

**Engineering Report
Water and Sanitary Sewer**

For

**Lake Local
Site Plan Application**

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

Planning Board #18.037

Prepared For

**550 Union, LLC
550 Union Avenue
Saratoga Springs, NY 12866
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Prepared By

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40 Long Alley
Saratoga Springs, New York 12866**



June 7, 2018

Revised August 16, 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 serving the restaurant sanitary waste will connect directly to an existing sewer manhole. This manhole is also owned by Saratoga County Sewer District No. 1. A second lateral will connect directly to the main at a wye to serve the kitchen waste. A 1,000-gallon grease trap is proposed on this lateral.

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 converted to serve as the marina office. There are no bathrooms in this building.

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's 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)
Restaurant	220 seats ¹	35 gpd/seat ²	7,700
Bar stools	78 seats ¹	20 gpd/seat ²	1,560
Outdoor chairs and picnic tables	146 seats ¹	20 gpd/seat ²	2,920
Marina (rental slips only)	108 slips ¹	20 gpd/ea ²	<u>2,160</u>
		Total	14,340

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

Average daily flow for wastewater is estimated to be 10.0 gallons per minute (gpm) based on a 24-hour day. Estimated peak hourly flow is 41.5 gpm (4.15 x average).⁴

Average daily demand for water is estimated to be approximately equal to the wastewater flow or 10.0 gpm. Peak hourly demand is estimated to be approximately equal to the peak hourly wastewater flow or 41.5 gpm. Peak instantaneous demand is calculated at 552 gallons per minute (gpm) based on restaurant use of 1 gpm per seat⁵ and marina use of 1 gpm per rental slip⁵.

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 10.0 gallons per minute (GPM) over the 24-hour period.
- Max Day Demand is 20.0 gallons per minute (GPM) based on twice the average.
- Peak Hourly Flow is 41.5 gallons per minute (GPM) based on 4.15 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 1,750 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 commercial occupancies protected by an automatic fire sprinkler system installed in accordance with the general criteria of NFPA 13R, Standard for the Installation of Sprinkler Systems, is the demand at the base of the automatic sprinkler riser” and inside/outside hose stream.

Using the minimum given by ISO, the NFF for this facility is 1,750 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 a saddle wye connection to the existing sewer main 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

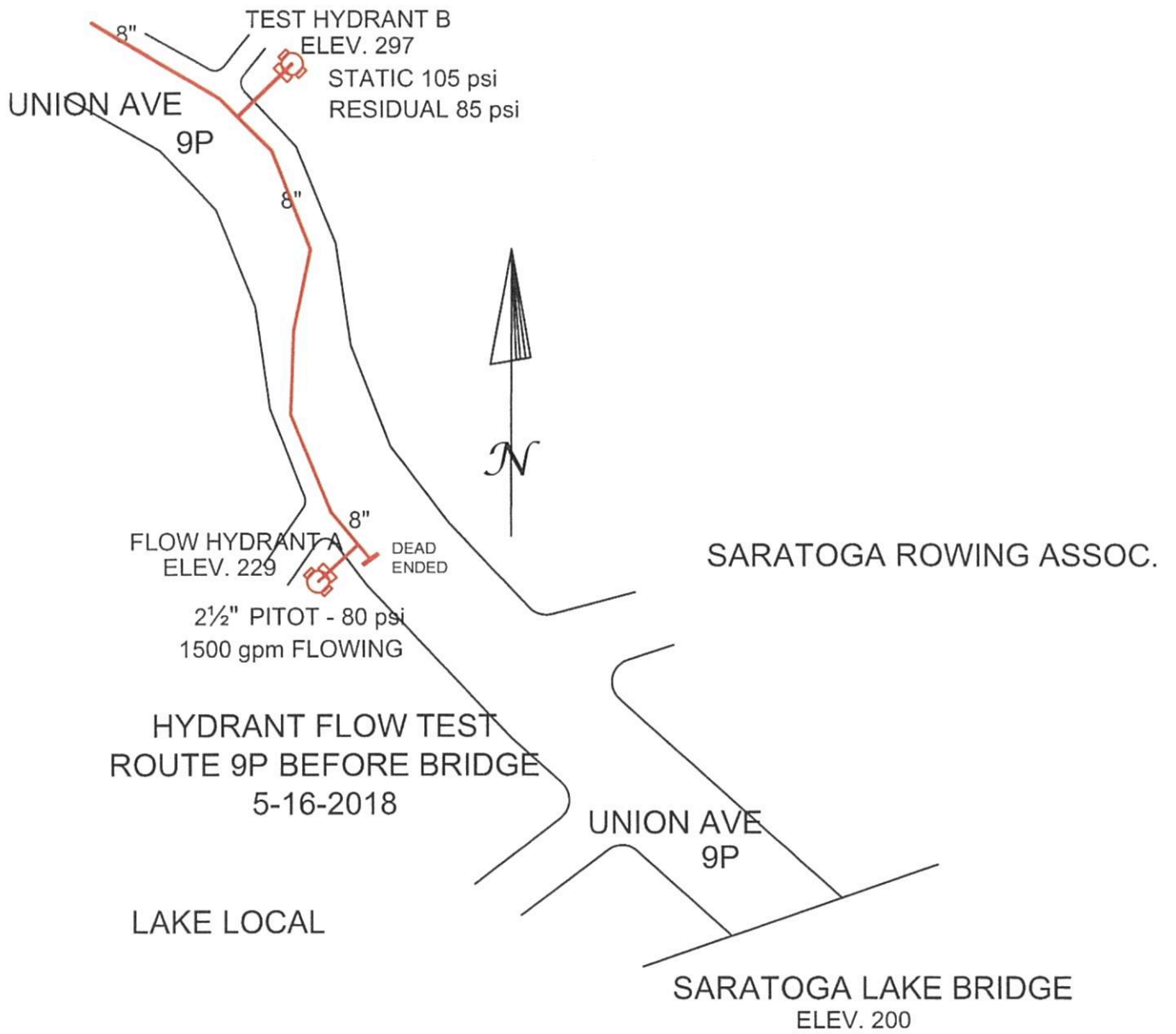
OUTLET COEFFICIENT USED _____

(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.

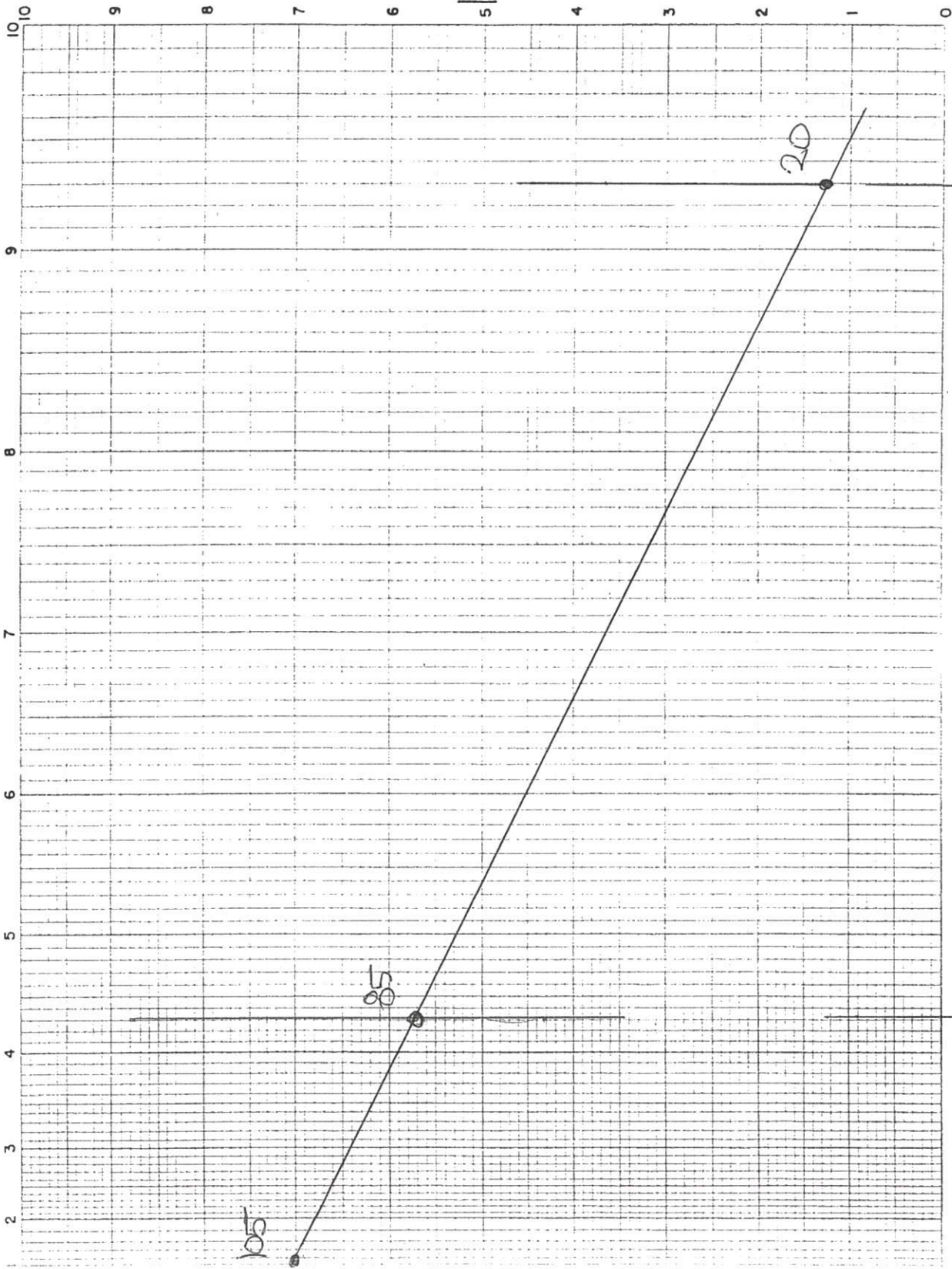
SHEET NO. _____ OF _____

SYSTEM NO. _____

DATE: 5/16/18

MULTIPLY SCALE BY 15

PSI



MULTIPLY SCALE BY 150
GPM

GPM

3270 gpm

1500 gpm

ATTACHMENT B
NEEDED FIRE FLOW (NFF) CALCULATIONS

ATTACHMENT C
WATER DEMAND CALCULATIONS

CALCULATIONS FOR WATER DEMAND

DETERMINE DAILY AVERAGE AND PEAK HOURLY DEMAND

RESTAURANT:

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

BAR STOOLS:

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

OUTDOOR CHAIRS/PICNIC TABLES:

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

MARINA:

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

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

FOR THE PEAK SEASON (MAY TO OCTOBER):

PEAK SEASON TOTAL	14,340	GPD (Qa thru Qf)	
	351,330	CF/YR (BASED ON 183 DAYS)	
AVG. DAILY DAMAND, Q _{av} =	10.0	GPM	(24 HRS)
MAX. DAILY DAMAND, Q _{max} =	20.0	GPM	(TWICE THE AVG.)
POPULATION	200	EA	(10-STATE STDS. PAGE
PEAKING FACTOR, Q _p /Q _{av}	4.15		10-5, FIG. 1, BASED ON
			75 GPD/PERSON)
PEAK HOURLY FLOW, Q _p =	41.5	GPM	

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

OFF-PEAK SEASON TOTAL	9,260	GPD (Qa thru Qd)	
	225,018	CF/YR (BASED ON 182 DAYS)	
AVG. DAILY DAMAND, Q _{av} =	6.4	GPM	(24 HRS)
MAX. DAILY DAMAND, Q _{max} =	12.8	GPM	(TWICE THE AVG.)
POPULATION	130	EA	(10-STATE STDS. PAGE
PEAKING FACTOR, Q _p /Q _{av}	4.21		10-5, FIG. 1, BASED ON
			75 GPD/PERSON)
PEAK HOURLY FLOW, Q _p =	26.9	GPM	
TOTAL USE FOR YEAR =	576,348	CF/YR	

ATTACHMENT D
SANITARY SEWER USE CALCULATIONS

CALCULATIONS FOR SANITARY SEWAGE USE

DETERMINE DAILY AVERAGE AND PEAK HOURLY FLOWS

RESTAURANT:

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

BAR STOOLS:

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

OUTDOOR CHAIRS/PICNIC TABLES:

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

MARINA:

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

TOTAL 14,340 GPD (Qa thru Qd)

AVG. DAILY FLOW, Q_{av} = 10.0 GPM (24 HRS)

POPULATION 200 EA (10-STATE STDS. PAGE
PEAKING FACTOR, Q_p/Q_{av} 4.15 10-5, FIG. 1, BASED ON
75 GPD/PERSON)

PEAK HOURLY FLOW, Q_p = 41.5 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