

3.6.3.4 Project Grouping 3 Cost Summary

The cost summary to construct the proposed interceptors, pump station/force main and gravity sewers in Project Grouping 3 is as follows:

Interceptors	\$610,000
Pump Station/Force Main	\$1,110,000
Gravity Sewers	<u>\$4,320,000</u>
Total Project Grouping 3 Cost	\$6,040,000

3.6.4 Project Grouping 4

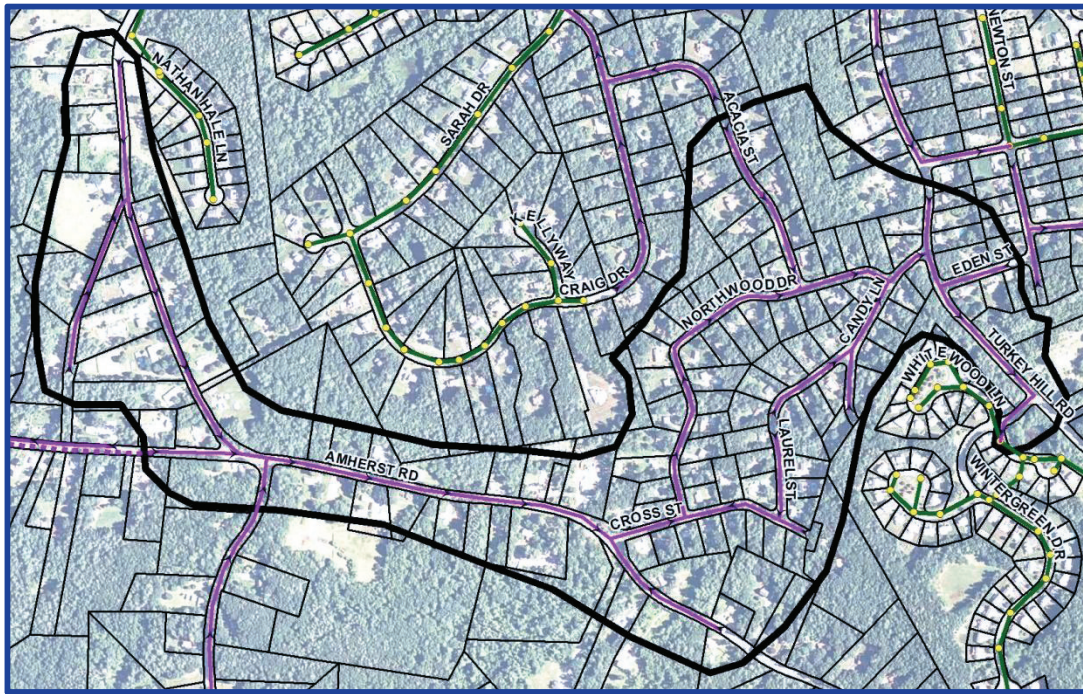
This project grouping consists of three different projects to provide sewer to neighborhoods to the north and south of Amherst Road in central Merrimack. The new sewers will drain to the existing sewer in Wintergreen Drive off Turkey Hill Road. Each individual project is summarized below.

3.6.4.1 Project 30: Amherst Road East Collector Sewers

This project involves constructing approximately 14,380 linear feet of 8-inch diameter collector sewers in part of Amherst Road, Eden Street, part of Turkey Hill Road, Northwood Drive, part of Acacia Street, Candy Lane, Laurel Street, Cross Street, part of Meetinghouse Road and an unnamed road off Meetinghouse Road. Note that approximately 6,450 linear feet of this sewer will also collect flows from the Amherst Road West Collector Sewers and Pump Station No. 7 and the Naticook Road Collector Sewers projects (Projects 29 and 34). Refer to Figure 3-20 for the extents of the proposed project area.

There are approximately 126 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 33,000 GPD (sanitary flow of 26,500 GPD and infiltration flow of 6,500 GPD).

FIGURE 3-20
PROJECT 30: AMHERST ROAD EAST COLLECTOR SEWERS



The estimated cost for the portion of this project that will collect flows from the other project areas is \$1,790,000 and for the remaining collector sewers is \$2,210,000 for a total project cost of \$4,000,000.

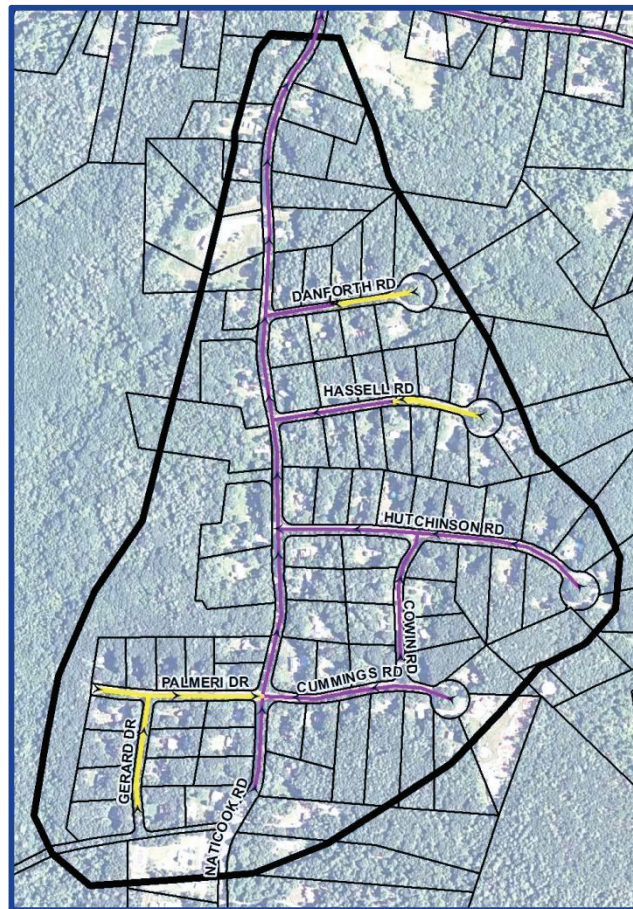
3.6.4.2 Project 34: Naticook Road Collector Sewers

This project involves constructing approximately 8,500 linear feet of 8-inch diameter collector sewers in part of Naticook Road, Danforth Road, Hassel Road, Hutchinson Road, Cummings Road and Cowin Road and approximately 2,330 linear feet of low pressure sewers in Danforth Road, Hassel Road, Palmeri Drive and Gerard Drive. Refer to Figure 3-21 for the extents of the proposed project area.

There are approximately 96 residential housing units that could be served by gravity sewer or by low pressure sewer within this project area with a projected average daily flow of 24,000 GPD (sanitary flow of 20,200 GPD and infiltration flow of 3,800 GPD).

The estimated cost for this project is \$3,100,000. The Amherst Road East Collector Sewers project must be constructed before this project (Project 30).

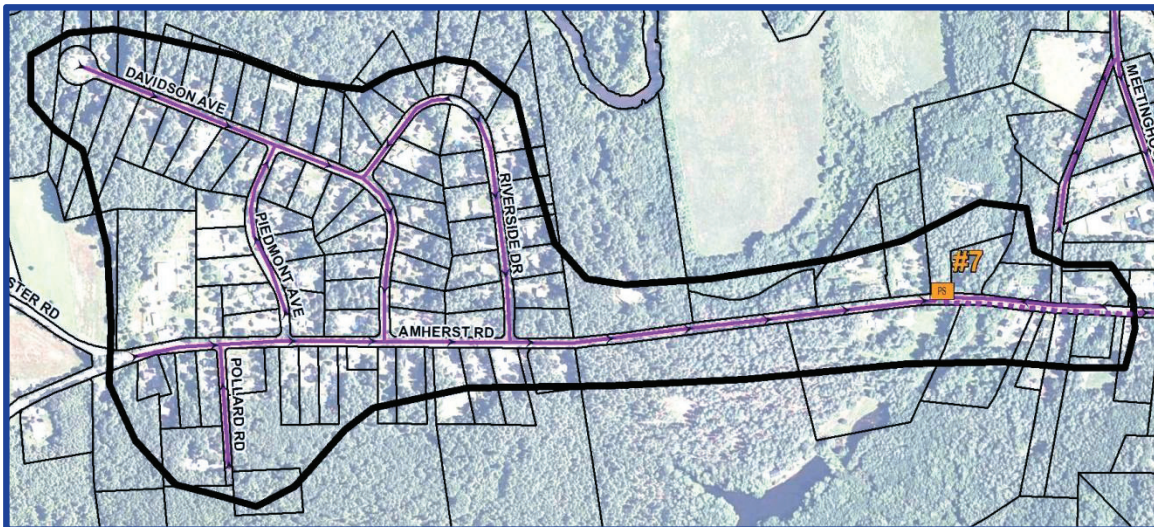
FIGURE 3-21
PROJECT 34: NATICOOK ROAD COLLECTOR SEWERS



3.6.4.3 Project 29: Amherst Road West Collector Sewers and Pump Station No. 7

This project involves constructing approximately 10,950 linear feet of 8-inch diameter collector sewers in part of Amherst Road, Riverside Drive, Davidson Avenue, Piedmont Avenue and Pollard Road. It also involves constructing Pump Station No. 7 on Amherst Road and approximately 1,000 linear feet of force main to convey flows to the proposed collector sewer in Amherst Road (Project 30). The pump station will see peak flows of approximately 86,500 GPD and will likely be a suction lift style station sized for 120 GPM. Refer to Figure 3-22 for the extents of the proposed project area.

FIGURE 3-22
PROJECT 29: AMHERST ROAD WEST COLLECTOR SEWERS AND PUMP
STATION NO. 7



There are approximately 97 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 25,300 GPD (sanitary flow of 20,400 GPD and infiltration flow of 4,900 GPD).

The estimated cost for this project is \$3,950,000. The Amherst Road East Collector Sewers project must be constructed before this project (Project 30).

3.6.4.4 Project Grouping 4 Cost Summary

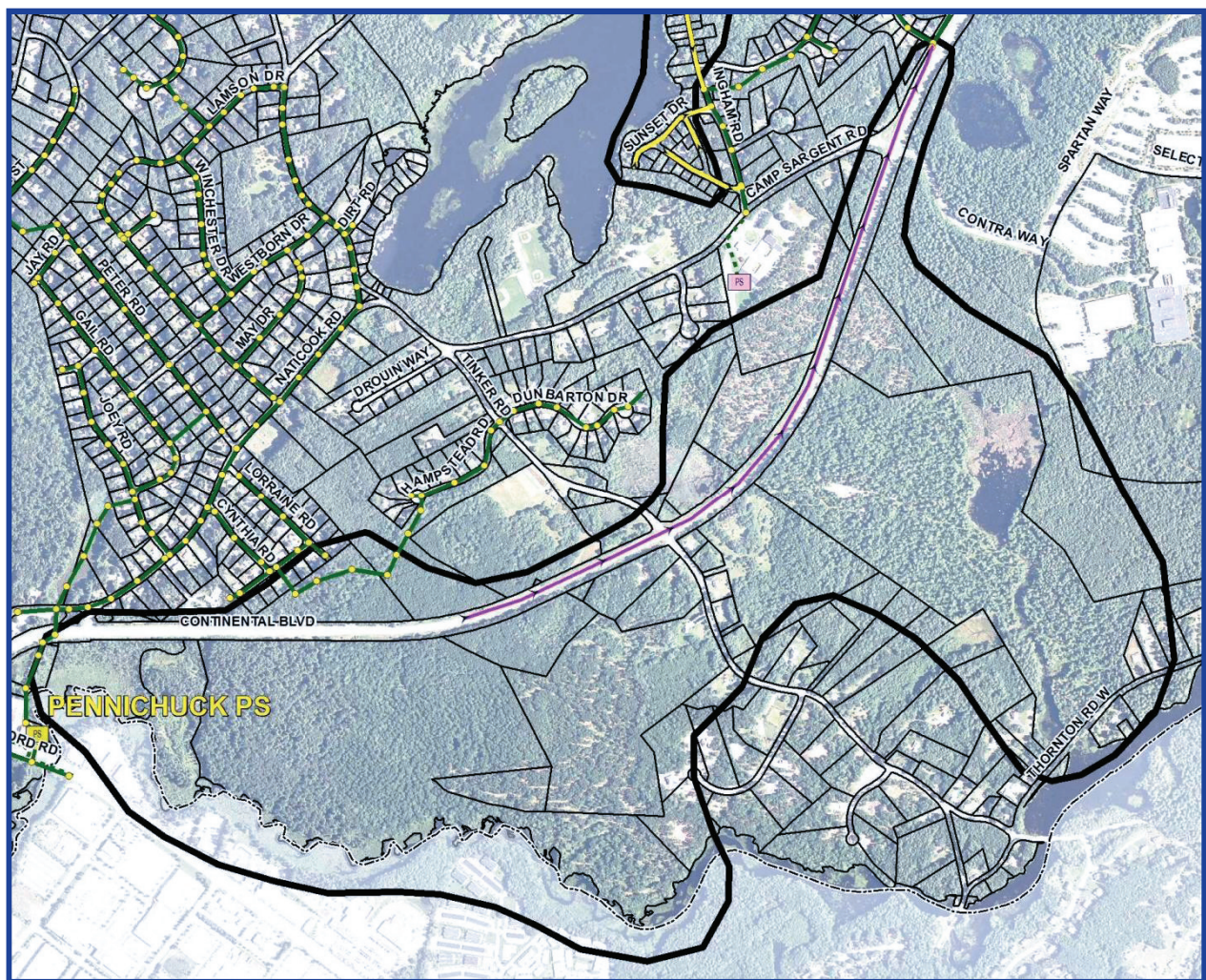
The cost summary to construct all of the proposed interceptors, pump station/force main and gravity sewers in Project Grouping 4 is as follows:

Interceptors	\$1,790,000
Pump Station/Force Main	\$900,000
Gravity Sewers	<u>\$8,360,000</u>
Total Project Grouping 4 Cost	\$11,050,000

3.6.5 Continental Boulevard Interceptor Extension Alternatives

This project involves extending the existing interceptor in Continental Boulevard southwest from the intersection with Cambridge Drive to approximately 2,000 linear feet beyond the intersection with Contra Way. As the Town is uncertain at this time what area may drain to this interceptor, two separate alternatives were considered to size the proposed interceptor based on potential future flows as described below. Refer to Figure 3-23 for the extents of the proposed project area.

FIGURE 3-23
PROJECT 4 OR 11: CONTINENTAL BOULEVARD INTERCEPTOR EXTENSION



3.6.5.1 Project 4 (Alternative A - Pennichuck Pump Station pumps to Nashua collection system)

This alternative assumes that future flows will come only from several undeveloped properties owned by Pennichuck Corporation which is a holding company for Pennichuck Water Works, Inc. (these properties are indicated with orange hatching on Figure 3-1). The Town noted that these properties may be developed into residential neighborhoods in the near future. This alternative involves extending 6,450 linear feet of 10-inch diameter interceptor along Continental Boulevard.

Assuming that 80% of the land area will be available to be subdivided into parcels (the remaining 20% would be for roads, any existing wetlands, etc.) and assuming minimum parcel sizes of 0.9 acres (per Town standards for Zone R-4, residential zone with public water and sewer), the undeveloped land could be subdivided into approximately 222 parcels. Based on this, the projected average daily flow is 60,400 GPD (sanitary flow of 46,600 GPD and infiltration flow of 13,800 GPD).

The estimated cost for this project is \$2,080,000. Note that this does not include the costs to construct collector sewers within the undeveloped properties.

3.6.5.2 Project 11 (Alternative B - Pennichuck Pump Station pumps to Merrimack collection system)

This alternative assumes the same future flows estimated for Alternative A as well as an additional peak flow of 700 GPM which corresponds to the capacity of the existing Pennichuck Pump Station. Currently, the Pennichuck Pump Station collects flow from southwestern Merrimack and northern Nashua and pumps it to the Nashua collection system for treatment. Per the agreement between the Merrimack and Nashua, each municipality owns 50% of the peak flow capacity which corresponds to about 64 GPM of average daily flow each (based on a peaking factor of 5.5 per the agreement). Merrimack has reached its average daily flow allocation and therefore, no additional users in Merrimack can be tied in to this sewer at this time.

In the future, the Town may consider rerouting the force main from the pump station to convey flows to Continental Boulevard rather than Nashua's collection system. If the force main is rerouted, the Town could at that time determine if Nashua's flows will continue to drain to the pump station or will be pumped separately to Nashua. Also, by eliminating the capacity restriction of the current inter-municipal agreement, Merrimack could expand its collection system in this area. It was determined through discussions with the Town that a future peak flow rate of 700 GPM would be assumed from this pump station for the purpose of developing the flow and cost estimates for Alternative B.

Using the same assumptions for future flows from the undeveloped property as noted under Alternative 1 and a peak flow of 700 GPM from the pump station, this alternative will require upsizing approximately 8,930 linear feet of existing interceptor in Continental Boulevard from the intersection with Cambridge Drive east to the F.E Everett Turnpike from 12-inch diameter pipe to 18-inch diameter pipe and extending 6,450 linear feet of 18-inch diameter interceptor along Continental Boulevard as described in Alternative A.

If the Town wished to extend sewer to the undeveloped Pennichuck properties sooner than the pump station force main is rerouted, it would be possible to split this project into two phases. The first phase would involve constructing the 6,450 linear feet of 18-inch diameter pipe interceptor extension to serve the newly developed properties. The second phase would involve upsizing the 8,930 linear foot portion of the existing interceptor that is 12-inch diameter to 18-inch diameter when the Town is ready to reroute the force main from Pennichuck Pump Station. Although new sewers are not typically designed so there is a larger diameter pipe upstream draining to a smaller diameter pipe downstream and the first phase of this project would be slightly more costly than Alternative A due to the interceptor size, it gives the Town the ability to take more flow in the future if they ever decide to reroute the pump station. If Alternative A were constructed, the Town would either be limited in their ability to take additional flows from the pump station or they would have to dig up the new 10-inch diameter section of the interceptor to replace it with a larger pipe as well as replacing the existing 12-inch diameter section of the interceptor.

The estimated cost for the first phase of the project is \$2,270,000 and for the second phase of this project is \$3,140,000 for a total combined cost of \$5,410,000. Note that this does not include the cost to construct collector sewers for the undeveloped properties or to reroute the Pennichuck Pump Station force main.

3.6.6 Project 1: Naticook Lake East Collector Sewers

This project involves constructing approximately 2,750 linear feet of low pressure sewers in Ingham Road, Dawn Avenue, Sunset Drive and High Noon Road on the east side of Naticook Lake. Refer to Figure 3-24 for the extents of the proposed project area.

**FIGURE 3-24
PROJECT 1: NATICOOK LAKE
EAST COLLECTOR SEWERS**



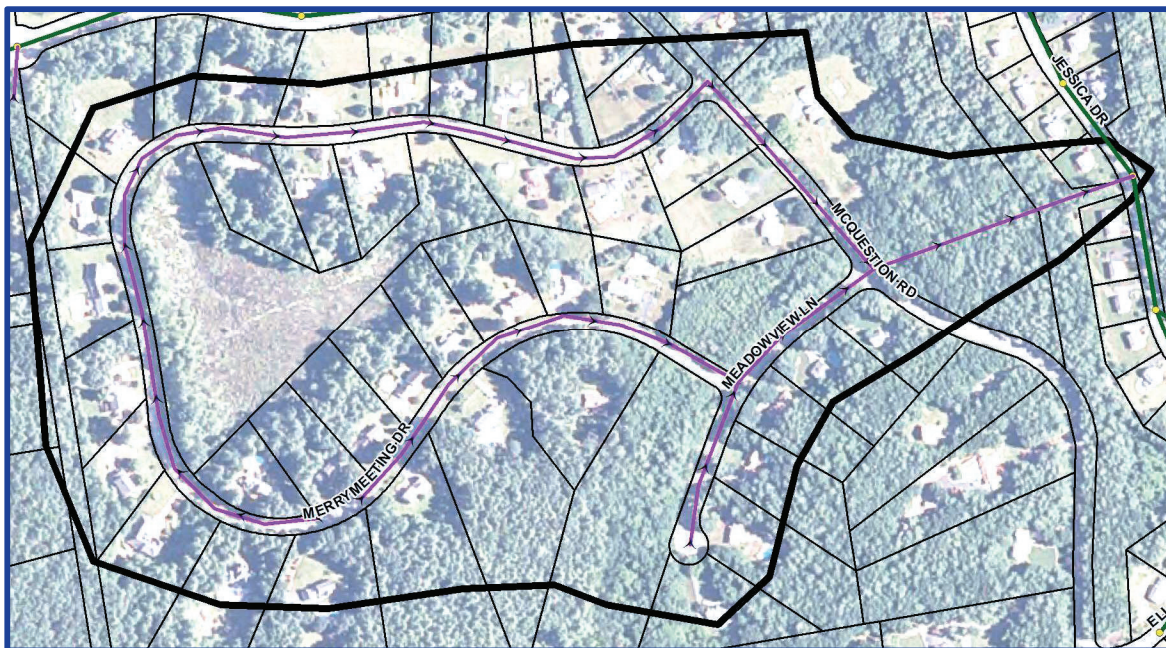
There are approximately 45 residential housing units that could be served by low pressure sewer within this project area with a projected average daily flow of 9,500 GPD (sanitary flow of 9,500 GPD and infiltration flow of 0 GPD).

The estimated cost for this project is \$1,060,000.

3.6.7 Project 2: McQuestion Road North Collector Sewers

This project involves constructing approximately 6,380 linear feet of 8-inch diameter collector sewers in part of McQuestion Road, Meadowview Lane and Merrymeeting Drive. Note that this project area could also potentially collect flows from a future development west of the paper road called Old Blood Road and to the south of the Madeline Bennett Middle School. The new collector sewers would drain east from McQuestion Road to the existing interceptor in Jessica Drive via a short run of cross-country sewer. Refer to Figure 3-25 for the extents of the proposed project area.

**FIGURE 3-25
PROJECT 2: MCQUESTION ROAD NORTH COLLECTOR SEWERS**



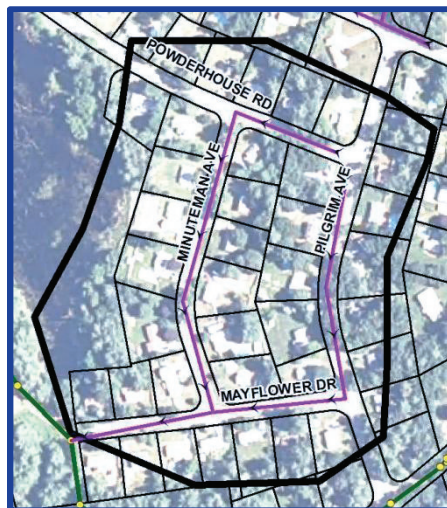
There are approximately 109 residential housing units that could be served by gravity sewer within this project area (this includes 72 units proposed in the potential future development) with a projected average daily flow of 29,100 GPD (sanitary flow of 22,900 GPD and infiltration flow of 6,200 GPD).

The estimated cost for this project is \$1,770,000. Note that this cost does not include construction of the sewer in the new development.

3.6.8 Project 3: Mayflower Drive Collector Sewers

This project involves constructing approximately 2,330 linear feet of 8-inch diameter collector sewers including Mayflower Drive, Pilgrim Avenue, Powderhouse Road and Minutemen Avenue. The new collector sewers will drain to the existing interceptor at the end of Mayflower Drive. Refer to Figure 3-26 for the extents of the proposed project area.

**FIGURE 3-26
PROJECT 3: MAYFLOWER
DRIVE COLLECTOR SEWERS**



There are approximately 35 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 8,400 GPD (sanitary flow of 7,400 GPD and infiltration flow of 1,000 GPD).

The estimated cost for this project is \$590,000. Note that this cost only includes 10% for technical services as the design is already complete.

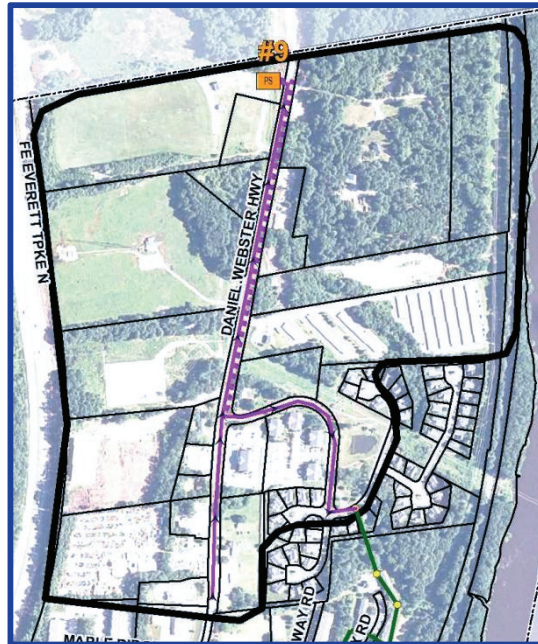
3.6.9 Project 7: DW Highway North Interceptor Extension and Pump Station No. 9

This project involves extending a 12-inch diameter interceptor approximately 2,700 linear feet from the existing interceptor in Kearsarge Lane, west to Crosswoods Path Boulevard and then south in Daniel Webster Highway toward Brunswick Road as well as to the north from Crosswoods Path Boulevard to the Bedford town line. Pump Station No. 9 will be constructed on Daniel Webster Highway near the Bedford town line along with approximately 1,800 linear feet of force main to convey flows to the new interceptor at the intersection with Crosswoods Path Boulevard. Refer to Figure 3-27 for the extents of the proposed project area.

There are approximately 83 acres of lightly developed commercial and some residential property within this drainage area that have the potential commercial or light industrial redevelopment. There is no specific information available on the type of development as the redevelopment is conceptual at this time, so the projected future flows were developed based on an average daily flow of 700 GPD/acre for a projected average daily flow of 61,200 GPD (sanitary flow of 58,100 GPD and infiltration flow of 3,100 GPD).

The estimated cost for this project is \$1,900,000. This does not include any costs for collector sewers that may drain to the interceptor from the redeveloped properties.

FIGURE 3-27
PROJECT 7: DW HIGHWAY NORTH
INTERCEPTOR EXTENSION AND
PUMP STATION NO. 9



3.6.10 Project 9: Clay Street Collector Sewers and Pump Station No. 5

This project involves constructing approximately 11,130 linear feet of 8-inch diameter collector sewers in Clay Street, Collins Avenue, Berkley Street, Buck Meadow Lane, Sandhill Drive, Short Street and Ivy Drive. It also involves constructing Pump Station No. 5 on Clay Street for the southern half of the neighborhood and approximately 1,500 linear feet of force main to convey flows to the existing interceptor at the intersection of Wire Road, Mallard Point Road and Buck Meadow Lane. The pump station will see peak flows of approximately 60,400 GPD and will likely be a submersible grinder style station sized for 50 GPM. The northern half of the neighborhood will drain to the existing sewer at the intersection of Wire Road, Mallard Point Road and Ivy Drive. Refer to Figure 3-28 for the extents of the proposed project area.

There are approximately 145 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 35,500 GPD (sanitary flow of 30,500 GPD and infiltration flow of 5,000 GPD).

FIGURE 3-28
PROJECT 9: CLAY STREET COLLECTOR
SEWERS AND PUMP STATION NO. 5



The estimated cost for this project is \$4,080,000.

3.6.11 Project 12: Back River Road Collector Sewers

This project involves constructing approximately 1,750 linear feet of 8-inch diameter collector sewer in Back River Road. The new collector sewer will drain to the existing sewer to the north in Back River Road near the intersection with Ries Drive. Refer to Figure 3-29 for the extents of the proposed project area.

There are approximately 22 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 5,400 GPD (sanitary flow of 4,600 GPD and infiltration flow of 800 GPD).

The estimated cost for this project is \$490,000.

**FIGURE 3-29
PROJECT 12: BACK RIVER
ROAD COLLECTOR SEWERS**



3.6.12 Project 13: Camp Sargent Road East Collector Sewers

This project involves constructing approximately 5,330 linear feet of 8-inch diameter collector sewers to the east of Camp Sargent Road including part of Camp Sargent Road, Cedar Lane, Spruce Street, Douglas Street and Beech Street. The new collector sewers will drain to three different locations based on topography: two locations along the existing interceptor in Continental Boulevard which runs parallel to the western end of Camp Sargent Road and one location at an existing sewer toward the eastern end of Camp Sargent Road. Refer to Figure 3-30 for the extents of the proposed project area.

There are approximately 77 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 18,600 GPD (sanitary flow of 16,200 GPD and infiltration flow of 2,400 GPD).

The estimated cost for this project is \$1,480,000.

FIGURE 3-30
PROJECT 13: CAMP SARGENT
ROAD EAST COLLECTOR
SEWERS



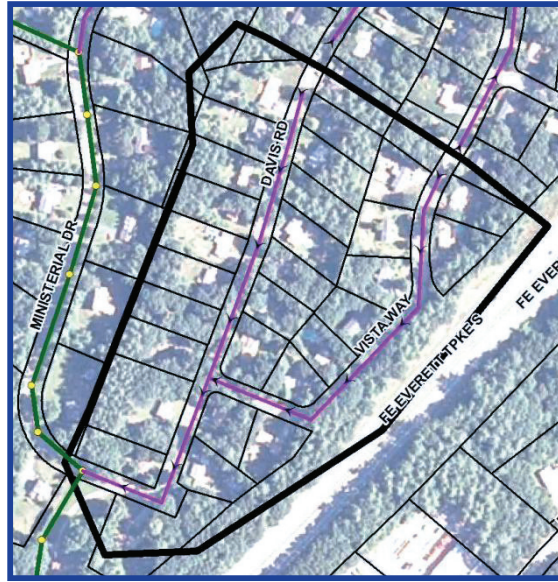
3.6.13 Project 15: Davis Road South Collector Sewers

This project involves constructing approximately 2,450 linear feet of 8-inch diameter collector sewer in part of Davis Road, part of Vista Way and part of Ministerial Drive. The new collector sewers will drain to the existing interceptor at the south end of Ministerial Drive. Refer to Figure 3-31 for the extents of the proposed project area.

There are approximately 31 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 7,600 GPD (sanitary flow of 6,500 GPD and infiltration flow of 1,100 GPD).

The estimated cost for this project is \$680,000.

FIGURE 3-31
PROJECT 15: DAVIS ROAD SOUTH
COLLECTOR SEWERS



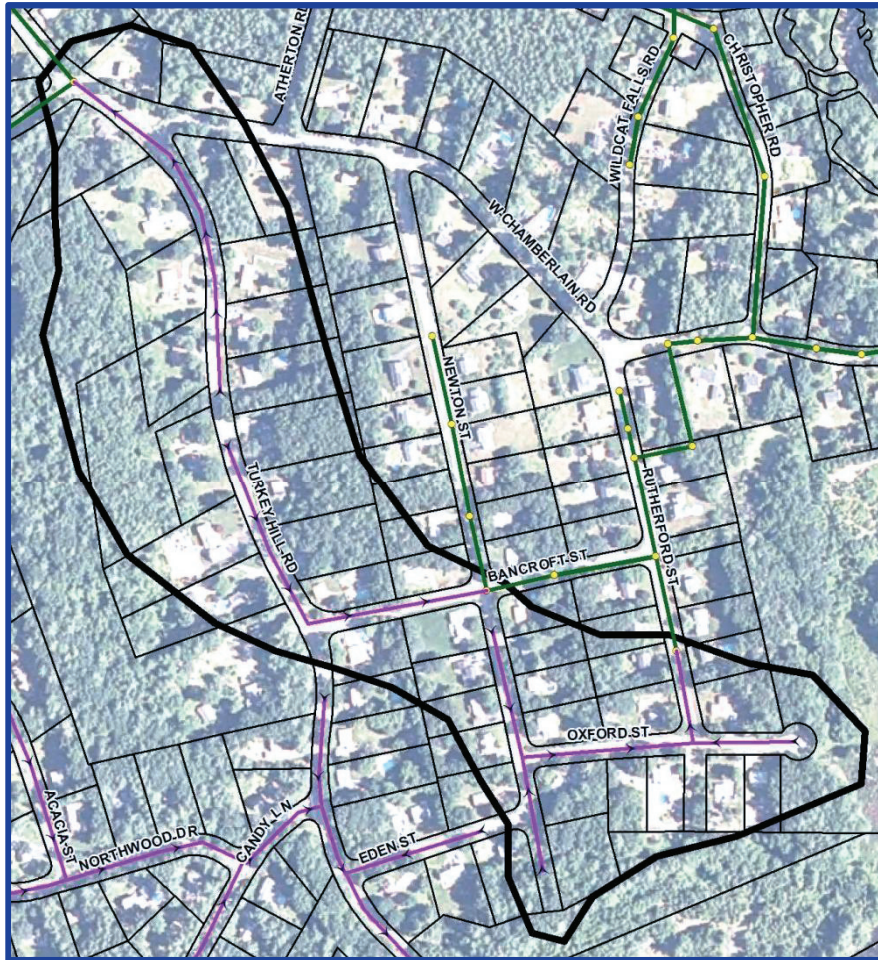
3.6.14 Project 16: Bancroft Street Collector Sewers

This project involves constructing approximately 3,600 linear feet of 8-inch diameter collector sewer in part of Bancroft Street, Oxford Street, part of Rutherford Street, part of Newton Street and part of Turkey Hill Road. The new collector sewers will drain to existing sewer in three different locations based on topography: the intersection of Turkey Hill Road, Sarah Drive and West Chamberlain Road; the intersection of Bancroft Street and Newton Street; and toward the south end of Rutherford Street. Refer to Figure 3-32 for the extents of the proposed project area.

There are approximately 38 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 9,600 GPD (sanitary flow of 8,000 GPD and infiltration flow of 1,600 GPD).

The estimated cost for this project is \$1,000,000.

FIGURE 3-32
PROJECT 16: BANCROFT STREET COLLECTOR SEWERS

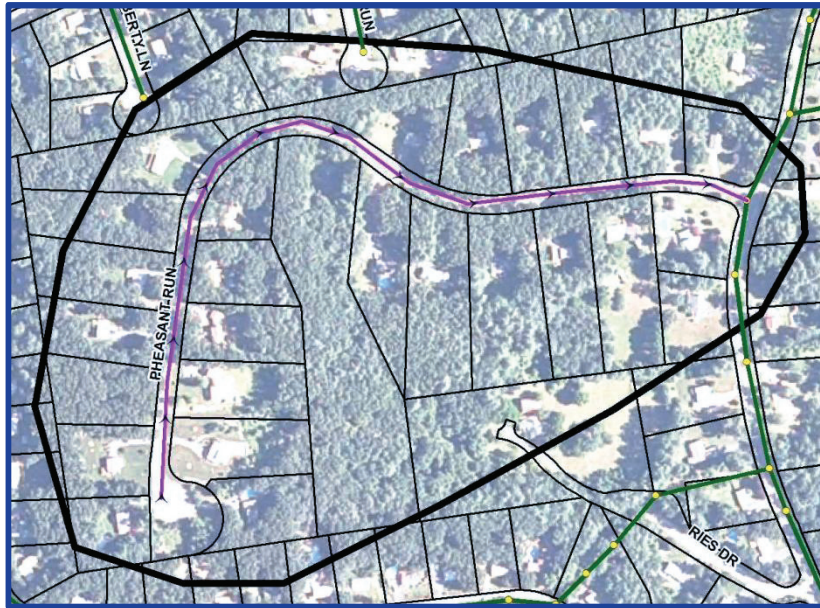


3.6.15 Project 18: Pheasant Run Collector Sewer

This project involves constructing approximately 2,330 linear feet of 8-inch diameter collector sewer in Pheasant Run. The new collector sewer will drain to the existing sewer at the intersection with Back River Road. Refer to Figure 3-33 for the extents of the proposed project area.

There are approximately 24 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 6,100 GPD (sanitary flow of 5,000 GPD and infiltration flow of 1,100 GPD).

FIGURE 3-33
PROJECT 18: PHEASANT RUN COLLECTOR SEWERS



The estimated cost for this project is \$650,000.

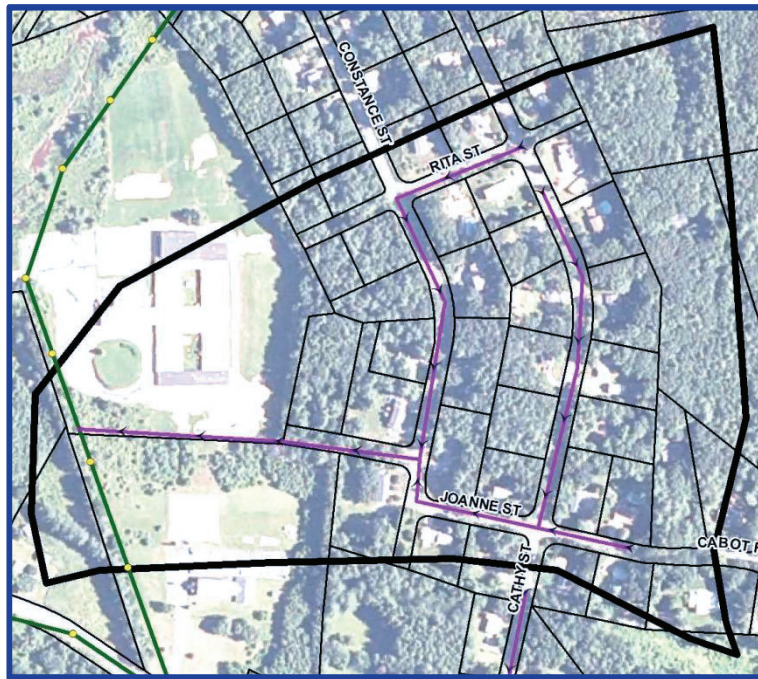
3.6.16 Project 20: Cathy Street North Collector Sewers

This project involves constructing approximately 3,530 linear feet of 8-inch diameter collector sewers in part of Cathy Street, Constance Street, Rita Street, part of Cabot Road and Joanne Street. The new collector sewers will drain from the end of Joanne Street cross-country to the west to the existing interceptor near Lyons Road that passes through the Reeds Ferry School property. Refer to Figure 3-34 for the extents of the proposed project area.

There are approximately 31 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 8,100 GPD (sanitary flow of 6,500 GPD and infiltration flow of 1,600 GPD).

The estimated cost for this project is \$980,000.

FIGURE 3-34
PROJECT 20: CATHY STREET NORTH
COLLECTOR SEWERS



3.6.17 Project 25: Craig Drive Collector Sewers

This project involves constructing approximately 2,250 linear feet of 8-inch diameter collector sewer in part of Craig Drive and part of Acacia Street. The new collector sewers will drain to the existing interceptor at the western intersection of Craig Drive and Sarah Drive. Refer to Figure 3-35 for the extents of the proposed project area.

There are approximately 20 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 5,200 GPD (sanitary flow of 4,200 GPD and infiltration flow of 1,000 GPD).

The estimated cost for this project is \$630,000.

**FIGURE 3-35
PROJECT 25: CRAIG DRIVE
COLLECTOR SEWERS**



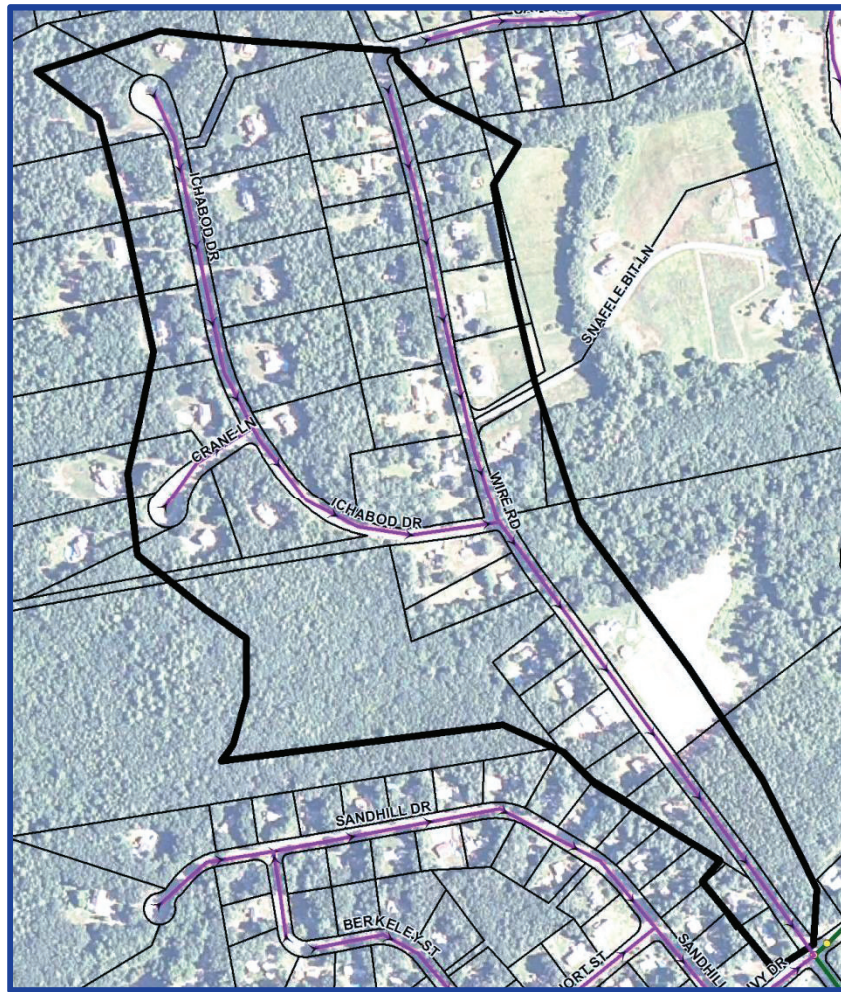
3.6.18 Project 26: Wire Road South Collector Sewers

This project involves constructing approximately 5,530 linear feet of 8-inch diameter collector sewers in part of Wire Road, Ichabod Road and Crane Lane. The new collector sewers will drain to the existing interceptor at the intersection of Wire Road, Mallard Point Road and Ivy Drive. Refer to Figure 3-36 for the extents of the proposed project area.

There are approximately 33 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 9,400 GPD (sanitary flow of 6,900 GPD and infiltration flow of 2,500 GPD).

The estimated cost for this project is \$1,540,000.

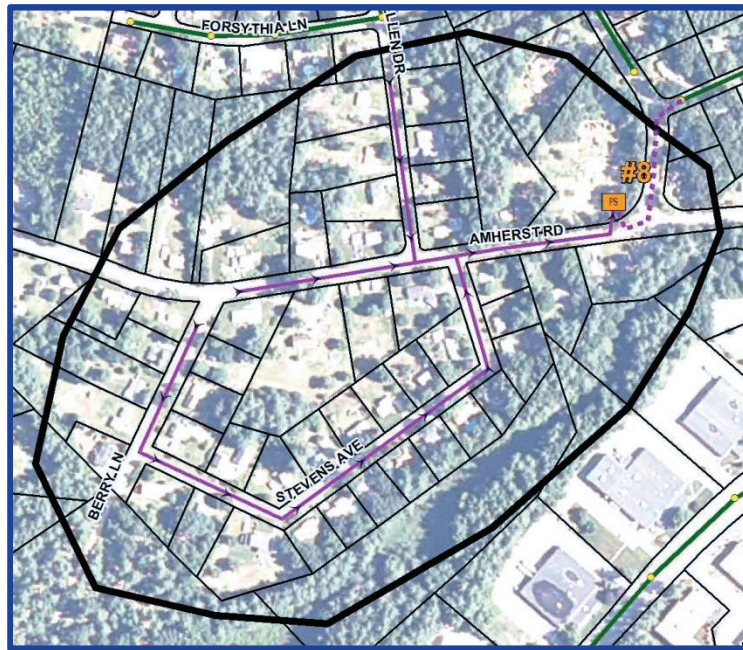
FIGURE 3-36
PROJECT 26: WIRE ROAD SOUTH
COLLECTOR SEWERS



3.6.19 Project 27: Stevens Avenue Collector Sewers and Pump Station No. 8

This project involves constructing approximately 3,300 linear feet of 8-inch diameter collector sewers in Stevens Avenue, Berry Lane, part of Amherst Road and part of Jo Ellen Drive. It also involves constructing Pump Station No. 8 on Amherst Road and approximately 380 linear feet of force main to convey flows to the existing sewer at the corner of Turkey Hill Road and Bigwood Drive. The pump station will see peak flows of approximately 39,300 GPD and will likely be a submersible grinder style station sized for 50 GPM. Refer to Figure 3-37 for the extents of the proposed project area.

FIGURE 3-37
PROJECT 27: STEVENS AVENUE COLLECTOR
SEWERS AND PUMP STATION NO. 8



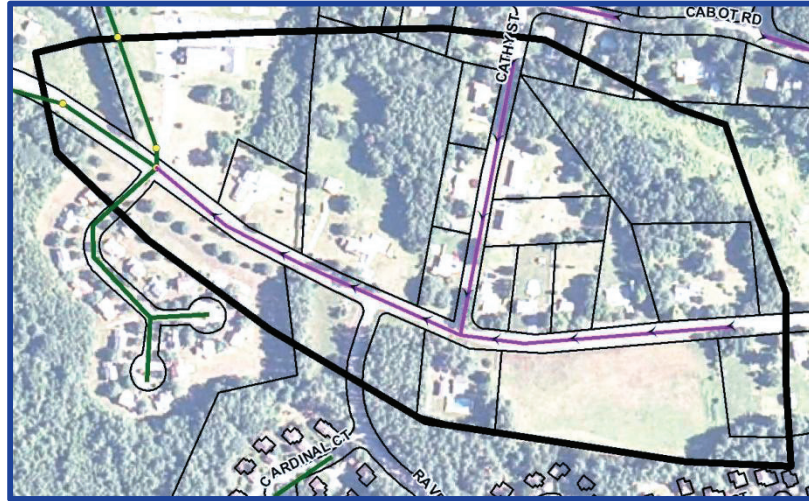
There are approximately 45 residential housing units that could be served by gravity sewer within this project area with a projected average daily flow of 11,000 GPD (sanitary flow of 9,500 GPD and infiltration flow of 1,500 GPD).

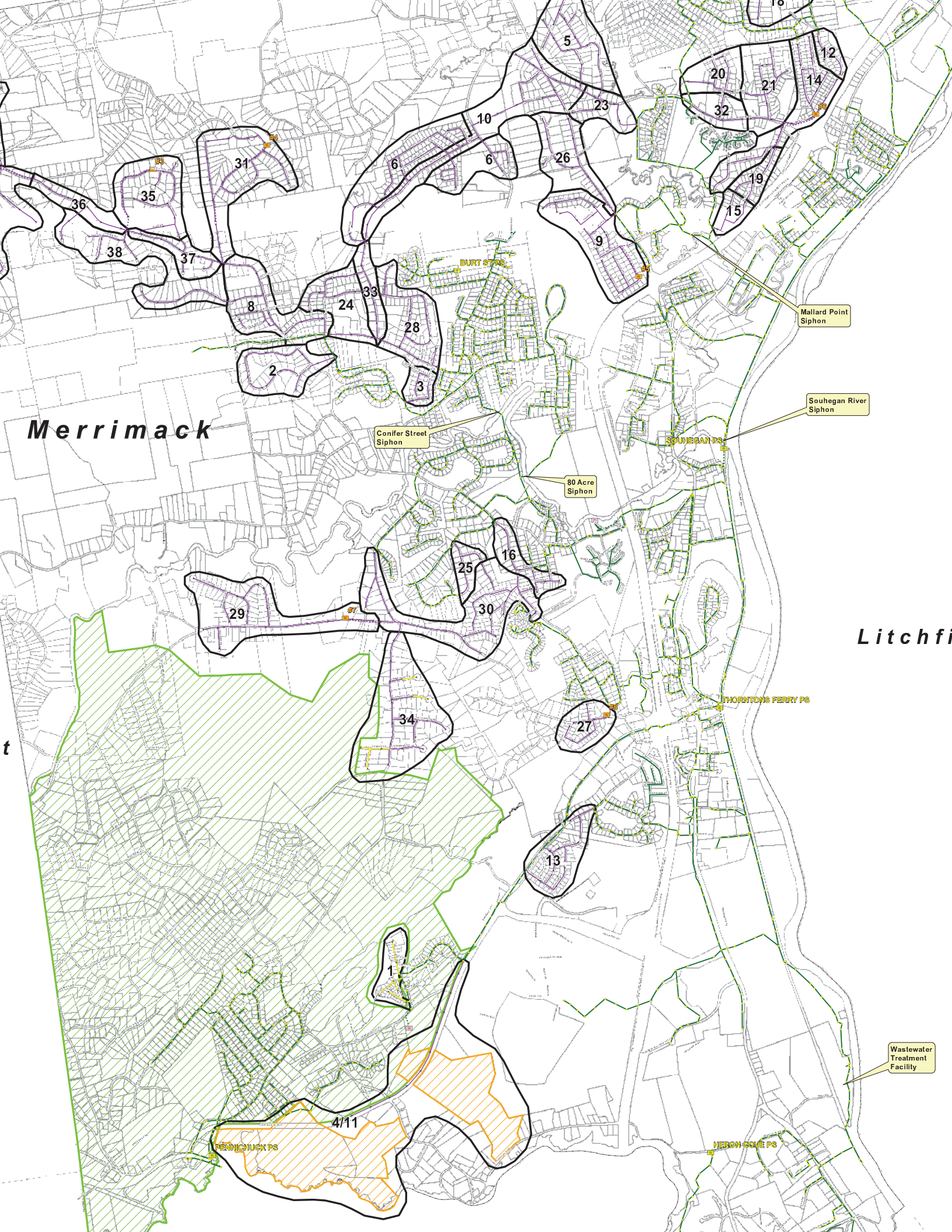
The estimated cost for this project is \$1,710,000.

3.6.20 Project 32: Cathy Street South Collector Sewers

This project involves constructing approximately 2,580 linear feet of 8-inch diameter collector sewers in part of Cathy Street and part of Bedford Road. The new collector sewers will drain west on Bedford Street to the existing interceptor at the intersection with Lyons Road. Refer to Figure 3-38 for the extents of the proposed project area.

FIGURE 3-38
PROJECT 32: CATHY STREET SOUTH COLLECTOR SEWERS





Merrimack

Litchfield

Conifer Street Siphon

80 Acre Siphon

Mallard Point Siphon

Souhegan River Siphon

BURT ST PS

SOUHEGAN PS

THORNTONS FERRY PS

Wastewater Treatment Facility

HERON COVE PS

PENNICHUCK PS

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