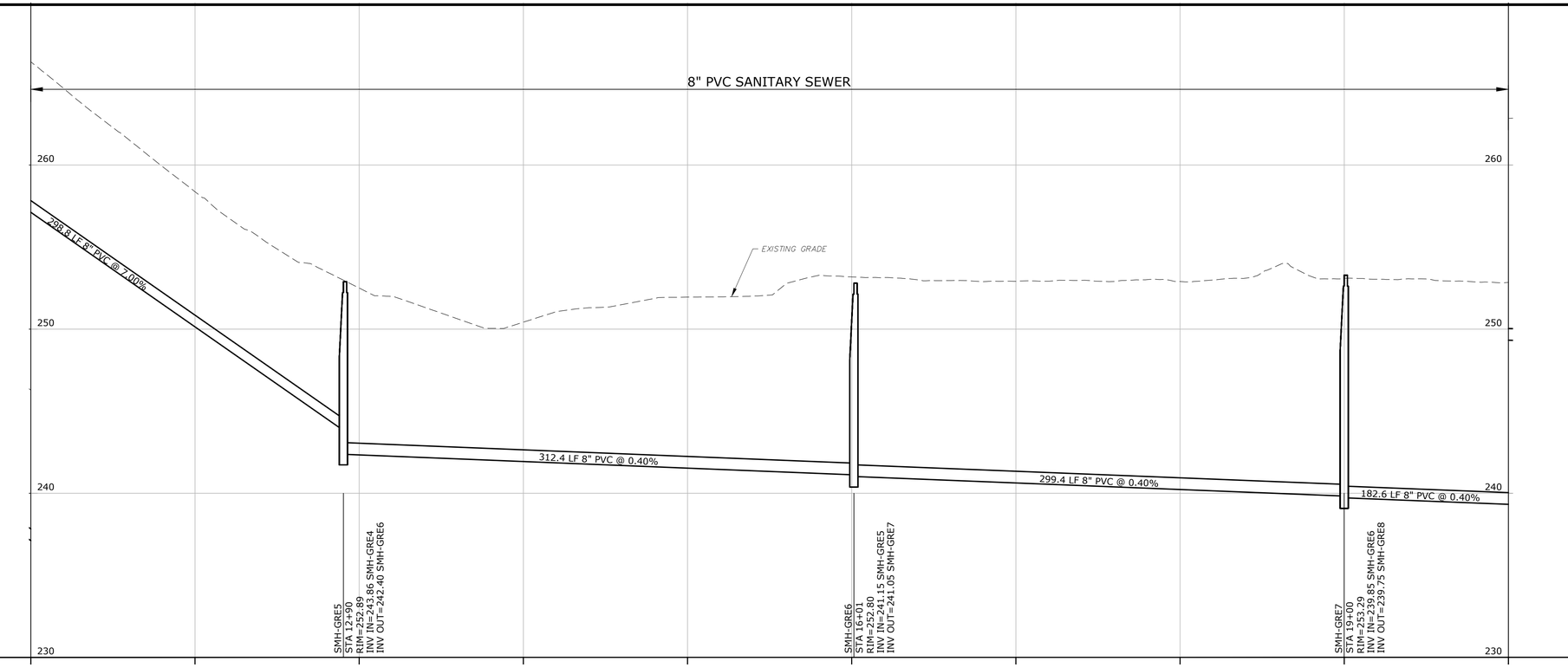
GUNN ROAD EXT. STA 0+00 TO STA 11+00

SCALE: AS SHOWN

C-126

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HORIZONTAL SCALE 1" = 40'
0 40' 80'
VERTICAL SCALE 1" = 4'
0 4' 8'

Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

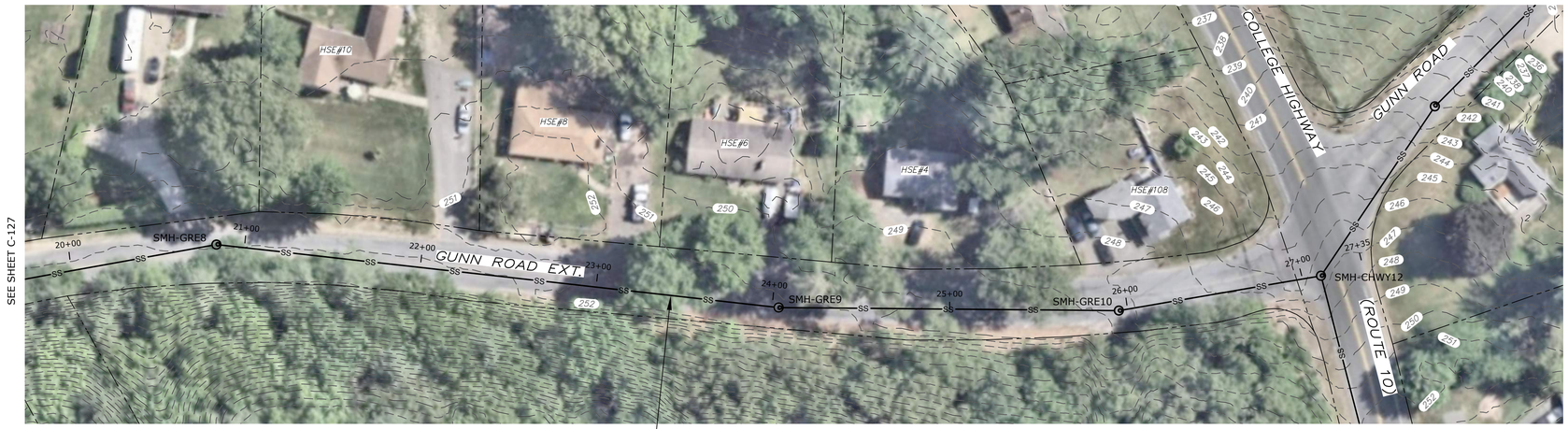
PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Gunn Rd Ext.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

GUNN ROAD EXT. STA 11+00 TO STA 20+00

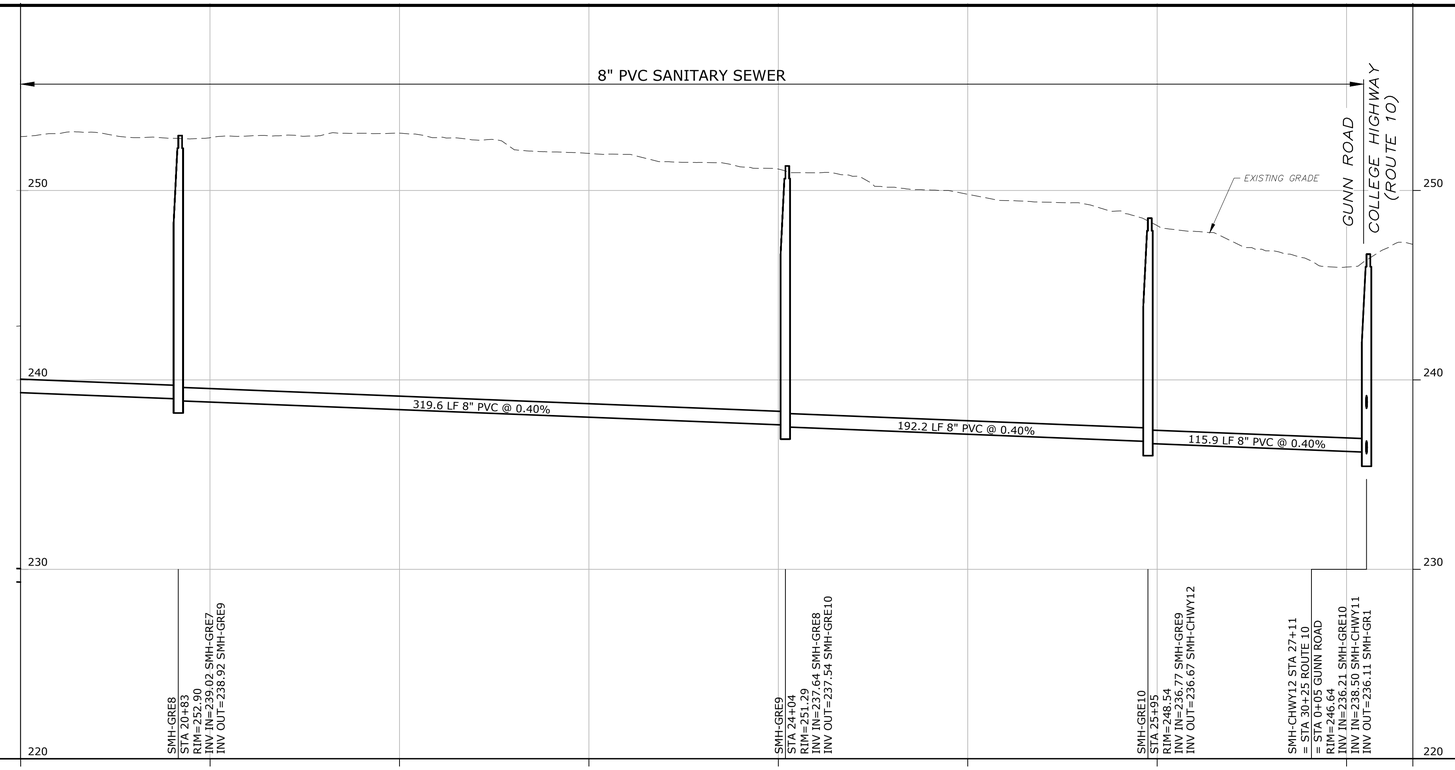
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C-127

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HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 4'



Tighe&Bond

CONCEPTUAL LAYOUT NOT FOR CONSTRUCTION

Village Area Sewer Study

Town of Southampton

Southampton, Massachusetts

MARK	DATE	DESCRIPTION
	10/31/2024	CONCEPTUAL LAYOUT

PROJECT NO:	S5005-030
DATE:	OCTOBER 2024
FILE:	S5005-030-Gunn Rd Ext.dwg
DRAWN BY:	TMP
DESIGNED/CHECKED BY:	DJP, JMP
APPROVED BY:	TTL

GUNN ROAD EXT. STA 20+00 TO STA 27+35

SCALE: AS SHOWN

C-128

Last Saved: 8/21/2024
Plotted: 08/21/2024 10:32am By: TMP
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Appendix C
Easthampton Sewer System Map

NORTHAMPTON

EASTHAMPTON

HADLEY

HOLYOKE

SOUTH HADLEY

Connecticut River

Manhan River

Nashawannuck Pond

Lower Mill Pond

Torrey Steet Pump Station

Ashley Circle Pump Station

Oliver Street Pump Station

Leachate Flow from Capped Landfill

Pomeroy Meadow Road Pump Station

Truehart Drive Pump Station

Pumped flow from Walgreens Pharmacy, Cooley Dickinson Urgent Care and Rehabilitation Facility, Big Y Supermarket, Smitty's Package Store and the Tractor Supply Co.

Pumped flow from Queen Bee Car Wash, the Red Rock Shops, Peanuts Day Care, and O' Reilly Auto Parts

Southampton's Wastewater Flow from the Village Area

Ballard Street Pump Station

Pumped Wastewater Flow from Mantis Graphics

Daley Field Pump Station

Lownds Ave Pump Station

Adams Street Pump Station

Liberty Street Pump Station

Lovefield Street Pump Station

Manhan River Outfall

WWTF

Ft. Hill Brewery

Mt Tom Pump Station

CT River Outfall

East St North Pump Station

East St South Pump Station

Brook Street Pump Station

Hendrick Street Pump Station

Phelps Street Pump Station

Cook Road Pump Station

Old Railroad Interceptor

New Railroad Interceptor

Hannum Brook Interceptor

Manhan River Interceptor

White Brook Interceptor

Broad Brook Interceptor

Parsons Street Sewer

DPW Garage

Easthampton High School

Mountain View School

Williston Northampton School

Nonotuck Park

Mass Audubon Arcadia Wildlife Sanctuary

Mount Tom State Reservation

Inset A

3" PVC FM

6-2" PVC FMs

12-2" PVC FMs

8" VC

6" VC

LEGEND

General

- Sewer Manhole
- Municipal Pump Station
- Municipal Grinder Pump Station
- Private Pump Station
- Siphon
- WWTF Piping
- Gravity Sewer Main
- Force Main (FM) / Low Pressure Sewer (LP)
- Interceptor
- WWTF Outfall
- Private Sewer
- Building
- Parcel Boundary
- Lakes and Ponds
- Recreational Open Space
- Bike Trail
- Private Road
- Interstate Highway
- City Boundary

Pipe Materials

AC - Asbestos Cement
CI - Cast Iron
CIPP - Cured-In-Place Pipe Liner
DI - Ductile Iron
HDPE - High Density Polyethylene
PVC - Polyvinyl Chloride
RC - Reinforced Concrete
VC - Vitrified Clay

Village Area Sewer Study

- Proposed Gravity Sewer
- Sewers Included in the Capacity Assessment
- Sewers Not Included in the Capacity Assessment

MAP C-1
Easthampton Wastewater Collection System
Village Area Sewer Study
Southampton, MA

1" = 800 feet

0 400 800 1,600 Feet

Tighe&Bond

October 2024

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Appendix D
Engineer's Opinion of Probable Capital Cost

TABLE D-1

Engineer's Opinion of Probable Capital Cost[1]

Village Area Sewer Study

Street	Sheet No.	Station Begin	Station End	Sewer Diameter (in)	Sewer Length (ft)/No.	Gravity Pipe Cost				Pressure Pipe Cost				Restoration Cost			Total Cost
						Average Depth Range[2]	Sewer Length (ft)	Unit Cost ($/LF)	Extended Cost ($)	Pipe Type[3]	Sewer Length (ft)	Unit Cost ($/LF)	Extended Cost ($)	Surface Restoration[4]	Unit Cost ($/LF)	Extended Cost ($)	
Pomeroy Meadow Rd.	C-101	1+15	8+22	8	707	<10 ft	707	$330	$233,000					Asphalt	$100	$71,000	$304,000
	C-101	8+22	9+53	8	131	10 ft-18 ft	131	$450	$59,000					Asphalt	$100	$13,000	$72,000
	C-101 thru C-103	9+53	22+47	8	1,294	< 10 ft	1,294	$330	$427,000					Asphalt	$100	$129,000	$556,000
College Highway	C-104	-2+67	1+33	2	400					LP	400	$150	$60,000	Asphalt-MH	$180	$72,000	$132,000
(RTE 10)	C-104	1+33	5+05	8	372	< 10 ft	372	$330	$123,000					Asphalt-MH	$180	$67,000	$190,000
	C-104 thru C-105	5+05	14+31	8	926	10 ft-18 ft	926	$450	$417,000					Asphalt-MH	$180	$167,000	$584,000
	C-105 thru C-106	14+31	24+22	8	991	>18	991	$710	$704,000					Asphalt-MH	$180	$178,000	$882,000
	C-106	24+22	26+49	8	227	10 ft-18 ft	227	$450	$102,000					Asphalt-MH	$180	$41,000	$143,000
	C-106	26+49	30+25	8	376	< 10 ft	376	$330	$124,000					Asphalt-MH	$180	$68,000	$192,000
Gunn Rd.	C-107	+5	1+89	8	184	10 ft-18 ft	184	$450	$83,000					Asphalt	$100	$18,000	$101,000
	C-107	1+89	4+86	8	297	<10 ft	297	$330	$98,000					Asphalt	$100	$30,000	$128,000
	C-107	4+86	8+08	8	322	10 ft-18 ft	322	$450	$145,000					Asphalt	$100	$32,000	$177,000
	C-107	8+08	9+47	8	139	<10 ft	139	$330	$46,000					Asphalt	$100	$14,000	$60,000
	C-107 thru C-108	9+47	10+49	8	102	10 ft-18 ft	102	$450	$46,000					Asphalt	$100	$10,000	$56,000
	C-108	10+49	17+33	8	684	<10 ft	684	$330	$226,000					Asphalt	$100	$68,000	$294,000
	C-108	17+33	18+94	8	161	10 ft-18 ft	161	$450	$72,000					Asphalt	$100	$16,000	$88,000
	C-108 thru C-109	18+94	28+66	8	972	<10 ft	972	$330	$321,000					Asphalt	$100	$97,000	$418,000
	C-109	28+66	29+76	8	110	10 ft-18 ft	110	$450	$50,000					Asphalt	$100	$11,000	$61,000
	C-109 thru C-110	29+76	32+49	8	273	<10 ft	273	$330	$90,000					Asphalt	$100	$27,000	$117,000
Pomeroy Meadow Rd. Ext.	C-116	+21	6+75	2	654					LP	654	$150	$98,000	Asphalt	$100	$65,000	$163,000
Mountain View Cir-west	C-117	+4	2+98	8	294	<10 ft	294	$330	$97,000					Asphalt	$100	$29,000	$126,000
	C-117	2+98	4+13	8	115	10 ft-18 ft	115	$450	$52,000					Asphalt	$100	$12,000	$64,000
	C-117	4+13	7+88	8	375	<10 ft	375	$330	$124,000					Asphalt	$100	$38,000	$162,000
Mountainview Cir-East	C-118	+9	2+15	8	206	<10 ft	206	$330	$68,000					Asphalt	$100	$21,000	$89,000
	C-118	2+15	3+09	8	94	10 ft-18 ft	94	$450	$42,000					Asphalt	$100	$9,000	$51,000
	C-118	3+09	4+52	8	143	<10 ft	143	$330	$47,000					Asphalt	$100	$14,000	$61,000
Helen Dr.	C-119	+6	2+38	8	232	10 ft-18 ft	232	$450	$104,000					Asphalt	$100	$23,000	$127,000
	C-119	2+38	3+00	8	62	<10 ft	62	$330	$20,000					Asphalt	$100	$6,000	$26,000
	C-119 thru C-120	3+00	16+00	2	1300					LP	1,300	$150	$195,000	Asphalt	$100	$130,000	$325,000
Longhill Gardens	C-121	+13	1+52	8	139	<10 ft	139	$330	$46,000					Asphalt	$100	$14,000	$60,000
	C-121	1+52	4+84	8	332	10 ft-18 ft	332	$450	$149,000					Asphalt	$100	$33,000	$182,000
Lynn Dr.	C-122	+4	+93	8	89	>18 ft	89	$710	$63,000					Asphalt	$100	$9,000	$72,000
	C-122	+93	6+02	8	509	10 ft-18 ft	509	$450	$229,000					Asphalt	$100	$51,000	$280,000
	C-122	6+02	6+51	8	49	<10 ft	49	$330	$16,000					Asphalt	$100	$5,000	$21,000
	C-122 thru C-123	6+51	13+45	2	694					LP	694	$150	$104,000	Asphalt	$100	$69,000	$173,000
Karen Ln.	C-124	1+29	3+00	8	171	<10 ft	171	$330	$56,000					Asphalt	$100	$17,000	$73,000
	C-124	3+00	6+55	8	355	10 ft-18 ft	355	$450	$160,000					Asphalt	$100	$36,000	$196,000
Parc Place	C-125	+15	2+78	8	263	<10 ft	263	$330	$87,000					Asphalt	$100	$26,000	$113,000
	C-125	2+78	9+05	8	627	10 ft-18 ft	627	$450	$282,000					Asphalt	$100	$63,000	$345,000
Gunn Rd Ext.	C-126	+83	7+85	8	702	<10 ft	702	$330	$232,000					Asphalt	$100	$70,000	$302,000
	C-126	7+85	9+41	8	156	10 ft-18 ft	156	$450	$70,000					Asphalt	$100	$16,000	$86,000
	C-126 thru C-127	9+41	14+70	8	529	<10 ft	529	$330	$175,000					Asphalt	$100	$53,000	$228,000

TABLE D-1

Engineer's Opinion of Probable Capital Cost[1]

Village Area Sewer Study

Street	Sheet No.	Station Begin	Station End	Sewer Diameter (in)	Sewer Length (ft)/No.	Gravity Pipe Cost				Pressure Pipe Cost				Restoration Cost			Total Cost
						Average Depth Range[2]	Sewer Length (ft)	Unit Cost ($/LF)	Extended Cost ($)	Pipe Type[3]	Sewer Length (ft)	Unit Cost ($/LF)	Extended Cost ($)	Surface Restoration[4]	Unit Cost ($/LF)	Extended Cost ($)	
	C-127 thru C-128	14+70	26+81	8	1211	10 ft-18 ft	1,211	$450	$545,000					Asphalt	$100	$121,000	$666,000
	C-128	26+81	27+11	8	30	<10 ft	30	$330	$10,000					Asphalt	$100	$3,000	$13,000
Parsons Way	---	---	---	8	1,010	< 10 ft	1,010	$330	$333,000					Asphalt	$100	$101,000	$434,000
Rosalie Ln.	---	---	---	8	1,171	< 10 ft	1,171	$330	$386,000					Asphalt	$100	$117,000	$503,000
Courtney Ln.	---	---	---	8	465	< 10 ft	465	$330	$153,000					Asphalt	$100	$47,000	$200,000
Rail Trail	C-110 thru C-115	+	48+89	6	4889					FM	4,889	$200	$978,000	---[5]	$0	$0	$978,000
	C-115	48+89	55+48	10	659	<10 ft	659	$340	$224,000					Asphalt-RT	$95	$63,000	$287,000
		Bridge crossing											$120,000	---	$0	$0	$120,000
Subtotal					**26,193**		**18,256**		**$7,136,000**		**7,937**		**$1,555,000**			**$2,390,000**	**$11,081,000**
FM Clean Out/Air Release Structures					5						$ 15,000	/each	$75,000				$75,000
LP Sewer Cleanout/Air Release Structures					3						$ 10,000	/each	$30,000				$30,000
Grinder Pump Stations[6]					35						$ 20,000	/each	$700,000				$700,000
Municipal Pump Stations					1						$700,000	/each	$700,000				$700,000
Total Construction Cost																	**$12,586,000**
Contingency[7]		30%															$3,775,800
Total Construction Cost with Contingency																	**$16,361,800**
Engineering Allowance[8]		25%															$4,090,000
Total Capital Cost																	**$20,451,800**

[1]Tighe & Bond has no control over the cost or availability of labor, equipment, or materials, over market conditions, or over the Contractor's method of pricing. The estimates of probable construction costs are made on the basis of Tighe & Bond's professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this estimate of the Probable Construction Cost. Costs are based on an October 2024 Engineering News Record Construction Cost Index of 13632.

[2]This range is based on the calculated depth from the ground surface to the pipe invert using the preliminary layout drawings.

[3]LP=low pressure sewer; FM=pump station force main

[4]Asphalt=pavement restoration along a Town road; Asphalt-MH=pavement restoration along a MassDOT highway; Aspalt-RT=pavement restoration along the Manhan Rail Trail.

[5]We assumed that the sewers along the proposed Greenway Rail Trail would be constructed concurrent with the rail trail and, as such, that the surface restoration for the proposed sewers would be paid for under the Greenway Rail Trail project.

[6]Grinder pump stations are proposed for each developed or developable parcel served by low pressure sewers.

[7]Includes a 30% construction contingency.

[8]The engineering allowance is for design, permitting, bidding, and construction phase services.