

TOWN OF WILLISTON, VERMONT

Sewer Capacity Analysis

October 2017



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1. EXECUTIVE SUMMARY

The sewer collection system was initially constructed in the early 1980's and has expanded within the sewer service area as new development has occurred. The Town owns and operates ten (10) wastewater pump stations, and there are several smaller pump stations that are privately owned and operated. Some of these private pump stations are operated and maintained through the Cooperative Maintenance Agreement administered by the Town.

All of the wastewater collected in the sewer service area is transported north to the River Cove pump station and is pumped in a 10" force main under the Winooski River to the Essex Jct. wastewater treatment facility. The treatment facility has a capacity of 3,300,000 gpd of which the Town of Williston currently owns a total of 1,040,000 gpd (31.52%). The remaining capacity is owned by the Village of Essex Jct (35.15%) and the Town of Essex (33.33%). In 2016, the Town of Williston utilized 606,000 gpd or 58% of their allocated treatment capacity. This actual flow has remained relatively consistent since 2014.

For 2016-17, the town allocated 30,440 gpd for new allocations as shown on Attachment A provided in Appendix C. This proposed allocation includes new residential and commercial, residential additions, affordable housing, and encouraging specific development. A total of 102,540 gpd is allocated for 2016-17, and includes the new allocations, planned public facilities, reserve, and pollution abatement. A reserve of 7% is maintained to account for infiltration and impacts to the wastewater flows caused during a wet weather year.

The overall sewer service area was divided into fourteen (14) individual sewer subareas to assess the current flows, and projected flows based on the current zoning. The existing sewer service area limits delineated on Map 7 in the Williston Comprehensive Plan were used for this study. To the extent possible, these smaller sewer subareas were delineated around the Town owned pump stations.

Actual wastewater flows are metered at the River Cove pump station. The existing average daily flows recorded at the River Cove pump station were 614,322 gpd in 2015 and 607,208 gpd in 2016. Approximately 60% of the Town allocated treatment capacity is utilized by the connected users. Pump run time data at the other Town owned pump stations was used to estimate the average daily and peak flows, and to assess the capacity of each pump station at current flow conditions.

Build-out projections were developed with the assistance of Ken Belliveau, Director of Planning and Zoning, by zoning district. Within the limits of the existing sewer service area, a total of 1360 residential units and 150,000 sq. ft. of commercial/industrial area are anticipated over the next 20 years. These projections include projects which require new allocation and projects which already have sewer allocation. A total average daily flow increase of 193,800 gpd is projected. If the sewer service limits are expanded, additional flow will be generated, but was not evaluated under this study. The unit daily flow for each residential unit followed the Town's design criteria of 135 gpd. For commercial uses, 68 gpd per 1,000 sq. ft. was used to estimate the average daily flow for commercial uses and 30 gpd per 1,000 sq. ft. was used to estimate the average daily flow for industrial uses.

Since the projections were developed by zoning district, assumptions were made on the potential location of the new development within each sewer subarea to assess the capacity limitations of the existing sewer system infrastructure. Peak flows were estimated from the wastewater flow projections at the design year 2037 to assess the future impacts within each sewer subarea.

To handle this additional flow, the sewer collection system was evaluated and specific segments of gravity sewers, pump stations, and force mains which will have capacity limitations over the next 10 years were identified. The critical locations of the sewerlines were identified based on the projected flow increases, pipe sizes, and flatter pipe slopes. Limitations with the sewerlines are relatively minor, as no pipeline segments were identified as having future capacity limitations in the next 10 years. Upgrades will be required at three (3) of the Town owned pump stations over the next 10 years. These upgrades address capacity needs only and not age related deficiencies. If refurbishment of equipment due to age is required at any of the pump stations, then the short-term future capacity needs should be taken into consideration.

A schedule was developed for implementation of the pump station upgrades based on the assumed rate of increase in flows within each sewer subarea. This schedule should be updated every five (5) years to make adjustments as new residential and commercial units connect to the sewer system. More or less growth could occur in specific sewer subareas, thereby causing different impacts on the existing infrastructure from the actual flow contribution. As mentioned previously, any of these capacity improvements should be coordinated with earlier upgrades which may be required due to age or other deficiencies.

To address the capacity limitations, improvements will be required at the following pump stations:

- Industrial Avenue: New 12” force main
- Blair Park: New pumps and controls
- River Cove: Addition of 3rd pump

To address the age related needs, improvements will be required at the following pump stations:

- South Ridge: New pumps and controls
- North Williston: New pumps and controls

Estimated costs were developed for the improvements and follow a timeline of when the additional capacity will be required. These costs are summarized in Section 7.

The annual treatment needs through FY 28 were summarized based on an annual proposed allocation of 9,690 gpd. Using the annual needs of 9,690 gpd for projected development, including development which already has committed allocation, and the assumption the Town will continue to buy 10,000 gpd of capacity every year through FY 22, the adequacy of the current and future treatment capacity was evaluated. It was found the excess treatment capacity is sufficient for the next 10 years, but it is recommended that the Town further evaluate the purchase of additional capacity in FY 22.

2. INTRODUCTION

2.1. Purpose

The Town of Williston retained Aldrich + Elliott to evaluate the capacity of the existing sewer system. Concerns have been raised by the Town regarding future growth capabilities and its effects on the current sewer collection system and future treatment needs. This study provides the Town with a future plan to address the sewer capacity limitations.

2.2. Scope of Study

The following engineering consultant services are provided for this study:

- Review metered flow data at River Cove pump station
- Develop future build-out analysis
- Delineation of service areas
- Evaluation of gravity sewers
- Evaluation of Town-owned pump stations and force mains
- Evaluation of wastewater treatment facility reserve capacity
- Identification of sewer system limitations
- Identification of future sewer improvements
- Outline of wastewater treatment capacity needs

2.3. Reference Documents

Existing information was gathered and reviewed to conduct the capacity analysis of the sewer system, as listed below:

- Metered water usage data for largest commercial users, 2015-16
- Pump Station Run Times, 2015-16
- Town of Williston, Sewer System Map, dated 2005.
- Town of Williston Private Wastewater Pump Stations Contract Operations and Maintenance, Request for Proposal, dated September 2005.
- Town of Williston Wastewater Facilities, Emergency Power Outage Plan, prepared by Forcier Aldrich & Associates, dated December 2005.
- Town of Williston Sewer System, Capacity Analysis, prepared by Forcier Aldrich & Associates, dated February 2007.

3. EXISTING WASTEWATER FACILITIES

3.1. Collection System

The Town of Williston's sewer collection system is comprised of gravity sewers, force mains, and pump stations as shown on the Sewer System Map, Figure No. 1. A majority of the sewer collection system was constructed in the early 1980's but has been expanded within the sewer service area. The gravity sewer sizes range from 6" to 18" diameter and 4" to 10" diameter pipe for force mains. Materials range from polyvinylchloride (PVC) and ductile iron (DI) pipe for the gravity sewers. The Town owns and operates ten (10) pump stations and receives wastewater flow from at least twelve (12) private pump stations. The Town's wastewater is pumped under the Winooski River to the Essex Junction Wastewater Treatment Facility. On Figure No. 2, a Sewer System Schematic is shown which indicates the flow directions and interconnections between the pump stations and treatment facility.

3.2. Pump Stations – Town

The Town of Williston owns and maintains ten (10) pump stations, each of which are described below and the locations are shown on the Sewer System Map, Figure No. 1.

3.2.1. River Cove (#1)

The River Cove pump station is located on the north side of River Cove Road west of Shirley Circle. This pump station receives flow from the entire Town of Williston and pumps all of the wastewater north through a 10" diameter force main under the Winooski River to the Essex Junction Wastewater Treatment Facility.

The River Cove pump station is a wet well/dry pit type duplex pump station constructed in 1984. Upgrades were performed to the pump controls and telemetry system in 2003, and interior valves and a bypass pump connection were installed in the force main in 2005. Further upgrades were completed in July 2013. The existing pumps and variable frequency drives (VFDs) were replaced as well as the existing generator and automatic transfer switch (ATS). The pump controller was upgraded as well as electrical, mechanical, structural, and architectural building upgrades were completed. Flows entering the wet well are measured with a Palmer Bowlus flume and bubbler type Isco flow meter. The pumps are operated using variable frequency drives with a design pumping capacity of 1,500 gpm per pump.

Stand-by power is provided on-site with a 100 kw generator and automatic transfer switch. A local SCADA system communicates directly with the Essex Jct wastewater treatment facility through radio telemetry and provides the ability to operate and monitor this pump station.

3.2.2. Gallop Hill (#2)

The Gallop Hill pump station is located at the end of Morgan Parkway and receives flow from Gallop Hill and Mountain View Estates. This submersible pump station was constructed in 1984. An alarm/dialer was installed in 1998 and the floats were replaced in 2000. A 4" diameter force main runs west on Morgan Parkway and south on Route 2A. These pumps were replaced in 2014 along with slide rails and interior wet well piping as well as interior grating. A new pump station control panel, pump controls, mission communication system, a new manual transfer switch, and submersible level transducer with redundant flow float control was included in the upgrade. Valve vault piping were also replaced with new plug and check valves. The Gallop Hill pump station has a design pumping capacity of 150 gpm per pump.

3.2.3. North Williston Road (#3)

The North Williston Road pump station is located just north of the intersection with Williston Road. This wet well/ dry pit pump station receives flow from North Williston Road, Meadow Run, Pleasant Acres, Golf Links, and Chatham Woods, and was constructed in 1984. In 1998, a new pump, control panel, level controller, and alarm/dialer was installed. There is a portable emergency generator connection with an ATS on site placed in 2013. A 4" diameter force main runs west on Williston Road and discharges near the entrance to the school. The North Williston Road pump station has a design pumping capacity of 225 gpm per pump.

3.2.4. Industrial Avenue (#4)

The Industrial Avenue pump station is located north of Industrial Avenue and west of Pamela Court. This duplex pump station receives flow from Meadow Brook, Pamela Court and Gail Terrace as well as all other service areas south and east of the pump station, and was constructed in 1984. The Industrial Avenue pump station is a wet well/dry pit pump station with a 6" force main which runs north on Pamela Court to the intersection of Pamela Court and Sharon Drive. In 2013 upgrades were completed to the pump station. This consisted of replacing one (1) existing pump, pump motor, generator, and automatic transfer switch (ATS). New variable frequency drives (VFDs) were installed, the existing control panel was relocated, and a new above grade control building was constructed with electrical, mechanical, and structural upgrades. The design pumping capacity for this pump station is 1,500 gpm for each pump.

3.2.5. Blair Park (#5)

The Blair Park Road pump station is located at the intersection of Blair Park Road and Williston Road. This duplex station receives flow from Blair Park, Commerce Street and Harvest Lane. A new 6" diameter force main installed in 1999 runs northeast to Route 2A and runs parallel to the existing 4" force main. The Blair Park pump station is a submersible duplex pump station with bypass pumping capabilities. The pumps were replaced in 2017 along with the slide rail systems, controls, floats, and external alarm communication system. An addition, a portable generator connection and the replacement piping for the wet well and valve pit were also completed. Pumps were upgraded with similar capacities to improve age related problems. It is anticipated major upgrades in the future will be required to handle new development and increased flows. Each pump has a design pumping capacity of approximately 250 gpm.

3.2.6. South Brownell Road (#6)

The South Brownell Road pump station is located at the southerly end of South Brownell Road just north of Interstate 89. This duplex pump station was constructed in 1984. The pump station receives flow from South Brownell Road and Production Park and has a 6" diameter force main that runs north on South Brownell Road and discharges at the intersection of North Brownell Road and Aspen Lane. The original 4" force main was replaced in 2006 to increase the capacity of the pump station. The South Brownell Road pump station was a submersible duplex pump station, but was upgraded to a new above ground package pump station in 2006 with a pumping capacity of 225 gpm. There is a portable generator connection on site and the existing wet well continues to be used.

3.2.7. Brennan Woods (#8)

The Brennan Woods pump station is located at the southwest corner of Barrett Lane. This pump station receives flow from the Brennan Woods development and discharges in a 6" diameter force main which runs west to the 8" diameter gravity sewer on Chelsea Place. The Brennan Woods pump station is a duplex above ground, vacuum-priming pump station. Addition of on-site stand-by power and an automatic transfer switch were done to accommodate the Finney Crossing project. This pump station has been owned and maintained by the Town since 2016.

3.2.8. Taft Farms (#10)

The Taft Farms pump station is located on Talcott Road east of Allen Brook Lane. The pump station receives flow from the Taft Farms area and was initially constructed by the developer to serve the Talcott Road area. The Taft Farms pump station is a duplex wet well/dry pit pump station and has a 4" diameter force main that runs south on Talcott Road to the intersection of Talcott Road and Williston Road. The pumps, controls and floats were replaced in 2017 along with the addition of a portable generator connection and a manual transfer switch. Each pump has a design pumping capacity of 150 gpm.

3.2.9. South Ridge (#12)

The South Ridge pump station is located west of South Ridge Road on the north side of the Allen Brook. This pump station was initially constructed by the developer in 1992 to serve the South Ridge development. The pump station receives flow from South Ridge and Pinecrest Village and has a 6" diameter force main which runs east along South Ridge Road to Old Stage Road. There is a portable generator connection on site. The South Ridge pump station is a duplex wet well/dry pit with a design pumping capacity of 225 gpm for each pump.

3.2.10. Old Stage Road (#13)

The Old Stage Road pump station is located on Old Stage Road near the intersection with Maple Road. This pump station was constructed in 1984. The pump station receives flow from Pinecrest Village, South Ridge, and all other areas of the Village. A 6" diameter force main runs west along Williston Road and discharges near Talcott Road. In 2011 the existing pumps were replaced with two (2) dry pit centrifugal pumps. The existing controller was reused and a new above ground pump control system was installed along with a new level transducer and a dehumidification unit in the dry well. The Old Stage Road pump station is a duplex wet well/dry pit pump station with design pumping capacities of 420 gpm per pump. On-site stand-by power and an automatic

transfer switch were recently installed to provide continuous operation during a power outage.

3.3. Pump Stations - Private

Several privately owned and maintained pump stations are located throughout the service area. Any pump station taken over by the Town must serve more than 200 individual connections or a municipal property connection and must be constructed in accordance with the requirements in the Public Works Standards.

Limited information is available on a majority of these private pump stations. The Town does provide assistance for contract operations and maintenance of some of these pump stations under a Cooperative Maintenance Agreement. A partial listing and description of some of these pump stations is provided below. The private pump station inventory is available in Appendix B.

3.3.1. Thomas Chittenden Health Center

The Thomas Chittenden Health Center pump station is located at the Health Center. A force main extends north and discharges to Williston Road.

3.3.2. East View / Mountain View Estates

The East View / Mountain View Estates pump station is located at the east end of North View Drive. The pump station receives flow from the Mountain View Estates development. It discharges in a 6" diameter force main which runs south to the Gallop Hill pump station. The East View / Mountain View Estates pump station is a duplex submersible pump station.

3.3.3. Meadow Run

The Meadow Run pump station is located west of Forest Run Road and south of Meadow Run Road. The pump station receives flow from the Meadow Run development and the Katie Lane pump station. A 4" diameter force main runs west and discharges to the 8" diameter gravity sewer on Country Lane. The Meadow Run pump station is duplex dry well / wet well pump station.

3.3.4. Old Stage Estates

The Old Stage Estates pump station is located southeast of the intersection of Paddock Lane and Southfield Drive. The pump station receives flow from Paddock Lane and Southfield Drive and a 6" diameter force main runs southwest and discharges to an 8"

diameter gravity sewer on Old Stage Road. The Old Stage Estates pump station is a duplex submersible pump station.

3.3.5. Heritage Meadows

The Heritage Meadows pump station is located east of Wildflower Circle and only receives flow from Wildflower Circle. A 4" diameter force main runs west and discharges to an 8" diameter gravity sewer on Old Stage Road. The Heritage Meadows pump station is a duplex submersible pump station.

3.3.6. Katie Lane

The Katie Lane pump station is located at the north end of Katie Lane. The pump station force main runs south along Katie Lane and discharges to the 8" diameter gravity sewer on Meadow Run Road. The Katie Lane pump station is a duplex submersible pump station.

3.4. Wastewater Treatment Facility

All of the wastewater generated by the Town passes through the River Cove pump station and is pumped north across the Winooski River to the Essex Jct wastewater treatment facility. This facility is designated as the Tri-Town Wastewater Treatment Facility and receives flow from the member communities which are the Village of Essex Jct, Town of Essex, and Town of Williston.

The Town of Williston initially owned a total of 530,000 gpd of treatment capacity which was increased by 250,000 gpd in 1999. In 2003, upgrades were funded by the Town which provided an additional 200,000 gpd of capacity. The Town has been in the process of purchasing additional wastewater treatment capacity from the Village of Essex Junction over the past several years at a rate of 10,000 gpd of additional capacity per year over five year periods. At the start of the process, the Town had approximately 980,000 gpd of capacity at the Essex Junction plant, and when all of the additional capacity has been purchased under the original agreement, the Town had a total of 1,030,000 gpd of available wastewater treatment capacity. Moving forward, the Town plans to continue purchasing an additional 10,000 gpd each year from the Village.

Table 3.3
Town of Williston - Treatment Capacity
As of FY17

Item	Flow (gpd)
Original Capacity	530,000
1999 Expansion	250,000
2003 Expansion	200,000
5 year Expansion	50,000
Yearly Expansion	10,000
Total	1,040,000

Under Amendment No. 3 between the member parties, the discharge permit was amended to increase the treatment capacity to 3.3 mgd. A summary of the treatment capacity owned by each municipality is provided in Table 3.4. As of FY17, the Town of Williston currently owns 1,040,000 gpd or 31.5% of the total of 3.3 mgd of permitted capacity.

In 2016, the Town of Williston utilized 58% of their allocated treatment capacity based on actual flows and excluding the committed reserve capacity.

Table 3.4
Essex Jct. Treatment Facility Capacity

Municipality	Treatment Capacity (mgd)	2016 Flows (mgd)	% of Capacity Utilized
Village of Essex Jct	1.16 (35.15%)	0.606	52%
Town of Essex	1.10 (33.33%)	0.421	38%
Town of Williston	1.04 (31.52%)	0.605	58%
Total	3.30 (100%)	1.635	50%

Notes:

1. The 2016 flow data was provided by Jim Jutras.
2. The % of capacity utilized is based on actual flows and does not include the committed reserve capacity for each municipality.

Each year, the Town evaluates the proposed allocation consistent with the phasing policy as summarized in Attachment A. A copy of this document is provided in Appendix C. Total new allocations for 2016-17 is 30,440 gpd. As shown in Table 3.5, the 2016-17

total allocation is 102,540 gpd including the reserve. A reserve of approximately 7% is maintained for infiltration. There is also a committed capacity of approximately 64,000 gpd. This capacity is allocated to development that will require additional sewer capacity but has yet to be completed and connected to the system.

**Table 3.5
Proposed Allocation - Attachment A**

Allocation Categories	2015- 16 Proposed Allocation (gpd)	2016-17 Proposed Allocation (gpd)
New Commercial and Industrial	7,500	7,500
New Residential, 2016-17	11,840	9,940
New Residential, future	0	0
Residential Additions/Minor Subdivisions	1,500	1,500
Affordable Housing	0	0
Pollution Abatement	2,500	1,500
Encouraging Specific Development	10,000	10,000
Planned Public Facilities	0	0
Total New Allocations	33,340	30,440
Reserve	72,100	72,100
Total Allocated	105,440	102,540

Notes:

1. Attachment A is updated each year by the Town and a copy of this document is provided in Appendix C.

4. SEWER SERVICE AREA

4.1. Description

For evaluating the impact of the current, committed but not connected, and future flows on the existing sewer system, the existing service area was divided into fourteen (14) sewer subareas. The boundary of the sewer service area is consistent with the limits shown in the Williston 2006 Comprehensive Plan, Map 7. Typically, it was preferred to delineate the service subarea around each Town owned pump station whenever possible since information is available on the existing flows which pass through each station. The delineation of these sewer subareas is shown on Figure No. 3, and a brief description of each subarea is provided in the following narratives.

4.1.1. No. 1: River Cove

Subarea No. 1 is located west of VT Route 2A from Hillside Drive north to the Winooski River. This subarea contains the River Cove Pump Station (#1) and several privately-owned pump stations. All of the wastewater flow passes through this sewer subarea.

Referring to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Gateway North and Agricultural/Rural Residential Zoning.

4.1.2. No. 2: Gallop Hill

Subarea No. 2 is located east of VT Route 2A from Bittersweet Circle north to the Winooski River. This sewer subarea includes the Mountain View Estates, Gallop Hill and Bittersweet developments, and contains the Gallop Hill Pump Station (#2) and three privately-owned pump stations.

Referring to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Agricultural/Rural Residential Zoning.

4.1.3. No. 3: Industrial Avenue

Subarea No. 3 is located west of VT Route 2A to North Brownell Road and extends north of Williston Road to Hillside Drive, excluding Blair Park. This sewer subarea

contains the Industrial Avenue Pump Station No. 4 and three privately-owned pump stations.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Industrial West and Agricultural/Rural Residential Zoning.

4.1.4. No. 4: South Brownell Road

Subarea No. 4 straddles South Brownell Road from Williston Road to Interstate 89. It includes Adams Park, Production Park, the eastern end of Shunpike Road, Kirby Lane and East Commerce Park. The South Brownell Pump Station (#6) and four privately-owned pump stations are within this sewer subarea.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as mostly Industrial West and some Agricultural/Rural Residential Zoning.

4.1.5. No. 5: Meadow Run

Subarea No. 5 lies east of VT Route 2A and includes the Meadow Run development and Katie Lane. This sewer subarea contains two (2) privately owned pump stations: Meadowrun and Katie Lane which serve a total of about 128 residential units.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Taft Corners Downtown and Agricultural/Rural Residential Zoning.

4.1.6. No. 6: Route 2A

Subarea No. 6 extends south from Hillside East to Chelsea Commons along Route 2A, including Maple Tree Place. This sewer subarea contains no Town owned pump stations but does receive flow from the privately owned pump station at Porterwood Trailer Park.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is zoned as Residential, Mixed-Use

Residential, Gateway South, Taft Corners Downtown, and some Agricultural/Rural Residential.

4.1.7. No. 7: Blair Park / Harvest Lane

Subarea No. 7 is comprised of the portion of Williston Road at Blair Park and includes Commerce Street and the northern half of Harvest Lane. This sewer subarea contains the Blair Park (#5) pump station and two (2) privately owned pump stations.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Industrial West, Taft Corners Downtown, Business Park, and Mixed-Use Commercial Zoning.

4.1.8. No. 8: Taft Corners Commercial Park

Subarea No. 8 is located on Marshall Avenue from the southwestern end of Harvest Lane to VT Route 2A. This sewer subarea does not include any Town owned pump stations but includes one (1) privately owned pump station.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Industrial West, Taft Corners Downtown, and Mixed-Use Commercial Zoning.

4.1.9. No. 9: Tafts Farm

Subarea No. 9 is comprised of the Taft Farms and Indian Ridge developments. This sewer subarea contains the Taft Farms Pump Station (#10) and one additional private pump station.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Residential and Mixed-Use Residential Zoning.

4.1.10. No. 10: Brennan Woods

Subarea No. 10 includes the Brennan Woods development. This sewer subarea includes the Brennan Woods pump station.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Residential Zoning.

4.1.11. No. 11: South Ridge

Subarea No. 11 contains the South Ridge and Pinecrest Village Developments. This sewer subarea contains the South Ridge pump station (#12) and one privately owned pump station.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Village Center and Residential Zoning.

4.1.12. No. 12: Village

Subarea No. 12 is comprised of The Commons, Village Grove, Maple Road and Whitney Hill Road residential developments. This sewer subarea does not contain any Town or privately owned pump stations.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Village Center Zoning.

4.1.13. No. 13: Old Stage Road

Subarea No. 13 is located in the vicinity of Old Stage Road and contains Old Stage Estates, Heritage Meadows, Turtle Pond, Brookside Drive and the eastern third of Lawnwood Drive. This sewer subarea contains the Old Stage (#13) and two (2) privately owned pump stations.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Village Center and Residential Zoning.

4.1.14. No. 14: North Williston Road

Subarea No. 14 is located along North Williston Road from Governor Chittenden Road south to Partridge Hill. This sewer subarea contains the North Williston Road (#3) Pump Station and three (3) privately-owned pump stations.

According to the Town of Williston Zoning Map, Figure No. 5 in Appendix A, the property located within this sewer subarea is identified as Village Center, Residential, and Agriculture/Rural Residential Zoning.

5. SEWER FLOWS

5.1. Existing Flows

For evaluating the current conditions, the existing flows were summarized for the major subareas. At the River Cove pump station, the flow meter data was used and at the other pump stations, the pump run times operating at the pump design capacity were used. Detailed information on 2014-2016 pump run times and estimated flows are provided in Appendix E. A discussion of the existing flows in each major subarea and assessment of the capacities is provided below. Some of the subareas are not evaluated because of the lack of information available on pump run times for private pump stations.

5.1.1. No. 1: River Cove

The existing sewer flows are metered at the River Cove pump station and this information is used to track the volume of treatment capacity utilized and uncommitted. All of the Williston flow passes through this subarea. It is anticipated that these flows will change from year to year as impacted by wet weather conditions and new connections. The average flows remained relatively steady throughout this three (3) year period and are shown in Table 5.1.

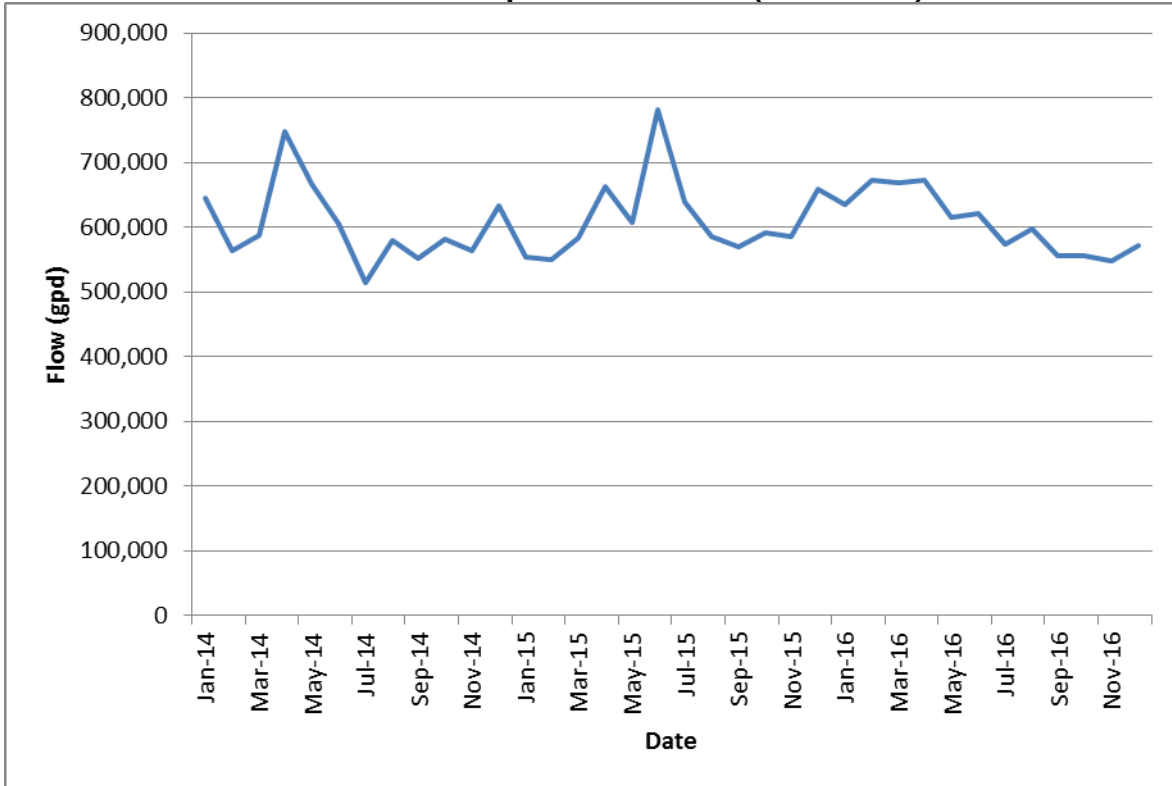
Table 5.1
River Cove Average Daily Flows

Year	Average Daily Flow (gpd)
2014	603,274
2015	614,322
2016	607,208
Average:	608,268

For this period, the average daily flow was 608,268 gpd as shown in Figure 5.1. The three (3) year average was used because of the dry weather in 2016. Based on the actual metered flows, approximately 59% of the treatment capacity is utilized.

The capacity of the existing pump station was evaluated at the average metered flows of 608,268 gpd. Using a peaking factor of 3.0, the peak hourly flow was estimated at 1,824,804 gpd. As shown in Table 5.1, this pump station utilizes about 84% of the pumping capacity of 1,500 gpm at peak hourly flow conditions.

**Figure 5.1
River Cove Pump Station Flows (2014-2016)**



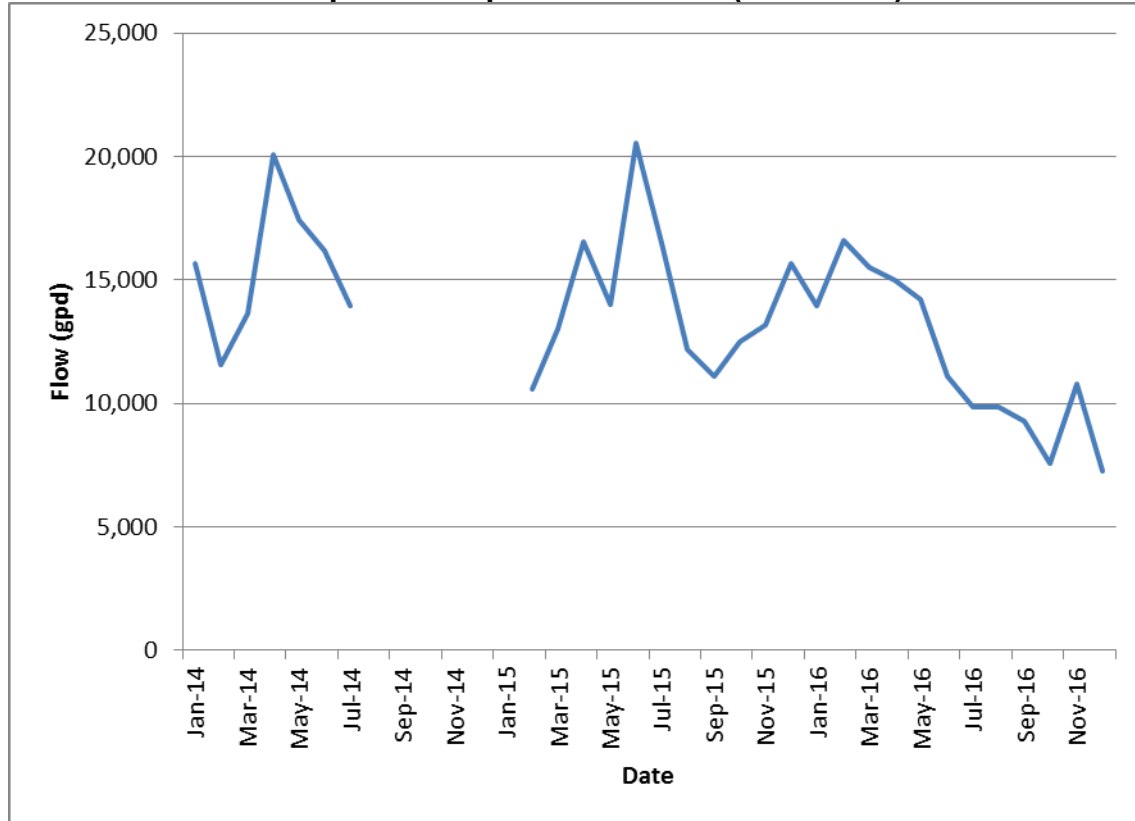
Notes:

1. The flows are metered at the River Cover pump station.

5.1.2. No. 2: Gallop Hill

For 2014-2016, the average daily flows were estimated at 13,800 gpd which is about 2.3% of the total flow contribution to River Cove. Figure 5.2 summarizes flows through the Gallop Hill pump station from 2014-2016. A peak hourly flow was estimated at 41,400 gpd using a peaking factor of 3.0. As shown in Table 5.2, the Gallop Hill pump station only utilizes about 19% of the pumping capacity of 150 gpm at peak flow conditions. Only the flow from subarea #2 passes through this pump station.

**Figure 5.2
Gallop Hill Pump Station Flows (2014-2016)**



Notes:

1. The flows are derived from run times taken from the pump station and the pump design capacity of the pump station. The design capacity flow rate at the pump station is identified as 150 gpm per pump.
2. Aug-Dec 2014 run times were not available.
3. Feb-Mar 2016 run times were averaged for the two (2) months.

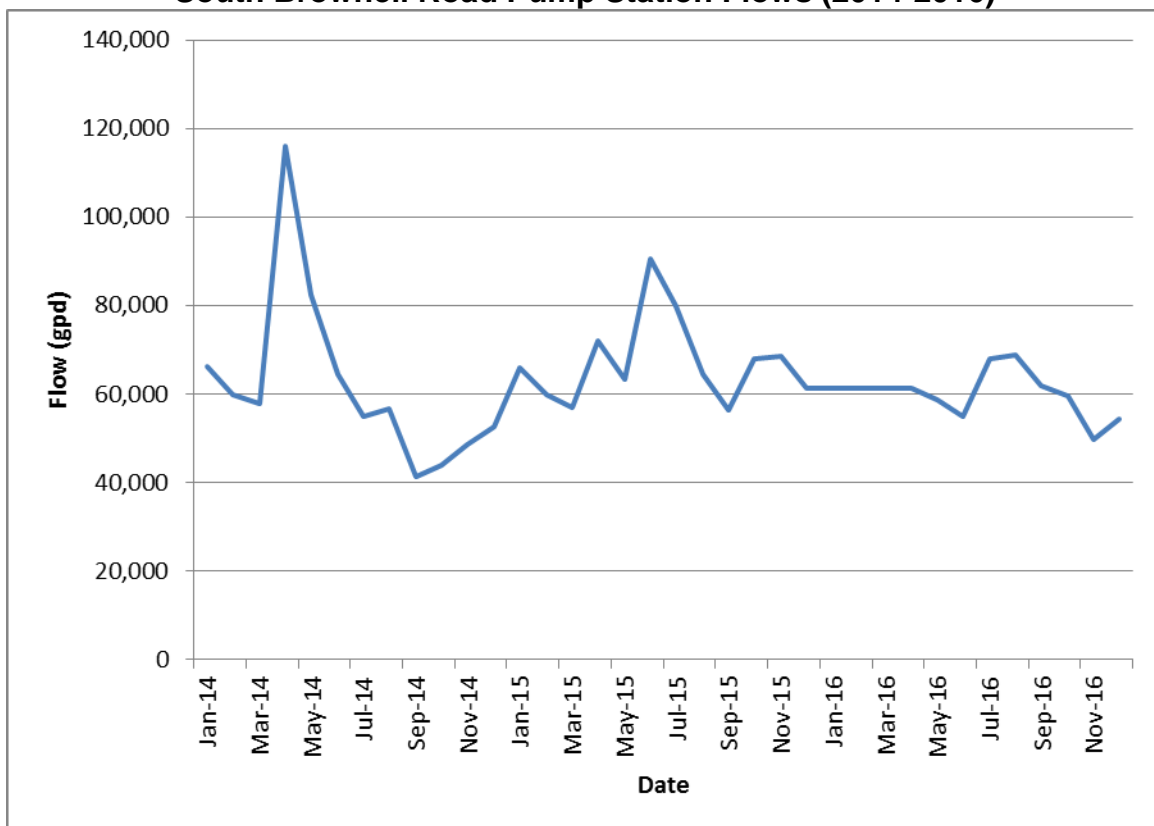
5.1.3. No. 3: Industrial Avenue

Industrial Ave has a variable frequency drive (VFD) which makes it unable to derive flows from run times since the pumping rate is not a steady value, and there is no flow meter at this pump station. It is estimated that approximately 90% of the flow that travels through River Cove pump station flows through Industrial Avenue. This assumption was used to approximate Industrial Avenue pump station flows. For 2014-2016, the average daily flows were approximately 547,441 gpd which is 90% of the total flow to River Cove. A peak hourly flow was estimated at 1,642,300 gpd using a peaking factor of 3.0. As shown in Table 5.2, the Industrial Avenue pump station utilizes about 76% of the pumping capacity of 1,500 gpm at peak flow conditions.

5.1.4. No. 4: South Brownell Road

For 2014-2016, the average daily flows were approximately 60,400 gpd which is about 10% of the total flow to River Cove. Figure 5.3 summarizes flows for the South Brownell Road pump station from 2014-2016. A peak hourly flow was estimated at 181,400 gpd using a peaking factor of 3.0. As shown in Table 5.2, the South Brownell pump station utilizes about 56% of the pumping capacity at peak flow conditions. In 2005, the force main size was increased to 6" to increase the capacity and the pump station was upgraded in 2008 to a capacity of 225 gpm. Only the flow from subarea #4 passes through this pump station.

Figure 5.3
South Brownell Road Pump Station Flows (2014-2016)

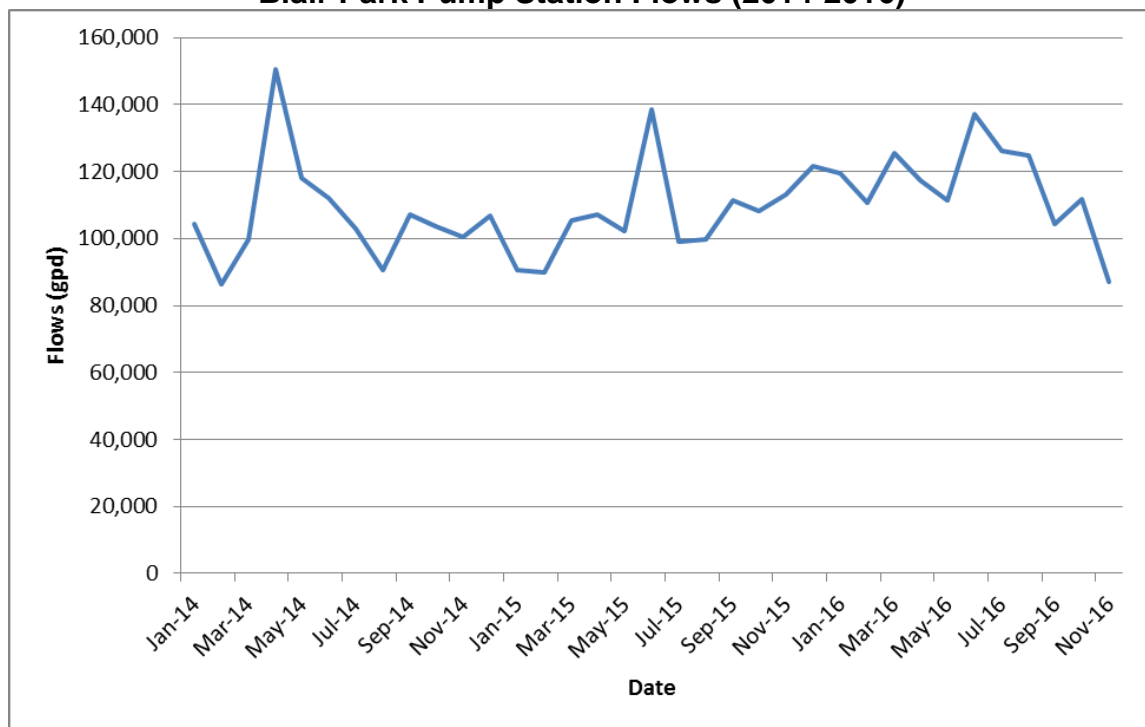
**Notes:**

1. The flows are derived from run times taken from the pump station and the pump design capacity of the pump station. The design capacity flow rate at the pump station is identified as 225 gpm per pump.
2. Dec 2016 run time log ended 12/5/2016.

5.1.5. No. 7: Blair Park / Harvest Lane

For 2014-2016, the average daily flows were approximately 107,300 gpd which is about 18% of the total flow to River Cove. Figure 5.4 summarizes flows for the Blair Park pump station for 2014-2016. A peak hourly flow was estimated at 322,000 gpd using a peaking factor of 3.0. As shown in Table 5.2, the Blair Park pump station utilizes about 89% of the original pumping capacity at peak flow conditions. The pumps were upgraded in 2016, but maintained the same capacity. Flow from subareas #7 and 8 pass through this pump station.

Figure 5.4
Blair Park Pump Station Flows (2014-2016)

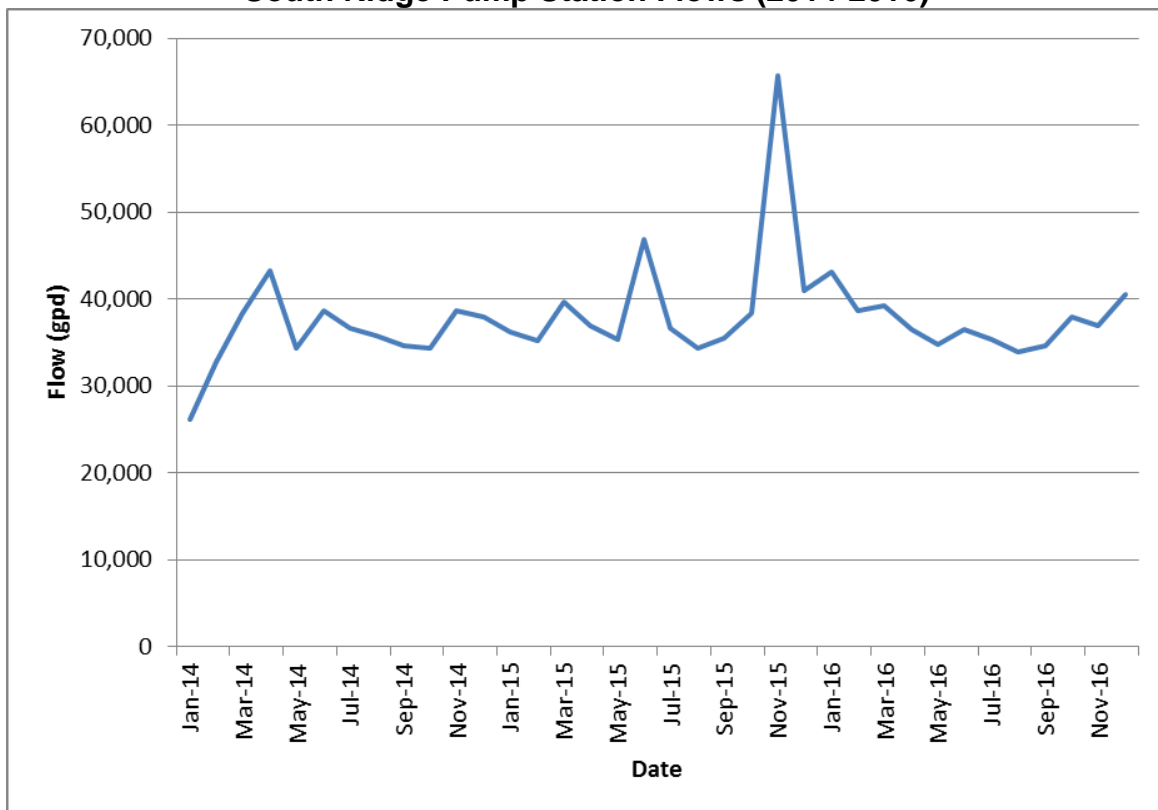
**Notes:**

1. The flows are derived from run times taken from the pump station and the pump design capacity of the pump station. The design capacity flow rate at the pump station is identified as 250 gpm per pump.
2. Dec 2016 run time log ended 12/8/2016.

5.1.6. No. 11: South Ridge

For 2014-2016, the average daily flows were approximately 37,800 gpd which is about 6% of the total flow to River Cove. Figure 5.5 summarizes flows through the South Ridge pump station from 2014-2016. A peak hourly flow was estimated at 113,400 gpd using a peaking factor of 3.0. As shown in Table 5.2, the South Ridge pump station utilizes about 35% of the pumping capacity of 225 gpm at peak flow conditions. Only flow from subarea #11 passes through this pump station.

Figure 5.5
South Ridge Pump Station Flows (2014-2016)

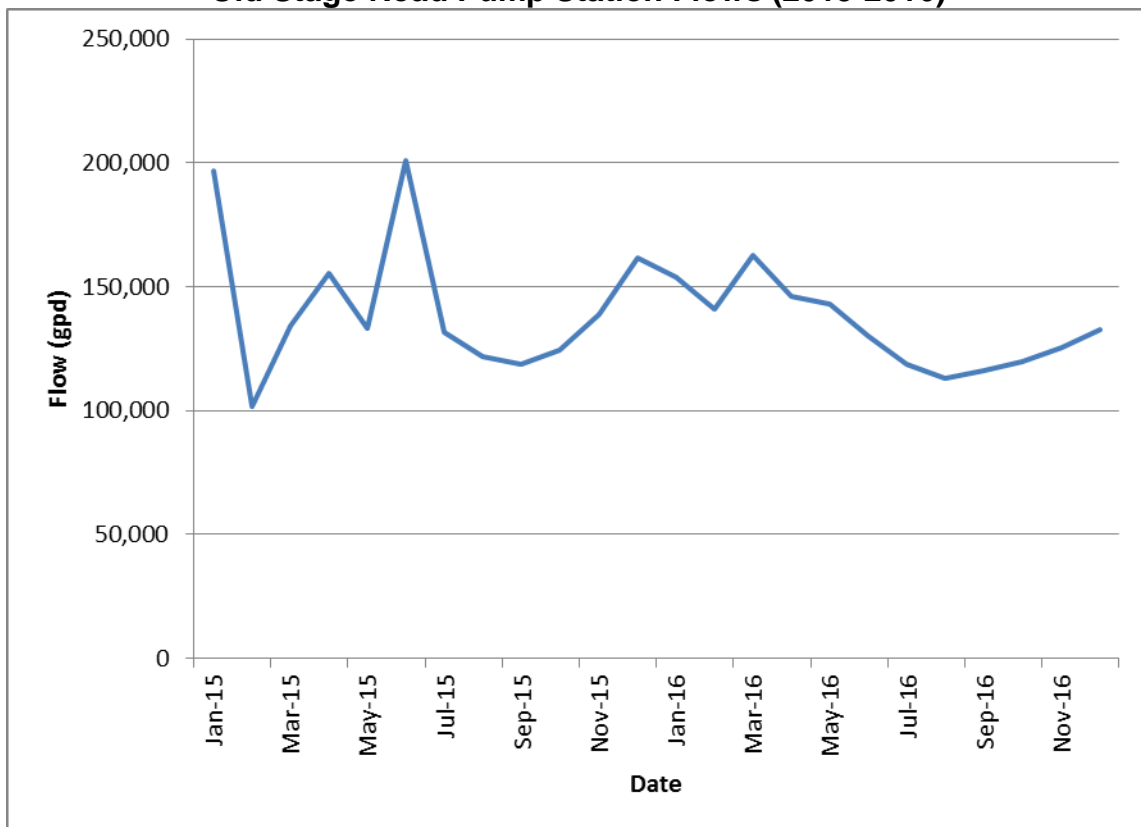
**Notes:**

1. The flows are derived from run times taken from the pump station and the pump design capacity of the pump station. The design capacity flow rate at the pump station is identified as 225 gpm per pump.
2. January 2014 is based on run times from 1/10-1/31.
3. In November 2015, pump #2 ran for 62 hours from 11/6-11/9.

5.1.7. No. 13: Old Stage Road

For 2015-2016, the average daily flows were approximately 138,334 gpd which is about 23% of the total flow to River Cove. Figure 5.6 summarizes flows through the Old Stage pump station for 2015-2016. A peak hourly flow was estimated at 415,002 gpd using a peaking factor of 3.0. As shown in Table 5.2, the Old Stage pump station utilizes about 69% of the pumping capacity of 420 gpm at peak flow conditions. All of the flow from subareas #11, 12, 13, and 14 pass through the Old Stage pump station.

Figure 5.6
Old Stage Road Pump Station Flows (2015-2016)

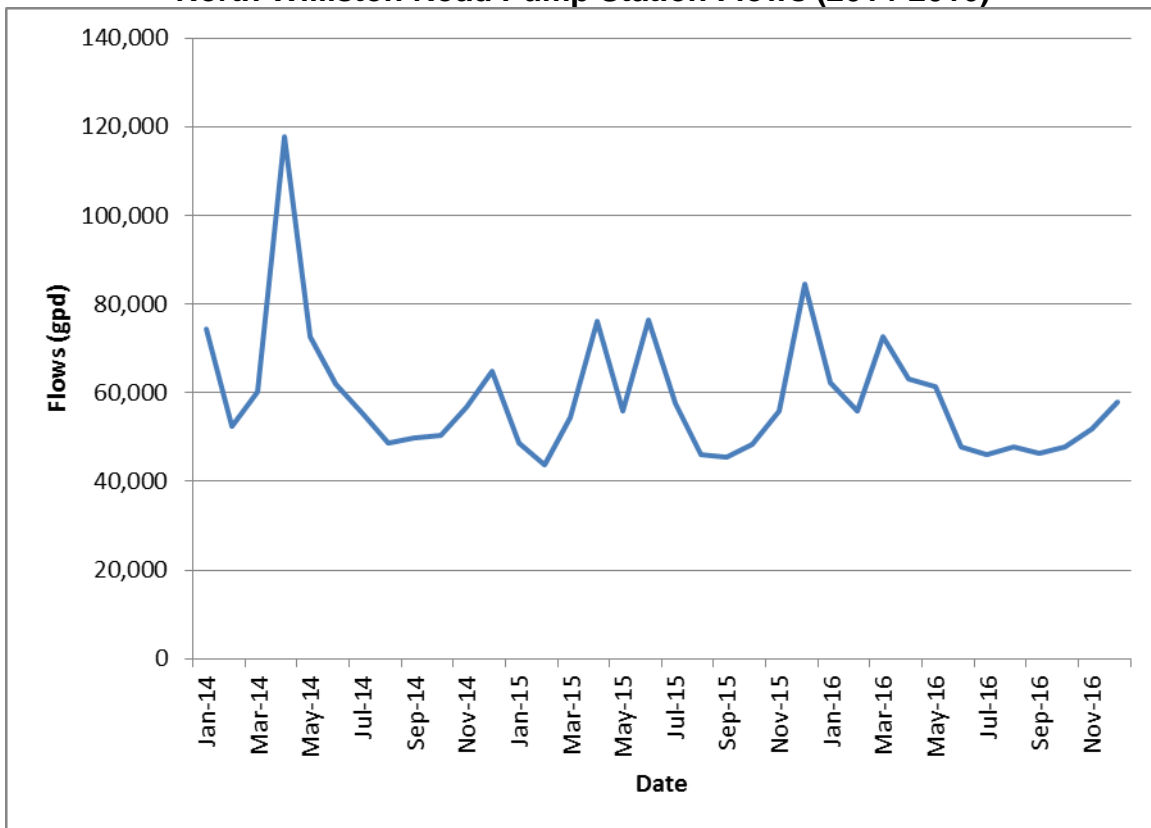
**Notes:**

1. The flows are derived from run times taken from the pump station and the pump design capacity of the pump station. The design capacity flow rate at the pump station is identified as 420 gpm per pump.

5.1.8. No. 14: North Williston Road

For 2014-2016, the average daily flows were approximately 58,900 gpd which is about 10% of the total flow to River Cove. Figure 5.7 summarizes flows through the North Williston Road pump station for 2014-2016. A peak hourly flow was estimated at 176,700 gpd using a peaking factor of 3.0. As shown in Table 5.2, the North Williston Road pump station utilizes about 55% of the pumping capacity of 225 gpm at peak flow conditions. Only the flow from subarea #14 passes through the North Williston Road pump station.

Figure 5.7
North Williston Road Pump Station Flows (2014-2016)

**Notes:**

1. The flows are derived from run times taken from the pump station and the pump design capacity of the pump station. The design capacity flow rate at the pump station is identified as 225 gpm per pump.
2. Pump 1 ran excessive hours from 12/11/2015-12/14/2015. (pump ran 32 hours)

Table 5.2
Pump Stations
Comparison of Design Capacities vs Estimated Peak Flows

Pump Station	Design Flow Rate, Each Pump⁽¹⁾ (gpd)	Average Daily Flow (gpd)	Peak Hourly Flow⁽⁴⁾ (gpd)	% of Design Flow
River Cove	2,160,000	608,268	1,824,804	84%
Gallop Hill	216,000	13,810	41,430	19%
North Williston Road	324,000	58,890	176,669	55%
Industrial Avenue	2,160,000	547,441	1,642,324	76%
Blair Park	360,000	107,344	322,033	89%
So. Brownell	324,000	60,423	181,268	56%
South Ridge	324,000	37,799	113,398	35%
Old Stage Road	604,800	138,334	415,002	69%

Notes:

1. The design flow rate is based on the design pumping capacity with one pump operating.
2. The average daily flow is estimated based on the design flow rate of each pump and the 2014-2016 elapsed run times for each pump recorded by the Town except for Old Stage where only 2015-2016 elapsed run times were used.
3. The flow entering the River Cove pump station is metered prior to entering the wet well.
4. The peak hourly flow is based on a peaking factor of 3.0.

5.2. Committed Capacity Not Connected

There is an additional committed capacity of 44,415 gpd that has been allocated to new development that has yet to be built and connected to the system. A comprehensive list of how much flow is being allotted and who it is being allocated to was provided by the Town and is available in Appendix F. These developments are mostly located around Taft's Corners, concentrated within subarea 6. For the purposes of this evaluation, it is assumed that this committed capacity will be connected.

5.3. Future Growth Projections

The number of new residential units and additional commercial space were identified for specific locations throughout the Town by zoning district. These estimates were completed by Ken Belliveau, Director of Planning and Zoning, and the resulting sewer flows were estimated.

A detailed breakdown of the future growth projections by zoning district is summarized in Table 5.3. A total of 1,360 residential units and 150,000 sq. ft. of commercial/industrial area are anticipated over the next 20 years within the sewer service area. These residential buildout estimates are based on the maximum allowable amount of residential units to be built each year from Williston's growth management allocation rules. The residential units in the Agricultural / Rural Residential Zone are outside of the sewer service area and not included in the future flow projection.

Table 5.3
Future Growth Projections by Zoning District

Location/Zoning District	No. of Residential Units	Commercial/ Industrial Area (sq. ft.)
Commercial Areas		
Taft Corners (TC)	1,120	50,000
Business Park	0	50,000
Industrial	0	0
Mixed Use	0	50,000
Village Center	0	0
Residential Zoning Areas		
West of Circ. Highway	100	0
Old Stage Road and Circ	60	0
No. Williston Road and Old Stage	50	0
East of No. Williston Road	30	0
Mixed Use	0	0
Agricultural / Rural Residential	240	0
Totals	1,600	150,000

Notes:

1. The future flow projections are based on 20 years within the existing sewer service area.
2. The projections are estimated by Ken Belliveau.

5.4. Projected Sewer Flows

The projected sewer flows at the design year for the residential and commercial/industrial uses are summarized by zoning district in Table 5.4. At the design year of 2037, an additional 193,800 gpd of flow for residential and commercial/industrial use is anticipated from new development over a 20 year period within the sewer service areas. These projected flows include projects with approved allocations.

Table 5.4
Projected Sewer Flows at Design Year

Location/Zoning District	Residential Average Daily Flow (gpd)	Commercial/Industrial Average Daily Flow (gpd)	Total Average Daily Flow (gpd)
Commercial Areas			
Taft Corners (TC)	151,200	3,400	154,600
Business Park	0	3,400	3,400
Industrial	0	0	0
Mixed Use	0	3,400	3,400
Village Center	0	0	0
Residential Zoning Areas			
West of Circ. Highway	13,500	0	13,500
Old Stage Road and Circ	8,100	0	8,100
No. Williston Road and Old Stage	6,750	0	6,750
East of No. Williston Road	4,050	0	4,050
Mixed Use	0	0	0
Totals	183,600	10,200	193,800

Notes:

1. The flow allocation used by the Town based on the number of bedrooms was used to estimate the average daily flow as follows: 1 bedroom = 75 gpd, 2 bedroom = 135 gpd, 3 bedroom = 230 gpd.
2. For the mixed use commercial areas, 68 gpd per 1,000 s.f. was used to estimate the average daily flow.
3. For the industrial areas, 30 gpd per 1,000 s.f. was used to estimate the average daily flow.
4. The above projected flows do not account for reserves for infiltration.

A discussion of the projected flows by zoning district is provided below.

5.4.1. Taft Corners

An additional 50,000 sq. ft. of commercial space and 1,120 residential units are projected for this zoning district, increasing the average daily flows by 154,600 gpd. The residential units are assumed to average two (2) bedrooms. This proposed development is planned in sewer subareas #6. The majority of the wastewater flow generated in this service area will be conveyed by gravity to the sewers on Route 2 towards the Industrial Avenue pump station.

5.4.2. Business Park

An additional 50,000 sq. ft. of commercial space is projected for this zoning district, increasing the average daily flows by 3,400 gpd. This proposed development is planned in sewer subarea #7. The majority of the wastewater flow generated in this service area will be conveyed by gravity to the Blair Park pump station.

5.4.3. Commercial - Mixed Use

An additional 50,000 sq. ft. of commercial space is projected for this zoning district, increasing the average daily flows by 3,400 gpd. This zoning district covers an area west of Route 2A and south of Route 2 and is located within sewer subarea #8. The wastewater flow generated in this service will be conveyed through the Blair Park pump station and continue towards Industrial Avenue.

5.4.4. Residential – Between Old Stage Road and Circ. Highway

An additional 60 residential units are projected for this zoning district, increasing the average daily flows by 8,100 gpd. This zoning district is a part of sewer subarea #11. The majority of the flow generated in this area will be conveyed from the South Ridge pump station to the Old Stage pump station via force main, where it will continue via gravity to the Industrial Ave pump station.

5.4.5. Residential – Between N. Williston Road and Old Stage Road

An additional 50 residential units are projected for this zoning district, increasing the average daily wastewater flows by 6,750 gpd. This zoning district covers the residential zone between N. Williston Road and Old Stage Road, and is located within sewer subareas #13 and 14. The flow from subarea #13 will travel through the Old Stage pump station and the flow from subarea #14 will travel through the North Williston pump station.

5.4.6. Residential –East of N. Williston Road

An additional 30 residential units are projected for this zoning district, increasing the average daily wastewater flows by 4,050 gpd. This zoning district covers the residential zone east of N. Williston Road and is located within sewer subarea #14. The flow from subarea #14 will travel through the North Williston pump station.

5.5. Total Future Flows

The total future flows were used to assess the capacity of the sewer system at the design year. The total future flows are the sum of current flows, plus the allocated but unconnected flows, and the projected new flow in each zoning district. The following Table 5.5 is a summary of the estimated future flows of each sewer subarea, excluding current average daily flows. In Section 6 these flows will be attributed to the corresponding pump stations and sewer lines that the subareas are serviced by.

Table 5.5
Future Flows @ Design Year 2037 by Sewer Subarea

Sewer Subarea	Closest Pump Station Down-Gradient	Flows Approved Not Connected (gpd)	New Flow Estimates (gpd)	Total Average Daily Flow (gpd)	Peak Hourly Flow⁽¹⁾ (gpd)
1	River Cove (#1)	0	0	0	0
2	Gallop Hill (#2)	0	0	0	0
3	Industrial Ave (#4)	0	0	0	0
4	Industrial Ave (#4)	0	0	0	0
5	Industrial Ave (#4)	1,080	0	1,080	3,300
6	Industrial Ave (#4)	35,235	119,365	154,600	463,800
7	Blair Park (#5)	0	3,400	3,400	10,200
8	Industrial Ave (#4)	0	3,400	3,400	10,200
9	Taft Farms (#10)	0	6,210	6,210	18,700
10	Industrial Ave (#4)	0	6,210	6,210	18,700
11	South Ridge (#12)	2,835	5,265	8,100	24,300
12	Old Stage (#13)	0	0	0	0
13	Old Stage (#13)	0	3,375	3,375	10,200
14	North Williston (#3)	3,780	3,645	7,425	22,300
Total		42,930	150,870	193,800	484,500

Notes:

1. A peaking factor of 3.0 was used to estimate the peak hourly flow.

6. EVALUATION OF EXISTING WASTEWATER FACILITIES

6.1. Sewer Collection System

Based on the wastewater flow projections, the capacity limitations for the sewer system were evaluated. This initial evaluation focused on the existing gravity sewerlines. The as-built drawings were reviewed to identify areas with smaller pipe sizes and flatter slopes. In Table 6.1, those segments which could be a potential concern regarding capacity limitations were evaluated at peak flow conditions. The capacity of each pipeline segment was evaluated for the current and projected flows at the design year 2037. A recent project replaced the segment of sewerline along Route 2A between manholes 146 and 147 in 2016. Note that this segment of sewer had a significant increase in capacity compared to other segments along Route 2A. There were no identified capacity limitations in the evaluated pipeline segments for the next ten (10) years. Although the segment of sewer line on Route 2 between ML 159 and 160 reaches capacity around the design year 2037, recommended improvements are only out to the next ten (10) years. These pipes will not reach 90% capacity during peak flows in the next ten (10) years. The following Table 6.1 presents these pipeline segments comparing the design capacity to the peak flow rate.

Table 6.1
Gravity Sewer Capacities of “Critical” Pipe Segments

Location	From Manhole	To Manhole	Pipe Size (inches)	Pipe Material	Design Pipe Slope (ft/ft)	Design Capacity (gpd)	Peak Flow Rate (gpd)	% Capacity
River Cove	ALT 104	ALT 105	18	PVC	0.0017	3,638,801	2,223,724	61%
Sharon Drive	113A	207A	18	PVC	0.0024	4,323,540	2,223,724	51%
Industrial Avenue	P.S.	ML 119	18	DI	0.0022	3,449,562	2,223,724	64%
No. Brownell Road	ML 128	ML 130	18	PVC	0.0025	4,412,695	2,223,724	50%
Route 2A	ML 146	ML 147	18	PVC	0.0031	4,913,769	1,710,223	35%
Route 2A	ML 147	ML 149	12	PVC	0.0052	2,158,534	1,710,223	79%
Route 2A	ML 153	ML 154	12	PVC	0.0077	2,626,652	1,710,223	65%
Route 2	ML 159	ML 160	12	PVC	0.0033	1,719,547	1,710,223	99%
Route 2A	ML 154	2AS 210	12	DI	0.0053	1,815,992	1,710,223	94%
Route 2A	2AS 215	2AS 216	8	PVC	0.0089	957,801	332,233	35%
Route 2A	2AS 216	2AS 217	10	PVC	0.004	1,164,226	332,233	29%
Route 2A	2AS 221	2AS 223	10	DI	0.004	970,188	332,233	34%
Route 2A	2AS 224	2AS 225	8	PVC	0.0053	739,126	332,233	45%
South Ridge	1A	2A	8	PVC	0.004	642,112	137,698	21%
South Ridge	1A	2B	8	PVC	0.004	642,112	137,698	21%
Route 2	3	6	8	PVC	0.004	642,112	137,698	21%
Old Stage Road	Wet well	WV 164	10	DI	0.004	970,188	471,702	49%
Route 2	WV 168	WV 169	10	PVC	0.0035	1,089,033	198,944	18%
No. Williston Road	WV 230	WV 231	8	PVC	0.005	717,903	198,944	28%
No. Williston Road	NV 351	NW 361	10	PVC	0.004	1,164,226	198,944	17%

Notes:

1. The information for each pipeline was taken from the as-built drawings.
2. The peak flow rate includes both the current and projected flows at the design year.

6.2. Pump Stations and Force Mains

6.2.1. No. 1: River Cove

The average daily flow which is contributed from this subarea and passes through this subarea is approximately 608,268 gpd at current conditions as evaluated in Section 5. At the design year, 42,930 gpd have been allocated towards this pump station along with an additional 150,870 gpd of new flow. All of the total flow passes through this pump station as it is transported to the Essex Jct. wastewater treatment facility. The peak flow at the design year of 2037 is estimated at 2,406,204 gpd (1,671 gpm) using approximately 111% of the pumping capacity. The existing pumps are not adequate and a third pump is recommended to handle the additional flow prior to the design year.

6.2.2. No. 2: Gallop Hill

The average daily flow for this subarea is approximately 13,810 gpd at current conditions as evaluated in Section 5. At the design year, no additional flow is projected for this pump station. The peak flow at the design year is estimated at 41,400 gpd (29 gpm) utilizing approximately 19% of the pumping capacity. The existing pumps are adequate to handle the additional flow, and as identified in the EPOP, the emergency storage at this location is adequate. The 4" diameter force main is anticipated to be adequate at the design year of 2037.

6.2.3. No. 3: North Williston Road

The average daily flow for this subarea is approximately 58,900 gpd at current conditions as evaluated in Section 5. At the design year, 3,780 gpd have been allocated towards this pump station and an additional 3,645 gpd of new flow is projected. The peak flow at the design year is estimated at 198,944 gpd (138 gpm) utilizing approximately 61% of the pump capacity. The existing pumps and force main are adequate to handle this additional flow at the design year.

6.2.4. No. 4: Industrial Avenue

The average daily flow which is contributed from this subarea and passes through this subarea is approximately 547,441 gpd at current conditions as evaluated in Section 5. At the design year, 42,930 gpd have been allocated towards this pump station and an additional 150,870 gpd of flow is projected. Approximately 90% of the current total flow passes through this pump station as it is transported to the River Cove pump station. The peak flow at the design year is estimated at 2,223,724 gpd (1,544 gpm) using approximately 103% of the pumping capacity. The existing pumps and 10" force main are not adequate to handle the additional flow and will require a capacity upgrade prior to the design year.

6.2.5. No. 5: Blair Park

The average daily flow for this subarea is approximately 107,300 gpd at current conditions as evaluated in Section 5. At the design year an additional 3,400 gpd of new flow is projected. The peak flow at the design year is estimated at 332,233 gpd (231 gpm) utilizing approximately 92% of the pumping capacity. The existing pumps are not adequate to handle the additional flow and will require an upgrade prior to the design year.

6.2.6. No. 6: South Brownell Road

The average daily flow for this subarea is approximately 60,400 gpd at current conditions as evaluated in Section 5. At the design year, no additional flow is projected for this pump station. The peak flow at the design year is estimated at 181,268 gpd (126 gpm) using approximately 56% of the pumping capacity. The existing pumps are adequate to handle the additional flow at the design year.

6.2.7. No. 12: South Ridge

The average daily flow for this subarea is approximately 37,800 gpd at current conditions as evaluated in Section 5. At the design year, 2,835 gpd have been allocated towards this pump station and an additional 5,265 gpd of new flow is projected. The peak flow at the design year is estimated at 137,698 gpd (96 gpm) utilizing approximately 42% of the pumping capacity. The existing pumps are adequate to handle the additional flow, and as identified in the EPOP, the emergency storage at this location is adequate.

6.2.8. No. 13: Old Stage Road

The average daily flow for this subarea is approximately 138,334 gpd at current conditions as evaluated in Section 5. At the design year, 6,615 gpd have been allocated towards this pump station and an additional 12,285 gpd of new flow is projected. The peak flow at the design year is estimated at 471,702 gpd (328 gpm) utilizing approximately 78% of the pumping capacity. The existing pumps are adequate to handle the additional flow at the design year.

6.2.9. Summary

The following Table 6.2 summarizes the anticipated future flows. The total peak hourly flow is the sum of the current flows, the allocated but unconnected flows, and the projected new flows with the peaking factor applied.

Table 6.2
Future Flows at Design Year 2037

Pump Station	Design Flow Rate, Each Pump (gpd)	Average Daily Flow (gpd)	Allocated Unconnected Flow (gpd)	Projected Additional Flow (gpd)	Total Average Daily Flow⁽²⁾ (gpd)	Total Peak Hourly Flow⁽¹⁾ (gpd)	% of Design Flow
River Cove	2,160,000	608,268	42,930	150,870	802,068	2,406,204	111%
Gallop Hill	216,000	13,810	0	0	13,810	41,430	19%
North Williston Road	324,000	58,890	3,780	3,645	66,315	198,944	61%
Industrial Avenue	2,160,000	547,441	42,930	150,870	741,241	2,223,724	103%
Blair Park	360,000	107,344	0	3,400	110,744	332,233	92%
So. Brownell	324,000	60,423	0	0	60,423	181,268	56%
South Ridge	324,000	37,799	2,835	5,265	45,899	137,698	42%
Old Stage Road	604,800	168,566	6,615	12,285	157,234	471,702	78%

Notes

1. A peaking factor of 3.0 was used to estimate the peak hourly flow.
2. Total Average Daily Flow = Existing Flow + Allocated Unconnected Flow + Projected Additional Flow

7. SEWER SYSTEM FUTURE NEEDS

Based on the projected wastewater flows developed in Section 6 and the evaluation of the capacity of the existing infrastructure, recommendations were developed for the future sewer system needs in the next 10 years. Specific items for expansion of the existing sewer system, pump stations, and force mains are described in the following sections. These future needs are based on capacity only and do not account for the age or condition of specific equipment and infrastructure.

7.1. Sewer Collection System

Capacity limitations within the existing gravity sewers are very limited and even those few locations of concern do not create any significant problems until design year 2037 conditions are approached. The capacities were evaluated at peak flow conditions, so any surcharging within these pipelines would be for relatively short durations and would not likely cause any major problems. Therefore, no short-term sewerline replacements were identified.

7.2. Capacity Related Upgrades

The recommended improvements to the pump stations and force mains are described in the following narratives and are shown on Figure No. 4. These upgrades are identified to increase the capacity of the pump stations, force mains, and other components where necessary.

7.2.1. River Cove Pump Station (#1)

An increase in pumping capacity is needed to approximately 2,000 gpm, requiring the addition of a third pump. Space was made available in the last upgrade for a third pump and a triplex system will be utilized for better redundancy and improved efficiency of operation.

7.2.2. Industrial Avenue Pump Station (#4)

An increase in pumping capacity will be needed, so replacing the forcemain is recommended. The existing 10" force main is nearing capacity requiring replacement with approximately 1,300' of new 12" force main along Sharon Drive. This will create less friction head in the force main, thereby adding additional pumping capacity to the station. This project will need to be constructed after the 10 year window, however planning and final design have been incorporated into the future needs schedule.

7.2.3. Blair Park Pump Station (#5)

An increase in pumping capacity is needed to approximately 325 gpm, requiring replacement of the existing pumps and control system. Also, the existing steel wet well will require replacement to extend the useful life of this pump station.

7.3. Age Related Upgrades

7.3.1. North Williston Pump Station (#3)

Due to age related concerns, it is recommended that the existing pumps and controls are replaced in kind with new equipment.

7.3.2. South Ridge Pump Station (#12)

Due to age related concerns, it is recommended that the existing pumps and controls are replaced in kind with new equipment.

7.4. Schedule

Using the projected wastewater flows and assuming a uniform annual increase, the anticipated year that the upgrade is required to provide the additional capacity is identified in Table 7.1. If the addition of flows occurs within other sewer subareas and at a different rate, then the anticipated implementation date may change accordingly. As the proposed development is approved and connected, this schedule will need to be reviewed and updated.

For the pump stations that require age related improvements, the timeline may need to be adjusted as priorities change.

Table 7.1
Sewer System
Schedule of Future Needs

Project	Fiscal Year										
	18	19	20	21	22	23	34	25	26	27	28
South Ridge Pump Station											
Planning / Final Design		X									
Construction			X								
River Cove Pump Station											
Planning / Final Design				X							
Construction					X						
North Williston Pump Station											
Planning / Final Design					X						
Construction						X					
Blair Park Pump Station											
Planning / Final Design						X					
Construction							X				
Industrial Avenue Pump Station											
Planning / Final Design										X	

7.5. Estimated Costs

A summary of the estimated costs to address each of the future needs is provided in Table 7.2 and 7.3 for the sewer system upgrades. The total costs are based on the current year (2017) costs and include: construction cost, engineering and permitting allowances, contingency, and other project costs. Note that the Industrial Avenue total cost does not include the estimated construction cost because it will go to construction after the 10 year planning window. Prior to implementation of each upgrade, additional study should be performed to identify the specific work involved and to update the cost estimates.

Table 7.2
FY 18-22
Sewer System Upgrades - Estimated Costs

Project	Fiscal Year				
	18	19	20	21	22
South Ridge Pump Station					
Planning / Final Design		\$25,000			
Construction			\$162,000		
River Cove Pump Station					
Planning / Final Design				\$20,000	
Construction					\$135,000
North Williston Pump Station					
Planning / Final Design					\$25,000
Construction					
Total	\$0	\$25,000	\$162,000	\$20,000	\$160,000

Notes:

1. Engineering News Record Construction Cost Index September 2017 Value = 10800

Table 7.3
FY 23-28
Sewer System Upgrades - Estimated Costs

Project	Fiscal Year					
	23	24	25	26	27	28
North Williston Pump Station						
Planning / Final Design						
Construction	\$150,000					
Blair Park Pump Station						
Planning / Final Design	\$40,000					
Construction		\$250,000				
Industrial Avenue Pump Station ⁽²⁾						
Planning / Final Design					\$40,000	
Total	\$190,000	\$250,000	\$0	\$0	\$40,000	\$0

Notes:

1. Engineering News Record Construction Cost Index September 2017 Value = 10800
2. Industrial Avenue cost does not include construction cost, construction contingency, or step III fees.

7.6. Land Purchase / Easements

Additional land purchase or acquisition of temporary or permanent easements may be required to implement the sewerline replacements, pump station upgrades, or to install the new sewer force mains. Prior to implementation, identification of land needs should be performed.

8. WASTEWATER TREATMENT – FUTURE NEEDS

8.1. Preliminary Design Criteria

To determine the future treatment capacity needs, the annual treatment needs were evaluated based on future projected flows.

As shown previously, new allocations for 1,360 residential units and 150,000 s.f. of commercial/industrial area will be required within the sewer service area. To meet these future needs, an average of 9,690 gpd of new treatment capacity will be required each year as shown in Table 8.1.

Table 8.1
Annual Capacity Needed - New Allocations (FY18 - FY38)

Use	Description	Annual Capacity Needed (gpd)
Residential Zones	240 Units	1,620
Commercial/Industrial Zones	1,120 Units 150,000 sq. ft	8,070
	Total Use	9,690 9,690

Notes:

1. The annual capacity needed for new allocations includes all projects that have flow allocated but are not yet connected out to FY 25.

Table 8.2 summarizes the capacity that is currently committed. This includes the 3 year average flow from 2014-2016, projects with committed capacity that are not yet connected, and a 7% reserve capacity for infiltration.

**Table 8.2
Committed Allocation**

Item	Flows
Current Flows ⁽¹⁾	608,268 gpd
Capacity Committed ⁽²⁾	42,930 gpd
Reserve Capacity ⁽³⁾	72,800 gpd
Total	723,998 gpd

Notes:

1. The current flows are the three year average from 2014-2016.
2. The capacity committed is the flow from projects with allocated flows that are not yet connected to the sewer system.
3. The reserve capacity includes the 7% of the total treatment capacity for infiltration.
4. The total is the treatment capacity required for FY 17.

8.2. Schedule

Using the annual projected needs of 9,690 gpd for development, the adequacy of the current treatment capacity was evaluated. For FY 18-25, the projected new flow excludes the portion of flow that is allocated but not yet connected. A schedule was developed to determine the future treatment capacity needs and is summarized in Table 8.3. The schedule shows the annual allocation of 9,940 gpd for projected new flow plus the 7% reserve allocation. The 10,000 gpd of additional treatment capacity will continue to be purchased from the Village each year through FY 22. Through FY 28, a total of 1,080,000 gpd of treatment capacity will be sufficient.

Table 8.3
Wastewater Treatment Capacity - Schedule of Future Needs

Fiscal Year	Projected New Flows⁽¹⁾ (gpd)	Treatment Capacity Needed⁽²⁾ (gpd)	Treatment Capacity Provided⁽³⁾ (gpd)	Treatment Capacity Remaining⁽⁴⁾ (gpd)	Percent Used
17	0	723,298	1,030,000	306,702	70.2%
18	5,397	729,395	1,040,000	310,605	70.1%
19	5,397	735,492	1,050,000	314,508	70.0%
20	5,397	741,589	1,060,000	318,411	70.0%
21	5,397	747,686	1,070,000	322,314	69.9%
22	5,397	753,783	1,080,000	326,217	69.8%
23	5,397	759,180	1,080,000	320,820	70.3%
24	5,397	764,577	1,080,000	315,423	70.8%
25	5,397	769,974	1,080,000	310,026	71.3%
26	9,690	779,664	1,080,000	300,336	72.2%
27	9,690	789,354	1,080,000	290,646	73.1%
28	9,690	799,044	1,080,000	280,956	74.0%

Notes:

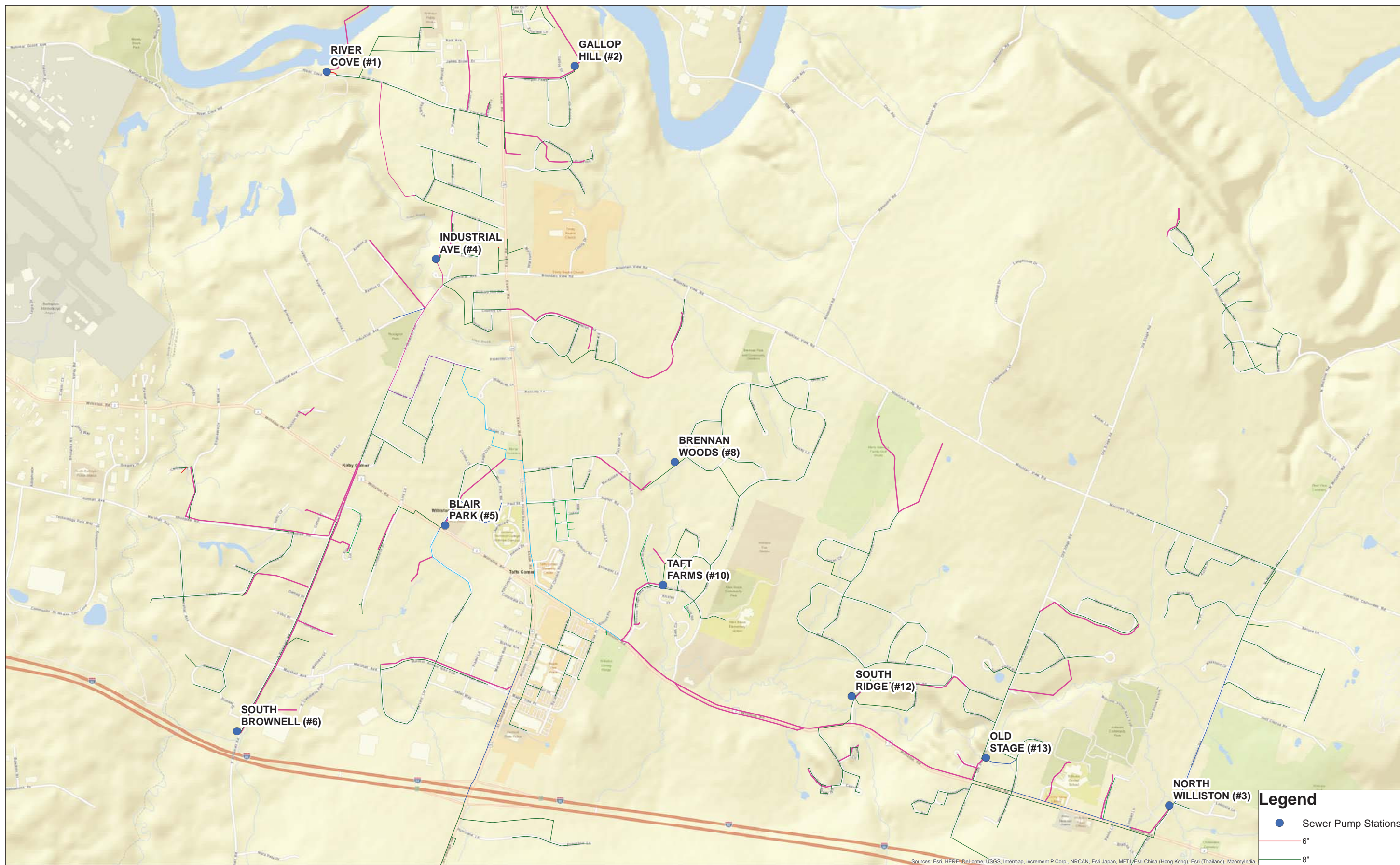
1. The projected new flows are for projects which do not have flow already allocated.
2. The needed treatment capacity is based on 2014-2016 average flows, allocated unconnected flows, projected new flows, and the 7% reserve for infiltration.
3. The Town plans on buying an additional 10,000 gpd of capacity per year from the Village of Essex Junction through FY 22.
4. The remaining treatment capacity is the difference between the provided treatment capacity and the needed treatment capacity.

The Town plans to continue to purchase 10,000 gpd per year of new treatment capacity from the Village of Essex Junction up to a total of 1,080,000 gallons. Based on this amount of capacity, the Town has adequate treatment capacity to meet their future growth needs. However, prior to FY 22, the adequacy of the available treatment capacity will be further evaluated and the Town will determine if the purchase of additional capacity is needed to meet their long term needs.



APPENDIX A

FIGURES



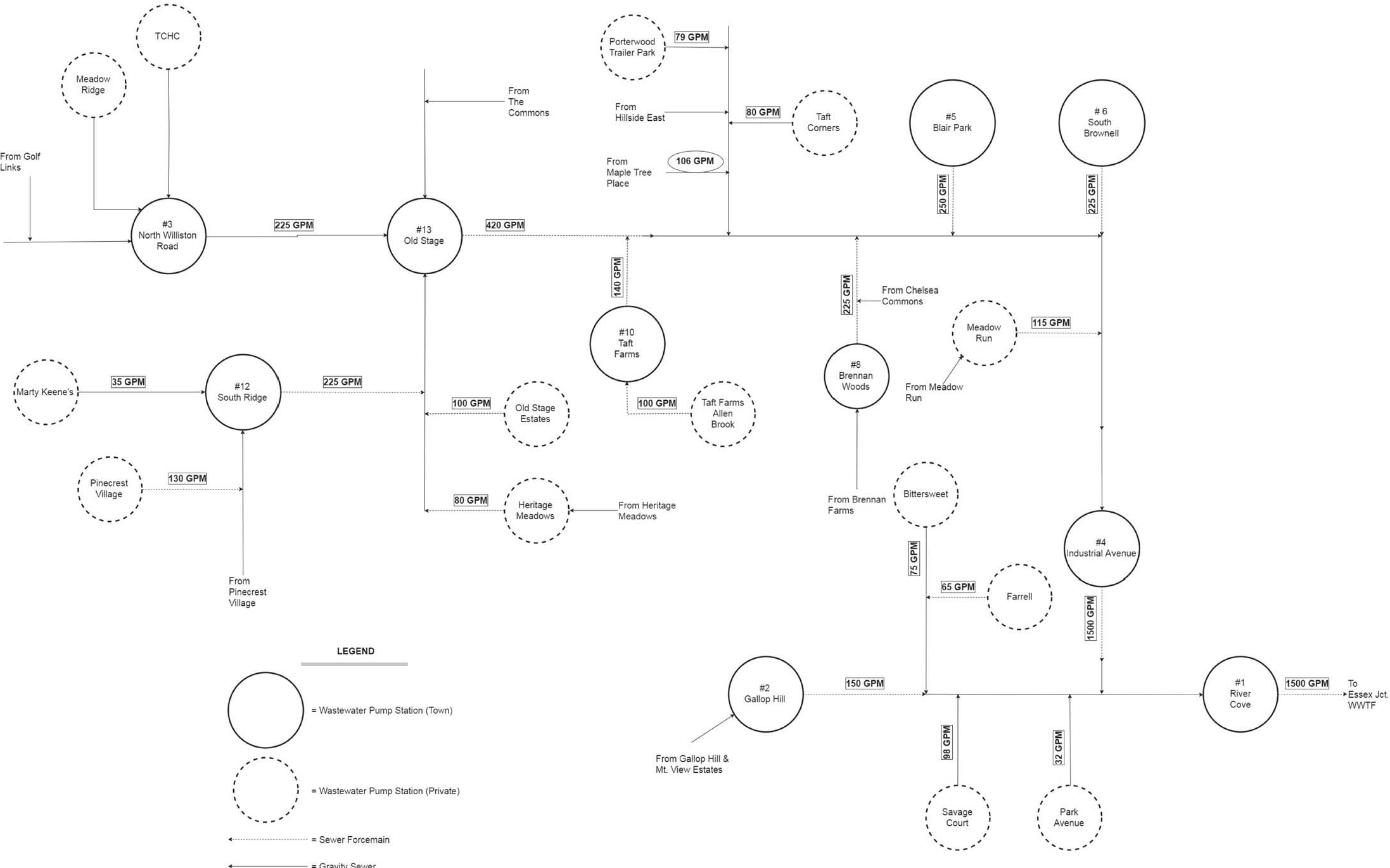
Legend

- Sewer Pump Stations
- 6"
- 8"
- 10"
- 12"
- 15"
- 18"
- 20"
- 24"
- Forcemain
- Unknown Size

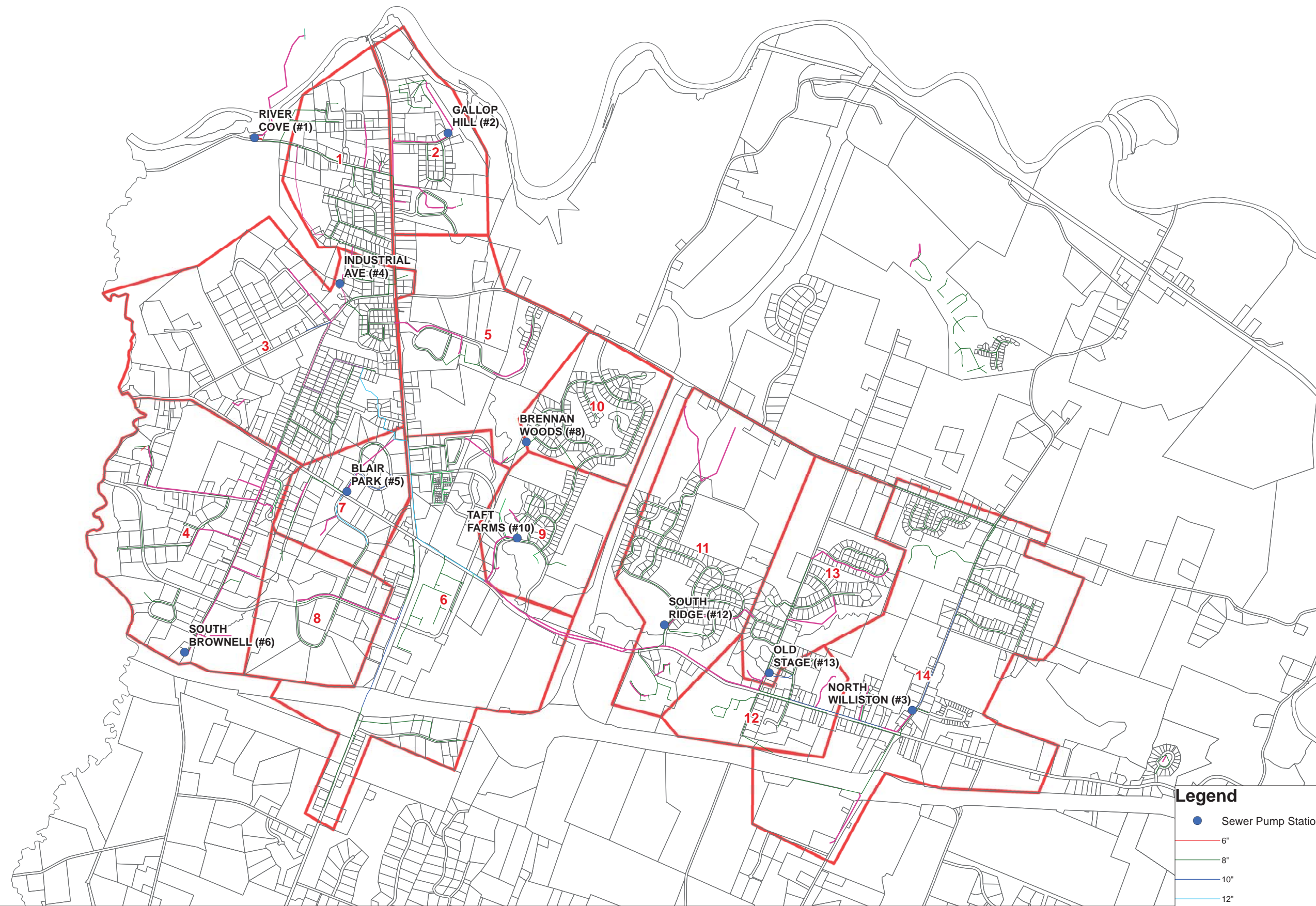


DESIGNED PF	PROJECT NO. 16083
DRAWN PF	FIGURE NO. 1
CHECKED	
DATE OCTOBER, 2017	

DESIGNED PF	PROJECT NO. 16083
DRAWN PF	
CHECKED	FIGURE NO.
DATE OCTOBER, 2017	2



- LEGEND**
- = Wastewater Pump Station (Town)
 - = Wastewater Pump Station (Private)
 - = Sewer Forcemain
 - = Gravity Sewer
 - = Pump Station Design Capacity
 - = Wastewater Flow



TOWN OF WILLISTON
WILLISTON, VERMONT

SEWER CAPACITY ANALYSIS

SEWER SUBAREAS



Legend

- Sewer Pump Stations
- 6" (red line)
- 8" (green line)
- 10" (blue line)
- 12" (cyan line)
- 15" (purple line)
- 18" (magenta line)
- 20" (red line)
- 24" (green line)
- Forcemain (pink line)
- Unknown Size (light green line)
- Tax Parcel Boundaries (thin black line)
- SewerSubareas (red outline)

DESIGNED
PF

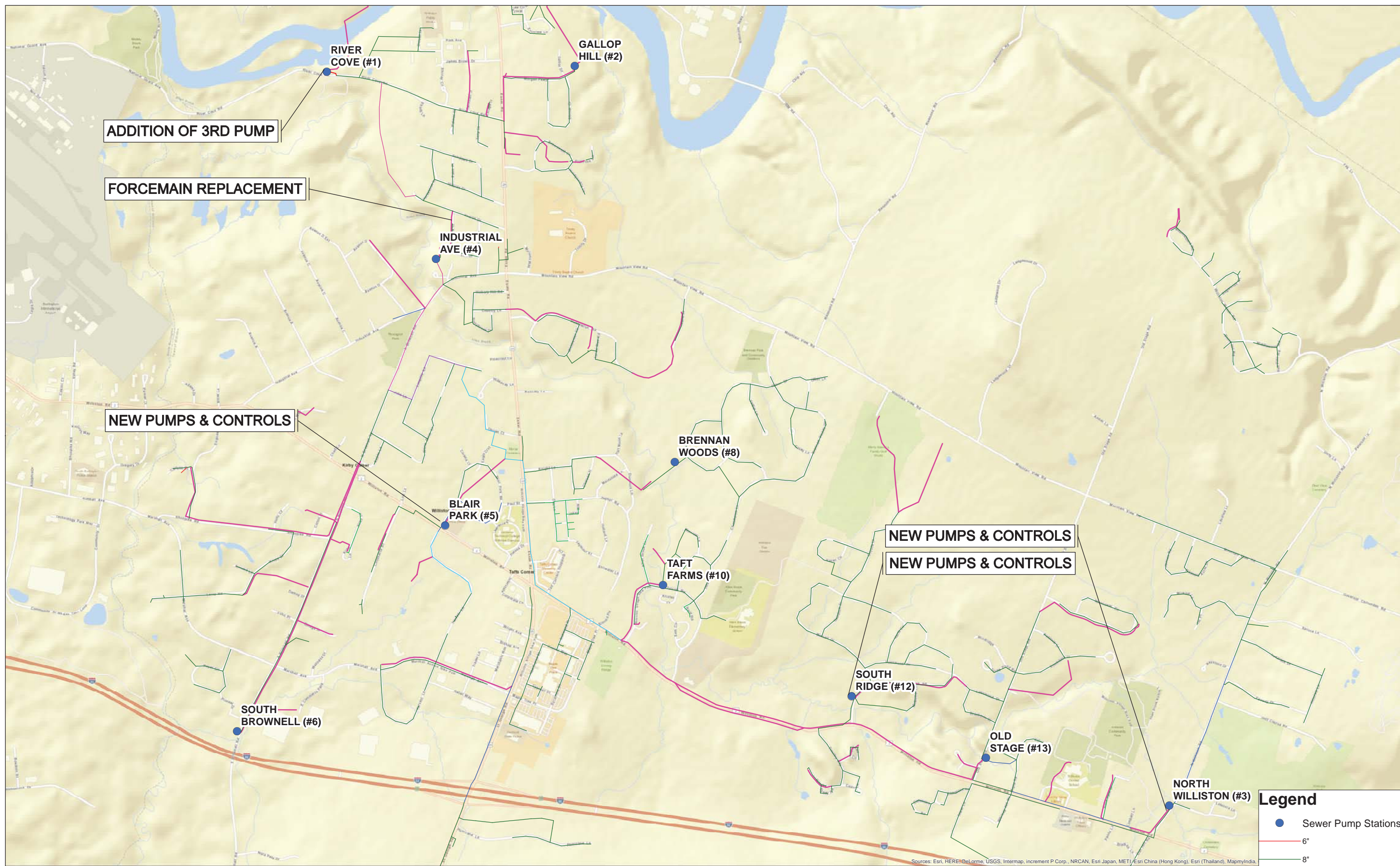
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DATE
OCTOBER, 2017

PROJECT NO.
16083

FIGURE NO.
3



TOWN OF WILLISTON
WILLISTON, VERMONT

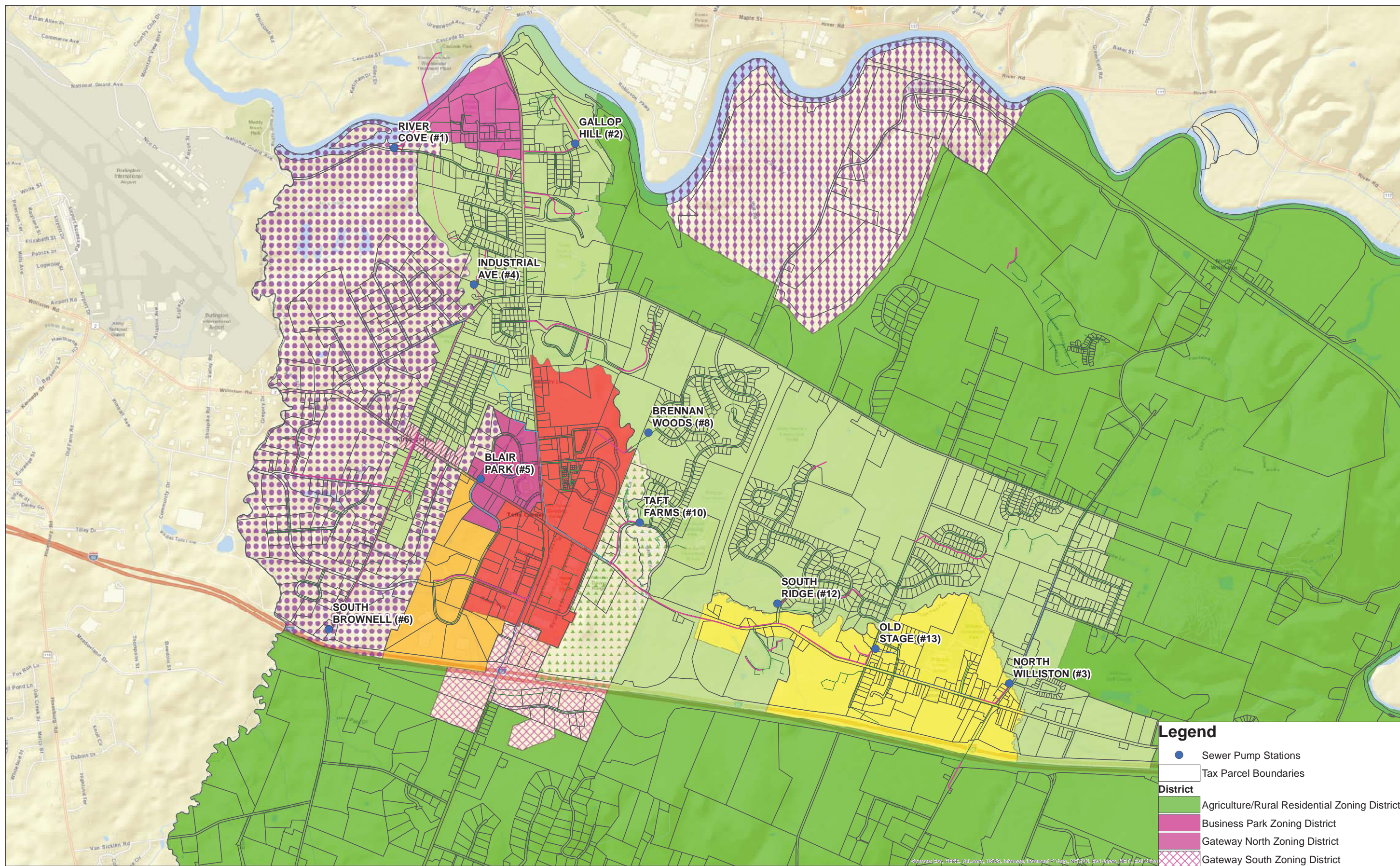
SEWER CAPACITY ANALYSIS

RECOMMENDED
IMPROVEMENTS



Legend	
●	Sewer Pump Stations
—	6"
—	8"
—	10"
—	12"
—	15"
—	18"
—	20"
—	24"
—	Forcemain
—	Unknown Size

DESIGNED PF	PROJECT NO. 16083
DRAWN PF	
CHECKED	FIGURE NO.
DATE OCTOBER, 2017	4



TOWN OF WILLISTON
WILLISTON, VERMONT

SEWER CAPACITY ANALYSIS

WILLISTON ZONING MAP

- Legend**
- Sewer Pump Stations
 - ▭ Tax Parcel Boundaries
 - District**
 - Agriculture/Rural Residential Zoning District
 - Business Park Zoning District
 - Gateway North Zoning District
 - Gateway South Zoning District
 - Gateway West Zoning District
 - Industrial East Zoning District
 - Industrial West Zoning District
 - Mixed Use - Commercial Zoning District
 - Mixed Use - Residential Zoning District
 - Residential Zoning District
 - Taft Corners Downtown Zoning District
 - Village Center Zoning District



DESIGNED
PF

DRAWN
PF

CHECKED

DATE
OCTOBER, 2017

PROJECT NO.
16083

FIGURE NO.
5



APPENDIX B

PRIVATE PUMP STATION INVENTORY

TOWN OF WILLISTON
PRIVATE PUMP STATION INVENTORY

September 2005

Description	Thomas Chittenden Health Center	Eastview/ Mtn View Estates	Meadowrun	Old Stage Estates	Brennan Woods	Heritage Meadows	Katie Lane
Pump Station							
Type	Duplex Submersible	Duplex Submersible	Duplex Dry Pit/ Wet Well	Duplex Submersible	Duplex Above Ground Self Priming	Duplex Submersible	Duplex Submersible
Dry Pit							
Type	None	None	Steel	None	None	None	None
Size	----	----	8' diam	----	----	----	----
Pumps							
Number	2	2	2 (duplex)	2 (duplex)	2 (duplex)	2 (duplex)	2 (duplex)
Type	Submersible	Submersible	Vertical Dry Pit	Submersible	Self Priming	Submersible	Submersible
Capacity, Each					250 gpm		
Motors							
Hp			5 hp		5 hp		
Phase	1 phase	1 phase	1 phase	1 phase	1 phase	1 phase	1 phase
Voltage	230 V	115/230 V	230 V	230 V	240 V	230 V	
Wet Well							
Type			Precast concrete		Precast concrete		Precast concrete
Size			8' diam		8' diam		
Emergency Storage Volume			7,000 gallons		18,000 gallons		2,300 gallons
Level Control			Floats		Floats	Floats	Floats
Valve Pit							
Type	None	None	None		None		
Alarm							
Local		Light and bell		Light and horn	Light and horn	Light and horn	Light
Remote	None	None	Autodialer	None		Autodialer	
Emergency Power							
Transfer Switch				Manual	None	Manual	None
Generator Connection		None		Yes	None		



APPENDIX C

ATTACHMENT A

Memorandum

TO: Williston Selectboard
Rick McGuire, Town Manager

From: Ken Belliveau, Director of Planning

Date: April 5, 2016

RE: **DRAFT Attachment A for Fiscal Year 2017**

1. Overview

This is the proposed Attachment A to the town's Sewer Allocation Ordinance for the period of July 1, 2016, through June 30, 2017 (FY 2017). Its purpose is for the Selectboard to use in making annual allocation decisions of available wastewater treatment capacity reserved for the Town of Williston at the Essex Junction Wastewater Treatment Facility for the upcoming fiscal year. The wastewater treatment capacity of the Essex Junction treatment facility is shared by the communities of Essex Junction, Essex and Williston under a contractual agreement.

The authority and categories for allocating any available wastewater treatment capacity is specified in the town's *Sewer Allocation Ordinance* last amended on May 4, 2015. The ordinance is intended to provide a method for allocating wastewater treatment capacity for new or expanded industrial, commercial and residential uses in accordance with the town's zoning districts and land use classifications.

- **Available Capacity**

The Town of Williston currently has a total of approximately 1,030,000 gallons per day (gpd) of wastewater treatment capacity reserved for its use at the Essex Junction treatment plant, representing approximately 35% of the plant's overall design capacity. This sewer capacity was intended to be allocated across the category of uses specified in Section 5 of the *Sewer Allocation Ordinance* over a period of at least 10 years spanning FY 2016-2025. Allocations are made by the Selectboard on an annual basis. The town's current Residential Growth Management process described in Chapter 11 of the town's *Unified Development Bylaw* is predicated on the availability of sewer capacity to support the town's goals through the end of FY 2025. Residential developments within the town's sewer service area may be approved for up to 68 dwellings per year under the terms of the current growth management system. Portions of this sewer capacity must also be made available for commercial, industrial, and institutional uses, as well as safety reserves necessary to allow for temporary spikes in system flow levels.

- **Acquiring Additional Capacity**

The town has been in the process of purchasing additional wastewater treatment capacity from the Village of Essex Junction over the past four years at a rate of 10,000 gpd of additional capacity per year over a five year period. At the start of the process, the town had approximately 980,000 gpd of capacity at the Essex Junction plant, and when all of the additional capacity has been purchased under this agreement, the town will have a total of 1,030,000 gpd of available wastewater treatment capacity.

2. Determining Available Capacity for Allocation

In order to determine how much capacity is available for potential allocation, several factors must first be considered and accounted for:

- 1) the amount of capacity that the town is committed to provide and currently being used by existing customers on an average basis per day,
- 2) the amount of treatment capacity the town has already committed itself to provide but which is not yet being used,
- 3) an appropriate amount of reserved capacity to insure safe daily operations anticipating weather fluctuations, seasonal variations in system usage, infiltration and in-migration, or other emergencies (recommended at 7% of total capacity).

- **Existing Flows**

The average daily flow of wastewater from the town in Calendar Year 2015 was calculated at 614,322 gpd, an increase of approximately 2% from 603,274 gpd observed in 2014. Wastewater flows fluctuate years to year, but the trend has shown an overall decline from the all-time high of 705,264 gpd in 2006 capping a period of an escalating pattern of increasing sewerage flows. Since then, average daily flows have been observed to vary within a fairly narrow range close to the five-year moving average currently at 628,272 gpd (see Figures 2 & 3).

There are a number of factors that affect the amount of wastewater flowing through the system, including the actual level of usage of the sewer system by its intended users, but sewerage flows are also affected by the amount of rainfall received and by leaks in the system that allows unwanted and unbilled for flows of water into the system. Periods of persistent, above average rainfall often times result in increased amounts of water leaking into the sewer system, often called inflow and in-migration, boosting flow levels beyond those generated by the intended users of the system, as seen in 2011. The public works department reports that they've been successful in identifying and repairing the network of pipes in the system in an effort to reduce sources of inflow and in-migration.

The continued success of these efforts will help to town make more efficient use of its available wastewater treatment capacity. Water conservation by customers may also be a factor affecting flow levels as older higher water using appliances and plumbing fixtures get replaced by more efficient ones. The net effect is that the volume of sewerage flowing through the system is roughly the same as the amount observed 10 years ago despite an increase in the number of users connected to the town's sewer system each year.

Moving forward, it is expected that sewage flows will eventually begin to increase reflecting the ongoing addition of new users to the system, both residential and commercial.

Figure 2: Average Daily Sewage Flows, River Cove Pump Station, 2005-2015

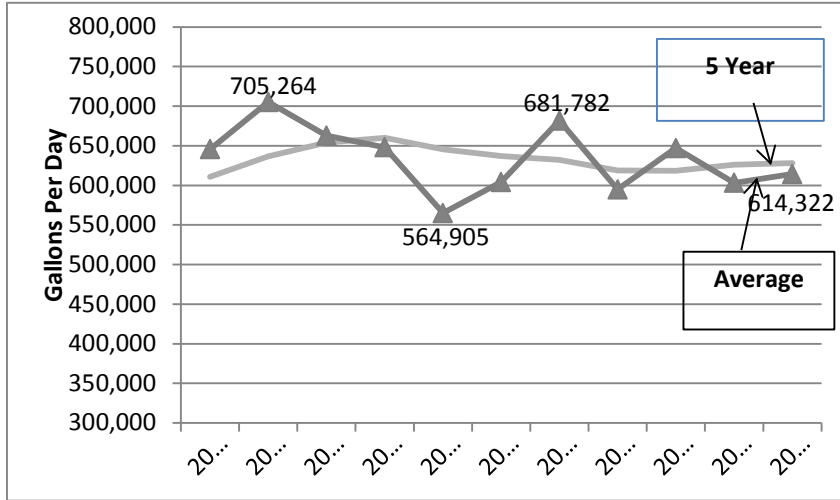
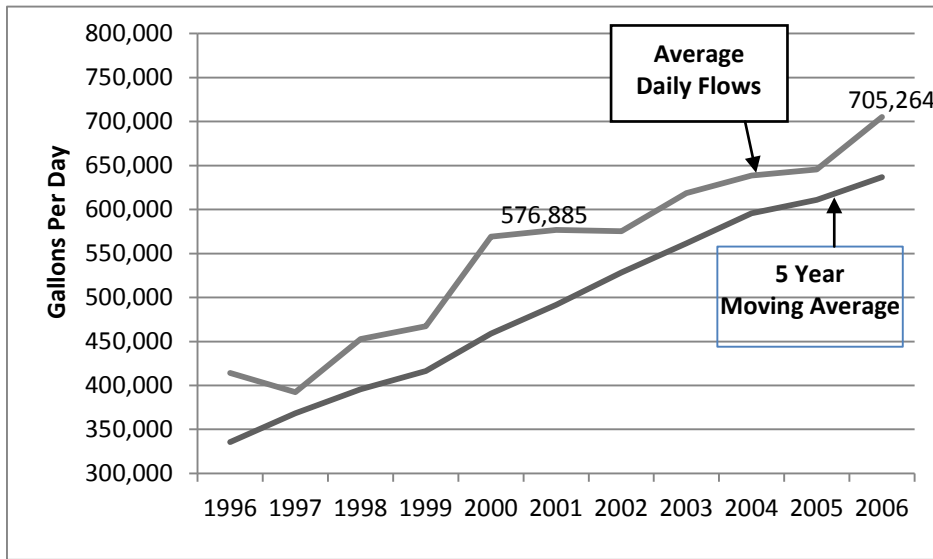


Figure 3: Average Daily Sewage Flows, River Cove Pump Station, 1996-2006



In recent years, the town has estimated the amount of capacity needed for existing users using either the five-year moving average or the actual observed volume from the previous calendar year, whichever is greater as the two lines have crossed over each other almost yearly. For FY 2017, staff recommends using the five year moving average for estimating the amount of capacity needed for existing system users since it is higher and thus a more conservative estimate.

- **Capacity Committed but Not Yet In Use**

This is the amount of capacity that is reserved for future users that the town has already committed to serve, but not yet on-line. This is based on the estimates used by the department of public works records of its future allocation agreements. As of January 2016, there are 63,397 gpd in this category. This is reported below in Table 1.

- **Reserve Capacity**

The town also maintains an amount or reserve capacity or 7% of the town’s total amount of available wastewater treatment capacity at the Essex Junction plant, or 72,100 gpd as recommended by the town’s engineering consultant (included in Table 1).

- **Calculating Available Allocation Capacity**

Based on the most recent measures of average current usage and sewer capacity that the town has already committed to potential users but which is not yet being used, the amount of available capacity available for potential allocation may be calculated as shown in Table 1.

Table 1: Calculation of capacity available for allocation

Total available treatment capacity	1,030,000 gpd
Projected capacity needed for existing users (5 yr. moving ave.)	- 628,272 gpd
Capacity committed but not yet on-line	- 63,397 gpd
Reserve capacity (7% of total treatment capacity)	- 72,100 gpd
Remaining available capacity for remaining FY 2016-2025	266,231 gpd

3. Allocation of Available Capacity

The results of this calculation indicate that there is an estimated maximum of 266,231 gpd of wastewater treatment capacity available for allocation by the Selectboard, or roughly 25% of the town’s total capacity at the facility. The town’s residential growth management system was recently updated to cover FY 2016-FY 2025, or a 10 year time frame. We are now in the second year of that allocation period, which means there are nine (9) allocation years remaining. Dividing the remaining capacity currently available by years leaves 29,581 gpd available for allocation for on average for each of those years (see below). It should be noted that new residential development requires approximately 10,000 gpd ± of sewer capacity annually to support the current growth management system.

$$\frac{266,231}{9} = 29,581 \text{ gpd / year}$$

Allocation History

In 2014, the Selectboard asked staff to provide some additional about allocation usage from previous years to aid in the annual wastewater allocation process. Information regarding sewer allocation for the past 10 years, from FY 2006 through 2015 Table 2 shows the amount of capacity allocated each year, and the amount of allocation that was actually purchased by

applicants is displayed in Table 3. Staff also calculated the average (mean) for each category over the 10 year time frame.

The data indicate that on average, the Selectboard has approved annual allocations of sewer capacity of approximately 103,000 gpd counting the required reserve capacity, including approximately 28,000 gpd of new capacity. The amount of allocation sold on average during that 10 year period is approximately 10,000 gpd, or roughly one third of the amount of capacity actually allocated by the Selectboard. One reason for this discrepancy is the category of “Encourage Specific Development” which contains 10,000 gpd of capacity, yet it tends to be utilized very sporadically.

The amount of allocation purchased by applicants each year is much more variable than the amount of capacity allocated in Attachment A, ranging from a low of roughly 3,366 gpd to a maximum of roughly 17,500 gpd. This is most likely due to fluctuations in the business cycle and periodic one-time events that result in periodic large purchases of sewer capacity. There are also a number of property owners of commercial land who have significant amounts of sewer capacity reserved for their properties purchased prior to the period under review. This has enabled a number of recent commercial developments to be built without the property owners having to purchase additional allocation. In addition, the town has seen significantly less new commercial development in the past 5-10 years than it had seen in the years of the 1990s and early 2000s.

This analysis suggests that if these observed patterns of sewer capacity utilization continue, the town should have sufficient capacity to accommodate the demand for sewer capacity over the next decade.

Proposed Allocation for FY 2017

Section 5 of the Sewer Allocation Ordinance specifies the categories to which any available sewer capacity should be assigned. Staff has prepared a list of recommended amounts of system allocation in each of these categories. In some cases, these amounts have been carried forward from the previous year’s allocation in order to continue to reserve some of the system’s capacity for projects or uses that have not yet materialized but may still likely do so in the near future. Some of these are newly proposed allocations. A proposed allocation schedule is described in Table 4.

For FY 2017, staff is recommending a similar but slightly lesser amount of sewer allocation for each of the allocation categories as in FY 2016. Historically, there were more requests for sewer allocation each year for commercial and industrial users than there was allocation available. More recently, there has been more than a sufficient amount of sewer allocation available to satisfy the demand over the past few years, and there are no new development proposals on the immediate horizon to suggest that FY 2017 will be significantly different. For new residential development, staff has estimated the amount of capacity needed for the 68 dwellings awarded growth management allocation by the DRB at 60 two bedroom dwelling units @ 135 gpd and 8 three bedroom dwellings @ 230 gpd. The actual number of bedrooms constructed in some developments will vary according to the desire of prospective buyers, but this should provide a sufficient amount of capacity to satisfy demand.

Table 2: Selectboard Approved Annual Allocation of Sewer Capacity, FY 2006 - 2015

	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	Mean
5.2.1/5.2.2 new commercial and industrial	2,029	2,029	2,029	2,039	2,000	4,000	7,500	7,500	7,500	7,500	4,413
5.2.3/5.2.4 new residential	7,057	8,590	10,940	10,555	9,755	11,230	10,280	10,280	12,410	9,310	10,041
5.2.5 residential additions/minor subdivisions	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
5.2.6 affordable housing	2,835	1,620	0	135	0	0	0	0	0	0	459
5.2.7 planned public facilities	4,155	4,155	3,212	3,212	1,000	1,000	1,000	1,000	1,000	0	1,973
5.4 pollution abatement	12,500	3,600	2,800	2,668	2,668	2,500	2,500	2,500	2,500	2,500	3,674
5.2.9 encouraging specific development	0	0	0	4,460	9,600	10,000	10,000	10,000	10,000	10,000	6,406
											0
TOTAL NEW ALLOCATIONS	30,076	21,494	20,481	24,569	26,523	30,230	32,780	32,780	34,910	30,810	28,465
											0
5.2.8 reserve	88,600	79,600	79,600	79,600	68,600	68,600	68,600	72,100	72,100	72,100	N/A
											0
TOTAL RESERVE ALLOCATIONS											0
											0
TOTAL ALLOCATED	118,676	101,094	100,081	104,169	95,123	98,830	101,380	104,880	107,010	102,910	103,415

Table 3: Sewer Allocation Sold to Applicants by Fiscal Year, FY 2006 - 2015

	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	Mean
5.2.1/5.2.2 new commercial and industrial	2,027	1,959	1,087	1,800	2,001	710	3,027	720	963	1,331	1,563
5.2.3/5.2.4 new residential	1,080	8,590	9,940	10,175	8,230	6,785	1,742	4,935	5,805	1,745	5,903
5.2.5 residential additions/minor subdivisions	1,425	840	1,245	520	500	480	755	815	550	290	742
5.2.6 affordable housing	2,835	0	0	0	0	0	0	0	0	0	284
5.2.7 planned public facilities	943	0	0	0	250	0	0	0	0	0	119
5.4 pollution abatement	0	0	132	0	340	135	0	0	0	0	61
5.2.9 encouraging specific development	0	0	0	1,122	6,200	1,015	0	0	10,000	0	1,834
											0
TOTAL NEW ALLOCATIONS	8,310	11,389	12,404	13,617	17,521	9,125	5,524	6,470	17,318	3,366	10,504
											0
5.2.8 reserve	9,000	0	0	0	0	14,750	0	0	0	0	2,375
											0
TOTAL RESERVE ALLOCATIONS											0
											0
TOTAL ALLOCATED	17,310	11,389	12,404	13,617	17,521	23,875	5,524	6,470	17,318	3,366	12,879

The proposed allocation schedule recommends approximately 30,440 gpd of new allocation.

Table 4: Proposed Allocation of Reserve Sewer Capacity (gpd)

Allocation Categories	2015-2016	2016-2017
5.2.1/5.2.2 new commercial and industrial	7,500	7,500
5.2.3/5.2.4 new residential, 2016-17	11,840	9,940
5.2.5 residential additions/minor subdivisions	1,500	1,500
5.2.6 affordable housing		
5.2.7 planned public facilities		
5.4 pollution abatement	2,500	1,500
5.2.9 encouraging specific development	10,000	10,000
TOTAL NEW ALLOCATIONS >>>	33,340	30,440
5.2.8 reserve	72,100	72,100
TOTAL RESERVE ALLOCATIONS >>>	72,100	72,100
TOTAL ALLOCATED (New plus Reserve)>>	105,440	102,540

Explanation of Categories

New Commercial. This category provides capacity for new and expanded businesses requiring additional sewer allocation based on use. It is available on a first come, first served basis after July 1 each year and administered by the public works department. The amount of capacity in this category was increased several times since 2010 because of additional available capacity for allocation, and to insure that there would capacity available to support potential business expansions as needed.

New Residential. This represents dwelling units in various residential projects that may seek allocation, including The Hamlet, Finney Crossing, Keystone, and others. These units have been approved for growth management allocation by the DRB within the past several years. The recent trend has been for developers to build smaller dwellings with fewer bedrooms, and these estimates reflect that trend.

Number of Dwellings	Gallons Per Day (GPD)	Total Gallons Per Day
60 – 2 bedroom units	135	8,100
8 – 3 bedroom units	230	1,480
68 total dwellings units		9,940

Affordable Housing: There are no new affordable housing units included for allocation this coming fiscal year in this category.

Encouraging Specific Development. No new projects falling into this category are currently identified. The capacity included in this category would be available for possible allocation on a project by project basis upon Selectboard review and approval provided the projects further identified goals within the town plan. In recent years, some of the expansion efforts of Vermont Technical College have received allocation from this category, and in FY 2014 Green Mountain Coffee Roasters received 10,000 gpd from this category. New significant employment generating businesses seeking to locate or expand in Williston needing allocation of sewer capacity might potentially receive allocation from this category.

Planned Public Facilities. For several years, the town has previously placed 1,000 gpd in this category to support a possible expansion of the Allenbrook School, and more recently for the new public works garage. The public works garage has been built, and no expansion of the school system is being contemplated. The need for additional sewer capacity to support any new or expanded public facilities is thus not anticipated in the foreseeable future.

Reserve: The reserve buffers the system against storm water infiltration, equipment failures, etc. It also provides capacity for areas where the failure of on-site wastewater disposal systems creates a public health emergency. The reserve figure has typically been calculated at 7% of the total system capacity (72,100 gpd) which is recommended for FY 2016-17. Any changes in policy made by the Selectboard to alter this number would potentially affect the amount of capacity available for allocation.

Pollution Abatement: No new projects are currently identified, and we have not used capacity from this category in the past decade. Staff suggests placing 1,500 gpd into this category, a reduction from 2,500 gpd in the recent past, so that it will be available should a need meeting criteria in the ordinance arise during this fiscal year. This capacity would be available for properties within the sewer service area seeking to connect to the town's sewer system because of failing septic system.



APPENDIX D

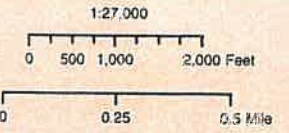
SEWER SERVICE AREA – MAP 7

Williston 2006 Comprehensive Plan

Map 7 - Sewer Service Area



Sources:
 Sewer data - updated by CCRPC, 2005 with
 guidance from Town and Forcier & Aldrich
 Roads - 2011 road data
 Tax Parcels - 2005 - GrassRoots GIS
 Surface Water - VT Hydrography set (VCGI) - 2002

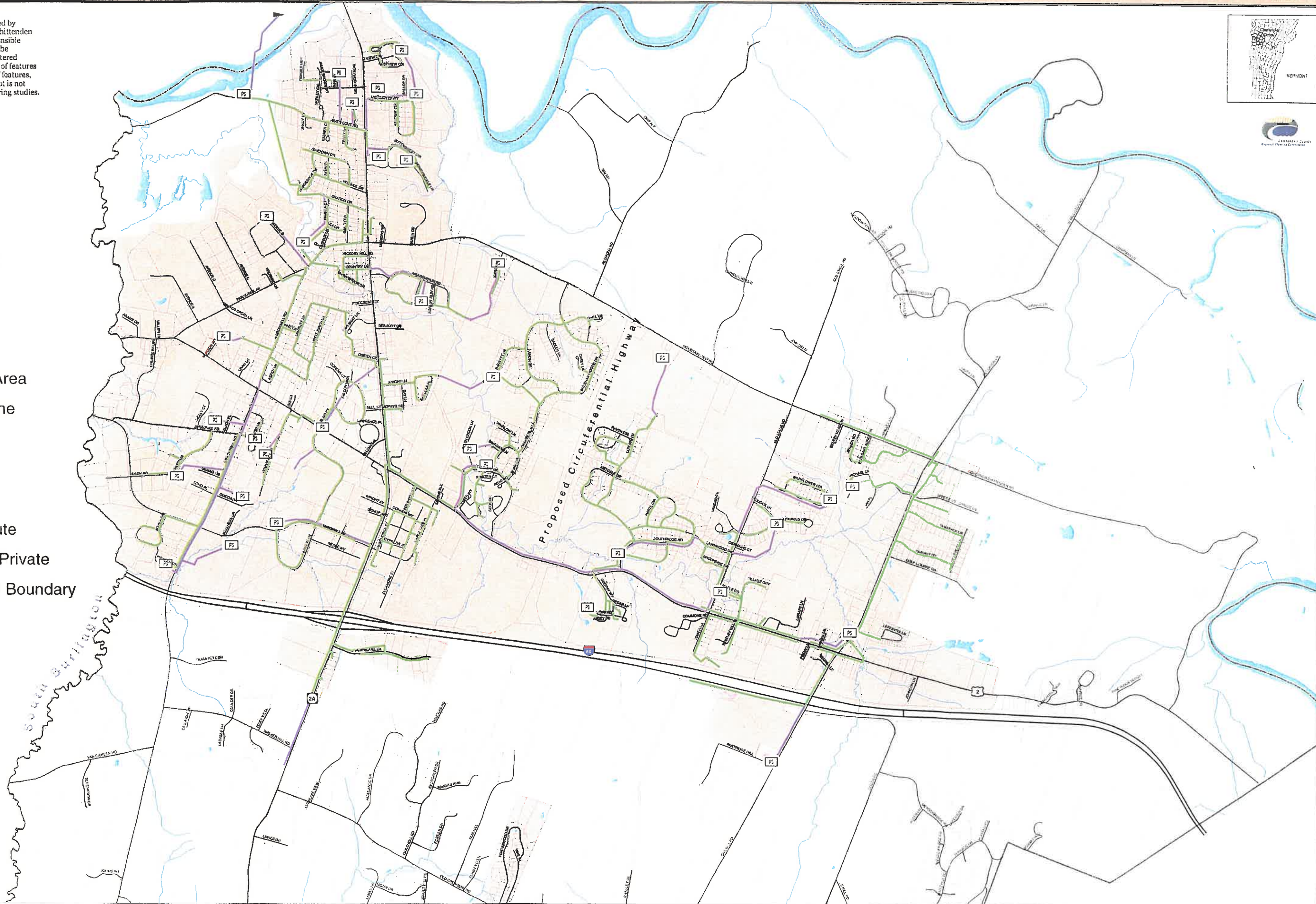


Disclaimer:
 The accuracy of information presented is determined by its sources. Errors and omissions may exist. The Chittenden County Regional Planning Commission is not responsible for these. Questions of on-the-ground location can be resolved by site inspections and/or surveys by registered surveyor. This map is not sufficient for delineation of features on-the-ground. This map identifies the presence of features, and may indicate relationships between features, but is not a replacement for surveyed information or engineering studies.



Legend

- PS Pump Station
- Treatment Plant
- Sewer Line Type**
- Forced
- Gravity
- Sewer Service Area
- Stream Centerline
- Water Body
- Road Centerline**
- Interstate
- US or State Route
- Class 2 - 4 and Private
- 2005 Tax Parcel Boundary
- Town Boundary





APPENDIX E

PUMP STATIONS – 2014-16 AVERAGE DAILY FLOWS

PUMP STATION #1 - RIVER COVE
 2014-2016 AVERAGE DAILY FLOWS (GPD)

	2014	
	Total Flow	Daily Average
Jan	19,993,900	644,965
Feb	15,806,460	564,516
Mar	18,212,130	587,488
Apr	22,419,570	747,319
May	20,672,500	666,854
Jun	18,184,290	606,143
Jul	15,953,700	514,635
Aug	17,945,680	578,892
Sep	16,581,450	552,715
Oct	18,002,310	580,719
Nov	16,889,370	562,979
Dec	19,593,980	632,063
Avg:	18,354,612	603,274

	2015	
	Total Flow	Daily Average
Jan	17,193,000	554,612
Feb	15,415,270	550,545
Mar	18,108,060	584,130
Apr	19,864,380	662,146
May	18,850,770	608,089
Jun	23,443,250	781,441
Jul	19,800,960	638,740
Aug	18,153,850	585,608
Sep	17,074,200	569,140
Oct	18,359,110	592,229
Nov	17,563,680	585,456
Dec	20,451,660	659,730
Avg:	18,689,849	614,322

	2016	
	Total Flow	Daily Average
Jan	19,659,050	634,162
Feb	18,488,450	673,532
Mar	20,726,370	668,592
Apr	20,197,060	673,235
May	19,066,550	615,050
Jun	18,653,650	621,788
Jul	17,783,510	573,662
Aug	18,493,370	596,560
Sep	16,668,560	555,619
Oct	17,243,800	556,252
Nov	16,416,310	547,210
Dec	17,695,880	570,835
Avg:	18,424,380	607,208

PUMP STATION #2 - GALLOP HILL
2014-2016 AVERAGE DAILY FLOWS (GPD)

	2014			Total Flow	
	Pump 1	Pump 2			
	Runtime	Flow	Runtime	Flow	
Jan	30	8,710	24	6,968	15,677
Feb	20	6,429	16	5,143	11,571
Mar	26	7,548	21	6,097	13,645
Apr	35	10,800	31	9,300	20,100
May	60	17,419	0	0	17,419
Jun	54	16,200	0	0	16,200
Jul	48	13,935	0	0	13,935
Aug					
Sep					
Oct					
Nov					
Dec					
AVG					15,507

	2015			Total Flow	
	Pump 1	Pump 2			
	Runtime	Flow	Runtime	Flow	
	17.5	5,625	15.4	4,950	10,575
	22	6,387	22.9	6,648	13,035
	26.7	8,010	28.4	8,520	16,530
	23.8	6,910	24.4	7,084	13,994
	32.9	9,870	35.6	10,680	20,550
	28.1	8,158	28.8	8,361	16,519
	20.7	6,010	21.3	6,184	12,194
	18	5,400	19	5,700	11,100
	22	6,387	21	6,097	12,484
	21	6,300	23	6,900	13,200
	27	7,839	27	7,839	15,677
AVG					14,169

	2016			Total Flow	
	Pump 1	Pump 2			
	Runtime	Flow	Runtime	Flow	
	24	6,968	24	6,968	13,935
	26.5	8,224	27	8,379	16,603
	26.5	7,694	27	7,839	15,532
	26	7,800	24	7,200	15,000
	24	6,968	25	7,258	14,226
	18	5,400	19	5,700	11,100
	17	4,935	17	4,935	9,871
	17	4,935	17	4,935	9,871
	15	4,500	15.9	4,770	9,270
	13	3,774	13.1	3,803	7,577
	18	5,400	18	5,400	10,800
	12	3,484	13	3,774	7,258
AVG					11,754

2014	15,507
2015	14,169
2016	11,754
AVG	13,810

Notes:
 Aug-Dec of 2014 not found
 Feb-Mar of 2016 not found, averaged total flow for those two months
 Dec 2016 record ended 12/20

PUMP STATION #3 - N WILLISTON ROAD
2014-2016 AVERAGE DAILY FLOWS (GPD)

	2014			Total Flow
	Pump 1	Pump 2		
	Runtime	Flow	Runtime	Flow
Jan	77	33,532	94	40,935
Feb	47	22,561	62	29,893
Mar	64	27,871	74	32,226
Apr	119	53,550	143	64,350
May	77	33,532	90	39,194
Jun	64	28,800	74	33,300
Jul	59	25,694	68	29,613
Aug	52	22,645	60	26,129
Sep	52	23,400	59	26,550
Oct	48	20,903	68	29,613
Nov	47	21,150	79	35,550
Dec	70	30,484	79	34,403
AVG				63,831

	2015			Total Flow
	Pump 1	Pump 2		
	Runtime	Flow	Runtime	Flow
Jan	52	22,645	60	26,129
Feb	43	20,732	48	23,143
Mar	88	38,323	37	16,113
Apr	76	34,200	93	41,850
May	60	26,129	68	29,613
Jun	79	35,550	91	40,950
Jul	61	26,565	71	30,919
Aug	49	21,339	57	24,823
Sep	47	21,150	54	24,300
Oct	51	22,210	60	26,129
Nov	58	26,100	66	29,700
Dec	101	43,984	93	40,500
AVG				57,758

2014	63,831
2015	57,758
2016	55,079
Avg	58,890

	2016			Total Flow
	Pump 1	Pump 2		
	Runtime	Flow	Runtime	Flow
Jan	66	28,742	77	33,532
Feb	55	25,603	65	30,259
Mar	77	33,532	90	39,194
Apr	65	29,250	75	33,750
May	65	28,306	76	33,097
Jun	49	22,050	57	25,650
Jul	50	21,774	56	24,387
Aug	53	23,081	57	24,823
Sep	48	21,600	55	24,750
Oct	51	22,210	59	25,694
Nov	53	23,850	62	27,900
Dec	61	26,565	72	31,355
AVG				55,079

Notes:
12/14/15: Noted that Pump 1 ran excessive hours from 12/11-12/14. (pump ran 32 hours) 225 gpm per pump

PUMP STATION #5 - BLAIR PARK
2014-2016 AVERAGE DAILY FLOWS (GPD)

	2014			Total Flow	
	Pump 1	Pump 2			
	Runtime	Flow	Runtime	Flow	
Jan	155	75,000	61	29,516	104,516
Feb	115	61,607	46	24,643	86,250
Mar	148	71,613	58	28,065	99,677
Apr	184	92,000	117	58,500	150,500
May	144	69,677	100	48,387	118,065
Jun	165	82,500	59	29,500	112,000
Jul	154	74,516	59	28,548	103,065
Aug	134	64,839	53	25,645	90,484
Sep	150	75,000	64	32,000	107,000
Oct	150	72,581	64	30,968	103,548
Nov	142	71,000	59	29,500	100,500
Dec	158	76,452	63	30,484	106,935
AVG					106,878

	2015			Total Flow	
	Pump 1	Pump 2			
	Runtime	Flow	Runtime	Flow	
	136	65,806	51	24,677	90,484
	121	64,821	47	25,179	90,000
	158	76,452	60	29,032	105,484
	157	78,500	57	28,500	107,000
	155	75,000	56	27,097	102,097
	209	104,500	68	34,000	138,500
	148	71,613	57	27,581	99,194
	148	71,613	58	28,065	99,677
	163	81,500	60	30,000	111,500
	163	78,871	61	29,516	108,387
	163	81,500	63	31,500	113,000
	184	89,032	67	32,419	121,452
AVG					107,231

	2016			Total Flow	
	Pump 1	Pump 2			
	Runtime	Flow	Runtime	Flow	
	181	87,581	66	31,935	119,516
	156	80,690	58	30,000	110,690
	193	93,387	66	31,935	125,323
	171	85,500	64	32,000	117,500
	167	80,806	63	30,484	111,290
	190	95,000	84	42,000	137,000
	189	91,452	72	34,839	126,290
	188	90,968	70	33,871	124,839
	149	74,500	60	30,000	104,500
	163	78,871	68	32,903	111,774
	124	62,000	50	25,000	87,000
	24	11,613	16	7,742	19,355
AVG					107,923

2014	106,878
2015	107,231
2016	107,923
Avg	107,344

Notes:
Log ends 12/8/16
250 gpm per pump

PUMP STATION #6 - SOUTH BROWNELL ROAD
2014-2016 AVERAGE DAILY FLOWS (GPD)

	2014				Total Flow
	Pump 1		Pump 2		
	Runtime	Flow	Runtime	Flow	
Jan	67	29,177	85	37,016	66,194
Feb	63	30,375	61	29,411	59,786
Mar	66	28,742	67	29,177	57,919
Apr	127	57,150	131	58,950	116,100
May	94	40,935	95	41,371	82,306
Jun	71	31,950	72	32,400	64,350
Jul	63	27,435	63	27,435	54,871
Aug	64	27,871	66	28,742	56,613
Sep	35	15,750	57	25,650	41,400
Oct	47	20,468	54	23,516	43,984
Nov	50	22,500	58	26,100	48,600
Dec	57	24,823	64	27,871	52,694
AVG					62,068

	2015				Total Flow
	Pump 1		Pump 2		
	Runtime	Flow	Runtime	Flow	
Jan	71	30,919	80	34,839	65,758
Feb	59	28,446	65	31,339	59,786
Mar	62	27,000	69	30,048	57,048
Apr	74	33,300	86	38,700	72,000
May	69	30,048	76	33,097	63,145
Jun	98	44,100	103	46,350	90,450
Jul	86	37,452	97	42,242	79,694
Aug	68	29,613	80	34,839	64,452
Sep	61	27,450	64	28,800	56,250
Oct	74	32,226	82	35,710	67,935
Nov	72	32,400	80	36,000	68,400
Dec	67	29,177	74	32,226	61,403
AVG					67,193

2014	62,068
2015	67,193
2016	52,007
AVG	60,423

December 2016 log ends 12/5
85->225 upgrade??

Notes:

	2016				Total Flow
	Pump 1		Pump 2		
	Runtime	Flow	Runtime	Flow	
Jan	64	27,871	71	30,919	58,790
Feb	70	32,586	48	22,345	54,931
Mar	74	32,226	82	35,710	67,935
Apr	73	32,850	80	36,000	68,850
May	68	29,613	74	32,226	61,839
Jun	62	27,900	70	31,500	59,400
Jul	55	23,952	59	25,694	49,645
Aug	58	25,258	67	29,177	54,435
Sep	52	23,400	56	25,200	48,600
Oct	46	20,032	47	20,468	40,500
Nov	55	24,750	60	27,000	51,750
Dec	8	3,484	9	3,919	7,403
AVG					52,007

PUMP STATION #13 - OLD STAGE ROAD
2014-2016 AVERAGE DAILY FLOWS (GPD)

	2014				Total Flow
	Pump 1		Pump 2		
	Runtime	Flow	Runtime	Flow	
Jan	151	102,290	157	106,355	208,645
Feb	125	93,750	122	91,500	185,250
Mar	119	80,613	116	78,581	159,194
Apr	198	138,600	192	134,400	273,000
May	147	99,581	146	98,903	198,484
Jun	136	95,200	133	93,100	188,300
Jul	154	104,323	115	77,903	182,226
Aug	149	100,935	105	71,129	172,065
Sep	112	78,400	112	78,400	156,800
Oct	122	82,645	128	86,710	169,355
Nov	134	93,800	137	95,900	189,700
Dec	148	100,258	158	107,032	207,290
AVG					190,859

	2015				Total Flow
	Pump 1		Pump 2		
	Runtime	Flow	Runtime	Flow	
Jan	108	73,161	134	90,774	163,935
Feb	60	45,000	53	39,750	84,750
Mar	86	58,258	79	53,516	111,774
Apr	93	65,100	92	64,400	129,500
May	82	55,548	82	55,548	111,097
Jun	122	85,400	117	81,900	167,300
Jul	81	54,871	81	54,871	109,742
Aug	70	47,419	80	54,194	101,613
Sep	68	47,600	73	51,100	98,700
Oct	76	51,484	77	52,161	103,645
Nov	83	58,100	82	57,400	115,500
Dec	100	67,742	99	67,065	134,806
AVG					119,364

2014	190,859
2015	119,364
2016	111,193
Avg	140,472

Notes:
350 gpm per pump

	2016				Total Flow
	Pump 1		Pump 2		
	Runtime	Flow	Runtime	Flow	
Jan	94	63,677	95	64,355	128,032
Feb	76	55,034	86	62,276	117,310
Mar	97	65,710	103	69,774	135,484
Apr	82	57,400	92	64,400	121,800
May	93	63,000	83	56,226	119,226
Jun	78	54,600	77	53,900	108,500
Jul	73	49,452	73	49,452	98,903
Aug	69	46,742	70	47,419	94,161
Sep	69	48,300	69	48,300	96,600
Oct	73	49,452	74	50,129	99,581
Nov	74	51,800	75	52,500	104,300
Dec	82	55,548	81	54,871	110,419
AVG					111,193

PUMP STATION #12 - SOUTH RIDGE ROAD
2014-2016 AVERAGE DAILY FLOWS (GPD)

	2014			Total Flow
	Pump 1	Pump 2		
	Runtime	Flow	Runtime	Flow
Jan	30	13,065	30	13,065
Feb	34	16,393	34	16,393
Mar	44	19,161	44	19,161
Apr	48	21,600	48	21,600
May	39	16,984	40	17,419
Jun	43	19,350	43	19,350
Jul	42	18,290	42	18,290
Aug	40	17,419	42	18,290
Sep	38	17,100	39	17,550
Oct	39	16,984	40	17,419
Nov	43	19,350	43	19,350
Dec	43	18,726	44	19,161
				35,956

	2015			Total Flow
	Pump 1	Pump 2		
	Runtime	Flow	Runtime	Flow
Jan	41	17,855	42	18,290
Feb	36	17,357	37	17,839
Mar	45	19,597	46	20,032
Apr	41	18,450	41	18,450
May	41	17,855	40	17,419
Jun	52	23,400	52	23,400
Jul	41	17,855	43	18,726
Aug	39	16,984	40	17,419
Sep	39	17,550	40	18,000
Oct	29	12,629	59	25,694
Nov	35	15,750	111	49,950
Dec	46	20,032	48	20,903
				40,120

	2016			Total Flow
	Pump 1	Pump 2		
	Runtime	Flow	Runtime	Flow
Jan	47	20,468	52	22,645
Feb	40	18,621	43	20,017
Mar	43	18,726	47	20,468
Apr	39	17,550	42	18,900
May	39	16,984	41	17,855
Jun	39	17,550	42	18,900
Jul	39	16,984	42	18,290
Aug	38	16,548	40	17,419
Sep	37	16,650	40	18,000
Oct	42	18,290	45	19,597
Nov	40	18,000	42	18,900
Dec	48	20,903	45	19,597
				37,322

2014	35,956
2015	40,120
2016	37,322
Avg	37,799

Notes:
Jan 2014 based on runtime from 1/10-1/31, unsure how many hours were run from 1/1-1/10.
Nov 2015, Pump 2 ran 62 hours from 11/6-11/9 in constant backflow? 225 gpm



APPENDIX F

COMMITTED UNCONNECTED FLOWS

Williston, Vermont Growth Management System: Allocated Dwelling Units FY 2016-FY2025

Allocation Year	FY 16		FY 17		FY 18		FY 19		FY 20		FY 21		FY 22		FY 23		FY 24		FY 25		
	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	14 Affordable	42 Market	
Growth Center	1 Finney	1 Finney	1 Finney	1 Finney	1 Cottonwood	1 Finney	1 Cottonwood	1 Finney	1 Cottonwood	1	1 Cottonwood	1 Cottonwood	1 Cottonwood	1 Cottonwood	1 Cottonwood	1 Cottonwood	1 Cottonwood	1 Cottonwood	1	1	
	2 Finney	2 Finney	2 Finney	2 Finney	2 Cottonwood	2 Finney	2 Cottonwood	2 Finney	2 Cottonwood	2	2 Cottonwood	2 Cottonwood	2 Cottonwood	2 Cottonwood	2 Cottonwood	2 Cottonwood	2 Cottonwood	2 Cottonwood	2	2	
	3 Finney	3 Finney	3 Finney	3 Finney	3 Cottonwood	3 Finney	3 Cottonwood	3 Finney	3 Cottonwood	3	3 Cottonwood	3 Cottonwood	3 Cottonwood	3 Cottonwood	3 Cottonwood	3 Cottonwood	3 Cottonwood	3 Cottonwood	3	3	
	4 Finney	4 Finney	4 Finney	4 Finney	4 Cottonwood	4 Finney	4 Cottonwood	4 Finney	4 Cottonwood	4	4 Cottonwood	4 Cottonwood	4 Cottonwood	4 Cottonwood	4 Cottonwood	4 Cottonwood	4 Cottonwood	4 Cottonwood	4	4	
	5 Finney	5 Finney	5 Finney	5 Finney	5 Cottonwood	5 Finney	5 Cottonwood	5 Finney	5 Cottonwood	5	5 Cottonwood	5 Cottonwood	5 Cottonwood	5 Cottonwood	5 Cottonwood	5 Cottonwood	5 Cottonwood	5 Cottonwood	5	5	
	6 Finney	6 Finney	6 Finney	6 Finney	6 Cottonwood	6 Finney	6 Cottonwood	6 Finney	6 Cottonwood	6	6 Cottonwood	6 Cottonwood	6 Cottonwood	6 Cottonwood	6 Cottonwood	6 Cottonwood	6 Cottonwood	6 Cottonwood	6	6	
	7 Finney	7 Finney	7 Finney	7 Finney	7 Cottonwood	7 Finney	7 Cottonwood	7 Finney	7 Cottonwood	7	7 Cottonwood	7 Cottonwood	7 Cottonwood	7 Cottonwood	7 Cottonwood	7 Cottonwood	7 Cottonwood	7 Cottonwood	7	7	
	8 Finney	8 Finney	8 Finney	8 Finney	8 Cottonwood	8 Finney	8	8 Finney	8	8	8	8 Cottonwood	8	8 Cottonwood	8	8 Cottonwood	8	8 Cottonwood	8	8	8
	9 Finney	9 Finney	9 Finney	9 Finney	9 Cottonwood	9 Finney	9	9 Finney	9	9	9	9 Cottonwood	9	9 Cottonwood	9	9 Cottonwood	9	9 Cottonwood	9	9	9
	10 Finney	10 Finney	10 Finney	10 Finney	10 Cottonwood	10 Finney	10	10 Finney	10	10	10	10 Cottonwood	10	10 Cottonwood	10	10 Cottonwood	10	10 Cottonwood	10	10	10
	11 Finney	11 Finney	11 Cottonwood	11 Finney	11 Finney	11 Finney	11	11 Finney	11	11	11	11 Cottonwood	11	11 Cottonwood	11	11 Cottonwood	11	11 Cottonwood	11	11	11
	12 Finney	12 Finney	12 Cottonwood	12 Finney	12 Finney	12 Finney	12	12 Finney	12	12	12	12 Cottonwood	12	12 Cottonwood	12	12 Cottonwood	12	12 Cottonwood	12	12	12
	13 Finney	13 Finney	13 Cottonwood	13 Finney	13 Finney	13 Finney	13	13 Finney	13	13	13	13 Cottonwood	13	13 Cottonwood	13	13 Cottonwood	13	13 Cottonwood	13	13	13
	14 Finney	14 Finney	14 Cottonwood	14 Finney	14	14 Finney	14	14 Finney	14	14	14 Cottonwood	14	14 Cottonwood	14	14 Cottonwood	14	14 Cottonwood	14	14	14	14
		15 Finney	15 Cottonwood	15 Finney		15 Finney		15 Finney		15 Cottonwood		15 Cottonwood		15 Cottonwood		15 Cottonwood		15 Cottonwood		15	15
		16 Finney	16 Cottonwood	16 Finney		16 Finney		16 Finney		16 Cottonwood		16 Cottonwood		16 Cottonwood		16 Cottonwood		16 Cottonwood		16	16
		17 Finney	17 Cottonwood	17 Finney		17 Finney		17 Finney		17 Cottonwood		17 Cottonwood		17 Cottonwood		17 Cottonwood		17 Cottonwood		17	17
		18 Finney	Three (3) units ↑ transferred 3/22/16 into FY 17 (affordable) from the "Outside SSA" area and allocated to Cottonwood.	18 Finney		18 Finney		18 Finney		18 Cottonwood		18 Cottonwood		18 Cottonwood		18 Cottonwood		18 Cottonwood		18	18
		19 Finney		19 Finney		19 Finney		19 Finney		19 Cottonwood		19 Cottonwood		19 Cottonwood		19 Cottonwood		19 Cottonwood		19	19
		20 Finney		20 Finney		20 Cottonwood		20 Cottonwood		20 Cottonwood		20 Cottonwood		20 Cottonwood		20 Cottonwood		20 Cottonwood		20	20
		21 Finney		21 Finney		21 Cottonwood		21 Cottonwood		21 Cottonwood		21 Cottonwood		21 Cottonwood		21 Cottonwood		21 Cottonwood		21	21
		22 Finney		22 Finney		22		22		22		22		22		22		22		22	22
		23 Finney		23 Finney		23		23		23		23		23		23		23		23	23
		24 Finney		24 Finney		24		24		24		24		24		24		24		24	24
		25 Finney		25 Cottonwood		25 Finney		25 Finney		25		25		25		25		25		25	25
		26 Finney		26 Cottonwood		26 Finney		26		26		26		26		26		26		26	26
		27 Finney		27 Cottonwood		27 Cottonwood		27		27		27		27		27		27		27	27
		28 Finney		28 Cottonwood		28 Cottonwood		28		28		28		28		28		28		28	28
		29 Finney		29 Cottonwood		29 Cottonwood		29		29		29		29		29		29		29	29
		30 Finney		30 Cottonwood		30 Cottonwood		30		30		30		30		30		30		30	30
		31 Finney		31 Cottonwood		31 Cottonwood		31		31		31		31		31		31		31	31
		32 Finney		32 Cottonwood		32 Finney		32		32		32		32		32		32		32	32
		33 Finney		33 Cottonwood		33 Finney		33		33		33		33		33		33		33	33
		34 Finney		34 Cottonwood		34 Finney		34		34		34		34		34		34		34	34
		35 Finney		35 Cottonwood		35 Finney		35		35		35		35		35		35		35	35
		36 Finney		36 Cottonwood		36 Finney		36		36		36		36		36		36		36	36
		37 Finney		37 Cottonwood		37 Finney		37		37		37		37		37		37		37	37
		38 Finney		38 Cottonwood		38 Finney		38		38		38		38		38		38		38	38
		39 Finney		39 Cottonwood		39 Finney		39		39		39		39		39		39		39	39
		40 Finney		40 Cottonwood		40 Finney		40		40		40		40		40		40		40	40
		41 Finney		41 Cottonwood		41 EAC		41		41		41		41		41		41		41	41
		42 Finney		42 Cottonwood		42 EAC		42		42		42		42		42		42		42	42
		Seven (7) units → transferred 3/22/16 into FY 16 (market) from the "Outside SSA" area and allocated to Cottonwood.	43 Cottonwood	Six (6) units → transferred 3/22/16 into FY 17 (market) from the "Outside SSA" area and allocated to Cottonwood.	43 Cottonwood																
			44 Cottonwood		44 Cottonwood																
			45 Cottonwood		45 Cottonwood																
			46 Cottonwood		46 Cottonwood																
			47 Cottonwood		47 Cottonwood																
			48 Cottonwood		48 Cottonwood																
			49 Cottonwood																		

This table shows the allocations made by the DRB as of March 22, 2017 and the available units (unshaded cells with no project name) as of the March 2017 Growth Management Allocation Hearing

Williston, Vermont Growth Management System: Allocated Dwelling Units FY 2016-FY2025

Allocation Year	FY 16		FY 17		FY 18		FY 19		FY 20		FY 21		FY 22		FY 23		FY 24		FY 25	
	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market	3 Affordable	9 Market
Sewer Service Area Outside Growth Center	1 Northridge	1 Bryan	1 Northridge	1 Bryan	1 Northridge	1 Bryan	1	1 Bryan	1	1 Bryan	1	1 Bryan	1	1Northridge	1	1Northridge	1	1	1	1
	2 Northridge	2 Bryan	2 Northridge	2 Bryan	2 Northridge	2 Bryan	2	2 Bryan	2	2 Bryan	2	2 Bryan	2	2Northridge	2	2Northridge	2	2	2	2
	3 Northridge	3 Bryan	3 Northridge	3 Bryan	3 Northridge	3 Bryan	3	3 Bryan	3	3 Bryan	3	3 Bryan	3	3Northridge	3	3Northridge	3	3	3	3
	Moved to FY 2018	4 Bryan	Moved to FY 2018	4 Bryan		4 Bryan		4 Bryan		4 Bryan		4 Bryan		4Northridge		4Northridge		4		4
		5 Bryan		5 Bryan		5 Bryan		5Northridge		5		5		5		5		5		5
		6 Bryan		6 Bryan		6 Bryan		6Northridge		6		6		6		6		6		6
		7 Shepard		7 Bryan		7 Bryan		7		7		7		7		7		7		7
		8 Pintair		8 Bryan		8Northridge		8		8		8		8		8		8		8
		9 Pintair		9 Bryan		9Northridge		9		9		9		9		9		9		9
	Outside Sewer Service Area	1 EAC	1 Miller	Units 1-3 moved to the Growth Ctr.	1 Miller	1 EAC	1 Miller	1	1	1	1	1	1	1	1	1	1	1	1	1
2 EAC		2 Brownell	Units 3-9 (Cottonwood) by DRB on 3/22/2016	2 Brownell	2 EAC	2 Brownell	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3 EAC		Units 3-9 moved to the Growth Ctr. (Cottonwood) by DRB on 3/22/2016	DRB on 3/22/2016	3 Handy	3 EAC	3 Shepard	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Units 1-3 move to Growth Ctr in FY 2018.				Units 4-9 moved to the Growth Ctr. (Cottonwood) by DRB on 3/22/2016	Units 1-3 move to Growth Ctr. In FY 2018.	4 Lakeview		4		4		4		4		4		4		4
						5 MacDonald		5		5		5		5		5		5		5
						6 Devita		6		6		6		6		6		6		6
						7 Devita		7		7		7		7		7		7		7
						8 Devita		8		8		8		8		8		8		8
						9		9		9		9		9		9		9		9

This table shows the allocations made by the DRB as of March, 2017 and the available units (unshaded cells with no project name) as of the March 2017 Growth Management Allocation Hearing

Projects Receiving Allocation as of the March 28, 2018 DRB Growth Management Allocation Hearing:

Number	Name	Total Project Dwelling Unit Equivalents (DUe)	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
DP 09-01	Finney Crossing	151	56	34	38	23	0	0	0	0	0	0
DP 15-02	Bryan/Snyder	34	6	9	7	4	4	4	0	0	0	0
DP 15-03	Shepard	1	1	0	0	0	0	0	0	0	0	0
DP 15-06	Pintair	2	2	0	0	0	0	0	0	0	0	0
DP 14-20	Miller	3	1	1	1	0	0	0	0	0	0	0
DP 15-08	Brownell	3	1	1	1	0	0	0	0	0	0	0
DP 16-05	Cottonwood Crossing	173	7	31	15	9	15	28	28	28	12	0
DP 16-02	Handy	1	0	1	0	0	0	0	0	0	0	0
DP 09-09	EAC	8			8							
DP 17-01	Northridge	21			11	2			4	4		
DP 09-09	Shepard	1			1							
DP 16-20	Devita	3			3							
DP 16-23	Lakeview	1			1							
DP 17-09	MacDonald	1			1							
Total		403	74	77	87	32	32	32	29	28	12	0

Williston, Vermont Growth Management Allocation Rules:

“Of the 80 dwellings available for allocation each fiscal year, a minimum of 25% of those dwelling units in each allocation area shall be reserved expressly for perpetually affordable housing as defined in WDB 46.3.9.” (WDB 11.3.3)

“No more than 75% of the units available in a given fiscal year and in any of the three ‘allocation areas’ established by WDB 11.3.2 may be allocated to any one proposed residential subdivision.” (WDB 11.5.1.5)

“no more than 50% of the number of allocation units in any of the allocation areas may be allocated two or more years prior to the fiscal year the allocation becomes available, and no more than 75% of the number of allocation units in any of the allocation areas may be allocated one year prior to the fiscal year the allocation becomes available.” (WDB 11.5.1.5)

How to Use These Tables:

Each unshaded cell represents one dwelling unit equivalent. Each unshaded cell with the name of a project in it represents one dwelling unit equivalent that has been awarded to that project.

Allocations, transfers, and removals of allocation made prior to the March 2017 round of Growth Management are shown in black.

Dark shaded () cells on the table represent dwelling unit equivalents that cannot be allocated in the March 2017 round of Growth Management due to the rules set forth in WDB 11.5.1.5



APPENDIX G

WASTEWATER FUTURE FLOW PROJECTIONS

Town of Williston
 16083 - Sewer Capacity Analysis
 Wastewater Future Flow Projections

Pump Station	Design Flow Rate, Each Pump (gpd)	Design Flow Rate, Each Pump (gpm)	Average Daily Flow (gpd)	Peak Hourly Flow (gpd)	% of Design Flow	Allocated Unconnected Flow (gpd)	Peak Allocated Unconnected Flow (gpd)	Projected Additional Flow (gpd)	Peak Projected Additional Flow (gpd)	Total Average Daily Flow (gpd)	Peak Additional Flow (gpd)	Total Peak Hourly Flow (gpd)	Total Peak Hourly Flow (gpm)	% of Design Flow	yrs till 90%
River Cove	2,160,000	1,500	608,268	1,824,804	84%	42,930	128,790	150,870	452,610	802,068	581,400	2,406,204	1,671	111%	4
Gallop Hill	216,000	150	13,810	41,430	19%	0	0	0	0	13,810	0	41,430	29	19%	
North Williston Road	324,000	225	58,890	176,669	55%	3,780	11,340	3,645	10,935	66,315	22,275	198,944	138	61%	
Industrial Avenue	2,160,000	1,500	547,441	1,642,324	76%	42,930	128,790	150,870	452,610	741,241	581,400	2,223,724	1,544	103%	10
Blair Park	360,000	250	107,344	322,033	89%	0	0	3,400	10,200	110,744	10,200	332,233	231	92%	4
So. Brownell	324,000	225	60,423	181,268	56%	0	0	0	0	60,423	0	181,268	126	56%	
South Ridge	324,000	225	37,799	113,398	35%	2,835	8,505	5,265	15,795	45,899	24,300	137,698	96	42%	
Old Stage Road	604,800	420	138,334	415,002	69%	6,615	19,845	12,285	36,855	157,234	56,700	471,702	328	78%	

Notes:

1. Total Average Daily Flow = Average Daily Flow + Allocated Unconnected Flow + Projected Additional Flow