Woodridge Lake Sewer District

Preliminary Summary Report

800.426.4262
W&C Contact

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

226304.00
Woodridge Lake Sewer District
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Appendix A: 1989 Consent Order

1. INTRODUCTION

1.1 WASTEWATER MANAGEMENT OVERVIEW

The Woodridge Lake Sewer District (WLSD) is a private residential development around the 385-acre Woodridge Lake in Goshen, CT. WLSD owns and operates a wastewater management system consisting of a collection system and Water Pollution Control Facility (WPCF), on a separate 90-acre effluent disposal system parcel. The collection system, which consists of 16 miles of sewers and eight pump stations, serves approximately 677 existing sewer users and roughly 184 undeveloped abutting parcels. The WLSD sewer service area is shown in Figure 1-1. The WPCF is located at the effluent disposal site. The majority of the wastewater infrastructure was constructed in the early 1970s.

WLSD uses ad valorem taxing, based on assessed property values, to apportion capital and annual O&M costs to the parcels within the sewer service area. Given the limited number of parcels served by the WLSD sewer system, current annual costs are high. The average annual sewer charge per WLSD home is $1,234, as compared to the 2011 Connecticut State-wide average of $369.

1.2 PROJECT GOALS

The Connecticut Department of Energy and Environmental Protection's (DEEP) issued a Consent Order (CO) in 1989. The CO, a copy of which is included in Appendix A, requires WLSD to address WLSD's sanitary sewer collection and wastewater disposal needs. WLSD previously completed system assessments and planning efforts, which served as valuable background to the facilities planning process. Substantial portions of these documents remain valid and were updated to reflect the current regulatory requirements and technological advances available to address WLSD's wastewater management needs.

WLSD retained Woodard & Curran in 2011 to complete the Facilities Plan Update Project. The Project includes an evaluation of existing facilities, needs assessment, and alternatives analysis to address the requirements of the CO and develop recommendations for WLSD's wastewater infrastructure for the next 20 years.

This Preliminary Summary Report provides a step-by-step framework to define the condition of existing wastewater infrastructure, determine the District's needs, and identify recommended solutions.

1.3 SCOPE OF PROJECT EVALUATION

In order to accomplish the Project goals, the project was organized as follows in Table 1-1 to address the various challenges facing WLSD:

Table 1-1: Facilities Plan Update Tasks

Task	Description	Location Summarized in Preliminary Report
1	Project Development and Management	---
2	Meetings and Coordination	---
3	Define Service Area, Flows and Pollutant Loadings	Section 2
4	Collection System Capacity Management Evaluation (Infiltration and Inflow)	Section 3
5	Collection System SCADA System Evaluation	Section 3
6	Groundwater Disposal System Evaluation	Sections 5 and 7
7	Treatment Facility Evaluation	Sections 4 and 7
8	Regionalization Alternatives Evaluation	Section 6

Task	Description	Location Summarized in Preliminary Report
9	Financial Evaluation	Section 8
10	Public Participation Program	---
11	Finalize Facilities Plan Report	---
12(1)	Additional I/I Investigations (via Amendment)	Section 3
13(1)	Flow Isolation Program (via Amendment)	Section 3
14(1)	Comprehensive CCTV Program (via Amendment)	Section 3

(1) Additional tasks added via Amendments.

1.4 PURPOSE OF PRELIMINARY REPORT

This Preliminary Summary Report highlights the work done to-date, provides a summary of technical review work, field work performed, key assumptions, and preliminary conclusions. It will be used to facilitate discussions with DEEP prior to completing the Project, and submitting the Final Report prior to implementation of the Recommended Plan.


Legend
GIS Parcels
Sewer MH (Converted from CAD)
Pump Station (Converted from CAD)
Sewer Pipe (Converted from CAD)
Gravity
Force
Sub Areas(Converted from CAD)
WLSD Service Area
Town Boundary
Sub Area #1
Sub Area #2
Sub Area #3
Sub Area #5
Sub Area #6
Sub Area #7
Sub Area #8
Plant Pump Station
GOSHEN
LITCHFIELD
SCALE: 1 " = 500 '
0 250 500 1,000 Feet
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Woodridge Lake Sewer District
WLSD Sewer Collection System
Figure 1-1
WOODARD &CURRAN
DATE: June, 2013
DOC: 2013.06.11 - Figure 1-1.m
DRAWN BY: JS
JOB NO.: 223604
SOURCE: WC, ESRI, Town of Goshen

2. FLOWS AND LOADS

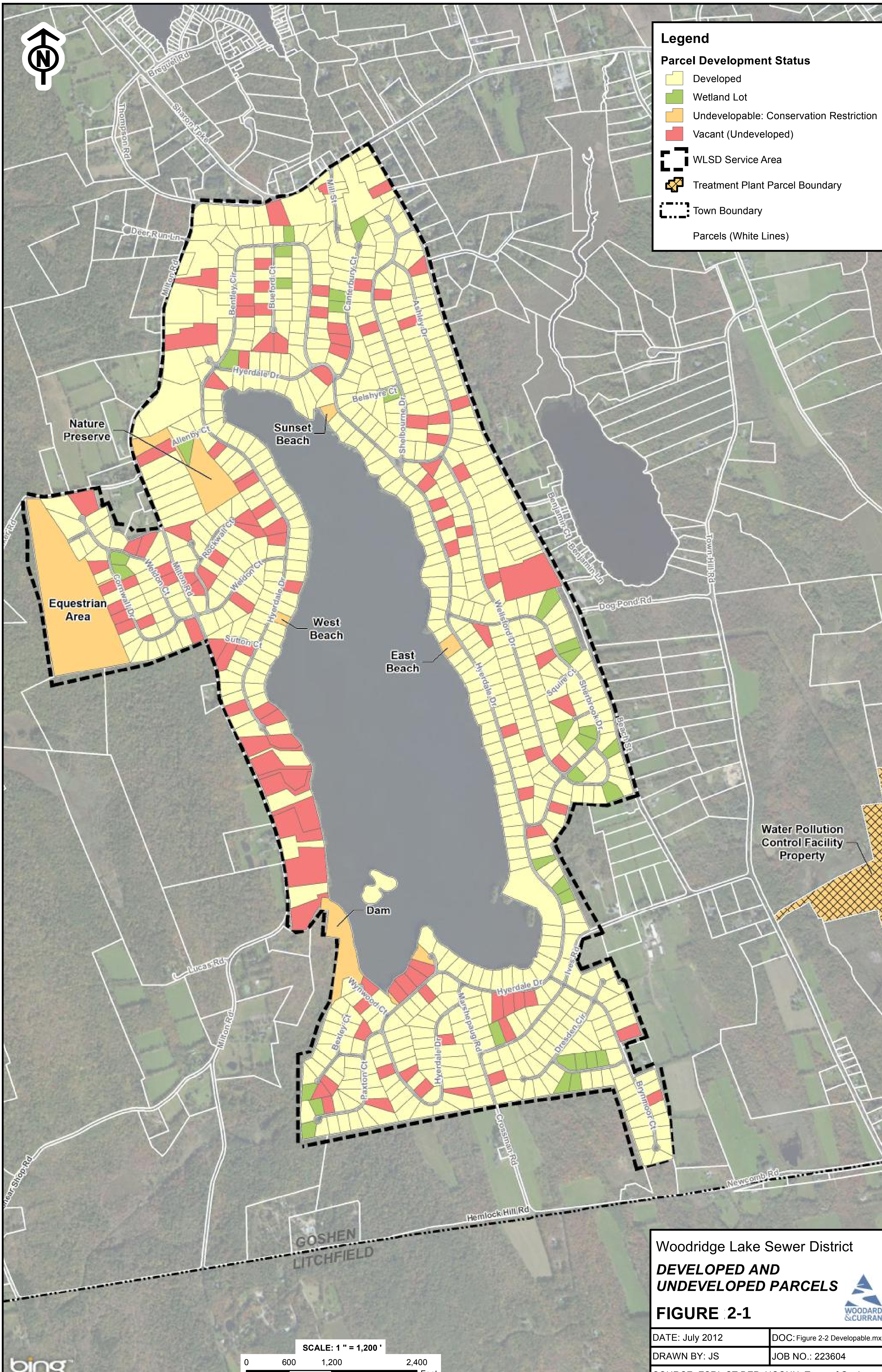
2.1 Introduction

In order to assess current capacities and future needs, Woodard & Curran analyzed the existing flows, design flows, and pollutant loadings. Future loadings were assessed at build-out conditions for the WLSD sewer service area. Only future sewer service connections to existing sewer mains were included in our evaluation, and no extensions to the sewer system were considered in this evaluation.

2.2 Service Area Build-Out Analysis

Woodard & Curran performed an analysis to project future conditions in the WLSD service area when it is completely built-out. For this analysis, we utilized existing electronic files provided by the WLSD, and we compiled additional information from the Town of Goshen and the State of Connecticut. This information included land use, zoning, wetlands, sensitive resources, conservation restrictions, flood zones, and areas designated by the State for preservation or development. From the analysis, we determined that there are 677 existing sewer connections and we project 184 future connections to existing lots which will result in 861 total connections at build-out. For these projections, we considered developed lots, vacant lots, new lots that can be created through subdivision, and likely undevelopable lots as follows:

- Developed Lots: Lots which have one or more existing buildings (refer to Figure 2-1).
- Vacant Lots: Lots that are not currently developed and could have a new building constructed in the future (refer to Figure 2-1). We assumed that at build-out all vacant lots would become developed.
- Lots Created Through Subdivision: All lots in the service area are zoned as either WL or RA-1. Lots zoned WL cannot be subdivided. For lots zoned RA-1, we assumed that at build-out, all developed and undeveloped lots would be subdivided to the maximum number of lots allowable based on minimum zoning requirements for land area with the exception of thirteen lots that have a deed restriction prohibiting subdivision. There is one 8.36 acre parcel zoned RA-1 which has been set aside for up to 34 affordable housing units.
- Undevelopable Lots: Lots that are not currently developed and cannot be developed in the future because of the following restrictions:
    - Wetland Lots: Based on the Goshen Inland Wetlands Commission and local realtor records, the WLSD developed a list of 33 lots that are likely to be restricted from development because of wetlands (refer to Figure 2-1). The ability to develop each individual lot will ultimately be a determination made by the Town of Goshen. However, for purposes of this analysis, we assumed that 50 percent, or 17 wetland lots, will not be developed.
    - Conservation Restrictions: There are seven properties within the WLSD Service Area that are owned by the Woodridge Lake Property Owners Association and are restricted from development including land under Woodridge Lake, Sunset Beach, East Beach, West Beach, the Equestrian Area, the Nature Preserve, and the Woodridge Lake Dam (refer to Figure 2-1).
    - Land Area: Lots that do not meet the minimum lot size requirements as defined by the Goshen Zoning Regulations (0.8 acres for WL and 1.0 acres for RA-1).



Woodridge Lake Sewer District

DEVELOPED AND UNDEVELOPED PARCELS

FIGURE 2-1

WOODARD & CURRAN

DATE: July 2012	DOC: Figure 2-2 Developable.mxd
DRAWN BY: JS	JOB NO.: 223604
SOURCE: ESRI, CT DEP, UCONN, Town of Goshen	

2.3 Future Projections

Woodard & Curran projected the future flow and pollutant loadings at build-out conditions by estimating average dwelling and per-capita unit generation rates from existing data and applying them to the projected sewer connections and population at build out. Specifically, we developed per-connection and per-capita unit generation rates from influent flow and load data collected by the WLSD from January 2010 to December 2011. The projected build-out sewer population was estimated to be 2,187 individuals using the total number of existing (677) and projected sewer connections (184) from our build-out analysis. This includes an assumption of 2.54 persons per lot, based on the average household size for the Town of Goshen from the 2010 census data. This projection represents an increase in the sewer population of approximately 467 people above the current sewer population of approximately 1,720.

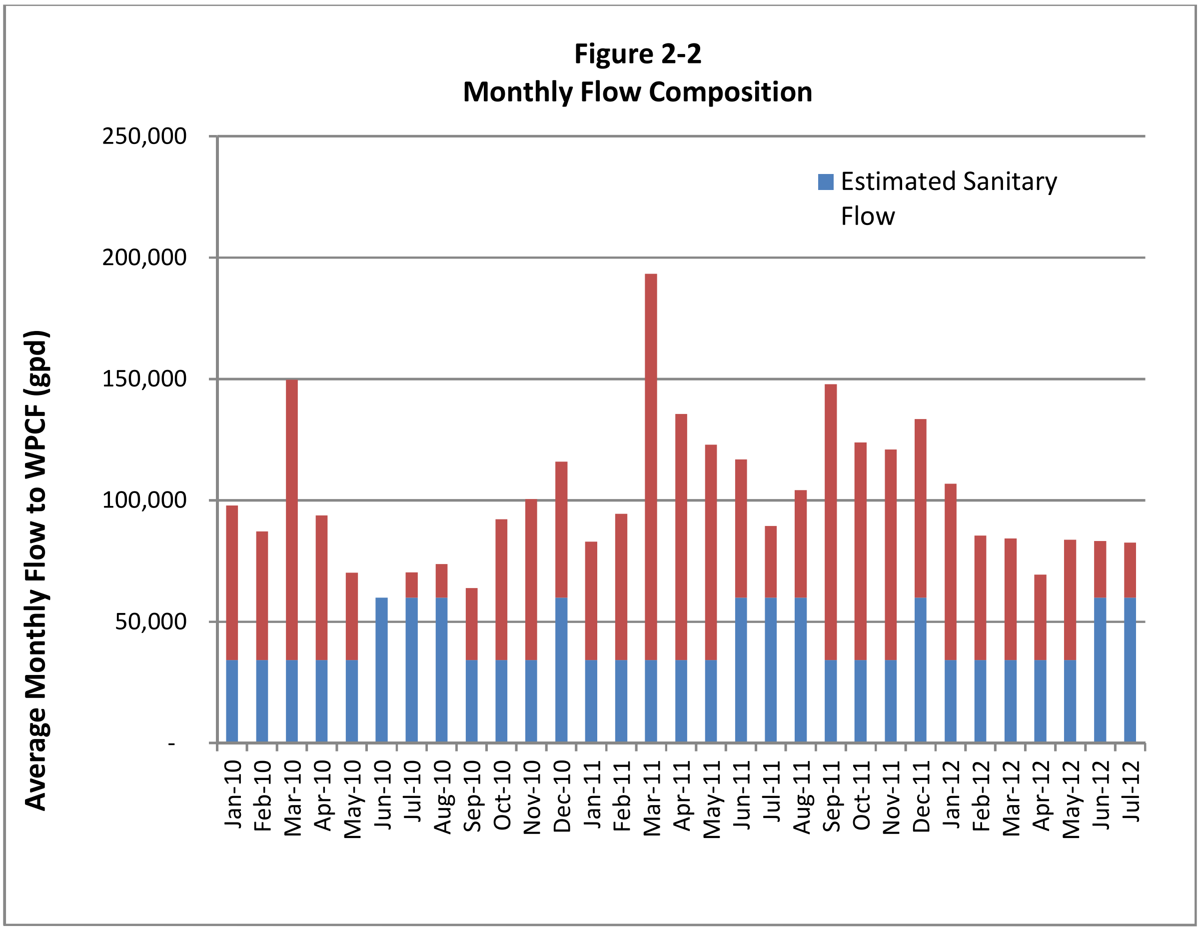
2.4 Flows

The average daily wastewater flow to the WPCF was approximately 105,000 gallons per day (gpd) from January 2010 through December 2011. This influent wastewater consists of the sanitary wastewater component generated from domestic sources, and the extraneous inflow and infiltration (I/I) flow component contributed from groundwater and precipitation. The projected flow at build-out conditions will include an increase in the sanitary wastewater component as a result of an increase in the number of anticipated sewer connections, as well as a significant decrease in I/I due to WLSD's ongoing I/I removal efforts. Since no future sewer extensions are planned, we do not anticipate increases in I/I that are typical with sewer main extensions.

WLSD homes are served by private wells, so metered water consumption data is not available. However, Woodard & Curran estimates that the average annual sanitary flow is 42,800 gpd. This estimate is based on the assumption that the existing properties served in the WLSD are near full occupancy for 4 months per year (June through August, plus December), and are at 57% occupancy for the remaining 8 months each year (34,200 gpd). This is based on WLSD's review of the Goshen Board of Elections data of registered voters in the District. In addition, we assumed that the vast majority of the 60,000 gpd flow during the dry-weather/low-groundwater summer 2010 period was sanitary flow.. The remaining 62,200 gpd of the total WPCF average annual flow of 105,000 gpd, is the average annual I/I, which is more than half of the annual wastewater flow. Figure 2-2 illustrates the variability of monthly sanitary and I/I flows in the WLSD during this time period.

Woodard & Curran determined the future wastewater flow by adding the calculated increase in sanitary flow from the projected 184 connections of existing lots to the existing collection system. Through our I/I investigations, which are summarized in Section 3, we estimate that the existing annual average per-connection and per-capita flow rates are 63 and 25 gpd, respectively (equating to 89 gpd/connection and 35 gpd/person during full occupancy periods). However, as these per-capita flows are relatively low compared to published typical values (40-130 gpd/person for all residential and 25-60 gpd/person for vacation homes), we projected the annual average flow from future connections to range from 63 to 95 gpd/connection (35 to 52 gpd/person at full occupancy), with the higher values representing a 50% safety factor above measured generation rates. The resulting increase in the sanitary wastewater component is 11,600 to 17,500 gpd (refer to Table 2-1).

Figure 2-2: WLSD's Monthly Average WPCF Flow Composition



2.5 Pollutant Loads

To calculate the future pollutant loadings, Woodard & Curran analyzed the existing data and the sewered population projections to determine the per capita generation rate for biochemical oxygen demand (BOD), total suspended solids (TSS), and Total Kjeldahl Nitrogen (TKN). Consistent with lower flow projections, the resulting per capita pollutant generation rates were slightly lower than typical published values.

Because pollutants are only measured on a monthly or bi-weekly basis, there is a limited amount of pollutant data. In addition, since generation rates were low, the following standard published rates were utilized to calculate the future connections' loads: 0.17 lbs/day per person for BOD; 0.20 lbs/day per person for TSS; and 0.04 lbs/day per person for TKN. Table 2-1 presents the resulting pollutant load projections.

Table 2-1: Pollutant Concentrations and Loadings at Build-Out Conditions

	Average Annual Flow			Average Annual Pollutant Loads [2]					
.	Sanitary Component (gpd)	I/I Component (gpd)	Total (gpd)	BOD Conc. (mg/l)	BOD Load (lbs/day)	TSS Conc. (mg/l)	TSS Load (lbs/day)	TKN Conc. (mg/l)	TKN Load (lbs/day)
Existing	42,800	62,200	105,000	151	146	172	151	21.5	18.8
Future Projection	11,600 to 17,500	-16,600 to -22,500[1]	-5,000		57		67		13.3
Total Future	54,400 to 60,300	39,700 to 45,600[1]	100,000	243	203	262	218	38.5	32.1

1. The projected I/I component is presented as the amount of I/I removal anticipated from the I/I Removal Project. To accomplish this goal will require the removal of approximately 27-36 percent of the existing I/I.
2. Pollutant concentrations based on projected load divided by a given flow. Also adjusted for seasonal use/population patterns.

2.6 Summary

The future flow is important for understanding the need for I/I removal, and for determining the conceptual size and hydraulic capacity of the proposed facilities for the evaluation of alternatives. Pollutant loads are important for understanding the treatment requirements for evaluation of the new treatment facility alternative. Table 2-2 summarizes current and future flows and loads. The flows and loads data was used to facilitate the comparison of a new WLSD WPCF (Section 7) versus a future regional connection to Torrington (Section 6).

Table 2-2: Flows and Loads Summary

Parameter	Value
Service Area Sewer Population Projections	
Existing Sewer Connections	677
Projected Increase in Sewer Connections	184
Projected Total Connections to WLSD	861
Persons per dwelling unit	2.54
Sewer Population Projection	2,187

Flow Projections (Average Annual)	
Existing Average Daily Flow (gpd)	105,000
Existing Sanitary Flow Component (gpd)	42,800
Projected Per Capita Flow Rate	25 to 37.5
Projected Increase in Sanitary Flow Component (gpd)	11,600 to 17,500
Total Future Flow without I/I Removal (gpd)	116,600 to 122,500
Total Future Flow with I/I Removal (gpd)	100,000(1)
Pollutant Load Projections (Future Average Annual)	
BOD Load (lbs/day)	203
TSS Load (lbs/day)	218
TKN Load (lbs/day)	32.1

1. Assumes removal of 27% to 36% of the I/I flow.

If no I/I is removed from the collection system, the future average annual flow could be in the range of 116,600 to 122,500 gpd. Since the WPCF utilizes groundwater through a flow-based permit with CT-DEEP, WLSD plans to integrate I/I removal in conjunction with future sewer connections to balance future flows with available capacity. In addition, the WLSD plans to implement a regular I/I removal program and maintenance program to minimize future I/I flow contributions. Based on the results of these efforts, the WLSD should annually monitor and adjust I/I removal goals considering seasonal flow, groundwater and precipitation factors, and the rate at which new sewer users are connected to the system.

3. CURRENT WLSD COLLECTION SYSTEM

3.1 OVERVIEW

The WLSD collection system, shown in Figure 1-1, was privately installed approximately 40 years ago and until recently, received limited preventative maintenance. The majority of the gravity sewer mains are double-walled plastic truss pipe together with a limited amount of cast iron pipe. The WLSD collection system consists of 16.2 miles (85,500 feet) of gravity sewer, 1.9 miles of force main piping, and 8 wastewater pump stations. Of the 677 current connections, approximately 115 are low-lying homes around the Lake that are served by individual grinder pumps, which discharge to mainline gravity sewers. The system is spread out over a large area and encircles Woodridge Lake. For the number of connections, the system has an unusually large amount of pipe, which allows for greater I/I potential.

For the purpose of evaluating the existing sewer system, the service area was divided into subareas based on the locations of pump stations. Table 3-1 summarizes the total length of pipe and inch-diameter-miles of pipe in each subarea. The unit of inch-diameter-mile of pipe is used to normalize I/I within subareas of varying sizes and pipe diameters.

Table 3-1: Sewer & Force Main Piping Lengths

Subarea[1]	Gravity Sewer Main			Force Main (miles)
	Diameter (inches)	Length (miles)	Unit Length (in-diam-mi)	
1	8	0.78	6.2	0.34
2	8	0.93	7.4	0.11
3	8	1.69	13.6	0.14
5	15	7.17	108	0.27
6	12/15	3.27	44	0.45
7	8	1.53	12	0.22
8	8	0.81	6.5	0.35
Total		**16.2**	**198**	**1.89**

1 Pump Stations are located at each subarea, with an additional Plant Pump Station located upstream of the treatment plant (a total of 8 pump stations). There is no subarea 4.

3.2 I/I OVERVIEW

As summarized in Section 2, the average daily wastewater flow to the WLSD WPCF was approximately 105,000 gpd from January 2010 through December 2011. During this same period, total daily flows ranged from a minimum of 43,000 gpd to a maximum of 402,000 gpd. This fluctuation is due to variations in seasonal population use but also due to variations in inflow and infiltration (I/I). Wastewater is comprised of sanitary and I/I flow sources. Based on our observations of the 2010 and 2011 flow data, the average annual sanitary flow is approximately 42,800 gpd, and the remaining average annual I/I is 62,200 gpd. Figure 2-2 illustrates the variability of monthly sanitary and I/I flow components in the WLSD during this time period. The red bars in the graph indicate estimated I/I and show that the average I/I from month to month can range from near zero in the summer of 2010 to approximately 160,000 gpd in March of 2011.

3.3 I/I INVESTIGATIONS

The WLSD has become increasingly proactive in attempting to remove I/I over the past several years and the Facilities Plan Update reinforced these efforts. The goal of the I/I investigations was to quantify and locate the I/I and to recommend steps for reducing I/I within the collection system. In order to combat excessive I/I, the Wastewater Facilities Plan incorporated several I/I tasks and investigations, which are summarized below:

- Flow Monitoring: Total daily flow data was estimated at each pump station/subarea from May 2010 through March 2011 utilizing pump run time data, together with approximate pumping rates. For March 2011, the estimated system-wide peak monthly I/I and peak daily I/I were 160,000 gpd and 380,000 gpd, respectively.
- Flow Isolation: Woodard & Curran conducted a flow isolation program in Spring 2011, Spring 2012 and Spring 2013. Flow isolation is performed during dry-weather nighttime hours during high groundwater periods to locate infiltration sources (on a manhole-to-manhole basis). Over the course of these three years, the entire collection system was flow isolated. Approximately 22,000 feet and 55,000 feet of gravity sewers were flow isolated in 2011 and 2012, respectively. A total of 21,000 gpd of pipeline infiltration and nearly 28,000 gpd of overall infiltration (pipeline, manhole and service lateral) was observed during the 2011 investigation. Groundwater levels were high following record snowfall and a series of significant spring precipitation events in 2011 yielding positive results. A more modest 7,500 gpd of infiltration was observed in 2012, when abnormally low groundwater levels and few spring-time precipitation events occurred. The 2013 flow isolation program repeated the 2012 field work, but was also of limited value due to unusually low groundwater conditions, and few significant precipitation events during the field work. The results of the flow isolation program were used to prioritize follow-up CCTV work.
- Physical Site Inspection: An initial physical site inspection was conducted by Woodard & Curran staff during Spring 2011 to observe lot-by-lot surface features that may contribute to excessive I/I. The physical site inspection targeted low-lying areas, steep slopes, saturated areas, and other surface features that often result in the location of elevated I/I sources. The qualitative observations of the physical site inspection were used to narrow the focus of the follow-up building inspection program.
- Building Inspections: Woodard & Curran staff conducted interior and exterior building inspections during summer 2011. The intent of the building inspections was to locate potential sump pumps, roof drains, and drain connections to the WLSD collection system. Access was granted in 104 of 193 homes (54% rate of entry) for the interior building inspections. Although drainage systems were located, no interior drain connections to the sewer system were observed. Several potential exterior sources were recommended for follow-up smoke and dye testing.
- Smoke and Dye Testing: Based on the results of the physical site inspection and building inspections, smoke (22,500 feet) and dye testing (15 locations) were conducted in October 2011. No illicit drain connections to the sewer system were observed.
- Manhole Inspections: Approximately 370 manhole inspections were completed by WLSD staff in 2011 and 2012 to locate potential infiltration and inflow sources, inventory system attributes, physical defects, and identify operation and maintenance needs. Most of the manhole inspections were performed in summer months when visible infiltration sources were minimal and the potential rate of infiltration was projected based primarily on qualitative criteria. The results of the manhole inspection program recommended 55 manholes for repairs or cleaning and 46 manholes for monolithic lining and exterior grouting. Based on the inspection reports and

projections, the proposed manhole work is estimated to remove between 13,000 and 53,000 gpd of peak month I/I (for a peak flow event similar to March 2011). Projections were based upon I/I observed during the flow isolation work completed in 2011 when groundwater levels were higher.

- CCTV Inspections: CCTV inspections were initially conducted in the summer of 2011 to locate specific infiltration sources. CCTV work was not conducted in 2012 due to the limited results of the spring 2012 flow isolation work and low groundwater conditions. The remainder of the collection system was televised in 2013. CCTV inspections are utilized to pinpoint defects and leaks after I/I has been quantified during flow isolation. Despite the apparent low groundwater conditions observed during the 2012 and 2013 flow isolation work, CCTV inspections still led to construction repair recommendations by observing evidence of infiltration (i.e. mineral deposits). The intent of the CCTV work was not to quantify infiltration already observed during flow isolation, but rather to locate the specific defects and to determine design recommendations. The CCTV work resulted in recommendations for limited pipe lining and extensive clean, inspect, test and seal (CITS) of pipe joints throughout the system.

WLSD Condition | **Proper Condition (shown for comparison)**

MH 3-15 pipe-MH joint leak (no boot/seal)

Typical modern rubber boot for PVC pipe

Mineral Deposits at Service Connection (no boot/wye)

PVC Cleanout (similar to wye, minimizes leaks)

The results of the CCTV work and manhole inspections suggest that the primary I/I sources relate to service lateral penetrations at sewer mains, sewer main penetrations at manholes, and a limited number of mainline truss-pipe joints. Similar to the pipe-MH joint leak shown below, numerous leaks were found at service connections (mineral deposits shown below) and at pipe to pipe joints. A few cracks and breaks were detected that also contribute I/I to the sewer system.

3.4 I/I REMOVAL RECOMMENDATIONS

I/I consist of groundwater infiltration, inflow and rainfall-induced infiltration. In general, the goals for a typical I/I removal program include the removal of all direct inflow sources, including roof leaders and catch basins, the removal of infiltration sources with unit flows greater than 4,000 gallons per day per inch-diameter-mile (gpd/idm), and the elimination of other I/I sources that can be cost effectively removed.

A very effective I/I program can be characterized as locating, on an average annual basis, 50% of the I/I in the collection system and removing 50% of the I/I from those sources (net 25% removal), subject to a cost effectiveness analysis. Based on the composition of wastewater in the WLSD, the ratio of average annual I/I to average annual sanitary flow is 1.45:1 (based on 2010-2011 data). However, WLSD has a relatively large collection system compared to the number of users. Given the collection system's characteristics as summarized in Table 3-1, and the annual average I/I of 62,200 gpd, the annual average unit I/I is 314 gpd/idm. Current design standards suggest that I/I in the range of 200 to 400 gpd/idm is acceptable for new PVC sewer systems. Therefore, although the quantity of I/I in the WLSD collection system is elevated, the unit I/I within the collection system is low.

I/I removal goals are more aggressive for WLSD than most communities since the average wastewater flow can equal or exceed the permitted groundwater disposal flow and since the District has plans to connect additional sewer users in the future. These goals include:

- Removal of sufficient average annual I/I to facilitate future sewer connections,
- Removal of additional I/I, as necessary, to comply with the requirements of the groundwater disposal permit,
- Implementation of an annual preventative maintenance and I/I removal program, and
- To annually monitor I/I removal effectiveness and adjust and goals based on seasonal flow, groundwater, precipitation factors, and the rate at which new sewer users are connected to the system.

A significant I/I source was located during the May 2011 CCTV work on Paxton Court estimated at 7,200 gpd. The WLSD subsequently installed a short liner to repair the damaged pipe section at a cost of approximately $21,000. A noticeable flow decrease was apparent at the WPCF following completion of this work indicating that the rehabilitation effort was effective.

Based on the 2011, 2012 and 2013 I/I field work; Woodard & Curran developed the following set of recommendations to reduce I/I through rehabilitation of the collection system. Table 3-2 summarizes the I/I removal recommendation, which will be implemented in Summer/Fall 2013.

- Pipe Lining: Build on the District's initial pipe lining efforts with additional cured-in-place pipe (CIPP) lining.
- Clean, Inspect, Test & Seal (CITS): Clean, test and seal pipe joints and repair capped service connections.
- Manhole Repair: Complete interior repairs to manholes.
- Manhole Lining: Perform monolithic lining for manholes.

Table 3-2: Cost and Range of I/I Removal for Recommended Improvements

Recommended Improvement (1)	Capital Cost of Improvements (2)
Pipe Lining, CITS Pipe Joints	$272,000
Manhole Repair & Lining	$257,000
Total:	**$529,000**

Notes: (1) Preliminary based on results of 2011 investigation work

(2) Includes design and construction engineering and 15% contingency

3.5 PUMP STATIONS EVALUATION

The existing collection system serving the WLSD does not include communication between the pumping stations and a central communications hub such as at the WPCF. Although operations staff are able to periodically inspect each pump station manually to observe conditions and record run time data, real time monitoring of system functions and flows would allow WLSD's staff to proactively manage its pump stations and I/I mitigation efforts.

In order to effectively manage the network of collection system pump stations and piping, Woodard & Curran evaluated options to improve communications between staff, the system, and the WPCF. Woodard & Curran initially performed an assessment of the District's SCADA needs at each pump station, evaluated each station's overall condition, and conducted a radio path study to determine the potential for wireless communications.

Based on Woodard & Curran's evaluation, the following limitations and needs were observed:

- Autodialers: Each pump station has a telephone line connected to an autodialer which dials out high wetwell conditions and loss of station power alarms to designated phone numbers. These land line phone connections have proven unreliable, resulting in operations staff missing alarm conditions that could have been addressed earlier.
- Pump Controllers: Currently, all of the pump stations within the WLSD collection system are equipped with Pribusin PCS-400 pump microcontrollers. The Pribusin microcontrollers utilize a propriety platform, which cannot be customized, and they are limited in their ability to provide process information to a SCADA system.
- Centralized Monitoring: The existing pump stations and WPCF do not have a centralized system for control, data collection and reporting. Currently, all operations and permit-required data is collected by hand, and there are no automated means to monitor or record this data; either at the WPCF or at the pump stations.
- Flow Measurement: Pump Stations 1, 2, 3, 5, 7, and 8 do not have a direct means of flow measurement. Pump Station 6 and the WPCF Pump Station have clamp-on ultrasonic flow meters located on the discharge piping in the below-grade drywells.
- Emergency Connections: All of the submersible pumping stations are equipped with generator quick connects and manual transfer switches that allow the staff to provide temporary emergency power utilizing a portable generator. Pump Station 6 and the Plant Pump Station have permanent emergency generators. However, Pump Station 6 and the Plant Pump Station have close-coupled motors below grade, which make them vulnerable to failure resulting from station flooding. In the event of system failure, there are no means for connecting a bypass pump to the force main at either of these stations.

3.6 PUMP STATIONS RECOMMENDATIONS

Based on our pump stations evaluation, we developed recommendations that are critical for I/I management, improve reliability, and foster emergency readiness. Following is the basis of design for the improvements associated with the Pump Stations/SCADA Upgrade Project, which will be completed in 2013.

- Flow Monitoring: Provide magnetic flow meters to the internal/drywell discharge force mains at Pump Station 6 and the Plant Pump Station. Add continuous wetwell level trending capabilities at Pump Stations 1, 2, 3, 5, 7 and 8. The flow monitoring improvements will allow the WLSD to more accurately monitor flows and I/I trends in each subarea over a much longer period than otherwise possible with temporary flow monitoring programs. The ability to adjust wetwell level settings will also improve the District's ability to manage flows between pump stations during high flow events, decreasing simultaneous peak flows, thus improving pumping efficiencies and better managing utility costs.

- Pump Station Control: Provide programmable logic controllers (PLC), wiring and programming in the existing pump control panels to provide control and monitoring at each pump station location. New PLCs will utilize open architecture software which provides the ability to calculate pump station flow and customize the monitoring and control capabilities. The PLCs facilitate SCADA readiness, improve connectivity during alarm conditions, and foster more proactive maintenance and response measures by WLSD operations staff. Lightning protection and surge protection will be incorporated as part of the control panel upgrades which will improve reliability as the stations are reported to be prone to lightning strikes that result in loss of station functionality.

- Centralized Data Collection: Provide a central PLC controller (SCADA master) and hardware for the SCADA system located at the WPCF. The SCADA master will include computers and software for automated data collection, remote alarm notification and reporting. The data collected from the pump stations is displayed in real time in a graphical format that is easy to read and interpret. Alarms are displayed for the staff to review and determine the best course of action. The alarming capability will include station loss of power, wetwell high level, pump fault, pump fail to start, level transmitter failure, and other backup/redundancy functions to promote emergency readiness. Status points, process variables (flow, level, pump run status and runtimes, status of station power, alarms, etc.) and alarms are logged and available for trending. The SCADA software can be configured to modify/customize the control system in response to the changing conditions and operational needs.

- Report Generation: Include reporting software (XLReporter) for the SCADA system. This package can be configured to generate automatic reports of process variables and alarms. The reports can be utilized to trend flow rates, pumping cycles and times to allow WLSD to identify and address inefficiencies that may develop. In addition, manual lab data can be entered into the program to compare to readings received from online instruments. The software can generate reports for any specified period (daily, weekly, monthly, etc.) and can be formatted to be identical to regulatory agency reports to reduce the amount of staff time required for reporting.

- Remote Access Capability: Install hardware package at the WPCF to provide secure remote access into the SCADA system. The remote access system will allow staff to monitor and control the system as if they were sitting in front of the SCADA PC at the WPCF, which enhances their ability to respond quickly and effectively. This remote access capability is available from a PC, laptop, smartphone or tablet through the use of a software application and the appropriate security credentials.

- Pump Station Communications: Provide licensed frequency radio for communication from the WPCF site with the pump stations via a repeater site at the WLSD Clubhouse. Implementation of radio communication would include the installation of radio equipment at each of the pump station locations, the WPCF, and a repeater site located at the WLSD Clubhouse. Licensed Frequency Radio will be a more reliable system for pump station communication than the existing leased telephone line system. In addition, radio communication is integral to implementing a centralized SCADA system which inherently increases reliability through improved monitoring, alarming and data collection. A Radio Propagation Study has been completed to demonstrate the feasibility of licensed frequency radio communication between the sites in the collection and treatment system.

- By-Pass Connections to Enhance Emergency Readiness: Provide bypass pump headers and quick connect fittings in the drywells at Pump Station 6 and the Plant Pump Station. Installation of these bypasses (which is a typical pump station design practice) will improve emergency response capabilities by providing the WLSD with a means for connecting a portable pump to the force main at each station to pump out the wetwells. The current configuration does not include a means for bypass which elevates the risk of SSOs from the pump stations.

Our opinion of probable project cost for the Pump Stations/SCADA Upgrade Project is $454,000. This project will be constructed in Summer/Fall 2013.

3.7 SUMMARY

Given that the WLSD collection system is 40 years old, the piping system is in fair condition. However, given the relatively large size of the system as compared to the number of connections, total I/I flows are slightly higher than sanitary flows. Therefore, I/I must be removed to allow future sewer connections within the existing sewershed and to balance the groundwater discharge permit flow requirements. The I/I Removal Construction Project is scheduled to commence in Summer/Fall 2013.

Based on the aggressive I/I removal goals, WLSD plans to implement improved I/I monitoring capabilities throughout the collection system. The proposed Pump Stations/SCADA Upgrade Project will allow for real-time continuous flow monitoring capabilities at the District's eight pump stations. This Project, which will be completed in 2013, will add emergency bypass capabilities to the two largest pump stations, improving emergency readiness and function during power outages.

Regardless of the treatment and disposal alternative selected (regional or local), the two projects described above will be completed by WLSD in 2013. The collection system is an integral component of each alternative and the projects' goals will have lasting benefits.

4. CURRENT WLSD TREATMENT SYSTEM

4.1 BACKGROUND

The existing WPCF (plant) was constructed in 1974 and includes preliminary treatment equipment, activated sludge treatment, rapid rate multi-media filtration, aerobic sludge digestion, sludge drying beds, a waste sludge dewatering system, as well as an Operations Building and Garage. Effluent produced by the plant typically meets the existing permitted requirements, but the plant was not designed to provide the high levels of treatment that are anticipated to be required in the near future.

Although most of the mechanical components of the plant have been well maintained, the majority of plant systems are past the end of their expected useful life. In addition, most of the process tanks are constructed of carbon steel and have been without cathodic protection for a substantial portion of their 40 year lifespan. Although no detailed investigations have been conducted relative to the remaining life of the in-ground tanks, the condition of visible aspects of other steel components of the plant, notably the above grade portions of the steel digester tanks as well as the steel diffused aeration piping in the contact and reaeration tanks, suggest that the remaining life of the in-ground steel tanks is limited.

4.2 EVALUATION

The existing preliminary treatment system consists of a modest-sized aerated equalization tank, aerated grit removal and in-channel grinding. Given its age and environmental conditions this equipment is exposed to, the mechanical components of this system are expected to have no salvage value for future use. The only potential aspect of the system that may be suitable for reuse is the influent equalization tank.

The existing activated sludge treatment system uses the contact stabilization configuration, consisting of contact and stabilization tanks that function in conjunction with the secondary clarifiers. This configuration of the activated sludge process is most commonly used when secondary permit limits are less stringent and are never used as the primary mode of operation when nutrient removal is required. Reuse potential for these tanks is minimized both by the limited expected lifespan of the existing steel tanks, as well as that the existing tank volume is significantly undersized compared to that required by processes such as the Modified Ludzack-Ettinger (MLE) or Sequencing Batch Reactor (SBR) processes that are likely candidates for the anticipated treatment limits. In order to convert the existing system to a nutrient removal process, the existing tank volume would need to be roughly three times as large as the existing process tanks.

The effluent filtration system consists of three multi-media Smith & Loveless sand filters with a common “can pump station” type drywell with pumps and control valves. This system is original to the 1972 plant construction and was upgraded in 2011. However, the system has neither been able to perform as intended or remain in service since being upgraded.

Solids produced at the facility are pumped to the aerobic digester tanks where they are aerated and stored prior to dewatering via a Somat dewatering unit. Dewatered solids are disposed of on-site in the area of the “E” beds to the east of the WPCF. This practice of on-site disposal of biosolids is not expected to continue after upgrade of the plant.

4.3 SUMMARY

The anticipated permit requirements and excessive age of equipment at the WLSD WPCF will necessitate either a significantly new WPCF under a local alternative, or conveyance of flow to a regional POTW (i.e. City of Torrington WPCF). The regional and local alternatives are presented in Sections 6 and 7, respectively.

5. CURRENT WLSD DISPOSAL SYSTEM

5.1 INTRODUCTION

WLSD utilizes groundwater disposal for treated effluent, which is regulated by CT-DEEP through a 1989 Consent Order permitting 100,000 gpd groundwater discharge permit Although I/I removal will reduce current flows and offset future sanitary flow contributions, reducing future flows below 100,000 gpd will not be possible. Therefore, a key component of the Wastewater Facilities Plan included evaluation of the current disposal site to determine current/actual capacity.

This Section presents an overview of our Groundwater Disposal System Evaluation related to the Wastewater Facilities Plan. This summary includes the reasons for conducting the evaluation, the results of our field work, and how these observations were integrated into the overall Wastewater Facilities Plan to develop an integrated recommended plan.

5.2 DISPOSAL SYSTEM OVERVIEW

The WLSD plant discharges effluent to a groundwater disposal system consisting of approximately 90 beds over roughly 90 acres as shown on Figure 5-1. These beds were constructed in a ridge and furrow configuration with most of the beds approximately 25 feet wide and ranging in length from just over 100 feet to as much as approximately 700 feet. Treated effluent is discharged to any of the beds via a series of pipelines and valves. Plant staff manually opens and closes valves to direct flow to any particular bed and typical operation involves loading only a single bed at a time with the duration of effluent flow to any particular bed ranging from a few hours to as long as a week of continuous use. The system is not configured to allow operation of multiple beds simultaneously due to the existing piping configuration and that the beds are not at the same elevation preventing effective distribution of flow.

5.3 SUMMARY OF WORK

For this task, we: reviewed existing data and original design criteria; interviewed WLSD operations staff; conducted hydraulic conductivity testing; performed flow testing; monitored groundwater and surface water levels; analyzed and summarized field data; and prepared summary observations. Following is a summary of key tasks completed:

- <u>Background</u>: The groundwater disposal system was originally designed to accommodate a flow of 200,000 gpd; The 1989 Consent Order allowed a permitted capacity of 100,000 gpd, in parallel with several other O&M mandates; three groundwater disposal evaluations were conducted in 1971, 1995 and 2001.
- <u>Flow Testing</u>: Flow testing of the existing disposal beds was conducted in Spring 2012; wells and piezometers were installed at the site to monitor groundwater conditions prior to, during, and after the flow tests; test pits were made adjacent to the beds, and the overgrowth was also stripped from the bed surfaces prior to the flow tests.
- <u>Data Analysis</u>: Woodard & Curran conducted data analyses on: groundwater level responses to flow testing; hydraulic conductivity; groundwater contour mapping and gradient; surficial hydrogeologic mapping; travel time; and site loading rates.
- <u>Challenges</u>: Several equipment challenges arose during the testing including: leaking distribution system pipes; maintaining a consistent flow rate to the test beds; groundwater level monitoring; and site drainage.

5.4 KEY TESTING AND EVALUATION CRITERIA

The testing was conducted in accordance with the testing plan approved by CT-DEEP, which used a number of considerations from the 2006 CT-DEEP document "Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems" (Guidance Manual) that was specifically reviewed and clarified with CT-DEEP in the Field Flow Testing Plan. Because the Guidance Manual is based on development of new systems versus renovation of existing ones, we performed large-scale testing to demonstrate site capacity in lieu of small-scale and laboratory testing criteria in the Guidance Manual. The key testing and evaluation criteria, which are summarized in Table 5-1, are as follows:

- Separation Distance: The Guidance Manual requires an unsaturated separation distance of three feet between the top of mounded groundwater and the bottom of the loading facility. For the purpose of our testing, we used a distance of 1.5 feet from the bottom of the existing beds to the top of mounded groundwater under seasonal high groundwater conditions. The reduction in separation distance to groundwater is similar to other facilities in the State where variances were granted, or in those cases where advanced treatment systems are in use to provide advanced pathogen reduction prior to discharge of the effluent to disposal systems.
- Equivalent Seasonal High Groundwater Conditions: Separation distance must be maintained under seasonal high groundwater conditions. However, these conditions did not exist in Spring 2012 when the testing was conducted. Therefore, we modified our approach to account for the conditions at the time of testing by increasing the separation maintained during the testing based on well elevations in both on-site and USGS reference wells.
- Unit Flow Rate: The Guidance Manual allows a maximum unit flow rate of 1.2 gallons per day per square foot (gpd/sf) of bed bottom area for tertiary treated wastewater effluent. This flow rate was used for testing, provided that the target separation distance was available. In cases when a separation distance of at least 1.5 feet could not be maintained during a bed test at 1.2 gpd/sf, the unit flowrate was reduced to maintain the separation distance.
- Travel Time: The Guidance Manual requires a minimum travel time from the point of effluent discharge of a bed to the closest point of concern (surface water or property line) of 21 days.

Table 5-1: CT-DEEP Groundwater Disposal Guidelines

	Travel Time	**Separation Distance from Groundwater**	**Unit Flow Rate**
	>21 days	> 3 feet	1.2 gpd/sf (max)
Intent of Guideline Criteria	Provide for virus and pathogen reduction	Provide treatment of wastewater through aerobic conditions between bottom of soil absorption system and groundwater	Define the highest recommended liquid flow rate through the soil that will provide treatment

5.5 FIELD INVESTIGATION RESULTS

Our field testing and evaluation was used to determine capacity of the existing beds considered (those tested plus those adjacent with similar hydraulic characteristics). Testing indicated that the area with the highest hydraulic capacity (Beds A-4, A-6, A-8, A-10, A-12) rebounds to antecedent groundwater conditions very rapidly upon termination of loading. Using controls to monitor groundwater levels and distribute flow, combined with careful operation, will allow WLSD to utilize these beds (A-6, A-10, A-12) for 50% of their uninfluenced capacity (0.6 gpd/sf), yielding an overall capacity of the beds of 125,000 gpd and 201,000 gpd under high and low groundwater conditions, respectively. If a less conservative approach is used, assuming 100% of the uninfluenced capacity of adjacent beds capacity, overall availability of the beds could increase to 195,000 gpd during high groundwater periods. This capacity is consistent with the original design capacity of 200,000 gpd, based on the historical basis of design when the WLSD disposal system was constructed. The caveats to these estimated flows are as follows:

- Based on recovery of the G-1 bed after testing as noted in transducer data, the recovery was slower than that observed in the high capacity A-8 bed area; therefore, we have precluded the use of the downgradient beds G5 and G6 because of likely rise in the water table while using G-4;
- The bed area upgradient of A-11 has periodically shown standing water during high groundwater times of year; therefore, limited capacity of adjacent beds during high groundwater conditions was assumed;
- The usage of intermediate beds in the A-11 area was also assumed to be limited by the slower potential recovery times in these less transmissive materials;
- Hydraulic gradients in the F-2/F-3 area are likely to decrease during high groundwater conditions; therefore limited capacity of F-5 was assumed under high groundwater times of the year;
- Bedrock is shallow downgradient of the D-2 area: therefore capacity of the D beds was limited to the use of D-1, because of the potential for breakout downslope of the D area.

5.6 FIELD INVESTIGATION CONCLUSIONS

The capacity of the existing beds considered, provides a capacity ranging from 125,000 to 195,000 gpd under seasonal high groundwater conditions, depending on design and operational features.

The current permitted capacity of 100,000 gpd is interpreted and has been applied as an average annual flow limit. Therefore, the flows and loads summary presented in Section 2, together with the proposed I/I removal goals outlined in Section 3, are based on annual average conditions. We do not anticipate that an effluent permit based on annual average flow will require equalization of treated effluent prior to disposal using the above capacities as an average flow limit.

5.7 GROUNDWATER DISCHARGE CAPACITY

In absence of specific rules, regulations or statutes governing large groundwater discharge systems (greater than 5,000 gallons per day), CT-DEEP references the “Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems” (the Guidelines) of February 2006. It is important to highlight that this is a “guidance” document and does not appear to have statutory jurisdiction over the groundwater discharge at WLSD or other large discharges elsewhere in Connecticut. We believe that strict interpretation and application of this guidance document to WLSD is inappropriate as it is expressly intended for new groundwater disposal sites and does not provide a methodology for evaluating or renovating existing groundwater disposal systems.

Determining the final groundwater discharge capacity and integrating capacity findings into the Preliminary Summary Report were critical factors in determining the path forward for WLSD. There are three primary factors that influence capacity of the existing site for groundwater disposal. These include: (1) unit flow rate; (2) separation distance from groundwater; and (3) travel time. All of these factors are based on the premise (and to representative of the pretreatment WLSD proposes) that the on-site soils are performing a substantial portion of the wastewater treatment or “renovation” required before it reaches a point of concern. The only upstream treatment consideration that influences capacity is if pretreatment is via a septic tank or some additional level of treatment. There is no consideration, with regard to the three factors noted, that treatment systems today are designed to remove pollutants and pathogens to an extent equal to or greater than possible via flow through the soil.

A description of each of the primary factors that influence capacity relative to CT-DEEP Guidelines, prior reports and the testing completed by W&C follows.

- Unit Flow Rate: CT-DEEP Guidelines limit the discharge rate for large disposal systems to 0.8 gallons per day per square foot of disposal area (gpd/sf) for systems with septic tank pretreatment and allow a higher rate of 1.2 gpd/sf for plants with a higher level of “pretreatment”. The intent of these criteria is to provide for a substantial “mat” of bacterial growth in the soil to aerobically treat the pollutants in the wastewater and will also limit the rate flow can pass through the soil. Woodard & Curran’s testing indicated that flow to Beds A-8 and G-1 transmitted flow into the groundwater at a rate of at least 1.2 gpd/sf and maintained greater than 1.5 feet of separation between discharges and estimated seasonal high mounded groundwater levels. These tests were intentionally completed with the loading rates only slightly higher than the CT-DEEP criteria (1.24 gpd/sf in Bed A-8 and 1.37 gpd/sf in Bed G-1), and were not limited by groundwater separation which exceeded the 1.5 foot criteria included in the testing plan. We believe this provides a margin of safety in the design capacity of the site.
- Separation Distance: The CT-DEEP Guidelines indicate that discharges to groundwater be 3 feet above mounded groundwater. Flow through this vertical, unsaturated soil is intended to provide treatment of pollutants and is projected to provide a three Log_{10} reduction of viruses (99.9%) reduce pathogens. Woodard & Curran found that groundwater levels did not pond in the majority of beds on site and through large-scale load testing that sufficient separation can be provided via naturally occurring soils. In addition, the benefits that a high level of treatment provides on removing pollutants prior to introducing wastewater to the beds, should allow lower separation while maintaining the above hydraulic capacities.
- Travel Time: CT-DEEP Guidelines recommend that a large wastewater disposal system provide 21 days of travel time from discharge to off-site receptors. The main purpose of this travel time requirement is to provide for the removal or inactivation of pathogens (viruses and bacteria). For reference, the Guideline indicates that 3 feet of vertical separation provides a three Log_{10} reduction (99.9%) of viruses and 21 days of travel time provides an additional 0.75 Log_{10} reduction of viruses for a total of 3.76Log_{10} reductions. For the purpose of our basis of design for upstream treatment we have used a four Log_{10} (99.99%). Following the field work, Woodard & Curran evaluated travel time three ways:
  1. The small-scale tests indicate that flow through the existing soils will provide 21 days of travel time in less than 58 feet of existing site soil. This can occur either as the flow is discharged or as the flow exits the permeable layer at the bottom of the slope.
  2. Based on a limited number of well slug tests, we estimated the hydraulic conductivity of the till and weathered/fractured bedrock interface layer will provide more that 21 days travel time. Assuming that flow travels through the layer on top of the bedrock down the slope (and not into the bedrock), discharge from many beds on site will have greater than 21 days of travel time. The more competent bedrock would have hydraulic conductivity much lower than this interface layer. The majority of travel would therefore be within this higher conductivity interface layer.
  3. As outlined in Section 7, WLSD is committed to providing an advanced treatment system that provides pathogen and virus reduction well in excess of that provided by 21 days of travel time through the soil. The Guidelines estimate that a travel time of 21 days provides 0.76 Log_{10} reductions of viruses. An ultraviolet light disinfection system can be designed to provide three or even four Log_{10} reduction of viruses, far in excess of what 21 days of travel time will provide, and even when combined with the pathogen reduction estimated form 3 feet of groundwater separation.

5.8 SUMMARY

Full scale bed tests demonstrated that (Bed A-8 and G-1 areas) have substantial hydraulic capacity. In addition, we believe that a very high level of treatment and disinfection provides a level of pathogen and virus reduction far in excess of that achieved by a 21 day travel time. In fact, advanced treatment and a four Log_{10} reduction of viruses provides a higher level of pathogen removal that that estimated in the Guidelines for both the 3 feet of vertical separation and the 21 day travel time, combined.

Figure 5-1: WLSD WPCF Site Layout and Disposal Beds

Woodridge Lake Sewer District
Goshen, CT

6. REGIONAL WASTEWATER MANAGEMENT ALTERNATIVE

As an alternative to on-site wastewater disposal, the option of connecting to a nearby community with treatment at the respective WPCF was also explored. In the case of the WLSD, the likeliest community for connection is the City of Torrington. A potential connection to Litchfield was also explored. This Section summarizes our evaluation of regional wastewater management alternatives.

6.1 INTRODUCTION

As an alternative to the groundwater disposal system that exists at the WLSD WPCF, Woodard & Curran developed conceptual capital, annual, and lifecycle costs for regional treatment and surface water disposal by conveying untreated wastewater to WPCFs at adjacent communities (Torrington or Litchfield) via pump stations and force mains. For the purposes of this evaluation, we prepared costs for the most probable configuration of each alternative. Should further evaluation of the Torrington force main connection be warranted, an intermunicipal agreement with the City of Torrington would need to be further refined and confirmed, including initial capital needs, future cost sharing provisions, and annual O&M costs, in addition to future Torrington permit modifications.

6.2 BASIS OF DESIGN CONDITIONS

For the regional wastewater treatment and disposal alternatives, we assumed the following basis of design conditions:

- Future average annual flow rate of 120,000 gallons per day (gpd), or 83 gallons per minute (gpm)
- Future peak hourly flow rate of 540,000 gpd, or 375 gpm
- Design pumping rate of approximately 500 gpm (needed to maintain adequate force main velocity)
- All pumping units (minimum of two at each pump station) on variable frequency drives (VFDs)
- 8-inch diameter ductile iron force main(s)

6.3 PREFERRED TORRINGTON ALTERNATIVE

The probable/preferred regional configuration, Alternative 1, involves a pump station at the existing WLSD WPCF to minimize reconfiguration of the existing Plant Pump Station. We assumed a conventional wet-pit dry-pit pump station configuration, consisting of precast wetwell and drywell, together with a precast building over the drywell. The pumping system, valves, piping, flow meter, VFDs, controls and emergency generator will be housed in the drywell.

For the force main route, an in-street route without cross-country easements was assumed for ease of construction and to reduce uncertainty during excavation. This resulted in selecting the route along Old Middle Street, Pie Hill Road, and Goshen Road, as shown in Figure 6-1, with interconnection to the Torrington sewer system at Lovers Lane. The proposed force main includes periodic access vaults and cleanout connections for future maintenance. We also included provisions for an odor control facility along the force main route to minimize odors and corrosion at the force main discharge.

As part of this route, a second pump station is proposed on Pie Hill Road. This location would have the greatest potential impact in terms of reducing hydraulic head and reducing the required pumping length (approximately 1,600 LF of proposed gravity sewer can be utilized).

Within the existing Torrington collection system, we assumed the extent of necessary improvements would be those identified by the City, in Wright-Pierce's July 5, 2005 memorandum. Approximately 3,500 linear feet of existing sewers in Torrington, downstream from the WLSD force main discharge, are likely to require replacement as part of this alternative. When Woodard & Curran met with the City on January 10, 2013, Torrington reiterated that the earlier Wright-Pierce recommendations, as follows, are likely still appropriate.

- Flow equalization of untreated wastewater upstream from the pump station is not required.
- No future provisions for flows from other areas of Goshen were included.
- The extent of groundwater, rock, ledge and other soil conditions along the force main route is unknown. For the purpose of our estimates, we assumed approximately 10% of the trench would require dewatering and 25% of the trench material would be rock/ledge.
- Potential ConnDOT access and trench repair requirements in Route 4 have not been defined. Based on prior work with ConnDOT, we assumed both a temporary and permanent trench repair along the force main route will be required.
- Future labor to operate the existing WLSD collection system and the proposed pump station and force main will likely be two full-time staff.
- The July 5, 2005 Wright-Pierce referenced a potential diversion of the flow from the Bantam River basin and the potential need for a Diversion Permit. We do not anticipate this requirement, and this was not included in this alternative.
- No potential future connections along the proposed force main were included in this alternative.

Our opinion of probable project cost for the regional wastewater treatment and disposal alternative is $20,500,000. The estimated annual cost for this alternative, including annualized capital and operating costs, is $1,966,800. If a 25% grant for capital costs is provided by CT-DEEP, the estimated annual cost is $1,655,700. Our opinion of probable cost for the probable/preferred Torrington alternative (Alternative 1) is summarized in Table 6-1 below:

Table 6-1: Summary of Regional Treatment and Disposal Alternative Costs

Item	Regional Wastewater Treatment and Disposal Alternative
Capital Cost	*$20,500,000*
Annualized Capital	$1,244,500
Annual O&M	$722,300
Total Annual Costs	**$1,966,800**
Total Annual Cost (with 25% capital grant)	**$1,655,700**
Existing WLSD Annual Expense Budget	*$825,200*

6.4 ADDITIONAL TORRINGTON AND LITCHFIELD ALTERNATIVES

We also considered other alternative connection routes to Torrington, as well as a connection alternative to Litchfield. Analysis of these alternatives involved the same preliminary basis of design conditions, key factors, and collection system improvements within Torrington as discussed above and the only variation in cost is associated with the force main route.

- Alternative 2: Alternative 2, shown in Figure 6-1, involves a route along Bare Hill Road, through a low-lying cross-country easement, East Street, and Goshen Road, with interconnection to the Torrington sewer system at Lovers Lane. Alternative 2 was not given priority, however, due to uncertainty and potential high costs associated with the low-lying cross-country easement. Cross-country easement costs would be added to the figure reflected above.
- Alternative 3: Alternative 3, also shown in Figure 6-1, involves a very similar route to Alternative 2, but includes a second cross-country easement which removes the sharp corner at East Street and Goshen Road. Alternative 3 reduces the force main length by approximately 1,800 LF compared to Alternative 2, but was not selected due to potential high costs and complications involved with the additional cross-country easement on private property. Cross-country easement costs would be added to the estimate reflected above.
- Alternative 4: To complete the assessment of potential alternatives, Woodard & Curran investigated the feasibility of connecting to the Litchfield WPCF south of Goshen. Alternative 4 may appear attractive initially due to the more gentle terrain along the route. The smaller elevation differences would result in 50 feet less of required static pumping head, however, the additional force main length will produce nearly double the head loss, and this alternative would therefore not provide any advantage in terms of pump sizing or cost. The Town of Litchfield's opinion toward such a connection was also not explored under this assessment since potential capital costs were significantly higher than the Torrington options. The potential connection to Litchfield, as shown in Figure 6-2, is twice as long as the Torrington alternatives.

Opinions of probable project costs for each alternative include the same criteria for periodic access vaults, cleanout connections, and odor control and are shown in Table 6-2 below.

Table 6-2: Cost Summary for Regional Alternatives

Alternative	Description	Capital Cost (1)
1	Probable Alternative with route along Old Middle St, Pie Hill Rd with a 2nd PS, East St, and Goshen Rd to Torrington.	$20,500,000
2	Across to Bare Hill Rd and through low-lying cross country easement, up East Street, and Goshen Rd to Torrington	$19,900,000
3	Same as Alt. 2, but with the sharp corner at East and Goshen Rd cut off through cross-country easement	$20,500,000
4	Discharge to Litchfield WPCF	$27,700,000

(1) Costs include projected capital costs plus 45% for engineering, legal, fiscal, administrative and contingency.

6.5 SUMMARY

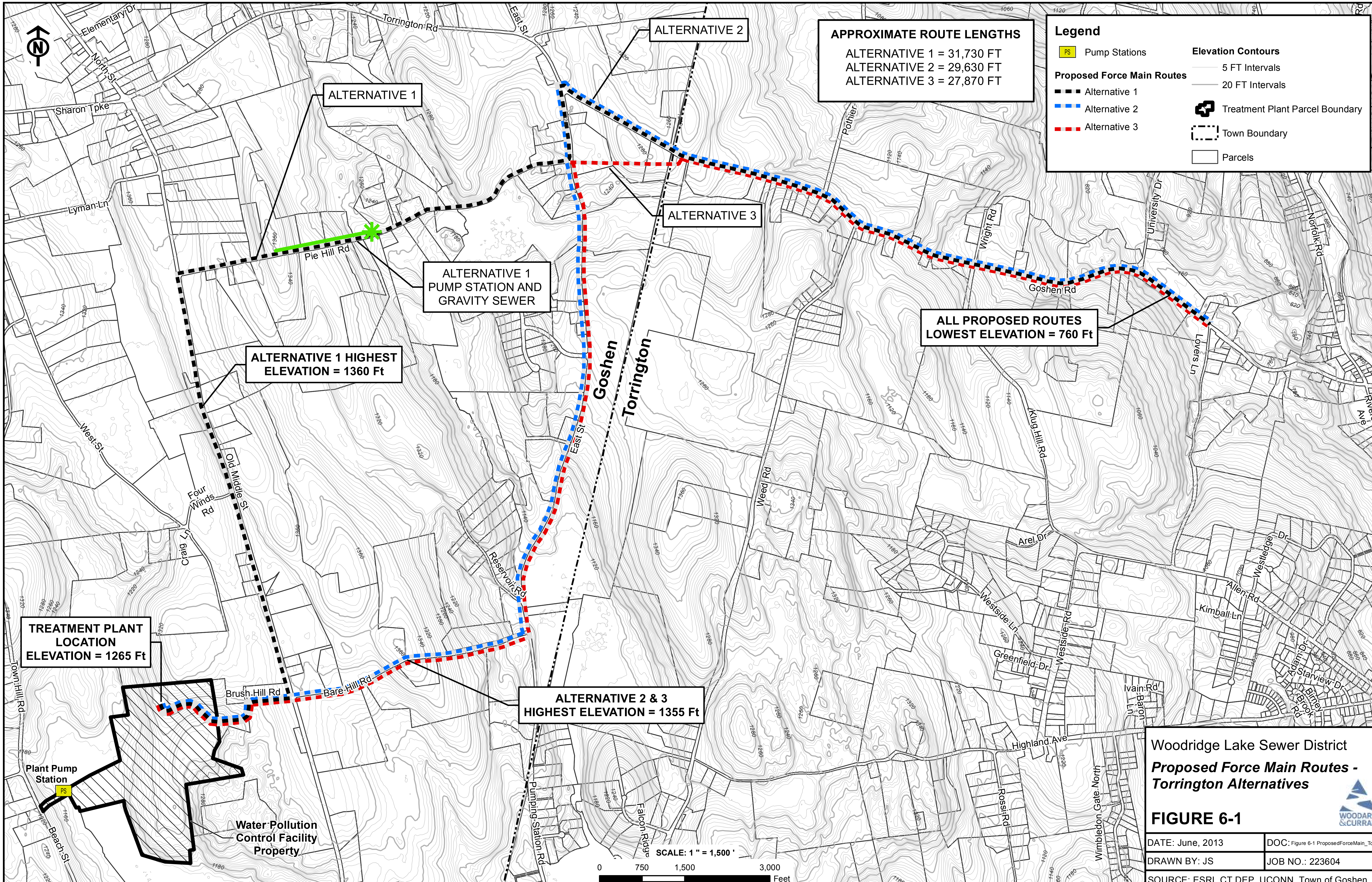
As part of the Facilities Plan Update, Woodard & Curran evaluated several regional alternatives for wastewater treatment and disposal in Torrington, as well as Litchfield. Given WLSD's lack of proximity to these communities and their respective collection systems, the capital costs of the various regional alternatives are high. These costs were used as a benchmark against continued local wastewater treatment and disposal alternatives, which are summarized in Section 7 of this Preliminary Summary Report.

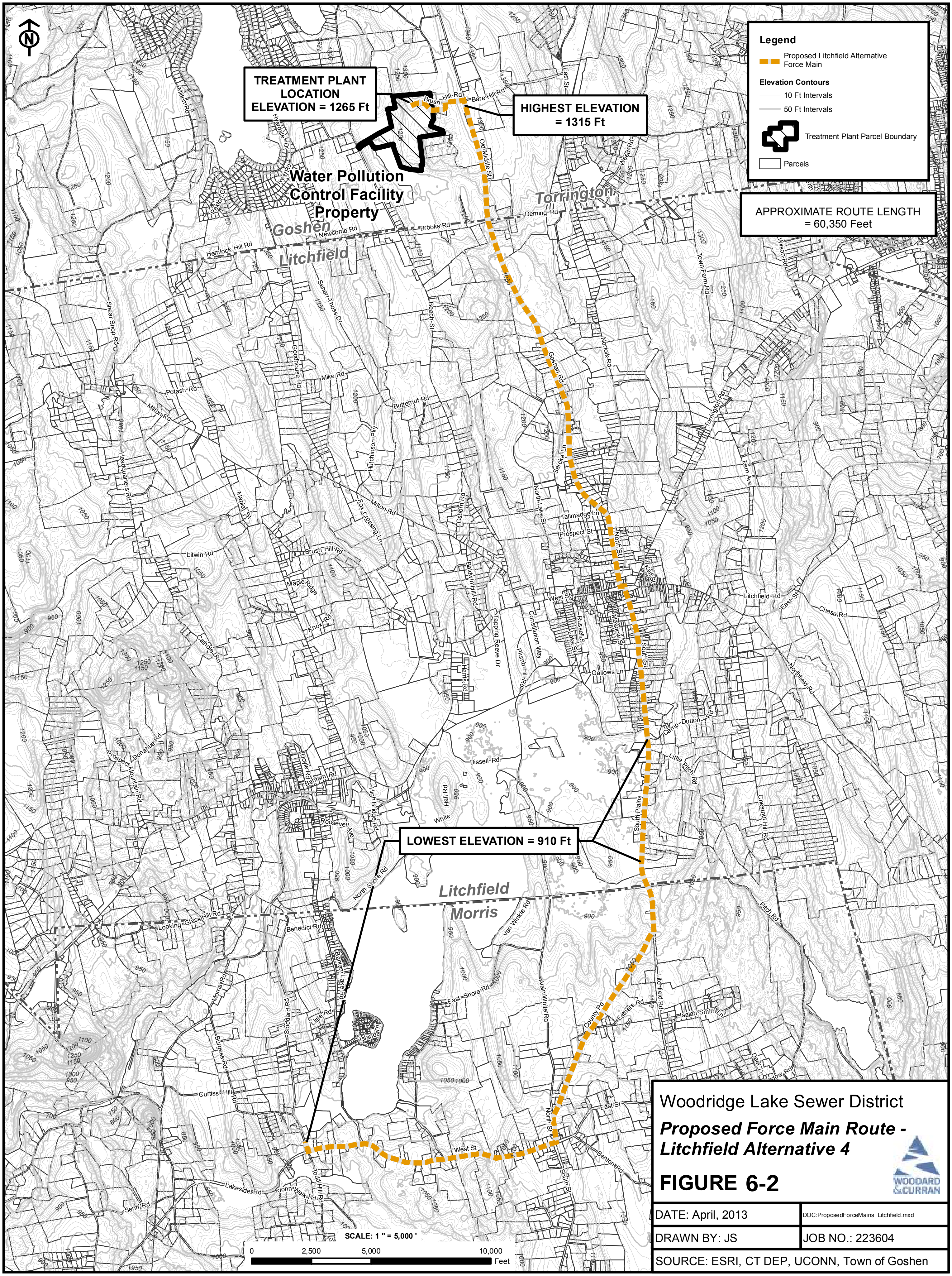
6.5 SUMMARY

As part of the Facilities Plan Update, Woodard & Curran evaluated several regional alternatives for wastewater treatment and disposal in Torrington, as well as Litchfield. Given WLSD's lack of proximity to these communities and their respective collection systems, the capital costs of the various regional alternatives are high. These costs were used as a benchmark against continued local wastewater treatment and disposal alternatives, which are summarized in Section 7 of this Preliminary Summary Report.

In addition to high costs for the regional alternatives, the proposed force main route from WLSD to Torrington would pass through major portions of conservation areas as outlined in the 2013-18 Conservation and Development Policies Plan. As such, the construction of a conveyance system would require integrated permitting to protect these open space resources.

Although Torrington is currently averaging flows well below its NPDES permit limit, the City indicated that all available flow is already allocated to unsewered needs areas in Torrington and through its intermunicipal agreement(s). Meetings with Torrington WPCA also highlighted future wastewater capital needs, including I/I removal, phosphorus and WPCF equipment upgrades/modernization.


APPROXIMATE ROUTE LENGTHS
ALTERNATIVE 1 = 31,730 FT
ALTERNATIVE 2 = 29,630 FT
ALTERNATIVE 3 = 27,870 FT
Legend
PS Pump Stations
Proposed Force Main Routes
Alternative 1
Alternative 2
Alternative 3
Elevation Contours
5 FT Intervals
20 FT Intervals
Treatment Plant Parcel Boundary
Town Boundary
Parcels
ALTERNATIVE 1
ALTERNATIVE 2
ALTERNATIVE 3
ALTERNATIVE 1 PUMP STATION AND GRAVITY SEWER
ALTERNATIVE 1 HIGHEST ELEVATION = 1360 Ft
ALL PROPOSED ROUTES LOWEST ELEVATION = 760 Ft
TREATMENT PLANT LOCATION ELEVATION = 1265 Ft
ALTERNATIVE 2 & 3 HIGHEST ELEVATION = 1355 Ft
Plant Pump Station
Water Pollution Control Facility Property
Goshen
Torrington
Elementary Dr
Torrington Rd
East St
North St
Sharon Tpke
Lyman Ln
Pie Hill Rd
West St
Old Middle St
Four Winds Rd
Craig Ln
Reservoir Rd
Brush Hill Rd
Bare Hill Rd
Town Hill Rd
Beach St
Pumping Station Rd
Falcon Ridge
Weed Rd
Pothier
Wright Rd
Goshen Rd
University Dr
Norfolk Rd
Lovers Ln
Riverside Ave
Klug Hill Rd
Arel Dr
Westledge Dr
Allen Rd
Kimball Ln
Westside Ln
Westside Rd
Greenfield Dr
Ivain Rd
Baron Ln
Adam Dr
Starview Dr
Birney Brook Rd
Highland Ave
Rossi Rd
Wimbledon Gate North
SCALE: 1 " = 1,500 '
0 750 1,500 3,000 Feet
Woodridge Lake Sewer District
Proposed Force Main Routes - Torrington Alternatives
FIGURE 6-1
WOODARD & CURRAN
DATE: June, 2013
DOC: Figure 6-1 ProposedForceMain_Torring
DRAWN BY: JS
JOB NO.: 223604
SOURCE: ESRI, CT DEP, UCONN, Town of Goshen



Woodridge Lake Sewer District

Proposed Force Main Route - Litchfield Alternative 4

FIGURE 6-2

DATE: April, 2013	DOC:ProposedForceMains_Litchfield.mxd
DRAWN BY: JS	JOB NO.: 223604
SOURCE: ESRI, CT DEP, UCONN, Town of Goshen	

7. LOCAL WASTEWATER MANAGEMENT ALTERNATIVE

7.1 INTRODUCTION

This task included development and evaluation of wastewater treatment and disposal alternatives at the existing WLSD WPCF site. This Section of Preliminary Summary Report includes an overview of the local alternatives, key assumptions, capital, annual and lifecycle costs, together with a comparison of the options.

7.2 BASIS OF DESIGN CONDITIONS

The flow and load projections summarized in Table 7-1 below were used as the basis for local treatment and disposal system sizing and evaluation.

Table 7-1: Design Influent Flows and Loads

	Flow	BOD		TSS		TKN	
	(gpd)	Conc. (mg/l)	Load (lbs/day)	Conc. (mg/l)	Load (lbs/day)	Conc. (mg/l)	Load (lbs/day)
Average Annual	125,000 (2)	208	209	172	172	35	35
Max Monthly	183,000	191	291	296	314	31	47
Max Daily	390,000	119	386	155	503	20	64
Peak Hour (1)	540,000						

(1) Based on maximum pumping capacity of the existing Plant Pump Station, and design pumping rate for new WLSD pump station for Torrington/regional alternative.

(2) Although the anticipated future average annual flow is anticipated to be 100,000 gpd, through aggressive I/I removal, WLSD proposes a 125,000 gpd average annual flow limit, given the variability in flows from year-to-year based on precipitation and groundwater conditions.

Following in Table 7-2 are the anticipated effluent permit requirements for the WPCF, which are based on similar treatment facilities with groundwater disposal permits. The stringent permit limits used in this evaluation to augment the disposal system assumptions that were presented in Section 5.

Table 7-2: Summary of Future/Design Influent Flows and Loads

Parameter	Average Concentration
BOD_5 (30-day average)	20 mg/L
TSS (30-day average)	20 mg/L
Total Nitrogen	5 mg/L
Total Phosphorus	15 mg/L

Fecal Coliform	< 4 colonies/100 mL

7.3 ALTERNATIVE OVERVIEW

For this alternative, Woodard & Curran proposes that a new treatment plant be built adjacent to the existing facility. This will allow the existing facility to remain in operation until the new one is constructed and would also allow the existing Garage and Operations Building to be reused. However, the area where the new process is proposed is located where sludge has historically been disposed, and will require relocation or removal before new structures are constructed.

The treatment process technology that is current "state of the art" relative to reliably achieving the anticipated effluent requirements is the membrane bioreactor (MBR) process. This process configuration, when combined with a robust disinfection step provides a system that can defensibly achieve a high level of treatment especially relative to meeting a level of pathogen/virus reduction equivalent to or better than that assumed achieved by the soil adsorption system. The proposed WPCF will also include preliminary treatment, disinfection using ultraviolet light, sludge storage and processing equipment, a building addition for plant superintendent and administrative staff and new effluent distribution piping and valves. Figure 7-1 illustrates the overall site.

Preliminary treatment at the new WPCF will be performed in a new Headworks Structure that includes screening and grit removal equipment. The screen will be sized to remove particles that are greater than 2 mm in size to protect the MBR equipment. The anticipated flows are such that a packaged headworks unit is ideally suited for the new WPCF. Screenings and grit removed by this equipment would be hauled offsite for disposal.

Wastewater leaving the Headworks will flow into an Equalization Tank and then into the MBR Process Tanks and Building. The Equalization Tank will provide flow attenuation to reduce the capital cost of downstream membranes and improve system performance. The MBR Building will house the membrane equipment and other equipment required to treat the wastewater. The current practice of on-site discharge of dewatered sludge is not expected to be permitted in the future. Therefore, the proposed WPCF will include a raw sludge storage tank, sludge thickening equipment, and a thickened sludge storage tank. These tanks would be sized to provide adequate sludge storage for weekly removal off site. Figure 7-1 also shows the existing and proposed treatment systems.

Treated effluent from the MBR will be disinfected using ultraviolet (UV) light. The UV equipment will be sized to provide 4-log removal of viruses. This level of treatment, when combined with the expected 1-log removal of viruses provided by the MBR equipment, will exceed the pathogen reduction recommendations included in the CT-DEEP's Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems.

Following treatment and disinfection, effluent would be conveyed and distributed to the disposal beds. Modifications to the beds are required. For the purpose of our cost estimates, we have included complete replacement of all piping in the system, the addition of automated valves for control of flow to each of the beds in service, and distribution piping to each of the beds that will be upgraded for use. The existing open bed ridge and furrow system will be retained for future use.

We prepared capital, annualized capital and overall annual costs of the improvements and O&M costs for the facility for a 20-year period. Our opinion of probable project cost for the on-site wastewater treatment and disposal alternative is $11,400,000. In addition, the estimated annual cost for this alternative, including annualized capital and operating costs is $1,474,500. If a 25% grant for capital costs is provided by CT-DEEP, the estimated annual cost is $1,301,500. Our opinion of probable cost for the probable/preferred Torrington alternative (Alternative 1) is summarized in Table 7-3 below:

Table 7-3: Summary of On-Site Treatment and Disposal Alternative Costs

Item	On-Site Wastewater Treatment and Disposal Alternative
Capital Cost	*$11,400,000*
Annualized Capital	$692,100
Annual O&M	$782,400
Total Annual Costs	**$1,474,500**
Total Annual Cost (with 25% capital grant)	**$1,301,500**
Existing WLSD Annual Expense Budget	*$825,200*

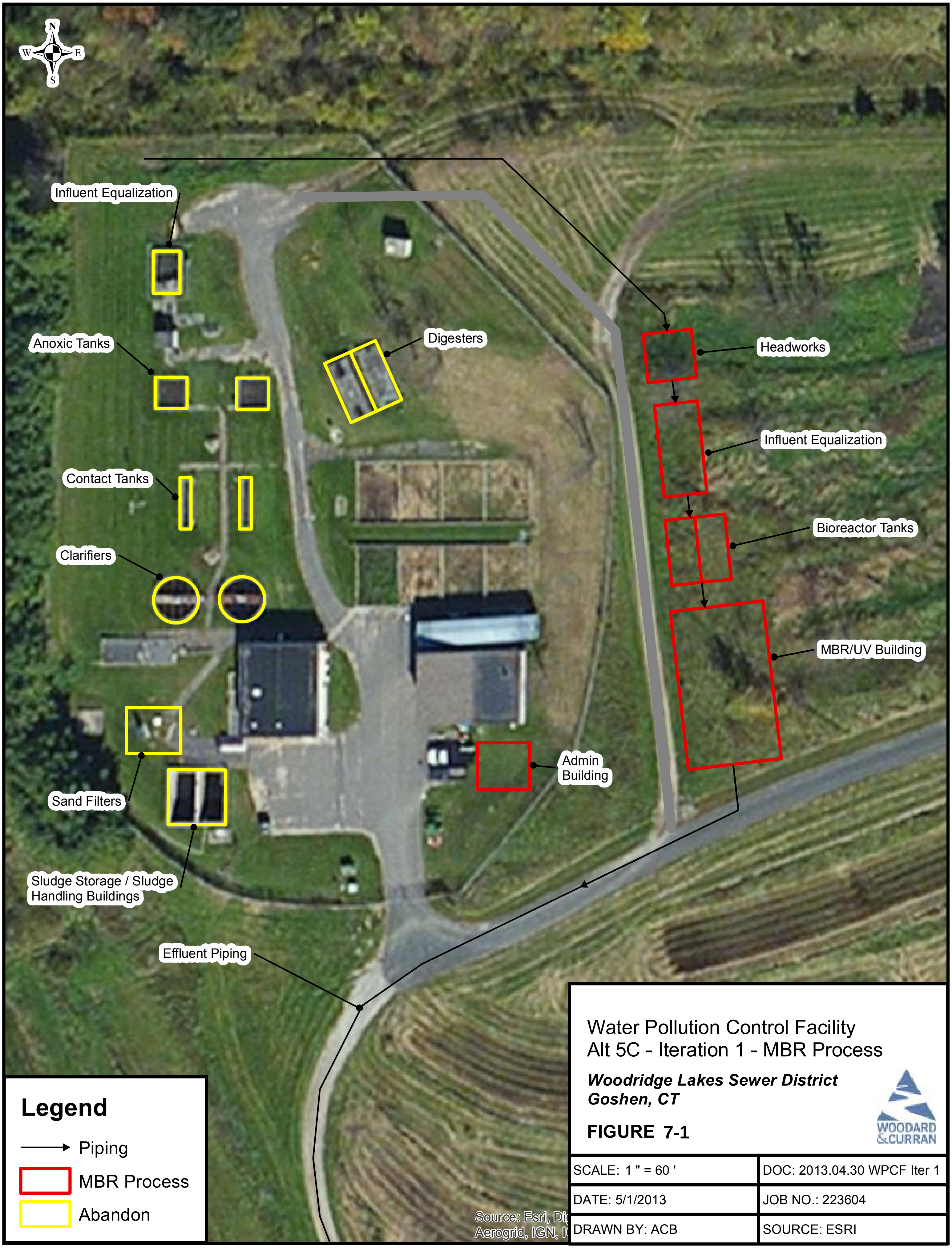
7.4 KEY FACTORS

Following are key assumptions and considerations related to the local wastewater management alternative:

- We assumed that no effluent equalization will be required, and that a new permit will be re-rated to an annual average flow of 1250,000 gallons per day.
- The proposed treatment system will provide a level of treatment that will exceed the level of pathogen reduction estimated by the CT-DEEP Guidelines for a groundwater disposal system. This approach is intended to permit us to propose use of the existing site for groundwater disposal.
- We estimate that the staffing required for the upgraded WPCF and collection system will be equal to current staffing complement of four (O&M staff only).

7.5 SUMMARY

The on-site local wastewater management alternative is viable, and the disposal beds have adequate capacity for current and future flows. Concurrence is sought from CT-DEEP on separation to groundwater, travel time and the average annual permitted flow limit. We believe the project as proposed meets the objectives and the CT-DEEP guidance especially when, the proposed level of treatment far exceeds CT-DEEP Guidelines for similar facilities, creating near reuse quality effluent, dramatically improving the quality of effluent discharged from the WPCF. The new upgraded WPCF will consist of a membrane bioreactor (MBR) followed by UV disinfection. The MBR will significantly reduce effluent solids to protect the disposal system, and improve effluent dispersal efficiency. The UV disinfections system will be designed to remove pathogens to a much higher level (4-log removal) than conventional on-site systems, thus providing far higher pathogen reduction, even before discharge to the effluent disposal system. In addition, WLSD's aggressive I/I removal program will offset future sanitary flow as I/I is removed.



Water Pollution Control Facility
Alt 5C - Iteration 1 - MBR Process

Woodridge Lakes Sewer District
Goshen, CT

FIGURE 7-1

WOODARD & CURRAN

SCALE: 1 " = 60 '	DOC: 2013.04.30 WPCF Iter 1
DATE: 5/1/2013	JOB NO.: 223604
DRAWN BY: ACB	SOURCE: ESRI

8. CONCLUSIONS AND REQUESTS

8.1 COMPARISON OF ALTERNATIVES

The conceptual costs for each of the probable alternative are summarized in Table 8-1 below:

Table 8-1: Summary of Overall Costs (Mid-Range)

Item	On-Site Wastewater Treatment and Disposal Alternative	Regional Wastewater Treatment and Disposal Alternative
Capital Cost	*$11,400,000*	*$20,500,000*
Annualized Capital	$692,100	$1,244,500
Annual O&M	$782,400	$722,300
Total Annual Costs	**$1,474,500**	**$1,966,800**
Total Annual Cost (with 25% capital grant)	**$1,301,500**	**$1,655,700**
Existing WLSD Annual Expense Budget	*$825,200*	*$825,200*

The on-site alternative is $9,100,000 more expensive than the on-site alternative representing a significant increase in total annual costs to Woodridge Lake taxpayers. For reference purposes, the average total 2011 annual sewer bill for Connecticut WPCAs was $369. The on-site alternative with a 2% CWF loan and 25% grant funds will raise the average WLSD sewer bill 30% from $1,235 to $1,608, or more than 4 times the 2011 Connecticut average bill of $369. The highest bill paid by any Connecticut residential user of another WPCA in 2011 was $1,469. The highest residential bill in Woodridge Lake will be $9,658, or more than five and a half times the highest bill of any other Connecticut WPCA.

8.2 REQUESTS OF CT-DEEP

Both the local and regional alternatives are expensive, but the Torrington alternative is unacceptable and unaffordable to WLSD residents. WLSD requests that CT-DEEP work with the residents to move forward with the on-site alternative, and maintain a flexible approach to the permitting of the local alternative. Following are key aspects of the permitting process that require flexibility based on our alternative and balanced local approach:

- Travel Time: The proposed on-site alternative addresses the objective of the 21-day travel time requirement through both travel time and treatment, In addition, 21 day travel time is strictly met under the guidelines for a significant portion of the site, and the objective met using the rock interface layer but in certain areas on site . To reach surface water body, flow will need to move vertically through till overburden that has a low hydraulic conductivity, providing additional travel time over 21 days (see Section 5).
- Separation to Groundwater: Full scale testing was completed using 1.5 feet separation in high ground water conditions. Similar to the travel time parameter, decreased separation to groundwater is believed to be acceptable given the high level of treatment proposed (MBR and UV disinfection).

- Permit Flow Limit: The existing average annual flow is 105,000 gpd,(2011-2012), and projected additional sanitary flows of 11,600 to 17,500 gpd can be offset by targeted removal of 16,600 to 22,500 gpd from the proposed I/I Removal Construction Project. The disposal fields were tested to be capable of handling an average annual flow of at least 125,000 gpd at seasonal high ground water conditions. A permitted flow limit to 125,000 gpd average annual flow will accommodate the proposed project, allow for seasonal flow variations based on precipitation and groundwater, and with no maximum day flow limit will eliminate the need for excess equalization costs on the site, which could otherwise add $2M to $9M to the local alternative.

APPENDIX A: 1989 CONSENT ORDER

STATE OF CONNECTICUT
VS.
WOODRIDGE LAKE SEWER DISTRICT

COPY

IN THE MATTER OF A CONSENT ORDER BETWEEN WOODRIDGE LAKE SEWER DISTRICT AND THE COMMISSIONER OF ENVIRONMENTAL PROTECTION

CONSENT ORDER

WHEREAS, the Commissioner of Environmental Protection (hereinafter, "the Commissioner") is charged with the responsibility of protecting the environment of the State from pollution.

WHEREAS, Woodridge Lake Sewer District maintains and operates a sewage treatment facility and owns land off Route 63 in the Town of Goshen, Connecticut.

WHEREAS, the agreement to this Consent Order and to undertake the activities herein shall not be construed as an admission of any alleged pollution by Woodridge Lake Sewer District or by its officers, directors, employees or agents.

WHEREAS, the Commissioner and Woodridge Lake Sewer District desire to protect the environment and avoid prolonged litigation.

NOW THEREFORE, it is hereby agreed that:

1) The Commissioner has jurisdiction of the subject matter herein and of the parties consenting hereto under Sections 22a-6, 22a-424, 22a-427, 22a-430, 22a-431, 22a-432 of the Connecticut General Statutes.

2) Woodridge Lake Sewer District by agreeing to the issuance of this Consent Order waives any further right it may have for an appeal on the subject of this Consent Order.

3) Woodridge Lake Sewer District agrees to implement the following to the satisfaction of the Commissioner:

   A) Establish and implement a groundwater quality monitoring program by redeveloping existing wells and installing additional monitoring wells.

   B) Develop and install a distribution system that will uniformly distribute effluent from the Woodridge Lake Sewer District treatment plant to the ridge and furrow land application system.

   C) Develop an Operation and Maintenance manual for the land application of effluent.

Phone:
165 Capitol Avenue • Hartford, Connecticut 06106

D) Investigate the hydraulic capacity of the ridge and furrow system.

4) Woodridge Lake Sewer District agrees to undertake the actions described in paragraph 3 above in accordance with the following schedule:

A) On or before June 30, 1989 submit for the review and approval of the Commissioner of Environmental Protection an engineering report which describes the proposed location and depths of groundwater monitoring wells to comply with paragraph 3(A).

B) On or before June 30, 1989 submit for the review and approval of the Commissioner of Environmental Protection a scope of study report which describes the investigations necessary to comply with paragraphs 3(B) and (D).

C) On or before August 31, 1989 verify to the Commissioner of Environmental Protection that the sampling program approved under paragraph (A) above has begun.

D) On or before September 30, 1989 submit for review and approval of the Commissioner of Environmental Protection an engineering report with plans and specifications describing the design of the distribution system to comply with paragraph 3(B).

E) On or before October 31, 1989 verify to the Commissioner of Environmental Protection that construction of the facilities approved under paragraph (D) above has begun.

F) On or before December 31, 1989 verify to the Commissioner of Environmental Protection that the construction approved under paragraph (D) has been completed and the facility is in operation.

G) On or before December 31, 1989 submit for review and approval of the Commissioner of Environmental Protection an Operation and Maintenance Manual.

H) On or before August 31, 1990 submit for review and approval of the Commissioner of Environmental Protection an engineering report detailing the hydraulic capacity of the land application system.

5) Until such time as the directives of paragraph 3(A),(B), and (C) are completed and put into service, the Woodridge Lake Sewer District shall operate and maintain the existing water pollution control facility in full compliance with Permit No. SP0000179 issued December 22, 1977 with the exception that paragraph 2 and 5 are further modified to read:

2) The discharge described in this permit shall not exceed and shall otherwise conform to the specific terms and general conditions specified herein:

A) Discharge Serial No. 001
Groundwaters in the Watershed of Bantam River
Average Daily Flow - 100,000 gallons per day

Parameter	Monthly Average Quantity	Monthly Average Concentration	Minimum Percentage Removal Efficiency
Biochemical Oxygen Demand$_5$	3.03 kg/day	20mg/l	90%
Suspended Solids	1.52 kg/day	10mg/l	90%

1) The discharge shall be required to meet the more stringent of the monthly average-concentrations or minimum removal efficiency requirements for each parameter.

2) The monthly average quantities and monthly average concentrations specified above shall not be exceeded by a factor of 1.5 during any week.

3) The pH of the discharge shall not be less than 6.5 nor greater than 8.0 at any time.

4) The discharge shall not contain more that 0.1 milliliters per liter settleable solids.

5) The above limitations shall apply to the filtered wastewater prior to discharge to the groundwaters.

5) Two groundwater monitoring wells in the vicinity of the disposal beds in use during the month shall be monitored and the results reported to the Director before the 10th of March, June, September, and December according to the following schedule:

Parameter	Minimum Frequency of Sampling	Sample Type
Depth to Groundwater	Quarterly	Instantaneous Measurement
pH	Quarterly	Grab
Total Phosphate as P	Quarterly	Grab
Organic Nitrogen as N	Quarterly	Grab
Ammonia Nitrogen as N	Quarterly	Grab
Nitrite-Nitrate as N	Quarterly	Grab

6) If any document required to be submitted to the Commissioner pursuant to this Consent Order is disapproved by the Commissioner, it shall be

6) If any document required to be submitted to the Commissioner pursuant to this Consent Order is disapproved by the Commissioner, it shall be resubmitted, with the deficiencies corrected, within 30 days of receipt of notice of disapproval.

7) Nothing herein shall at any time preclude the Commissioner from instituting any other legal proceeding to address any violation of law or to prevent or abate pollution, and nothing herein shall relieve Woodbridge Lake Sewer District of its obligations under federal, state and local law.

8) In the event that Woodridge Lake Sewer District becomes aware that it may not comply, or may not comply on time, with any requirement of this order or any document approved hereunder, Woodridge Lake Sewer District, shall immediately inform the Commissioner, and shall take all reasonable steps to ensure that any noncompliance or delay is avoided, or, if unavoidable, is minimized to the greatest extent possible. Notification shall not excuse noncompliance or delay. In so notifying the Commissioner, Woodridge Lake Sewer District, shall state the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and Woodridge Lake Sewer District shall comply with the dates approved by the Commissioner.

9) This Consent Order may be modified for cause upon the written consent of the parties, except that the Commissioner may allow additional time for compliance in accordance with paragraph 8.

10) The undersigned certify that they are fully authorized by the party or parties they represent to enter into the terms and conditions of this Consent Order and to bind legally the party or parties accordingly.

11) The terms of this Consent Order shall apply to and be binding upon the parties hereto and their successors and assigns.

12) Woodridge Lake Sewer District agrees to pay to the Department of Environmental Protection a penalty of $2,250 for failure to submit fifteen groundwater monitoring reports between 1985 and 1988, as required by the permit. Said penalty shall be paid by bank or certified check payable to the Connecticut Department of Environmental Protection, and shall reference the Consent Order No. found below and delivered to:

    Joseph Wettemann
    Sanitary Engineer
    Department of Environmental Protection
    122 Washington Street
    Hartford, CT 06106

13) Any document required to be submitted to the Commissioner under this order shall be signed by a duly authorized officer of Woodridge Lake District and by the person who is responsible for preparing such document for the consultant, who shall certify as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments and certify under penalty of law that based on reasonable investigation, including my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief."

Failure to comply with this order shall subject Woodridge Lake Sewer District to an injunction and penalties under Chapters 439 and 446k of the Connecticut General Statutes. In addition, any false statement made to the Commissioner in any information submitted pursuant to this order shall be punishable as a criminal offense under Section 22a-438 of the Connecticut General Statutes or, in accordance with Section 22a-6, under Section 53a-157 of the Connecticut General Statutes.

Entered as a Consent Order of the Commissioner of Environmental Protection on this 27th day of July, 1989.

for John Anderson

Leslie Carothers
Commissioner

Woodridge Lake District hereby consents to the entry of this Consent Order without further notice.

BY William L. Donaldson
Its duly authorized agent

CONSENT ORDER NO. WC4856
DEP/WPC-055-002
TOWN OF GOSHEN
SENT CERTIFIED MAIL-RRR
DISCHARGE CODE Z
LAND RECORDS

MAILED TO:
WOODRIDGE LAKE SEWER DISTRICT
P.O. BOX 248
GOSHEN, CT 06756

CC: THOMAS C. WHITE
HIRAM A. TUTTLE, P.E.

WOODARD
&CURRAN

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS