

**Engineering Report  
Water and Sanitary Sewer**

**For**

**Lake Local  
Site Plan Application**

**550 UNION AVENUE  
SARATOGA SPRINGS, NEW YORK**

**Planning Board #18.xxx**

**Prepared For**

**550 Union, LLC  
550 Union Avenue  
Saratoga Springs, NY 12866  
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40 Long Alley  
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**June 7, 2018**

**I. Introduction**

The proposed project involves the renovation and expansion of the property at 550 Union Avenue occupied by the Lake Local restaurant.

Municipal water and sewer exists in and adjacent to the property.

Water will be supplied for domestic and fire protection from the existing City of Saratoga Springs 8-inch main on Union Avenue, which dead-ends immediately after the existing fire hydrant.

For sanitary sewer collection, new laterals will connect to the existing Saratoga County Sewer District No. 1 sewer main that runs through the property. One lateral will connect directly to an existing sewer manhole. This manhole is also owned by Saratoga County Sewer District No. 1.

**II. Project Description**

The current proposal envisions a year-round 298-seat restaurant with the ability to accommodate 146 seats of outdoor dining comprised of picnic tables and Adirondack chairs lining the beach area.

A new band shelter will be constructed. The existing Board Shop will be expanded to provide a small convenience store/deli where boaters and pedestrians associated with the many lake events can purchase ice, beverages, sandwiches and grab and go items.

The hillside will be stabilized and completely re-landscaped to provide a series of connected modern cottages. These combined with the existing house will provide a 25-bedroom Inn and place for a full time Resident Manager. In the final phase of the project, a 10-room Bed and Breakfast more closely associated with the restaurant will be constructed.

The existing marina will be reconfigured to accommodate 108 rental boat slips and 31 restaurant parking slips.

**III. Existing Water and Sanitary Sewer Utilities**

Municipal water service is currently provided by the City of Saratoga Springs. An 8-inch diameter water main is located on the south side of Union Avenue and dead-end immediately after a fire hydrant.

A hydrant flow test conducted on May 16, 2018 indicate static pressures in the area of Union Avenue near the entrance to Regatta View of 105 pounds per square inch (psi). During flow tests, the downhill hydrant running at approximately 1,500 gallons per minute caused the residual pressure at the test hydrant to drop to 85 psi giving a theoretical available flow of approximately 3,270 gallons per minute at 20 pounds per square inch (psi). Refer to Attachment A for the Hydrant Fire Flow Test Summary provided by Northeast Fire Protection Systems, Inc.

Municipal sanitary sewer service is available from the Saratoga County Sewer District No. 1 (SCSD) at the sanitary sewer main that crosses the property in an easement. The sewer main runs east between the former mobile homes then north across the west side of the Local Restaurant to the SCSD Saratoga Lake #2 pump station near the west end of the Route 9P bridge. Wastewater is conveyed by this lift station to the Saratoga County Sewer District No. 1 (SCSD) collection system around Saratoga Lake. Ultimately the wastewater flows for conveyance and treatment at SCSD's wastewater treatment plant in Mechanicville.

**IV. Projected Water and Wastewater Flows**

The table below provides information on the anticipated wastewater flow rates for the re-development project:

Description		Use Rate	Total Use (gpd)
Hotel/Inn	25 rooms <sup>1</sup>	110 gpd/ea <sup>3</sup>	2,750
Bed and Breakfast	10 rooms <sup>1</sup>	110 gpd/ea <sup>3</sup>	1,100
Restaurant	220 seats <sup>1</sup>	35 gpd/seat <sup>2</sup>	7,700
Bar stools	78 seats <sup>1</sup>	20 gpd/seat <sup>2</sup>	1,560
Outdoor chairs and picnic tables	146 seats <sup>1</sup>	20 gpd/seat <sup>2</sup>	2,920
Marina (rental slips only)	108 slips <sup>1</sup>	20 gpd/ea <sup>2</sup>	<u>2,160</u>
		Total	18,190

1. Room counts, restaurant seats, etc. are estimated based on provided data.
2. From Table B-3, NYSDEC 2014 Design Standards for Wastewater Treatment Systems.
3. From Table 1, NYSDOH Design Standards for Individual Wastewater Treatment Systems.

Average daily flow for wastewater is estimated to be 12.6 gallons per minute (gpm) based on a 24-hour day. Estimated peak hourly flow is 51.8 gpm (4.11 x average).<sup>4</sup>

Average daily demand for water is estimated to be approximately equal to the wastewater flow or 12.6 gpm. Peak hourly demand is estimated to be approximately equal to the peak hourly wastewater flow or 51.8 gpm. Peak instantaneous demand is calculated at 622 gallons per minute (gpm) based on hotel use of 2 gpm per room<sup>5</sup>, restaurant use of 1 gpm per seat<sup>5</sup> and marina use of 1 gpm per rental slip<sup>5</sup>.

For the purposes of input into the City of Saratoga Springs water model, we offer the following estimated water demands for the project:

- Average Day Demand is 12.6 gallons per minute (GPM) over the 24-hour period.
- Max Day Demand is 25.2 gallons per minute (GPM) based on twice the average.
- Peak Hourly Flow is 51.8 gallons per minute (GPM) based on 4.11 times the average.
- Fire Flow Demand is 1,000 gallons per minute (GPM) per ISO guidelines.

## V. Proposed Water and Wastewater Utilities

### Proposed Water Utilities

To service the project, the existing 8-inch water main on Union Avenue is proposed to be wet tapped near the new western driveway access. The new 8-inch connection to the existing 8-inch waterline in Union Avenue will include a wet tap with saddle, isolation valve, and thrust block.

The new 8-inch ductile-iron waterline will be installed parallel to the existing sanitary sewer main with a minimum of 10-feet of horizontal separation as required by the City of Saratoga Springs and 10-State Standards.

Individual building services will be provided. The water services proposed for the buildings are 4-inches or 6-inches in diameter as required to meet peak demands and fire protection needs. Each building will be metered separately.

A fire hydrant will be installed on the property in a parking lot island north of the restaurant.

Needed Fire Flow (NFF) calculations using the ISO Guide for Determination of Needed Fire Flow are presented in Attachment B. The calculation shows a NFF of 750 gallons per minute. This calculation is for a non-sprinklered building. For a building protected by an automatic fire sprinkler system, the ISO states:

*“The NFF for residential occupancies (such as apartment buildings, lodgings and rooming houses, board and care facilities, hotels, motels and dormitories) protected by an automatic fire sprinkler system installed in accordance with the general criteria of NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and including Four-Stories in Height, is the demand at the base of the automatic sprinkler riser”.*

*“The minimum NFF is 1,000 gpm at 20 psi for a duration of 2 hours”.*

Using the minimum given by ISO, the NFF for this facility is 1,000 gpm.

The hydrant flow test data indicates approximately 3,270 gpm at 20 psi. Based on this information, there is adequate fire protection water supply available at the site.

Static pressure in the water main at the point of connection are greater than 100 psi. Considering the proposed buildings are to be at a lower elevation, pressure regulating valves may be needed at each building.

Connections and appurtenances, including tapping sleeves and valves, mechanical joints, tees, isolation valves, fire hydrants, thrust blocks, trenching, bedding, service connections, as well as testing and disinfection will all be specified in accordance with City of Saratoga Springs standards.

#### Proposed Wastewater Utilities

Sanitary service will be provided by using saddle wye connections to existing sewer mains and installing new 6-inch PVC gravity sewer laterals.

A 1,000-gallon exterior grease trap is proposed to handle the restaurant kitchen wastewater. The grease trap was sized according to NYSDEC guidelines using a detention time of 30 minutes and a peak flow estimated at 30 gallons per minute.

Pipe, trenching, bedding, service connections, and testing will be specified in accordance with City of Saratoga Springs and Saratoga County Sewer District No. 1 minimum standards.

#### **Notes**

4. From Figure 1, GLUMRB Recommended Standards for Wastewater Facilities  
 $Q = (18 + P^{1/2}) \div (4 + P^{1/2})$  where  $P$  = population in thousands
5. From Table XV, Community Water Systems Source Book, Ameen.

**Attachments**

Attachment A	Hydrant Flow Test Data
Attachment B	Needed Fire Flow (NFF) Calculations
Attachment C	Water Demand Calculations
Attachment D	Sanitary Sewer Use Calculations

**ATTACHMENT A**  
**HYDRANT FLOW TEST DATA**



# North East Fire Protection Systems Inc.

P.O. BOX 508 BURNT HILLS, N.Y. 12027 (518) 885-1115 FAX (518) 885-0526

## HYDRANT FLOW TEST REPORT

LOCATION: ROUTE 9P BEFORE SARATOGA

LAKE BRIDGE - UNION AVE -

TEST BY: NORTH EAST FIRE & B&B PLBQ

DATE: 5/16/18 TIME: 1:45 PM

TARGET HYD. LOCATION (B) ELEV. 297'

TEST RESULTS: STATIC PRESSURE (B) 105 PSI

RESIDUAL PRESSURE (B) 85 PSI WITH 1500 GPM FLOWING AT (A)

RESIDUAL PRESSURE (B) \_\_\_\_\_ PSI WITH \_\_\_\_\_ GPM FLOWING AT (A)

FLOW HYD. LOCATION (A) ELEV 229'

1) PORT FLOWED (A) 1 DIAMETER 2 1/2

2) PORT FLOWED (A) \_\_\_\_\_ DIAMETER \_\_\_\_\_

3) PORT FLOWED (A) \_\_\_\_\_ DIAMETER \_\_\_\_\_

1) PITOT or FLOW METER READING (A) 80 PSI AT 1500 GPM

2) PITOT or FLOW METER READING (A) \_\_\_\_\_ PSI AT \_\_\_\_\_ GPM

3) PITOT or FLOW METER READING (A) \_\_\_\_\_ PSI AT \_\_\_\_\_ GPM

OUTLET COEFFICIENT USED \_\_\_\_\_

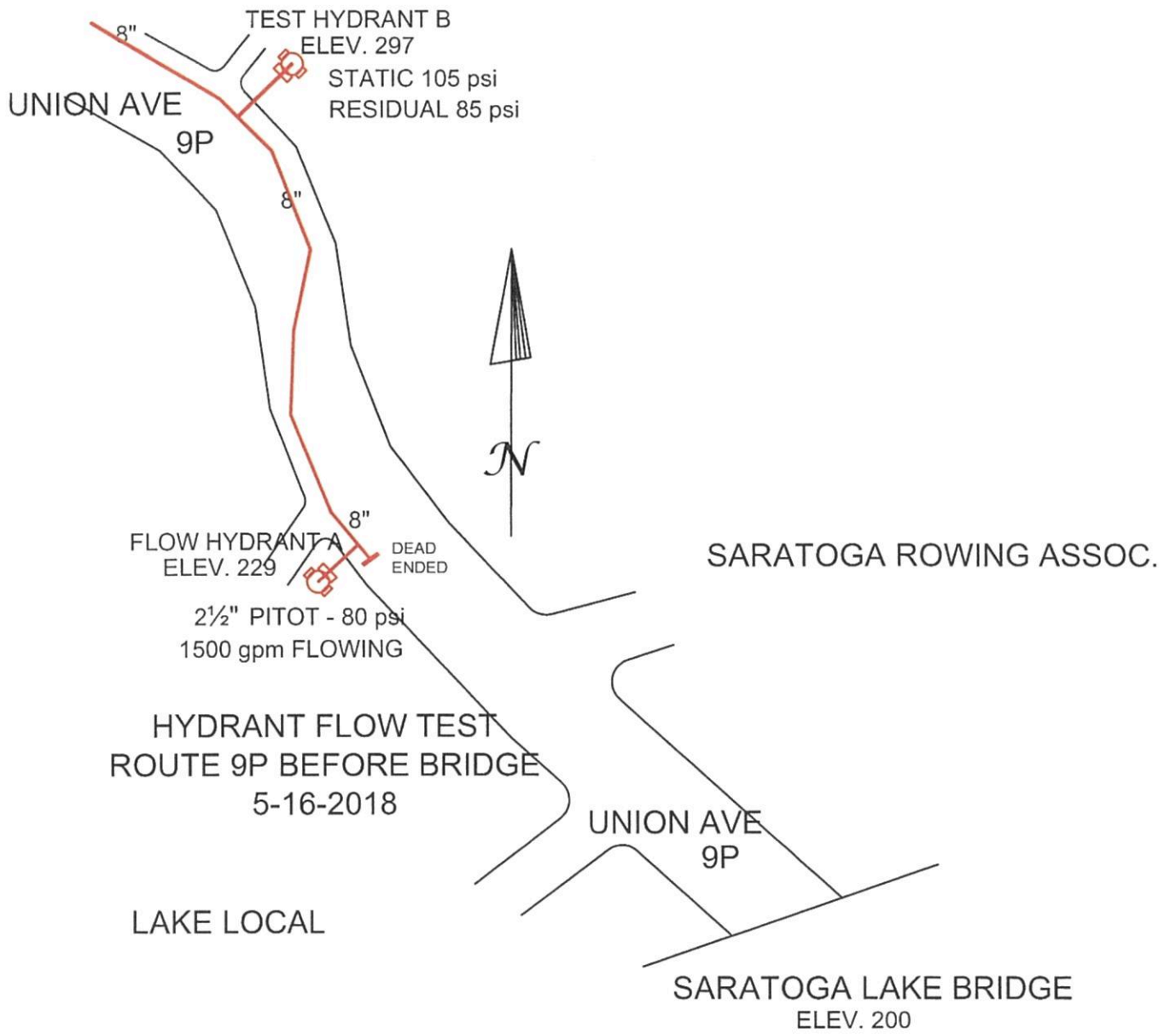
(smooth 0.90) (square & sharp 0.88) (projecting into barrel 0.77)

$$Q_{20} = Q \left( \frac{S - R_{20}}{S - R} \right)^{0.54} = 1500 \left( \frac{105 - 20}{105 - 85} \right)^{0.54} = 1500 (2.18) = 3270 \text{ gpm}$$

ESTIMATED FLOW AT 20 PSI 3270 GPM

LOCATION SKETCH ATTACHED? YES X NO \_\_\_\_\_





CONTRACT NO. \_\_\_\_\_

NAME: SARATOG SPRINGS - RT 9P BEFORE BRIDGE

ADDRESS: UNION AVE.

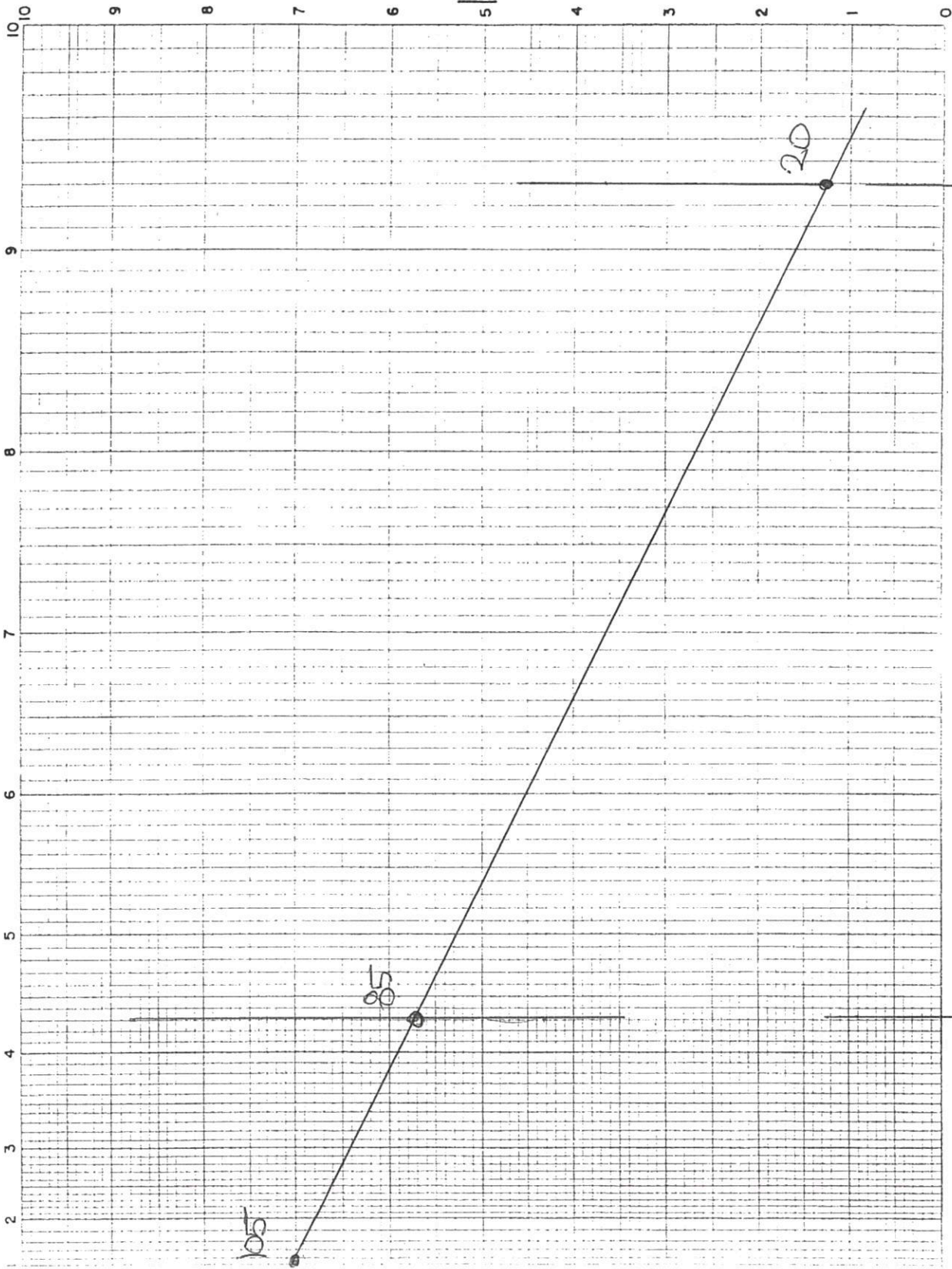
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

SYSTEM NO. \_\_\_\_\_

DATE: 5/16/18

MULTIPLY SCALE BY 15

PSI



MULTIPLY SCALE BY 15  
GPM

GPM

3270 gpm

1500 gpm

**ATTACHMENT B**  
**NEEDED FIRE FLOW (NFF) CALCULATIONS**

**Assumptions: Building is 2 stories.  
 Wood frame construction.  
 10 bed and breakfast rooms (5 per floor).  
 Each floor is 3,000 SF.  
 Nonsprinklered building.**

References: 1. Insurance Services Office (ISO) Guide for Determination of Needed Fire Flow  
 Edition 06-2014

Needed Fire Flow Formula:

$$NFF_i = (C_i)(O_i)[1.0 + (X + P)]_i$$

where:

- NFF = the needed fire flow in gallons per minute
- C<sub>i</sub> = a factor related to the type of construction and effective area
- O<sub>i</sub> = a factor related to the type of occupancy
- X = a factor related to the exposure hazard of adjacent buildings
- P = a factor related to the communication hazard with adjacent buildings

**CONSTRUCTION TYPE**

Construction Class 1 (wood frame construction)  
 Construction type coefficient (F) = 1.5 (Chapter 2, Reference 1)  
 Effective area (A) = 900 SF (600 + 600/2) (50% of each additional floor)

$$C = 18F \times A^{1/2}$$

C = 810.00 gpm  
 C = 750 gpm (rounded to nearest 250 gpm)

**OCCUPANCY TYPE**

Motel (Rooming House)  
 Occupancy combustibility class C-2 (Limited Combustibility)  
 Occupancy Factor (O) = 0.85 (Chapter 3, Reference 1)

**EXPOSURES AND COMMUNICATION**

Exposure Factor (X) = none (Chapter 4, Reference 1, exception for habitational and sprinklered)  
 Exposure and Communication Factor (X + P) = 0.00

**CALCULATION**

$$NFF = (C)(O)(1+(X+P))$$

NFF = 637.50 gpm  
 NFF = 750 gpm (rounded to nearest 250 gpm)

**ATTACHMENT C**  
**WATER DEMAND CALCULATIONS**

CALCULATIONS FOR WATER DEMAND

DETERMINE DAILY AVERAGE AND PEAK HOURLY DEMAND

HOTEL/INN:

NO. OF ROOMS 25 EA  
DESIGN FLOW = 110 GPD/EA (NYSDEC) \*  
 $Q_a = \frac{110}{2,750} \text{ GPD}$

BED AND BREAKFAST:

NO. OF ROOMS 10 EA  
DESIGN FLOW = 110 GPD/EA (NYSDEC) \*  
 $Q_b = \frac{110}{1,100} \text{ GPD}$

RESTAURANT:

NO. OF ORDINARY SEATS 220 EA  
DESIGN FLOW = 35 GPD/EA (NYSDEC) \*  
 $Q_c = \frac{35}{7,700} \text{ GPD}$

BAR STOOLS:

NO. OF SEATS 78 EA  
DESIGN FLOW = 20 GPD/EA (NYSDEC) \*  
 $Q_d = \frac{20}{1,560} \text{ GPD}$

OUTDOOR CHAIRS/PICNIC TABLES:

NO. OF SEATS 146 EA  
DESIGN FLOW = 20 GPD/EA (NYSDEC) \*  
 $Q_e = \frac{20}{2,920} \text{ GPD}$

MARINA:

NO. OF RENTAL SLIPS 108 EA (RESTAURANT SLIPS NEGLECTED)  
DESIGN FLOW = 20 GPD/EA (NYSDEC) \*  
 $Q_f = \frac{20}{2,160} \text{ GPD}$

\* NYSDEC 2014 DESIGN STANDARDS TABLE B-3 "Typical Per-Unit Loading Rates"

FOR THE PEAK SEASON (MAY TO OCTOBER):

PEAK SEASON TOTAL	18,190	GPD (Qa thru Qf)	
	445,655	CF/YR (BASED ON 183 DAYS)	
AVG. DAILY DAMAND, $Q_{av}$ =	12.6	GPM	(24 HRS)
MAX. DAILY DAMAND, $Q_{max}$ =	25.2	GPM	(TWICE THE AVG.)
POPULATION	250	EA	(10-STATE STDS. PAGE
PEAKING FACTOR, $Q_p/Q_{av}$	4.11		10-5, FIG. 1, BASED ON
			75 GPD/PERSON)
PEAK HOURLY FLOW, $Q_p$ =	51.8	GPM	

FOR THE OFF-PEAK SEASON (NOVEMBER TO APRIL):

OFF-PEAK SEASON TOTAL	13,110	GPD (Qa thru Qd)	
	318,573	CF/YR (BASED ON 182 DAYS)	
AVG. DAILY DAMAND, $Q_{av}$ =	9.1	GPM	(24 HRS)
MAX. DAILY DAMAND, $Q_{max}$ =	18.2	GPM	(TWICE THE AVG.)
POPULATION	180	EA	(10-STATE STDS. PAGE
PEAKING FACTOR, $Q_p/Q_{av}$	4.16		10-5, FIG. 1, BASED ON
			75 GPD/PERSON)
PEAK HOURLY FLOW, $Q_p$ =	37.9	GPM	
TOTAL USE FOR YEAR =	764,228	CF/YR	

DETERMINE INSTANTANEOUS DEMAND

FOR THE PEAK SEASON (MAY TO OCTOBER):

INN/B&B:

NO. OF ROOMS 35 EA  
DESIGN FLOW = 2 GPM/UNIT (AMEEN TABLE XV)\*\*  
 $Q_a = \frac{2}{70} \text{ GPM}$

RESTAURANT:

NO. OF SEATS 444 EA  
DESIGN FLOW = 1 GPM/SEAT (AMEEN TABLE XV)\*\*  
 $Q_b = \frac{1}{444} \text{ GPM}$

MARINA:

NO. OF RENTAL SLIPS 108 EA  
DESIGN FLOW = 1 GPM/SLIP (AMEEN TABLE XV)\*\*  
 $Q_c = \frac{1}{108} \text{ GPM}$

TOTAL INSTANTANEOUS  $\frac{\quad}{\quad}$  622 GPM (Qa thru Qc)

FOR THE OFF-PEAK SEASON (NOVEMBER TO APRIL):

INN/B&B:

NO. OF ROOMS 35 EA  
DESIGN FLOW = 2 GPM/UNIT (AMEEN TABLE XV)\*\*  
 $Q_a = \frac{2}{70} \text{ GPM}$

RESTAURANT:

NO. OF SEATS 298 EA  
DESIGN FLOW = 1 GPM/SEAT (AMEEN TABLE XV)\*\*  
 $Q_b = \frac{1}{298} \text{ GPM}$

TOTAL INSTANTANEOUS  $\frac{\quad}{\quad}$  368 GPM (Qa thru Qb)

\*\* AMEEN TABLE XV "Instantaneous Water Demands for Commercial Areas"



**ATTACHMENT D**  
**SANITARY SEWER USE CALCULATIONS**

CALCULATIONS FOR SANITARY SEWAGE USE

DETERMINE DAILY AVERAGE AND PEAK HOURLY FLOWS

HOTEL/INN:

NO. OF ROOMS 25 EA  
 DESIGN FLOW = 110 GPD/EA (NYSDEC) \*  
 $Q_a = \frac{110 \times 25}{1} = 2,750 \text{ GPD}$

BED AND BREAKFAST:

NO. OF ROOMS 10 EA  
 DESIGN FLOW = 110 GPD/EA (NYSDEC) \*  
 $Q_b = \frac{110 \times 10}{1} = 1,100 \text{ GPD}$

RESTAURANT:

NO. OF ORDINARY SEATS 220 EA  
 DESIGN FLOW = 35 GPD/EA (NYSDEC) \*  
 $Q_c = \frac{35 \times 220}{1} = 7,700 \text{ GPD}$

BAR STOOLS:

NO. OF SEATS 78 EA  
 DESIGN FLOW = 20 GPD/EA (NYSDEC) \*  
 $Q_d = \frac{20 \times 78}{1} = 1,560 \text{ GPD}$

OUTDOOR CHAIRS/PICNIC TABLES:

NO. OF SEATS 146 EA  
 DESIGN FLOW = 20 GPD/EA (NYSDEC) \*  
 $Q_e = \frac{20 \times 146}{1} = 2,920 \text{ GPD}$

MARINA:

NO. OF RENTAL SLIPS 108 EA (RESTAURANT SLIPS NEGLECTED)  
 DESIGN FLOW = 20 GPD/EA (NYSDEC) \*  
 $Q_f = \frac{20 \times 108}{1} = 2,160 \text{ GPD}$

TOTAL 18,190 GPD (Qa thru Qf)

AVG. DAILY FLOW,  $Q_{av} = 12.6 \text{ GPM (24 HRS)}$

POPULATION 250 EA (10-STATE STDS. PAGE  
 PEAKING FACTOR,  $Q_p/Q_{av} = 4.11$  10-5, FIG. 1, BASED ON  
 75 GPD/PERSON)

PEAK HOURLY FLOW,  $Q_p = 51.8 \text{ GPM}$

\* NYSDEC 2014 DESIGN STANDARDS TABLE B-3 "Typical Per-Unit Loading Rates"

DETERMINE PEAK KITCHEN WASTE FLOWS

QTY	DESCRIPTION	DFU* (EACH)	TOTAL DFU
<u>KITCHEN:</u>			
4	DISHWASHERS	4	16
2	BAR SINKS	2	4
2	KITCHEN SINKS	2	4
4	FLOOR DRAINS	2	8
TOTAL			32

SAY 35 DFU

PEAK FLOW = 25 GPM (ESTIMATED FOR 35 DFU)

USE FOR DESIGN 30 GPM

\* DRAINAGE FIXTURE UNITS FROM NYS BLDG. CODE TABLE 709.1