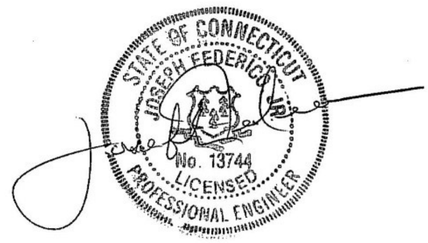
Wastewater Management Plan

On-Site Wastewater Renovation System Improvements and Modifications

Lutheran Home of Southbury

990 Main Street North
Southbury, CT

Prepared by:



BETA

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1.0 INTRODUCTION

1.1 Background

The Lutheran Home of Southbury (Lutheran Home) is a convalescent nursing and rest home for the aged, located at the intersection of Main Street North (Route 6) and Dublin Road in Southbury, Connecticut. The postal address for the facility is 990 Main Street North. Provided services include both rehabilitation and long term health care. The facility is situated on a 10.5 acre parcel that is identified on Town of Southbury Tax Map 33 as Lot 6 within Block 22 (Parcel ID 33-22-6). The centroid of the parcel is further identified at 41.5033 degrees north latitude and -73.2087 degrees west longitude. A Locus Map derived from the USGS topographic map of the Woodbury, Connecticut quadrangle and a Lot Location Plan prepared from Southbury Tax Maps are provided as Figures 1 and 2, respectively.

The subject parcel was previously owned by Southbury Real Estate Group, LLC, who operated the Lutheran Home facility from February 26, 2015 to July 14, 2021 at which point it was sold to Ascentria. The site is presently improved by one main building, a storage building and paved parking areas. One building expansion occurred in the early 1980's, and no changes to the property have occurred since. Potable water service is provided through the distribution system from the Heritage Village Water Company.

The property slopes downward in a general westerly direction. This is the same direction as local groundwater flow in the vicinity of the site. A slight depression exists in the eastern portion of the property where a wetland area has formed. Surface drainage runs off the property to the south from this wetland area through a culvert under Dublin Road. This only occurs under intense rain events and when groundwater elevations are high. Under most conditions, surface water runoff is captured on-site and infiltrated into the ground. Paved areas on the property drain into subsurface drywells, and roof areas drain onto lawn areas. Considering the above, the entire site is considered to be available for recharge of groundwater. A Site Plan showing various features on the subject property is provided as Figure 3. Groundwater contour mapping is included in Appendix F.

1.2 Existing Subsurface Disposal Systems

Two subsurface wastewater renovation systems exist on the property. A small system (OWRS 301) is located in the northwest corner of the property that serves 14 beds associated with the original building (Parley Manor). No operational problems with this system have been reported or are evident. Accurate records of the as-built condition of OWRS 301 do not exist. However, based on information compiled during site inspections, this system includes two septic tanks in series, (2,000 gallons and 1,000 gallons) and a leaching system consisting of 610 linear feet of leaching trench and two leaching pits of unknown size.

A second system (OWRS 302) is located in an area to the east of the building. This system was originally constructed circa 1982 to support expansion of the facility that added 120 beds. The design of this system was reviewed by the State of Connecticut Department of Environmental Protection (presently known as the Department of Energy and Environmental Protection) and was assigned file number DEP/WPC 130/014. This system functioned well until 1994 when flows began to overtop the lower portions of the leaching system. An engineering report was prepared by Dudley Ashwood, P. E. to address the surface ponding and in March of 1995, a Consent Order (WC-5171) was issued by the Connecticut Department of Environmental Protection that approved the engineering report and mandated the construction of the recommended remedy. The repair, which was completed in 1995, added to the number of trenches (galleys) effectively increasing the infiltrative surface area.

OWRS 302 consisted of two grease interceptors in series (2,000 gallons each), a 12,000 gallon primary septic tank, two 6,000 gallon secondary septic tanks, a 6,000 gallon pump chamber equipped with two submersible pumps and 2,740 linear feet of 4'x4' leaching galleys installed in a 27 trench configuration. OWRS 302 functioned well until 2009 when surface ponding again occurred and most of the galleys were observed to be full or near capacity (ref. Civil 1 Engineers), while some sections were completely dry. This indicated that there was a distribution problem as well as clogging in the biomat below the trenches. To improve the condition of the biomat, installation of a SoilAir system, which uses blowers to force air into the leaching galleys thereby promoting aerobic process to renovate the trenches, was proposed and approved by CTDEEP.

A General Permit Application, with a CWMP and design of improvements, was submitted to CTDEEP in April 2016 to address the failed system. The primary improvements to OWRS 302 involved the SWAS and a new equalization/dosing system. Existing grease interceptors, septic tanks and the effluent pump chamber remained. The existing SWAS was completely replaced with a new system utilizing patented Geomatrix GST 6212 leaching chambers coupled with the proprietary SoilAir technology. Construction of the improvements were completed in 2018. Additional information pertaining to the improvements is included in Section 6 and in the appendices.

2.0 WASTEWATER FLOW RATES

As indicated previously, the Lutheran Home provides 134 beds for residents. Aside from typical domestic sewage, other sources of wastewater include kitchen and laundry facilities. OWRS 301 handles wastewater from 14 beds within the facility, whereas OWRS 302 handles flow from 120 beds, the kitchen and laundry facilities. Applying design flowrates specified in the *Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems (Guidance for Design)* for healthcare facilities (150 gallons per bed), the total design flowrate for the facility would be 20,100 gallons per day (gpd). The flow to OWRS 301, serving Parley Manor, has been estimated by BETA from field observations at 20 gallons per bed or 280 gpd. The sources of wastewater contributing to this system are limited to bathroom toilets and sinks, only. Accordingly, 19,820 gpd would be directed to OWRS 302.

However, metered water consumption records for the facility indicate that wastewater flows are significantly lower than those derived from regulatory guidance documents. From November 1, 2015 through March 25, 2016, daily water consumption data was recorded and compiled by the maintenance staff at the Lutheran Home (refer to Table 1). This period is significant in that the Lutheran Home was at full capacity, extraneous water uses such as lawn irrigation were inactive so there was a strong correlation between water consumption and wastewater generation and four key holidays (Veteran's Day, Thanksgiving, Christmas and New Year's Day) that tend to increase the number of visitors to the facility were included in the data. This data was used for development of design flows.

The average daily water consumption rate over this time period was 11,700 gallons or 88 gallons per bed. The maximum monthly flow occurred in January when average daily water use was at 13,135 gallons or 98 gallons per bed. Based on the maximum monthly flow and the estimated 280 gpd directed to OWRS 301, OWRS 302 was handling 12,855 gpd. It should be noted that the total maximum day water consumption rate was 18,400 gallons with an estimated 18,120 gallons directed to OWRS 302. Accordingly, OWRS 302 was designed hydraulically for a uniform flow rate of approximately 12,855 gpd to accommodate maximum monthly flows with an appropriate flow equalization volume provided to buffer higher daily flows. The analysis for flow equalization volume is provided in Section 6. Pollutant analyses for total phosphorus storage and nitrogen dilution was based on the average day flow of 11,700 gpd. Based on review of July 2020 Effluent Dosing Tank pump discharge information, average daily flows are on the order of 7,500 gallons per day to OWRS 302.

OWRS 301, which has had no operational issues, was previously reported by others to be capable of handling 3,200 gpd. Actual wastewater flows (280 gpd), as identified above, are well within this capacity. Soil tests in this existing system area, previously performed by others during the design of the system for the building expansion, indicated that area soils are fine sands and medium coarse gravels. Percolation rates were reported at greater than 1 inch in 5 minutes. No further evaluation or any modifications to this system are proposed.

An evaluation of site conditions and recommended improvements to OWRS 302, are the focus of the remainder of this report.

Table 1
Daily Water Consumption Data

	Water Consumption (Gallons)				
Day	November 2015	December 2015	January 2016	February 2016	March 2016
1	8,600	10,500	10,900	16,800	14,400
2	8,700	10,900	10,900	13,800	16,900
3	10,800	12,300	11,000	11,500	13,200
4	10,900	15,000	11,000	9,100	11,400
5	10,800	10,600	11,100	12,200	12,200
6	9,600	10,600	13,600	11,100	12,200
7	9,600	12,500	17,400	11,100	12,200
8	9,500	9,900	14,000	11,000	16,200
9	9,600	11,000	11,100	15,800	11,000
10	10,000	12,800	11,000	9,600	12,700
11	10,400	11,600	11,000	10,400	12,600
12	11,000	14,100	12,800	11,500	11,400
13	10,800	14,100	16,200	10,800	11,500
14	9,500	13,600	16,400	8,800	11,400
15	9,500	11,100	18,400	9,800	9,300
16	9,500	10,800	12,300	9,800	13,200
17	11,400	11,300	12,300	10,100	10,900
18	12,300	12,700	12,400	14,500	10,900
19	15,300	10,900	11,000	10,900	11,200
20	16,900	10,900	13,300	12,200	11,200
21	12,900	11,000	11,900	12,200	11,200
22	12,900	9,800	12,400	12,100	11,100
23	12,800	12,400	12,200	15,300	14,800
24	10,200	12,400	12,200	8,600	16,900
25	9,700	9,000	12,200	8,601	14,000
26	10,800	9,000	13,700	8,602	14,400
27	10,800	9,000	13,900	8,603	16,900
28	10,800	9,300	13,600	8,604	13,200
29	10,800	10,600	13,000	8,605	11,400
30	10,700	10,600	17,000		12,200
31		10,900	17,000		12,200
Total Monthly Use	327,100	351,200	407,200	322,015	314,000
Average Day Use	10,697	11,329	13,135	11,625	12,560
Minimum Day Use	8,600	9,000	10,900	8,600	9,300
Maximum Day Use	16,900	15,000	18,400	16,800	16,900

4.0 PHYSICAL SETTING

4.1 Bedrock

Bedrock beneath the study area is mapped as the Portland Arkose, which is a reddish-brown, medium to coarse-grained, sedimentary rock composed of quarts, feldspar and rock fragments (Rogers, 1985). Surficial materials are mapped as sand and gravel beneath the northwestern half of the Site with the southeastern half of the property mapped as glacial till (Stone, 1992).

4.2 Soil

Soil beneath the majority (54 percent) of the Lutheran property is classified as Canton and Charlton Soil. Canton and Charlton soil are described as well-drained gravelly loam with depth to water more than 6.5 feet below grade. Soil beneath the central portion of the Lutheran Home property is classified as Sutton Soil. Sutton Soil is described as moderately well-drained, fine sandy loam over gravelly sandy loam with depth to water greater than 6.5 below ground surface. Soil beneath the easternmost portion of the property is classified as Ridgebury, Leicester and Whitman Soil, which are poorly drained with a depth to water less than 1.5 feet below ground surface. (http://websoilsurvey.nrcs.usda.gov).

4.3 Surface Water

Regionally, the site lies within the Pomperaug River watershed (CT6800), which covers an area of approximately 13,691 acres. The Pomperaug River watershed includes two segments impaired for recreation due to elevated bacteria levels. The lower Pomperaug River impaired segment (CT6800-00_01) begins at the confluence with Transylvania Brook, on the south side of East Flat Hill Road in Southbury. It flows through a largely wooded area to its confluence with the Housatonic River. The impaired segment in the upper Pomperaug River (CT6800-00_03) begins at the confluence with Bullet Hill Brook and flows through a suburban area surrounded by a narrow tree-lined corridor, ball fields and a golf course, until the Flood Hill Bridge Road crossing.

The nearest surface-water bodies to the existing subsurface wastewater renovation system area are the wetland complex located in the central portion of the property approximately 60 feet east of OWRS 302, Stiles Brook located in the eastern portion of the property approximately 650 feet east of OWRS 302 and a pond located near the intersection of Hidden Brook Drive and Dublin Hill Road approximately 900 feet from OWRS 302.

3.0 WASTEWATER CHARACTERISTICS

Wastewater at the Lutheran Home is generated from sanitary, kitchen and laundry facilities. On January 16, 2015 and June 24, 2015, grab samples of the septic tank effluent were collected and analyzed for five day biochemical oxygen demand (BOD_5), total nitrogen, total phosphorus and total suspended solids (TSS). Results are provided below.

Parameter	Concentration (mg/l) January 16, 2015	June 24, 2015
BOD_5	320	190
Total Nitrogen	26	38
Total Phosphorus	2.5	Not Detected
Total Suspended Solids	72	660

Due to the limited number of samples collected, the effluent data only provides a basis for comparison to published information on similar facilities. As shown above, the average nitrogen concentration from the two grab samples was 32 mg/l. BETA has recently designed two wastewater treatment facilities serving healthcare facilities that are similar in size and nature to the Lutheran Home (Maples Rehabilitation and Nursing Center in Wrentham, MA and the Southeast Rehabilitation & Skilled Care Center in Easton, MA). The Southeast Rehabilitation and Skilled Care Center was operated the same entity operating the Lutheran Home. Based on several years of operating data from these facilities, the average total nitrogen concentration leaving the septic tanks at both facilities was 28 mg/l. Therefore, to conduct nitrogen loading and dilution analyses, a septic tank effluent concentration of 30 mg/l will be used. This concentration is also in line with concentrations published for healthcare facilities in the *Guidance for Design.*

The measured concentration of phosphorus in the grab samples is low compared to literature values. Neither of the above named facilities had discharge limits or other regulatory restrictions for total phosphorus so no septic tank effluent data is available for comparison. Typical total phosphorus concentrations in septic tank effluent, as published in Section IV of the *Guidance for Design,* range from 5 mg/l and 15 mg/l with maximum concentrations of 20 mg/l. For purposes of this report, a concentration of 20 mg/l will be used to conservatively analyze phosphorus sorption in soil.

BOD and TSS concentrations factor into the analysis of hydraulic loading capacity of the SWAS or its long-term acceptance rate. For design purposes, septic tank effluent concentrations for both BOD and TSS are assumed to be 250 mg/l. This value is consistent with published concentrations but is likely conservative. TSS concentrations will likely be lower due to the large septic tank volume provided and the use of an effluent filter.

4.4 Groundwater

The Lutheran Home is located within The Heritage Village Level A Aquifer Protection Area. Level A delineates the final Aquifer Protection Area, which becomes the regulatory boundary for land use controls designed to protect the well from contamination. There are no regulated activities as defined in RCSA section 22a-354i-1(34) that are conducted on the site.

5.0 SUBSURFACE INVESTIGATIONS

A site-specific hydrogeologic investigation was undertaken by Legette, Brashears and Graham, Inc. (LBG) between June 2015 and March 2016 to define aquifer characteristics, groundwater configuration and water quality beneath the Site. The investigations included drilling 13 test borings, installing 13 groundwater-monitoring wells (MW-1 through MW-13), and installing 4 piezometers (PZ-A through PZ-D). Data from sieve analyses conducted on selected sediment samples collected from test borings were used to estimate hydraulic conductivity. LBG also completed in-situ permeability tests in monitoring wells MW-1 through MW-8 to estimate hydraulic conductivity of the onsite unconsolidated deposits, collected water-level measurements in existing standpipes, monitoring wells and piezometers to determine the groundwater configuration and collected groundwater samples from the 13 new monitoring wells. A copy of this Hydrogeological Study is included in Appendix A. Results are summarized below.

As part of this evaluation, all available published geologic and hydrogeologic data along with data from hydrogeologic investigations conducted by BETA Group, Inc. (BETA) in 2015 and Dudley Ashwood in 1994 and 1995 were reviewed.

5.1 Hydraulic Conductivity

A subsurface investigation was completed by Dudley Ashwood (1994) to obtain the site-specific hydrogeologic data necessary to repair OWRS 302. The assessment included the digging of 15 test pits and performing permeability tests under laboratory conditions of the soil samples collected from 2 of the 15 test pits. Each test pit was completed to depth of 9.5 to 14 feet below ground surface. The data obtained from this investigation indicate that the unconsolidated material in the study area is comprised primarily of fine to medium sand with some coarse sand, fine gravel and silt. Data from these permeability tests were used to estimate hydraulic conductivity values for the study area ranging from 0.7 to 2.1 ft/day.

In 2015, BETA completed a preliminary subsurface investigation on the property. The assessment included digging 12 test pits, designated as TP -1 through TP-12, to depths ranging from 5.9 to 13 feet below ground surface. TP-1 through TP-9 were excavated in the previously identified future reserve area across the wetland to the east. TP-10 through TP-12 were excavated adjacent to the existing SWAS. Data obtained from this investigation indicate that the unconsolidated material approximately 100 to 200 feet east of the central wetland buffer area is comprised primarily of very fine to medium sand with some coarse sand intermixed with silt and clay. Laboratory falling head permeability tests were conducted on soil samples collected from 5 of the test pits. Data from these tests were used to estimate hydraulic conductivity ranging from 0.26 to 1.54 ft/day. The lower vadose zone hydraulic conductivity values were reported from test holes closer to the wetland, away from SWAS.

5.1.1 In-Situ Permeability Results

Slug tests were conducted by LBG at Monitoring Wells MW-1 through MW-8. It should be noted that monitoring wells MW-5 through MW-8 are located in the western section of the site and are not proximate to OWRS 302. These wells and soil borings B-1 through B-9 were installed to assess another area of the site for the possible relocation of OWRS 302 or the feasibility of future expansion of the facility.

The computer program AQTESOLV® was used to interpret the slug test data and calculate hydraulic conductivity values for the saturated soils beneath the site. The program requires basic input parameters including the initial water-level displacement following the insertion/removal of the slug, water-level measurements at various times throughout the test, radius of the well and borehole, length of the well screen, depth of the base of the well screen, and saturated thickness of the aquifer.

The KGS Model for slug test analysis was used to calculate conductivity values from the slug test data, as it readily applies to both fully and partially penetrating wells in unconfined aquifers and is suitable for highly permeable sands and gravel.

The hydraulic conductivity values calculated for the saturated soils using slug test data ranged from 0.3 to 6.8 ft/day with an average of 1.9 ft/day in all the monitoring wells. The range in wells MW-1 through MW-4 was 1.3 to 6.8 ft/day with an average of 3.1 ft/day.

5.1.2 Sieve Analysis Permeability Results

The computer program SizePerm© was used to calculate theoretical hydraulic conductivities in the unsaturated soil. Sieve analysis data for soil samples collected from soil borings and test pits were entered into the program, which uses a number of methods to calculate hydraulic conductivity. The methods are generally specific to certain soil types and are based on average grain-size diameter and the uniformity coefficient of the sample. For the purposes of this study, the Sauerbrei method was used for calculation of hydraulic conductivity since it applies to fine to coarse-grained sands. The hydraulic conductivity values calculated for the unsaturated materials ranged from 3.9 to 16 ft/day with an average of 8.1 ft/day. The hydraulic conductivity values calculated for the saturated materials using sieve data ranged from 3 to 10 ft/day with an average of 6.6 ft/day.

5.2 Mounding Analysis

A computer model was developed to simulate various load conditions for the SWASs, evaluate the associated groundwater mound and estimate the maximum load capacity for the site soils. The computer model was developed using MODFLOW-2005. This code, published by the USGS, is currently the most widely used and accepted groundwater modeling code and has been used for numerous mounding projects in Connecticut that have been accepted by the CTDEEP. The model requires three basic input parameters: recharge rates, horizontal and vertical hydraulic conductivity, and the size and shape of the SWASs.

The recharge rate used in the model is based on the average annual recharge for the Southbury area; estimated to be 24 inches per year. Recharge from infiltration of precipitation that falls directly on the aquifer is conservatively assumed to be approximately one-half of average annual precipitation. The other half of the total precipitation is lost to surface-water runoff and evapotranspiration. This estimate is based upon work by MacNish and Randall (1982) in New York State but is reasonable to apply to the study area because of the similarity of climates. The average annual precipitation recorded at the Northeast Regional Central data (NRCD) gage located in Woodbury, Connecticut for the period 1966-2006 was 50.40 inches. A groundwater recharge rate for the LHM of 24 inches per year from precipitation falling directly on stratified–drift deposits is reasonable given these precipitation totals.

The second input parameter required by the model is the horizontal hydraulic conductivity of the aquifer. The distribution of the initial horizontal hydraulic conductivity values were derived from slug tests, sieve analysis, laboratory permeability tests, surficial geologic mapping for the area (Stone, Schafer, London and Thompson, 1992), boring logs and the published soil survey mapping for the area (NRCS Webpage, http://soildatamart.nrcs.usda.gov). The initial horizontal hydraulic conductivity values input into the model ranged from 0.5 ft/day for the tighter units located throughout the region to 350 ft/day for the coarse sand and gravel glacial outwash deposits in the study area. All initial horizontal hydraulic conductivity values and distributions were adjusted during model calibration. The initial ratio of vertical to horizontal hydraulic conductivity was assumed to be 1:10, a value supported in published literature. This ratio was also adjusted during calibration. Initial storage coefficient and specific yield values for the study area were also derived from published data and professional judgment. The specific yield values input into the model was 0.01.

The third input parameter required by the model, is the size and shape of the SWASs and the onsite storm water infiltration systems, which are shown on the Technical Plans provided in Appendix B. OWRS 301 and OWRS 302, with average daily discharges of 280 gpd and 11,420 gpd, respectively, were simulated using the well package in MODFLOW. The estimated daily infiltration from each of the systems was provided in the form of charts that showed total daily precipitation versus average daily storm water discharge.

Final horizontal and vertical hydraulic conductivity values reached through the model calibration range from 0.1 ft/day to 115 ft/day. The simulated hydraulic conductivity beneath OWRS 301 and OWRS 302 was 1.1 ft/day, a value comparable to the 95-percent lower confidence interval for geometric mean of 1.9 ft/day calculated from data derived from the field investigation. The specific yield ranges from 0.0033 to 0.35. The simulated bottom permeability for the surface water bodies simulated in the model ranged from 0.05 ft/day to 20 ft/day.

Two model simulations were required to predict the amount of groundwater mounding that would result from the maximum month design flow of 13,135 gpd. The first simulation was run so that the measured (March 17, 2016) season-high groundwater elevation, which already accounts for the average discharge of 11,700 gpd, could be corrected to be reflective of the design flow of 11,700 gpd. To do this, the model was run to steady-state with the SWASs discharging 1,435 gpd.

The simulated head difference between the average discharge of 11,700 gpd and the design flow of 13,135 gpd is reflective of the simulated additional groundwater mounding at the design flow. This predicted additional mounding was then superimposed onto the season high (March 17, 2016) water-table contour map. Table 2 shows the differences between the bottom elevation of OWRS 302 and the prior existing stormwater infiltration system and the maximum post mounding groundwater elevation.

As shown in Table 2, the maximum post-mounding groundwater elevation for OWRS 302 is greater than 2 feet below the bottom of the SWAS. Thus, the model confirms the area should accept the design rate without excess mounding. Table 2 also shows that the post mounding groundwater elevations were below the bottom of the stormwater infiltration disposal trenches.

Table 2
OWRS 302 Bottom Elevations versus Post-Mounding Groundwater Elevations

Dispersal Trench	Bottom of SSDS Elevation (ft MSL)	Maximum Post-Mounding Groundwater Elevation (ft MSL)	Difference Between Bottom of System and Maximum Groundwater Elevation (feet)
At Design Flow Conditions			
OWRS 302			
1	277.83	272.23	5.60
2	278.83	273.44	5.39
3	279.83	274.41	5.42
4	279.83	275.11	4.72
5	279.83	275.15	4.68
6	279.83	275.15	4.68
Stormwater Infiltration System			
DMH-6	265.1	265.03	0.07
DMH-7	267.8	266.92	0.88
DMH-8	266.85	263.77	3.08
DMH-9	266.85	265.41	1.44
DMH-10	266.35	262.52	3.83
DMH-11	266.5	264.22	2.28

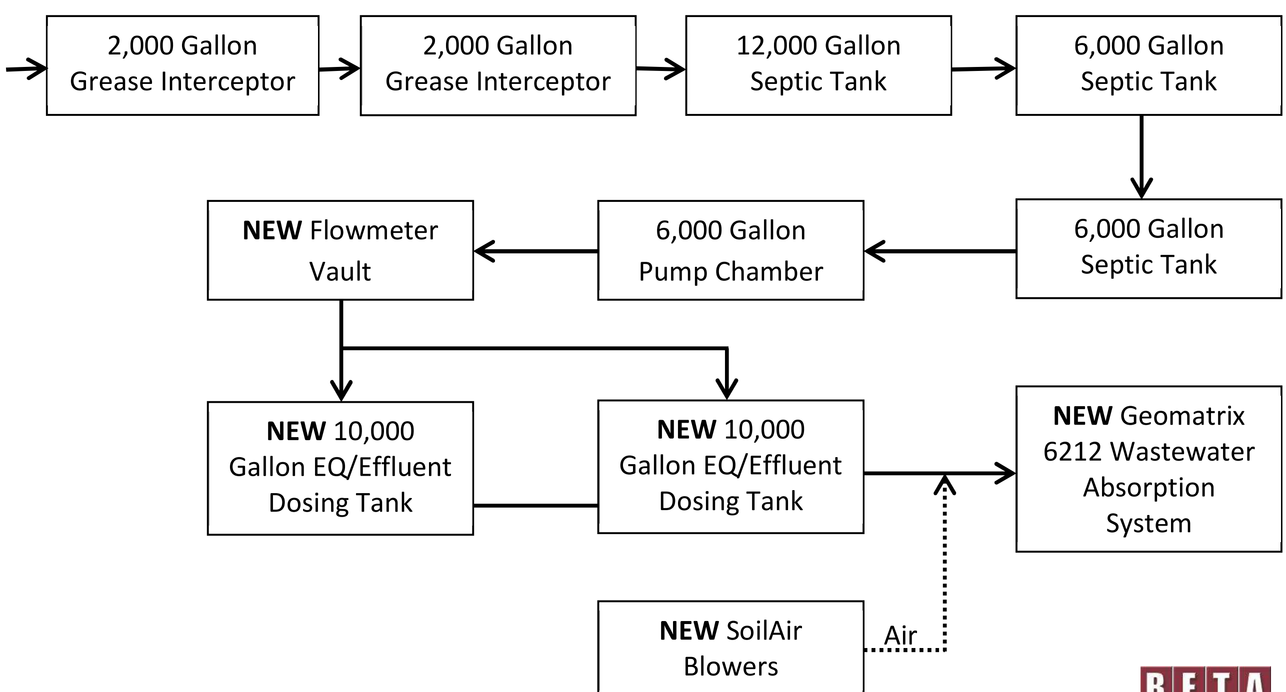
5.3 Travel Time Analysis

A travel-time analysis was conducted to ensure there is sufficient time for full die-off of pathogenic bacteria prior to reaching downgradient sensitive receptors including property boundaries, surface water bodies, and groundwater supply wells. The analysis was completed using the post-mound, groundwater-elevation data and PATH3D, which is a particle tracking program for calculating groundwater paths and travel times. The program incorporates a velocity interpolator that converts hydraulic heads, hydraulic conductivity and porosity into a velocity and a numerical solver for tracing the movement of fluid particles in the groundwater flow system. This evaluation was made more conservative by increasing the hydraulic conductivity values derived during model calibration in the subsurface wastewater adsorption systems areas to 4.3 ft/day, the 95-percent upper confidence interval for geometric mean derived from the field investigation data. A porosity of 0.30 was also used for this analysis. The post-mounding, groundwater velocities ranged from less than 0.15 ft/day to 0.95 ft/day, which equate to 21-day travel distances of approximately 3 feet and 20 feet, respectively. These results indicate that the groundwater will not cross an adjacent property boundary, enter a surface water body or reach any other downgradient sensitive receptor before 21 days of travel time is achieved.

6.0 IMPROVEMENTS

6.1 On-Site Wastewater Renovation System 302

The primary improvements to OWRS 302 involved the SWAS and equalization/dosing tanks. Existing grease interceptors, septic tanks and the effluent pump chamber remain. The existing SWAS was completely replaced with a new system utilizing patented Geomatrix GST 6212 leaching chambers coupled with the proprietary SoilAir technology. The overall on-site wastewater renovation system is shown schematically below.



OWRS 302 Description	Capacity	Pump Specs	Location
Grease Trap #1	2,000 Gallons	N/A	North West of Existing Building
Grease Trap #2	2,000 Gallons	N/A	North West of Existing Building
Septic Tank #1	12,000 Gallons	N/A	North West of Existing Building
Septic Tank #2	6,000 Gallons	N/A	North West of Existing Building
Septic Tank #3 w/ Effluent Filter	6,000 Gallons	N/A	North West of Existing Building
Pump Chamber (w/ two pumps)	6,000 Gallons	Two 2-HP, 200V, 3-Phase Submersible	North West of Existing Building
5' Diameter Flow Meter Vault	N/A	One 1/3-HP, Submersible w/ Float Cont. and High Level Alarm	North West of Existing Building
Effluent Dosing Tank	10,000 Gallons	Three 3-HP, 480V, 3-Phase Submersible	East of Parking Lot
Effluent Dosing Tank	10,000 Gallons	Three 3-HP, 480V, 3-Phase Submersible	East of Parking Lot
3,240 Linear Foot Leaching System w/ Geomatrix chambers	N/A	N/A	East of Parking Lot
SoilAir Blower	N/A	4-HP	East of Parking Lot

The Geomatrix GST leaching chambers are an adaptation of the stone leaching trench. This system has been improved via the use of a removable form to accurately shape and construct leaching fingers along the sides of a central distribution channel. The fingers are constructed with 3/4" washed stone and surrounded with ASTM C33 sand. These fingers serve to increase the sidewall surface area by more than six times that of a traditional stone leaching trench. Additionally, the narrow profile of the leaching fingers and central distribution channel, combined with the uniform profile of the sand treatment media, serve to enhance oxygen transfer efficiencies. Enhanced oxygen transfer results in better treatment of the wastewater pollutants and a leach field with a longer lifespan.

SoilAir is a patented process that is being utilized on approximately 1,500 sites in the region, including a number in and around Southbury, to address biomat accumulation and to provide for enhanced wastewater treatment. Pressurized air is blown into the wastewater distribution header and the oxygen in the air supply helps to promote nitrification of the wastewater. It also enters the soil surrounding the leaching structures where it supports and promotes the growth of microorganisms that consume the biomat. Maintaining the biomat at a proper thickness allows wastewater to infiltrate freely onto surrounding soil while maintaining an appropriate level of treatment.

6.2 Flow Equalization

As noted in Section 2, the average daily water consumption rate at the Lutheran Home was 11,700 gpd while the average daily water consumption rate during the maximum month (January 2016) was 13,135 gpd. Assuming that water consumption is equal to wastewater generation, the daily flow during the maximum month was established as the uniform design wastewater flow rate since it provides a degree of conservatism over the use of average flows. Accordingly, 12,855 gpd will be processed through OWRS 302 and 280 gpd will be handled by OWRS 301.

Since maximum daily water consumption has been reported to reach 18,400 gpd with an estimated 18,120 directed to OWRS 302, an appropriate flow equalization volume was provided to buffer higher daily flows. Equalization reduces the loading on the SWAS, resulting in a smaller system footprint. In-line flow equalization is the preferred approach since it is more effective than off-line storage in dampening variations in wastewater flows and loads.

For the month of January and extending into the first week of February, the uniform design wastewater flow rate was subtracted from the daily water use values to determine the volume that would need to be stored. The analysis provided in Table 3 shows that the volume of storage for flow equalization must be greater than 16,165 gallons (February 2, 2016). Two interconnected 10,000 gallon dosing/equalization tanks provide an equalization volume of 17,232 gallons. This is the net volume determined by subtracting the minimum liquid volume that must be maintained for safe pump operation and dosing from the total tank volume.

Table 3
Analysis to Determine the Volume of Equalization Storage

Date	Wastewater Flow (GPD)	Volume to be Stored (Gal.)	Cumulative Stored Volume (Gal.)
01/01/16	10,620	(2,235)	-
01/02/16	10,620	(2,235)	-
01/03/16	10,720	(2,135)	-
01/04/16	10,720	(2,135)	-
01/05/16	10,820	(2,035)	-
01/06/16	13,320	465	465
01/07/16	17,120	4,265	4,730
01/08/16	13,720	865	5,595
01/09/16	10,820	(2,035)	3,560
01/10/16	10,720	(2,135)	1,425
01/11/16	10,720	(2,135)	-
01/12/16	12,520	(335)	-
01/13/16	15,920	3,065	3,065
01/14/16	16,120	3,265	6,330
01/15/16	18,120	5,265	11,595
01/16/16	12,020	(835)	10,760
01/17/16	12,020	(835)	9,925
01/18/16	12,120	(735)	9,190
01/19/16	10,720	(2,135)	7,055
01/20/16	13,020	165	7,220
01/21/16	11,620	(1,235)	5,985
01/22/16	12,120	(735)	5,250
01/23/16	11,920	(935)	4,315
01/24/16	11,920	(935)	3,380
01/25/16	11,920	(935)	2,445
01/26/16	13,420	565	3,010
01/27/16	13,620	765	3,775
01/28/16	13,320	465	4,240
01/29/16	12,720	(135)	4,105
01/30/16	16,720	3,865	7,970
01/31/16	16,720	3,865	11,835
02/01/16	16,520	3,665	15,500
02/02/16	13,520	665	16,165
02/03/16	11,220	(1,635)	14,530
02/04/16	8,820	(4,035)	10,495
02/05/16	11,920	(935)	9,560
02/06/16	10,820	(2,035)	7,525
02/07/16	10,820	(2,035)	5,490

6.3 Long Term Acceptance Rate

The Long Term Acceptance Rate (LTAR) is defined as the infiltrative surface loading rate at which a SWAS will continuously accept effluent for a long period of time. It is dependent on the soil characteristics, the biomat and wastewater characteristics leaving the septic tank.

For OWRS-302, vadose zone hydraulic conductivity (K, ft/day) values were obtained during deep hole testing. The following values are representative of the soils in the area from the most restrictive layer observed.

BETA Group Data
Test hole #B-10, from the C1-Layer, 2.80 ft/day

Dudley Ashwood Report
Test hole # DP110, from 48" depth, 1.600 ft/day
Test hole # DP111, from 72" depth, 0.655 ft/day
Test hole # DP111, also from 72" depth, 0.792 ft/day

To be conservative, a K value of 0.655 ft/day, which is the lowest value stated in the Dudley Ashwood report was used to determine the LTAR. Using the Healy and Laak relationship the LTAR was determined to be:

$$\begin{aligned} \text{LTAR} &= 5K - [\ 1.2 / (\text{Log}_{10}K)\ ]\text{, where K is in units of ft/min.} \\ &= [(0.655 \text{ ft/day}) / (1440 \text{ min/day})] - [1.2 / \text{Log}_{10}(0.655/1440))] \\ &= 0.361 \text{ gpd/ft}^2 \end{aligned}$$

The LTAR must be adjusted to account for wastewater strength in terms of its five day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS). Applying typical BOD_5 and TSS concentrations of 250 mg/L each, the LTAR adjustment factor was calculated as follows:

$$\begin{aligned} \text{LTAR Adjustment Factor} &= [250/(BOD_5+TSS)]\text{^}(1/3) \\ &= [250/(250+250)]\text{^}(1/3) \\ &= 0.794 \end{aligned}$$

Therefore, the adjusted LTAR is 0.287 gpd/ft^2. It should be noted that the previously approved LTAR was 0.37 to 0.41 gpd/ft^2 based on permeability testing conducted in the 1980's. The calculated LTAR adjustment factor was expected to be conservative in that the TSS concentration is expected to be below 250 mg/l due to the large septic tank volume and the use of an effluent filter. The SoilAir technology was also be applied to the SWAS to control biomat formation.

6.3.1 SWAS Sizing

The New SWAS utilizes Geomatrix GST 6212 leaching chambers. The Effective Leaching Surface Area of these units is 17.6 ft^2/ft with an interior storage volume of 9.23 gallons/ft, per the manufacturer.

To accommodate the maximum monthly flow of 12,855 gal/day, at an LTAR of 0.287 gpd/ft^2, 44,790 ft^2 of leaching area are required. Applying the Effective Leaching Surface Area associated with the Geomatrix GST 6212 chambers, 2,545 linear feet of trench are required.

The configuration for the New SWAS associated with OWRS 302 is as follows:

- Five (5) pressure dosed zones of GST-6212 consisting of two (2) 270 feet long trenches per zone for a total of 2,700 linear feet (Zones 1 - 5)
- One (1) pressure dosed zone of GST-6212 consisting of three (3) 180 feet long trenches for a total of 540 linear feet (Zone 6)

Based on the design length of the trenches, each zone has an absorption capacity of 2,727 gpd. Zones 1 through 5 provide a total absorption capacity of 13,635 gpd, which is sufficient to handle the average daily flow of 12,855 gallons during the maximum month. Although Zone 6 is considered a spare zone, its 2,727 gpd capacity brings the theoretical total wastewater absorption capacity to 16,362 gpd. Groundwater mounding limits the hydraulic loading rate to 12,855 gpd.

6.3.1 System Configuration

The existing grease interceptors and septic tanks continue to be utilized in their present capacity. The pumps in the existing pump chamber have been upgraded to transfer flow to the two new interconnected 10,000 gallon flow equalization/dosing tanks. Six pumps are housed in one of the flow equalization tanks. Each pump is dedicated to one pressure dosing zone (Zones 1 through 6). The current control logic for system operation is as follows:

- Distribution of flow to all zones (1-6) each day
  - The controls rotate zones after a period of 120 minutes (2 hours).
    - ✓ Pump 1 (Zone 1) is lead for two hours
    - ✓ Pump 2 (Zone 2) is lead for two hours
    - ✓ Pump 3 (Zone 3) is lead for two hours ……. etc…….

During resting period, the pressure zones are aerated to enhance biological treatment (SoilAir technology).

6.3.2 SWAS Location

The SWAS associated with the improved OWRS 302 is situated in the location of the former, failed wastewater absorption system at the east side of the building parking lot. The former system was completely removed and properly disposed to allow installation of the new system.

Technical plans for the improvements related to OWRS 302 are provided in Appendix B.

6.4 Nitrogen Dilution

A site-wide nitrogen dilution analysis was conducted to demonstrate that the New OWRS will comply with Connecticut Water Quality Standards requiring a maximum concentration of 10 mg/L at downgradient receptors. To accomplish this, groundwater contours under future mounded conditions were reviewed to determine the direction of flow from the SWAS associated with OWRS 302. Most of the flow from the system flows in a westerly direction; however in a mounded groundwater condition, wastewater discharged to a portion of Zone 5 and all of Zone 6 contributes flow in an easterly direction toward the wetland. On a proportionate area basis, wastewater flow contributions in a westerly direction were estimated at 10,278 gpd from OWRS 302 and 280 gpd from OWRS 301. Therefore, approximately 1,142 gpd was assumed to flow is an easterly direction. The delineation of site areas and their direction of flow are shown in Figure 4.

Since the width of the SWAS associated with OWRS 302 perpendicular to the direction to groundwater flow is not substantially less than the width of the property, the plume is assumed to cover the entire lot area. Therefore, the total lot area, as shown in Figure 4, was used as the effective infiltration area. Area 1B, which encompasses a majority of the site, is engineered to collect and recharge a majority of the precipitation from a storm event. The infiltration capacity of the stormwater system estimated between the 3-year and 5-year storm. The percentage precipitation infiltrating in this area has been assumed to be 75 percent.

The expected nitrogen concentration was calculated from the following formula:

$$\boldsymbol{Ngw = \frac{[Qww\ x\ Nww] + [Qprecip + Nprecip]}{Qww + Qprecip}}$$

As shown, in the following calculation, the total nitrogen concentration at the western property line was expected to be 8.38 mg/l, while the concentration at the wetland to the east of OWRS 302 was expected to be less than 7 mg/l. The concentration at the wetland does not include further dilution that would occur from Area 3.

<u>Design Parameters</u>

Average annual precipitation (in/yr)	50.4
Fertilizer Use (lbs./day/ft^2)	0.0
Precipitation Total-N Concentration, $N_{precip,}$ (mg/L)	0.5
Total N Concentration Raw Wastewater, (mg/L)	30
Total N Removal (Septic tanks and SoilAir) (%)	40
Total N concentration to SWAS at OWRS 302 (mg/L)	18
Effective Total N Concentration with OWRS 301, N_{ww}, (mg/L)	18.32
Average Total Monthly Wastewater Flow (gpd)	11,700
Hydrologic Soil Group (NCRS)	B

Nitrogen Dilution Calculations (Zone 6 resting)

A. Analysis at the western property line

Area 1A

Wastewater Flow, gpd	280
Composite Curve Number	79
Percentage of Infiltration	39
Effective Area for Precipitation Infiltration (ft^2)	36,605

Infiltrated Precipitation, (gpd) = 39%*36,605 ft^2*50.4 in/yr*(1 ft/12 in)*(1yr/365d)*7.48 gal/ft^3 = 1,229

Area 1B

Wastewater Flow, gpd	10,278
Composite Curve Number	79
Percentage of Infiltration (assumed – Stormwater collection)	75
Effective Area for Precipitation Infiltration (ft^2)	187,265

Infiltrated Precipitation, Q (gpd) = 75%*187,265 ft^2*50.4 in/yr*(1 ft/12 in)*(1yr/365d)*7.48 gal/ft^3 = 12,089

Total Infiltration (1A +1B), Q_{precip} (gpd) = 1,229 gpd + 12,089 gpd = 13,317
Total Wastewater Flow, Q_{ww}, (gpd) = 280 gpd + 10,278 gpd = 10,558

N_{gw} (mg/L)= ([10,558 gdp x 18.32 mg/l]+[13,317 gpd x 0.5 mg/l])/(10,558 gpd + 9,288 gpd) = <u>8.38</u>

B. Analysis at the wetland to the east of OWRS 302 (1/2 of Zone 5 contributing)

Area 2

Wastewater Flow, Q_{ww}, gpd	1,142
Composite Curve Number	69
Percentage of Infiltration (assumed – Stormwater collection)	44.5
Effective Area for Precipitation Infiltration (ft^2)	50,530

Infiltrated Precipitation, Q_{precip} (gpd) = 44.5%*50,530 ft^2*50.4 in/yr*(1 ft/12 in)*(1yr/365d)*7.48 gal/ft^3 = 1,935

N_{gw} (mg/L)= ([1,142 gdp x 18 mg/l]+[1,935 gpd x 0.5 mg/l])/(1,142 gpd + 1,935 gpd) = <u>6.99</u>

6.5 Phosphorus Removal

The *Guidance for Design* requires demonstration that the unsaturated soil beneath the SWAS has the capacity to adsorb at least 6 months of the phosphorus in the percolate. As previously indicated in Section 3, phosphorus concentrations in two grab samples of the septic tank effluent were reported at 2.5 mg/l and below the laboratory detection limit, respectively. These concentrations are believed to be low. The previous report by Dudley Ashwood used a phosphorus concentration of 20 mg/L, which is conservative as this is the maximum value reported in the *Guidance for Design*. The calculation of phosphorus storage provided below is based on this conservative loading value. As shown, phosphorus storage in the soil beneath Zones 1 through 5 is 7.8 months.

Design Parameters

Length of Trenches (ft)	2700
Width of Trench (ft)	5.167
Height of Trench (ft)	1
Average Phosphorus Loading (mg/L)	20
Average Daily Flow (gal/day)	11,420
Thickness Unsaturated Soil (ft)	4.8
Soil P Adsorption (mg/100g) [1]	9
Soil Density (lb/ft^3) [2]	120

Calculations

Total Effective Area[3] (ft^2) = (3240')*(5.167'+2*1') =	19,350
Phosphorus Loading (mg P/day) = (11,420 gal/day)*(20 mg/L)*(3.785 L/gal.) =	864,494
Phosphorus Loading (mg P/month) = (30.4 day/month)*(864,494 mg P/day) =	26,280,618
Soil Density (gm/ft^3) = (120 lb/ft^3)* 90% * (454 grams/lb) =	49,032
Soil Adsorption of P (mg P)[4] = 49,032 gm/ft^3 *19,350 ft^2 *4.8 ft*50% *9 mgP/100 gm =	204,934,147
Sorption Capacity (months) = (204,944,738 mg P) / (26,280,618 mg P/month) =	**7.8**

Notes

1. The soil at the site is Charlton and was classified by Sawhney & Hill to have a sorption capacity of 21.8 mg P/100g of soil (B2 layer). Since test data has shown that sorption capacity is lower in the C soil layer the Merrimac soil sorption value of 9.0 mg/ 100 g soil was used as a conservative value.
2. Maximum dry soil density from Connecticut Experiment Station Bulletin 706 for Charlton soils (C layer 30-48"). Use 90% of max density based on typical insitu soil density.
3. The effective leaching area is based on standard trench area (bottom and sidewalls), not the effective leaching area provided by the GST system.
4. As required in CTDEEP Design Guidance Section X pg. 50 the unsaturated soil zone was reduced by 50%.

7.0 SYSTEM OPERATION, MAINTENANCE AND MONITORING

Proper operation and maintenance practices are key elements to the long term viability for any OWRS. The system owner is committed to providing sufficient funding, qualified operating personnel and management direction to ensure that the system achieves required water quality objectives and operating standards. In the event the system fails or malfunctions, immediate action to prevent, mitigate, and correct the failing condition shall be taken.

Although the system does not include enhanced pretreatment facilities, there are mechanical/electrical components that are critical to system performance. The technology underlying the SoilAir System is owned by Geomatrix and information about the characteristics and operation of the SoilAir System and the Equipment is proprietary information of SoilAir. The components must be operated and maintained properly so treatment objectives in terms of effluent recharge and nutrient removal are met. Appendix G includes manufacturer's literature.

7.1 OWRS 302 Maintenance Schedule

OWRS 302 shall be operated and maintained in accordance with the following minimum requirements.

- Grease interceptors shall be pumped quarterly, unless it is shown that longer pumping intervals are adequate to maintain system performance.
- Septic tanks shall be pumped annually.
- Baffles and effluent filters shall be inspected during pump-out, and filters cleaned as necessary.
- Audible and visual alarms in the pump chambers shall be inspected and tested annually.
- Leaching systems shall be inspected quarterly for evidence of ponding or surfacing effluent.
- Leaching field areas shall be maintained appropriately, including but not limited to mowing grass three times between May and November, brush clearing if necessary, and prohibition of the planting or growth of trees over the leaching systems.
- Flowmeters shall be calibrated annually.

The use of sewage system additives, as defined in section 22a-460(g) of the Connecticut General Statutes, are prohibited unless such additive is registered with the commissioner in accordance with section 22a-462-3 of the Regulations of Connecticut State Agencies. The commissioner in no way certifies the safety or effectiveness of any registered additive.

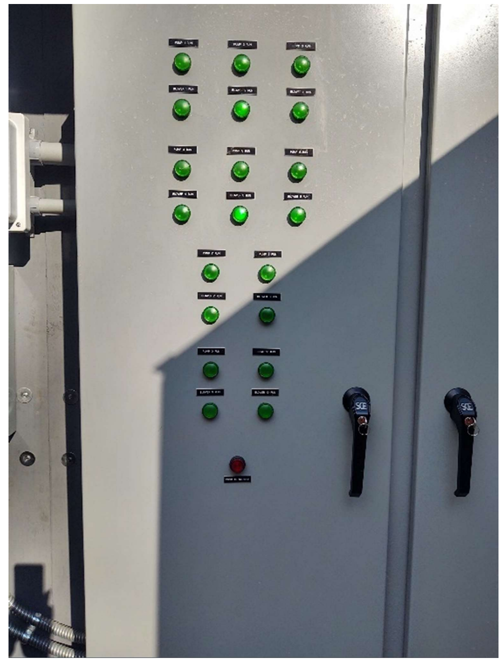
Oils, greases, industrial or commercial wastes, toxic chemicals, wastes from water treatment systems, or other substances, that will adversely affect the operation of the subsurface sewage disposal system, or which may pollute ground or surface water, shall not be discharged to the subsurface sewage disposal system.

Upon identification of an issue, whether it be through visual observation, notification from an alarm, or other source, the facility is prepared to react. The facility has ongoing maintenance contracts as follows:

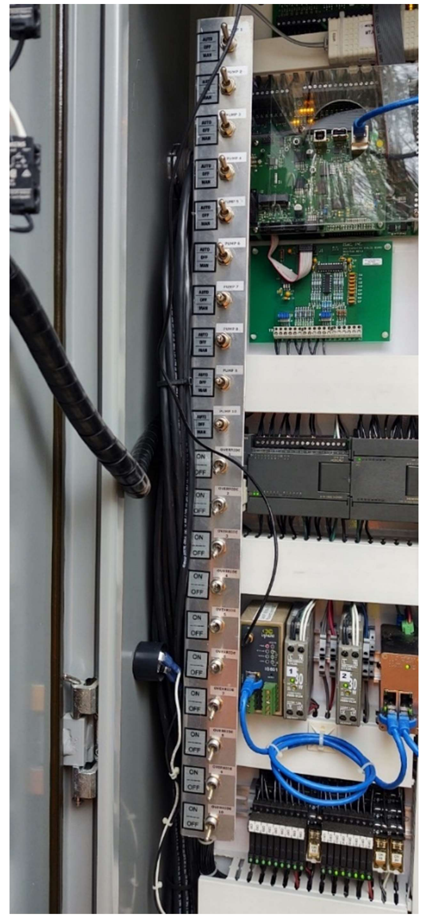
Item	Company	Telephone Number
Soil/Air System	Geomatrix	860-510-0730
Generator	Cummins	860-529-7474
Pump Repair and Pumping	H.L. Bennett	203-264-5645
Electrical	Electrical Technicians	203-262-0481

7.2 OWRS 302 Pump and Blower System

The main control panel for the pumps and blower system is located in the vicinity of the equalization tanks east of the SWAS. Pump and blower controls are located here.



Automatic Operation



In the automatic mode, the blower and pump selector switches should be set to the "auto" position. The pump operation is controlled by float level switches in the 10,000 gallon equalization tank chamber. When the level in the tank reaches the lead pump "on" level, a contact is made and one (1) of the pumps will operate until the level in the tank has dropped to the pumps "off" float level. If the level in the wetwell continues to rise above the lead pump "on" float level, either due to high flows, lead pump failure or control malfunction, the lag pump will be activated. If the liquid level continues to rise, the high wetwell level alarm will be activated. If the level in the wetwell continues to drop below the pump "off" elevation, the "low wetwell" level alarm will be activated.

The pumps automatically alternate between lead and lag after each cycle. Automatic alternation ensures that the bearings and seals in each pump are fully rotated to prevent premature failure. A green pump run light will illuminate in the pump control panel during pump operation.

Operation of the pumping system is controlled by floats in the wetwell. The float level switch set-point elevations for pump operation are listed below in Table 2. These elevations were set during the start-up of the station and can be changed by shortening or lengthening the float level switch cable.

Table 2 – Pump System Set Point Elevations

Float Operation	**Pump Chamber** Elevation, feet	**Dosing Tank #1** Elevation, Feet	**Dosing Tank #2** Elevation, Feet
High Water Alarm	NA	278.5	278.5
Lag Pump On	253.59	278	278
Lead Pump On	253.09	277.5	277.5
Pumps Off	250.09	272.5	272.5
Reference Elevations			
Surface Elevation	259.4	282.5	282.5
Invert In Elevation	254.09	(+/-)277	(+/-)277
Bottom of Wet Well	248.09	270.5	270.5

Note: Elevations presented are approximate and are operator adjustable. Floats are used to activate/deactivate pumps in "Auto" mode and can be adjusted. Pumps must be in the "auto" position for automatic on – off operation to occur at the levels stated above.

Manual Operation

When the pumps are in the manual mode, the operator must manually turn each pump on or off by positioning the pump selector switch to "hand" or "off," respectively.

Except in the case of emergencies, the pump station must NEVER be left unattended when the pumps are set in either the "hand" or "off" position. Running the pumps dry for extended periods of time can cause severe damage to the pumps. The operator should constantly monitor the level in the wetwell to ensure that over pumping or flooding does not occur. Secondly, the operator should provide a delay of at least 15 seconds between manually starting the second pump.

The following is a brief summary explaining how to start a submersible pump.

1. Examine the control panel to be sure nothing electrically or mechanically is. preventing start-up of the equipment.
2. Verify that there is water in the tank above the height of the pump.
3. Verify that the discharge valve, located in the valve pit, is "open".

The pumps should not be operated with a closed discharge valve. This could cause pump or seal damage.

4. Return to the control panel and place appropriate, selected pump to the "on" position.
5. Place the pump operation selector switch to the "hand" position.
6. Inspect the equipment to ensure that no unusual noise or vibrations occur during operation and that the pumps are actually discharging by verifying liquid level drop in the tank and observe the pressure gauge.
7. If the unit is functioning properly, turn the pump operation selector switch to the off position. When the pump has completely stopped, place the selector switch in the proper operating position (hand-off-automatic). During normal automatic operation this switch should be in the "auto" position.

The manufacturers' literature in Appendix G of this manual has more detailed information for the pump. This literature should be reviewed by all operators.

Any time a pump is taken out of service for inspection or repair the main control circuit breaker must be placed in the "off" position and locked out. The appropriate selector switch must also be turned to the "off" position and tagged.

7.3 Groundwater Monitoring

To determine compliance with the General Permit to Discharge from Subsurface Sewage Disposal Systems Serving Existing Facilities, a groundwater monitoring plan has been implemented. The program calls for the collection of grab groundwater samples on a quarterly basis from the following seven monitoring wells:

MW-2R MW-3 MW-9R MW-10 MW-11 MW-12 MW-13

The locations of these monitoring wells are depicted on the Technical Plans included in Appendix B.

Groundwater samples shall be analyzed for the following parameters:

Table 3 – Groundwater Monitoring Parameters

Parameter	Units	Minimum Sampling Frequency	Sample Type
Coliform, Fecal	col/100mL	Quarterly	Grab
Groundwater Depth	ft, in	Quarterly	Instantaneous
Nitrogen, Ammonia	mg/L	Quarterly	Grab
Nitrogen, Nitrate	mg/L	Quarterly	Grab
Nitrogen, Nitrite	mg/L	Quarterly	Grab
Nitrogen, Total Kjeldahl	mg/L	Quarterly	Grab
Nitrogen, Total	mg/L	Quarterly	Grab
pH	S.U.	Quarterly	Instantaneous
Phosphorus, Total Dissolved	Mg/L	Quarterly	Grab

7.4 Reporting and Record Keeping

Chemical analyses to determine compliance with effluent limits and conditions established in the approval of registration shall employ methods approved by the Environmental Protection Agency pursuant to 40 CFR 136, unless an alternative method has been approved in writing in accordance with 40 CFR 136.4. The results of chemical analyses and treatment facilities monitoring and maintenance shall be entered on a Discharge Monitoring Report (DMR), provided by the Department, and reported to the Bureau of Materials Management and Compliance Assurance in electronic format by the end of the month following each month in which a sample is taken or treatment facility monitoring or maintenance is performed. The DMR shall also include a detailed explanation of each violation of an effluent limitation, inspection, monitoring or maintenance requirement, corrective actions performed, and a schedule for the completion of any corrective actions remaining.

Each analytical result of a wastewater sample taken and all data generated by any other monitoring shall be retained at the site for at least five years from the date such result or data was generated or received by the permittee, whichever is later.

If an analytical result of a wastewater sample taken or data generated by any other monitoring conducted under this general permit indicates that a violation or other condition of this general permit has occurred, all appropriate actions shall be taken immediately to abate such violation and prevent its recurrence. Within 48 hours of its occurrence, a written notification shall be submitted to the commissioner. Upon completing such notification, it shall be retained for a period of at least three years at the site.

Written notifications required by this general permit shall be in letter form identifying the Permittee name, site name, site location, street address, town, and date of approval of registration, date(s) of sampling and analysis, monitoring location, monitored constituents, and analytical and other monitoring results triggering notification, a summary of any response action taken or planned, and the name and telephone number of a person the Department may contact for further information. A copy of any notification required to the local health department and the local WPCA shall also be submitted.

8.0 CERTIFICATION

I certify that, based on reasonable investigation, including my inquiry of the individuals responsible for obtaining the information, the submitted information is true, accurate and complete, and in my professional judgment, proper operation and maintenance of the each subsurface sewage disposal system installed to treat the wastewater which is the subject of this registration will ensure that the discharge of such wastewater is consistent with the General Permit to Discharge from Subsurface Sewage Disposal Systems Serving Existing Facilities and this WMP. This certification is based in part on my review of the WMP, past and current uses of the site at which such wastewater is generated and all known information about subsurface sewage disposal systems located on the subject site. I understand that any false statement in this certification may be punishable as a criminal offence under section 53a-157b of the Connecticut General Statutes and under any other applicable law.

Joseph Federico, P.E.
PEN 0013744

Figures

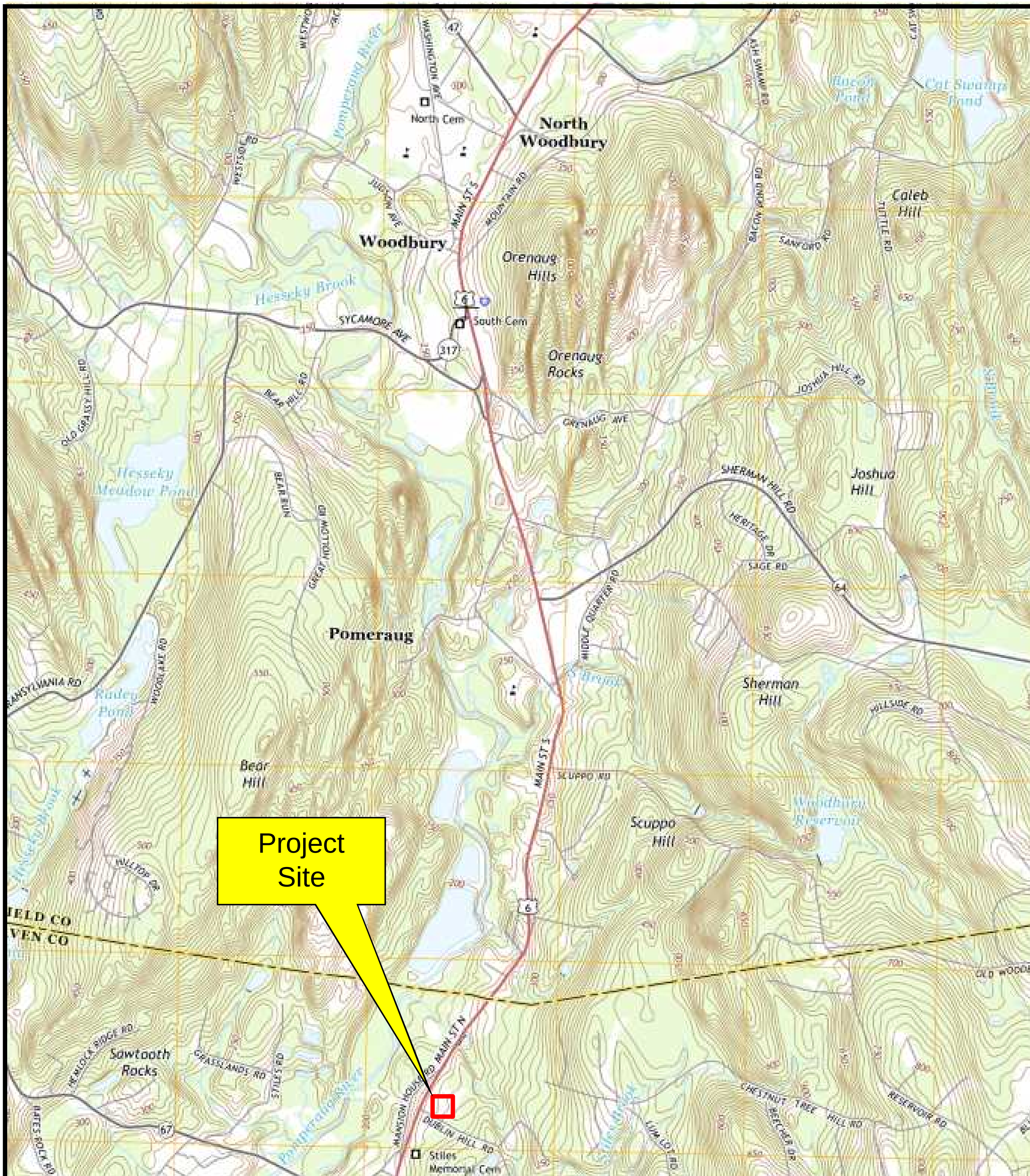


Fig. 1: Locus Map

Lutheran Home of Southbury
Wastewater Management Plan
Southbury, CT

Scale: Not to Scale

BETA

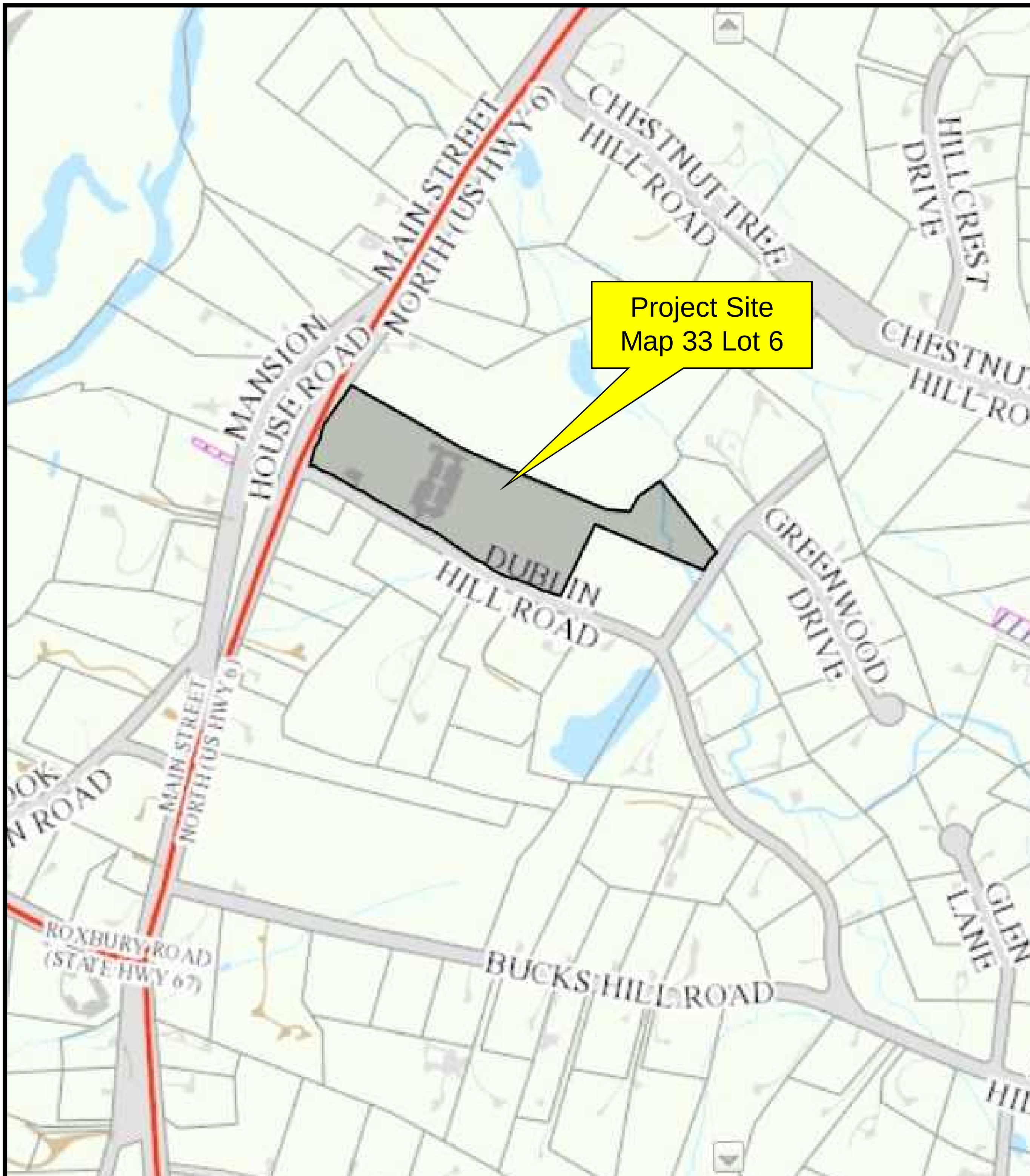
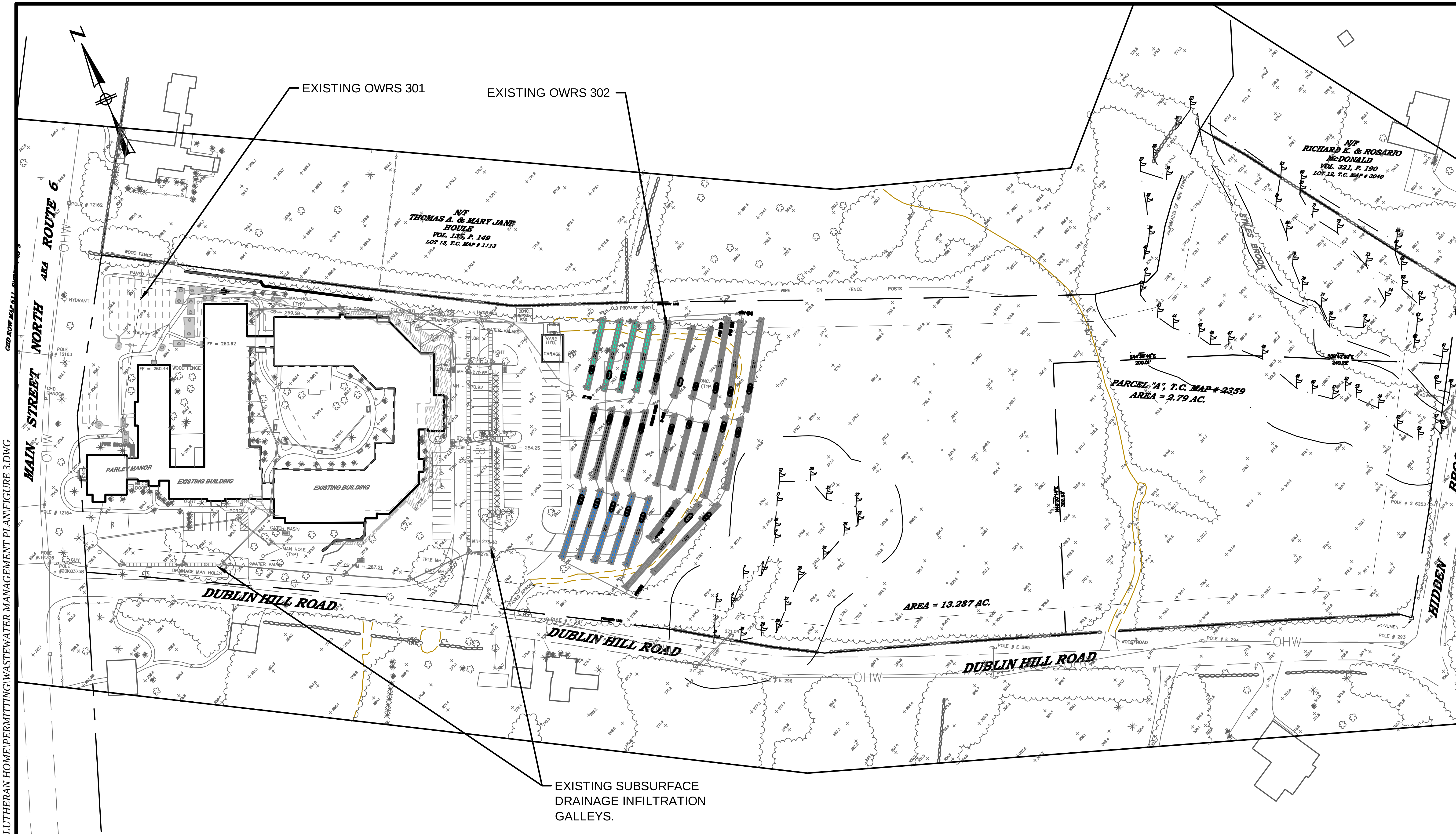


Fig. 2: Lot Location Plan

Lutheran Home of Southbury
Wastewater Management Plan
Southbury, CT

Scale: Not to Scale

BETA



J:\5051 SOUTHBURY LUTHERAN HOME\PERMITTING\WASTEWATER MANAGEMENT PLAN\FIGURE 3.DWG

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Lutheran Home of Southbury
Wastewater Management Plan

Southbury, CT

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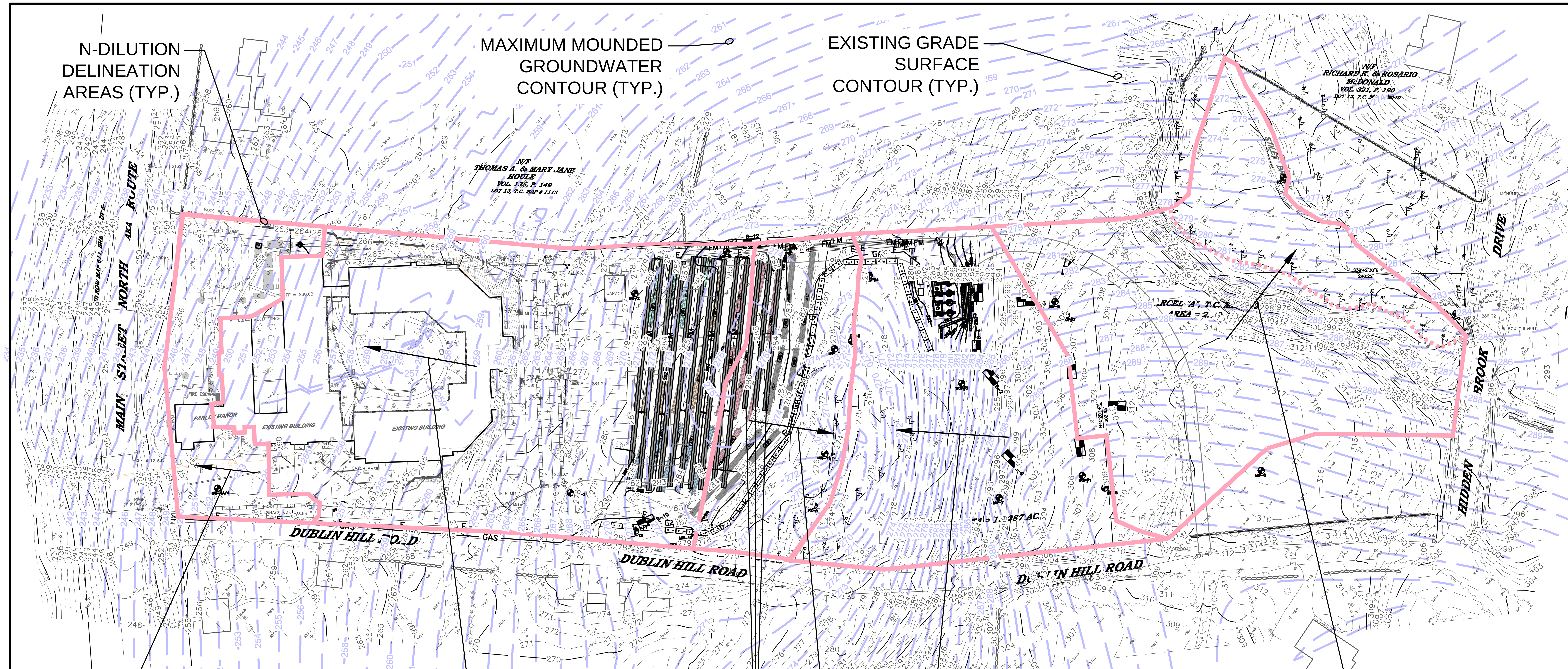
Figure No. 3

Existing Site Plan



GST ZONE-6
OFF LINE SPARE

AREA 1A:
36,605 SF
0.84 AC +/-
HYDROLOGIC GROUP B
COMPOSITE RUNOFF CN = 79

AREA 1B:
187,265 SF
4.30 AC +/-
HYDROLOGIC GROUP B
EXISTING STORMWATER INFILTRATION GALLERIES HAVE RECHARGE CAPACITY FOR UP TO A 10-YEAR STORM. UTILIZE 50% OF ANNUAL INFILTRATION AS A CONSERVATIVE ESTIMATE FOR RECHARGE VOLUME

AREA 2:
HYDROLOGIC GROUP B
50,530 SF (1.16 AC +/-)
COMPOSITE RUNOFF CN = 69

AREA 3:
HYDROLOGIC GROUP B
103,020 SF (2.36 ACRES)
COMPOSITE RUNOFF CN = 55

AREA 4:
HYDROLOGIC GROUP B, CN=55
109,830 SF (2.52 ACRES)
HYDROLOGIC GROUP D, CN=77
33,960 SF (0.78 ACRES)
COMPOSITE RUNOFF CN = 60

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Engineers • Planners • Landscape Architects
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Lincoln, RI 02865
401.333.2382
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P.E. Stamp:

Client:
Southbury Real Estate Group, LLC
990 Main Street North
Southbury, CT 06488

Project
Lutheran Home of Southbury, CT
On-Site Wastewater Renovation System Improvements & Modifications

Title
FIGURE 4: AREAS FOR N-DILUTION

Revisions

No.	Description	Date

File: NitrogenDilutionFigure.dwg
Drawn By: RMB
Designed By: RMB
Checked By: JF
Job No: 5051 Date: March 30,2015

North Arrow
As Shown

Scale

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION
For Regulatory Review Only

Sheet No.:

Plot Date: Apr 12, 2016 2:24pm

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