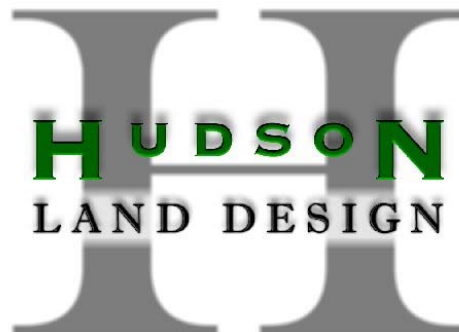
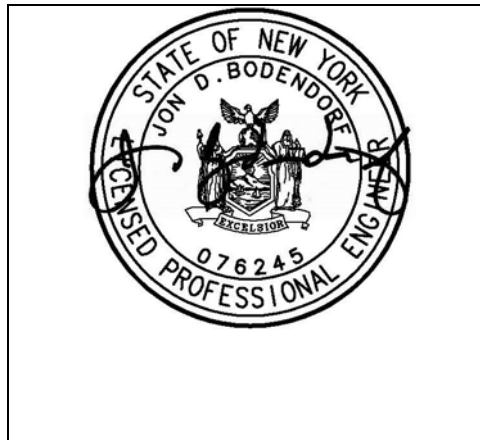


***Water and Sewer Engineer's Report:
for
Edgewater***

Prepared for:
Scenic Beacon Developments, LLC
29 East Main Street
Beacon, NY 12508

August 29, 2017
Revised September 26, 2017



Prepared by:
Hudson Land Design Professional Engineering, P.C.
176 Main Street
Beacon, NY 12508

TABLE OF CONTENTS

1.0	PROJECT LOCATION	1
2.0	PROJECT DESCRIPTION	1
3.0	ESTIMATED WATER & WASTEWATER QUANTITIES	2
4.0	WATER SUPPLY	2
5.0	SEWAGE CONVEYANCE	4

APPENDICES

Appendix A: Hydrant Flow Test Results

Appendix B: Water Main Loop Map

1.0 PROJECT LOCATION

The Edgewater project is located at 22 Edgewater Place, and sits on approximately 12 acres of land near the intersection of Bank Street and Tompkins Terrace, and Bank Street and Branch Street in the City of Beacon, Dutchess County, New York. The property is identified as parcel numbers 5954-25-581985, 5955-19-590022, 5954-25-566983 and 5954-25-574979 on the City of Beacon Tax Maps.

2.0 PROJECT DESCRIPTION

The project consists of the demolition of an existing apartment building and residential dwelling to allow for construction of 7 new residential buildings with internal travel-ways, parking areas, site infrastructure and landscaped areas. A new water main will be installed and is proposed to be dedicated to the City as part of this project. New private sewer lines will also be constructed to convey sewage to the City of Beacon sewer system.

Water for the project will be obtained by making a connection to the existing City of Beacon water supply system. Wastewater generated by the project will be disposed of by means of a new sewer main that will convey wastewater flows to the existing City of Beacon sewer collection system.

This report summarizes all data and information necessary for the design of the water and sewer infrastructure that will serve the project.

The project has been designed in accordance with the following:

- New York State Department of Health (NYSDOH) Standards for Individual Water Supply and Individual Sewage Treatment Systems Appendix 75-A
- Dutchess County Department of Health (DCDOH) Water and Wastewater Systems Design and Construction Standards
- New York State Department of Environmental Conservation (NYSDEC) "Design Standards for Wastewater Treatment Works" for Intermediate Sized Sewage Facilities.
- Recommended Standards For Wastewater Facilities (Ten States Standards)

3.0 ESTIMATED WATER & WASTEWATER QUANTITIES

At full build-out, the project is expected to generate 42,350 gallons of wastewater per day. Based on previous conversations with the City of Beacon Sewer Superintendent, the City's existing sewer infrastructure and sewer treatment plant have sufficient capacity to handle the anticipated increase in daily sewage load; however the West Main Street sewer pump station may require upgrades to handle the additional flows generated from this site, and other new construction sites that flow toward this pump station. Hudson Land Design has engaged in conversations with the City Engineer and Sewer Superintendent regarding the sewer pump station and forcemain. Discussions will continue with the engineer and superintendent as City's hydraulic model of the sewer system is updated. The site currently contains an apartment building, and a single family residence. Both structures will be demolished and removed; thereby eliminating any current inflow and infiltration (I&I) entering the City sewer system from the site.. The following table provides estimated water usage/wastewater generation at full buildout of the project, according to the NYSDEC Design Standards for Wastewater Treatment Works, 2014.

Water and wastewater quantities for the project are based on the following:

Flow Component	# of Units	Flow Rate per Unit - gallons per day (gpd)	Total Component Flow (gpd)
Residential (385 bedrooms*)	110 per bedroom	42,350 gpd	Residential (385 bedrooms*)

*The current bedroom breakdown is as follows: 53 studio, 182 one-bedroom, 66 two-bedroom, and 6 three-bedroom apartments.

Total Flow: 42,350 gpd

4.0 WATER SUPPLY

At full build-out, the project is expected to require 42,350 gallons of water per day. Based on previous conversations with the City of Beacon Water and Sewer Superintendent, the anticipated increase in daily water demand is readily available for this project. There is a 6" cast iron (CI) water main that runs beneath Tompkins Terrace, and an 8" CI main that runs beneath Bank Street. An 8" CI spur that runs into the site beneath Branch Street from Bank Street to an existing hydrant. It is proposed to connect to the 6" CIP on Tompkins Terrace with 8" ductile iron pipe (DIP). The 8" DIP will be brought through the site to provide water supply to the new buildings which will continue down to Branch Street and connect to the 8" CIP forming a looped connection to the City water system. The new 8" water main will be dedicated to the City once installed and certified. New fire hydrants and periodic isolation valves will be provided within the site. A 20' wide utility easement will be granted to the City for maintenance purposes. Flow

and pressure tests have been conducted on existing hydrants near the site to confirm that adequate flow and pressure are available for the project.

Approximately 2,280 lf of 8" diameter class 52 ductile iron water main extension will be installed to serve the project. The water main is proposed to be dedicated to the City of Beacon. New 6" class 52 ductile iron service lines will be provided to each building and then split to provide fire flow and domestic service. The two existing water service connections to the

The new water main shall have gate valves and hydrants as shown on the plan set. Nine (9) gate valves and five (5) hydrants are proposed. It should be noted that one of the hydrants is an existing one that will be relocated along Branch Street. A minimum pressure of 20 pounds per square inch shall be maintained at the furthest point in the distribution.

Hydrant flow tests were performed in conjunction with the City's Water and Sewer Department on May 25, 2017. Two hydrants were tested, and for each test, two additional hydrants were monitored for pressure loss. For the first test, the measured static pressure at the monitoring hydrants was 90 psi (RH1) and 120 psi (RH2), while static pressure at the test hydrant was 98 psi. The measured flow from the test hydrant (TH1) was 1,353 gallons per minute (gpm) with a pitot reading of 65 psi. The residual pressure at the monitoring hydrants was 70 psi (RH1) and 95 psi (RH2) respectively.

For the second test, the measured static pressure at the monitoring hydrants was 120 psi (RH3) and 138 psi (RH4), while the static pressure at test hydrant #2 was 120 psi. The measured flow from the test hydrant (TH2) was 1,453 gpm with a pitot reading of 75 psi. The residual pressure at the monitoring hydrants was 94 psi (RH3) and 96 psi (RH4) respectively.

The resultant available flows at hydrants RH1, RH2, RH3 and RH4 are 2,661 gpm, 2,860 gpm, 3,008 gpm and 2,538 gpm respectively. Therefore, the available capacity and pressure for the project appears to be more than adequate. The results of the tests and a sketch showing the hydrant locations are attached in Appendix A.

Using the results obtained for the two hydrants closest to the project (RH1 and RH2), anticipated fire flows and available static pressures from the proposed hydrants can be estimated via linear interpolation. The following table represents the anticipated available fire flows and static pressures for the project's proposed hydrants:

Hydrant ID/location	Elevation (ft)	Anticipated Fire Flow (gpm)	Anticipated static pressure (psi)
1 (Near Tompkins Ave entrance)	112	2,711	98
2 (Near walking path pavilion)	90	2,772	107

3 (South of Buildings 4 and 5)	71	2,824	115
4 (Southeast of Buildings 2 and 3)	101	2741	102

A spread sheet showing the equation used for the interpolated results is included in Appendix A. In addition, the estimated available pressure at each building's highest water fixture is provided, which is based on these results.

All minimum separation distance requirements from the water main and individual service connections shall be maintained. A minimum of 10 feet of separation is required between water and sewer lines that are running parallel. If a water line and a sewer line must cross, they shall do so perpendicular to each other. A minimum of 18" shall be provided from the crown of the sewer pipe to the bottom of the water pipe or the crown of the water pipe to the bottom of the sewer pipe.

4.1 Proposed Water Main Dedication to the City

The water main is proposed to be dedicated to the City. There is concern that the proposed water main that will loop the City's water system only provides a benefit to the project. The MTA has recently proposed a multi-use development just below the site within their existing parking lot. The MTA project would include a building with a parking garage beneath multi-use on the upper floors. Currently, there is a single dead-end 6" CIP water main that enters the site. There is an opportunity to provide a looped connection through the site by extending the existing water main through their site, and provide a looped connection to the water main within Edgewater. This will allow for the MTA property to be fed in two directions, and more importantly, will allow for back-feed to the existing 6" main within West Main Street in the event of water main break. The Applicant will provide a stub to the MTA property for this purpose. A map showing this connection is provided in Appendix B

5.0 SEWAGE CONVEYANCE

The project is expected to generate 42,350 gallons of wastewater per day. Per conversations with the City of Beacon Sewer Superintendent, the City's existing sewer infrastructure and sewer treatment plant have sufficient capacity to handle the anticipated increase in daily sewage load. Approximately 1,010 lf of 8" SDR 35 PVC sewer main will be installed on site to convey the sewage to the City's municipal main. Most of the site's existing sewer service connections are old and likely experience infiltration and inflow (I&I) problems. During rain storms, the flow into the City's sewer mains increases dramatically, which is a common problem in cities with old buildings. The increase in flow adds unnecessary strain to the existing sewer mains and sewer plant. There is currently an existing sewer line with a manhole located within Edgewater place where residential buildings once stood. The sewer manhole will be removed, and the sewer line will be disconnected from the City system. The existing service connections from the apartment

building and residential dwelling will disconnected and plugged at the connection as well. Disconnection of these structures and pipes will eliminate any potential I&I flows into the City sewer system that are currently occurring on site; thus reducing I&I flow surges to the City's municipal system during rain storms.

Each building will be provided with a new 6" SDR 35 PVC sewer service connection to the new sewer main. Minimum pitch on the individual sewer laterals shall be 1% slope. Raw line inverts that will provide for acceptable pitch from the proposed buildings to the sewer collection system have been provided on the plans. All of the loft service lines will be connected to a 6" SDR 35 PVC header that will convey the sewage to a proposed on-site sewer manhole. The minimum slope on the 6" sewer lines shall be 1.0%.

Ten (10) sanitary manholes are proposed at changes of direction and pipe slope. The minimum slope on 8-inch sewer main shall be 0.40%. Sewer mains shall be laid in straight alignment. The sewer main shall be tested for alignment and exfiltration and the sanitary manholes shall be hydrostatically tested in accordance with the requirements on the subdivision plan set.

The new sewer main will connect to a proposed doghouse manhole located in Branch Street. Sewage will be conveyed to the City owned sewer treatment plant which has a reported excess capacity of 6 million gallons per day.

APPENDIX A

Hydrant Flow Test Results

Job:	Edgewater	
Job No.:	2016:015	
Description:	Hydrant Flow Test #1	
Prep. By:	AG	Date: 5/25/2017
Check By:	MAB	Date:



174 Main Street
Beacon NY 12508
845-440-6926

Hydrant Flow Test #1

Location: Edgewater Place
 Personnel: M. Bodendorf, B. Butler, A. Gasparre
 Test date: 5/16/2017
 Test time: 11:30 p.m.

Tested (Observed) Flow:

Hydrant ID:	1	Static Pressure:	98 psi
Location:	Corner of Bank St and Tompkins Ave.		
Calculated Discharge (Q_r):	$Q_r = 29.83(c_d)(D^2)(P_p)^{0.5}$		
Where:			
Nozzle Size (D):	2.5 inches		
Pitot Reading (P_p):	65 psi		
Friction Loss Coefficient (c_d):	0.9	(0.9 typical for smooth 2.5" opening)	
Calculated Q_r :	1353 gpm		

Calculated Available Flow:

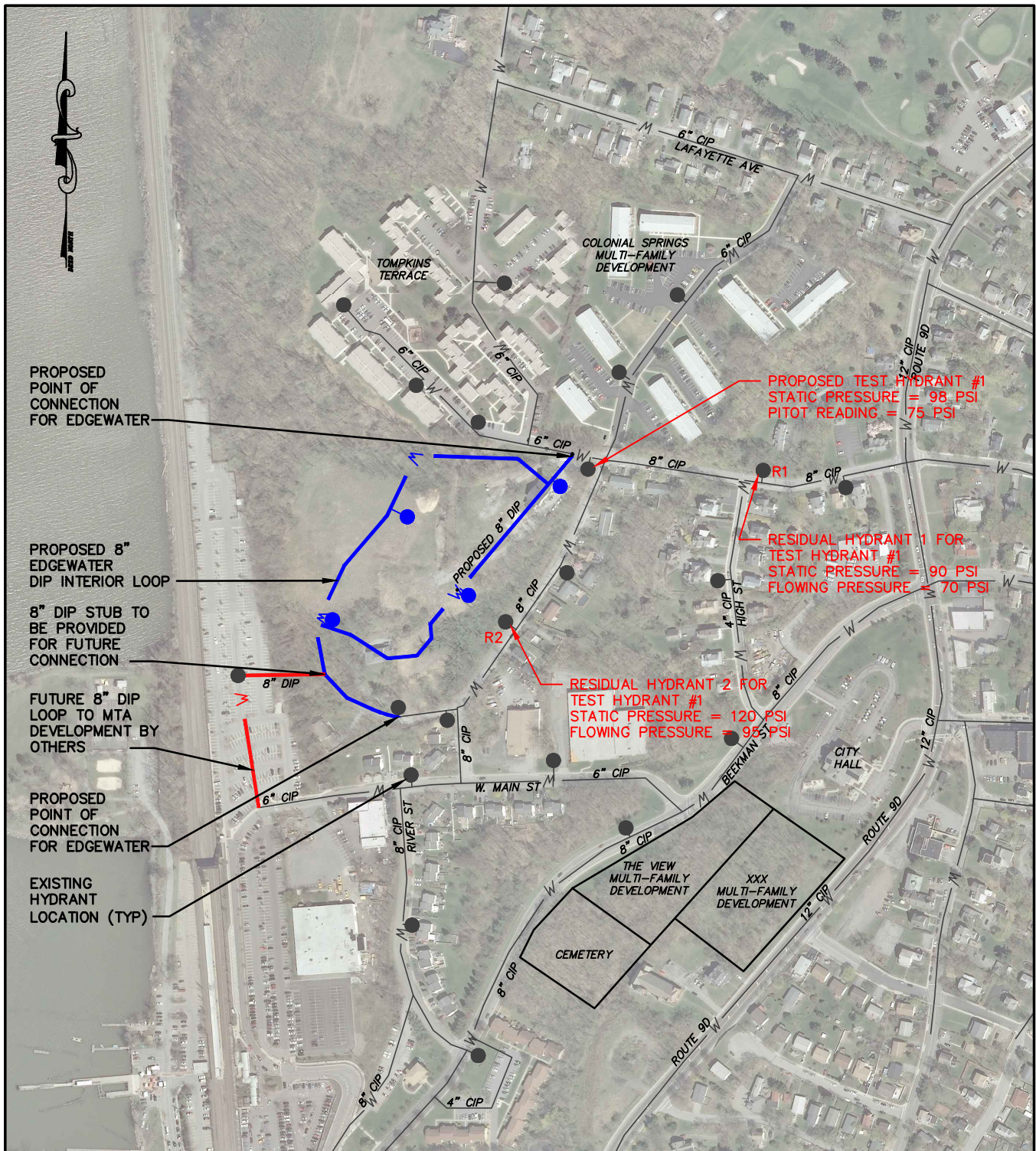
Residual Hydrant ID: 1
 Location: Corner of High St & Tompkins Terrace
 Calculated Fire Flow (Q_f): $Q_f = Q_r((P_s - P_f)/(P_s - P_r))^{0.54}$
 Where:
 Static pressure (P_s): 90 psi
 Residual pressure (P_r): 70 psi
 Desired pressure at fire flow (P_f): 20 psi
 Calculated Q_f : 2661 gpm
 Hydrant Classification/Color⁽¹⁾: Class AA - Light Blue

Calculated Available Flow:

Residual Hydrant ID: 2
 Location: Western Side of Bank Street, North of W. Main St
 Calculated Fire Flow (Q_f): $Q_f = Q_r((P_s - P_f)/(P_s - P_r))^{0.54}$
 Where:
 Static pressure (P_s): 120 psi
 Residual pressure (P_r): 95 psi
 Desired pressure at fire flow (P_f): 20 psi
 Calculated Q_f : 2860 gpm
 Hydrant Classification/Color⁽¹⁾: Class AA - Light Blue

Notes:

- 1) Per AWWA C502. Color shall be as designated in Federal Standard 595B, top and nozzle caps to be painted.
- 2) Consult with local water operator to verify color schemes and parts to be painted.
- 3) Hydrant colors shall signify only the approximate capacity of the individual hydrant as tested alone, and not its capacity when more than one hydrant in the vicinity is in use. The marking of the hydrant is not to be considered as in any way guaranteeing the capacity indicated by the color.



WATER MAIN TEST MAP 1

SCALE: 1" = 400'

DATE: MAY 2, 2017

(REVISED MAY 25, 2017)

PREPARED FOR:
SCENIC BEACON DEVELOPMENTS, LLC

9-11 CREEK DRIVE

CITY OF BEACON

DUTCHESS COUNTY, NEW YORK

TAX PARCEL 5954-25-566983, 574979, 582985, & 5955-19-590022



PREPARED BY:
HUDSON LAND DESIGN
PROFESSIONAL ENGINEERING

174 MAIN STREET
BEACON, NY 12508
PH: 845-440-6926

Job: Edgewater
 Job No.: 2016'015
 Description: Hydrant Flow Test #1
 Prep. By: AG Date: 5/25/2017
 Check By: MAB Date:

Hydrant Flow Test #1

Location: Edgewater Place
 Personnel: M. Bodendorf, B. Butler, A. Gasparre
 Test date: 5/16/2017
 Test time: 11:30 p.m.

Tested (Observed) Flow:

Hydrant ID:	1	Static Pressure:	98 psi
Location:	Corner of Bank St and Tompkins Ave.		
Calculated Discharge (Q_r):	$Q_r = 29.83(c_d)(D^2)(P_p^{0.5})$		
Where:			
Nozzle Size (D):	2.5 inches		
Pitot Reading (P_p):	65 psi		
Friction Loss Coefficient (c_d):	0.9	(0.9 typical for smooth 2.5" opening)	
Calculated Q_r :	1353 gpm		

Calculated Available Flow:

Residual Hydrant ID:	1	Calculated Available Flow:	2
Location:	Corner of High St & Tompkins Terrace	Residual Hydrant ID:	Western Side of Bank Street, North of W. Main St
Calculated Fire Flow (Q_f):	$Q_f = Q_r((P_s - P_f)/(P_s - P_r))^{0.54}$	Calculated Fire Flow (Q_f):	$Q_f = Q_r((P_s - P_f)/(P_s - P_r))^{0.54}$
Where:		Where:	
Static pressure (P_s):	90 psi	Static pressure (P_s):	120 psi
Residual pressure (P_r):	70 psi	Residual pressure (P_r):	95 psi
Desired pressure at fire flow (P_f):	20 psi	Desired pressure at fire flow (P_f):	20 psi
Calculated Q_f :	2661 gpm	Calculated Q_f :	2860 gpm
Hydrant Classification/Color ⁽¹⁾ :	Class AA - Light Blue	Hydrant Classification/Color ⁽¹⁾ :	Class AA - Light Blue

Notes:

- 1) Per AWWA C502. Color shall be as designated in Federal Standard 595B, top and nozzle caps to be painted.
- 2) Consult with local water operator to verify color schemes and parts to be painted.
- 3) Hydrant colors shall signify only the approximate capacity of the individual hydrant as tested alone, and not its capacity when more than one hydrant in the vicinity is in use. The marking of the hydrant is not to be considered as in any way guaranteeing the capacity indicated by the color.

Job:	Edgewater		
Job No.:	2016:015		
Description:	Hydrant Flow Test #2		
Prep. By:	AG	Date:	5/25/2017
Check By:	MAB	Date:	

Hydrant Flow Test #1

Location:	Edgewater Plan
Personnel:	M. Bodendorf, B. Butler, A. Gasparre
Test date:	5/16/2017
Test time:	11:30 p.m.

Tested (Observed) Flow:

Hydrant ID:	2	Static Pressure:	120 psi
Location:	Branch Street		
Calculated Discharge (Q_r):	$Q_r = 29.83(c_d)(D^2)(P_p^{0.5})$		
Where:			
Nozzle Size (D):	2.5 inches		
Pitot Reading (P_p):	75 psi		
Friction Loss Coefficient (c_d):	0.9	(0.9 typical for smooth 2.5" opening)	
Calculated Q_r :	1453 gpm		

Calculated Available Flow:

Residual Hydrant ID:	3
Location:	West Side of Bank Street
Calculated Fire Flow (Q_f):	$Q_f = Q_r((P_s - P_f)/(P_s - P_r))^{0.54}$
Where:	
Static pressure (P_s):	120 psi
Residual pressure (P_r):	94 psi
Desired pressure at fire flow (P_f):	20 psi
Calculated Q_f :	3008 gpm
Hydrant Classification/Color ⁽¹⁾ :	Class AA - Light Blue

Calculated Available Flow:

Residual Hydrant ID:	4
Location:	Corner of Bank Street and W. Main Street
Calculated Fire Flow (Q_f):	$Q_f = Q_r((P_s - P_f)/(P_s - P_r))^{0.54}$
Where:	
Static pressure (P_s):	138 psi
Residual pressure (P_r):	96 psi
Desired pressure at fire flow (P_f):	20 psi
Calculated Q_f :	2538 gpm
Hydrant Classification/Color ⁽¹⁾ :	Class AA - Light Blue

Notes:

- 1) Per AWWA C502. Color shall be as designated in Federal Standard 595B, top and nozzle caps to be painted.
- 2) Consult with local water operator to verify color schemes and parts to be painted.
- 3) Hydrant colors shall signify only the approximate capacity of the individual hydrant as tested alone, and not its capacity when more than one hydrant in the vicinity is in use. The marking of the hydrant is not to be considered as in any way guaranteeing the capacity indicated by the color.



174 Main Street
Beacon NY 12508
845-440-6926

Job: Edgewater
 Job No.: 2016-015
 Description: Hydrant Flow Test #2
 Prep. By: AG Date: 5/25/2017
 Check By: MAB Date:

Hydrant Flow Test #1

Location: Edgewater Plan
 Personnel: M. Bodendorf, B. Butler, A. Gasparre
 Test date: 5/16/2017
 Test time: 11:30 p.m.

Tested (Observed) Flow:

Hydrant ID: Static Pressure: 120 psi
 Location: Branch Street
 Calculated Discharge (Q_t): $Q_t = 29.83(c_d)(D^2)(P_p^{0.5})$
 Where: 2.5 inches
 Pitot Reading (P_p): 75 psi
 Friction Loss Coefficient (c_d): 0.9 (0.9 typical for smooth 2.5" opening)
 Calculated Q_t : 1453 gpm

Calculated Available Flow:

Residual Hydrant ID: 3
 Location: West Side of Bank Street
 Calculated Fire Flow (Q_f): $Q_f = Q_t((P_s P_f)/(P_s P_t))^{0.54}$
 Where: 120 psi
 Static pressure (P_s): 94 psi
 Residual pressure (P_r): 20 psi
 Desired pressure at fire flow (P_f) 20 psi
 Calculated Q_f : 3008 gpm
 Hydrant Classification/Color⁽¹⁾: Class AA - Light Blue

Calculated Available Flow:

Residual Hydrant ID: 4
 Location: Corner of Bank Street and W. Main Street
 Calculated Fire Flow (Q_f): $Q_f = Q_t((P_s P_f)/(P_s P_t))^{0.54}$
 Where: 138 psi
 Static pressure (P_s): 96 psi
 Residual pressure (P_r): 20 psi
 Desired pressure at fire flow (P_f): 20 psi
 Calculated Q_f : 2538 gpm
 Hydrant Classification/Color⁽¹⁾: Class AA - Light Blue

Notes:

- 1) Per AWWA C502. Color shall be as designated in Federal Standard 595B, top and nozzle caps to be painted.
- 2) Consult with local water operator to verify color schemes and parts to be painted.
- 3) Hydrant colors shall signify only the approximate capacity of the individual hydrant as tested alone, and not its capacity when more than one hydrant in the vicinity is in use. The marking of the hydrant is not to be considered as in any way guaranteeing the capacity indicated by the color.

Edgewater

Calculated Fire Flow and measure static pressures for Existing Hydrants

Hydrant ID	Fire Flow (gpm)	Elevation (ft)	Static Pressure (psi)
1 (Corner of High St/Tompkins Ave)	2661	130	90
2 (W. Side of Bank St - N. of W. Main St)	2860	58	120

Anticipated Fire Flow and static pressures for Proposed Hydrants (via linear interpolation)

$$y2 = \frac{(x2-x1)(y3-y1)}{(x3-x1)} + y1$$

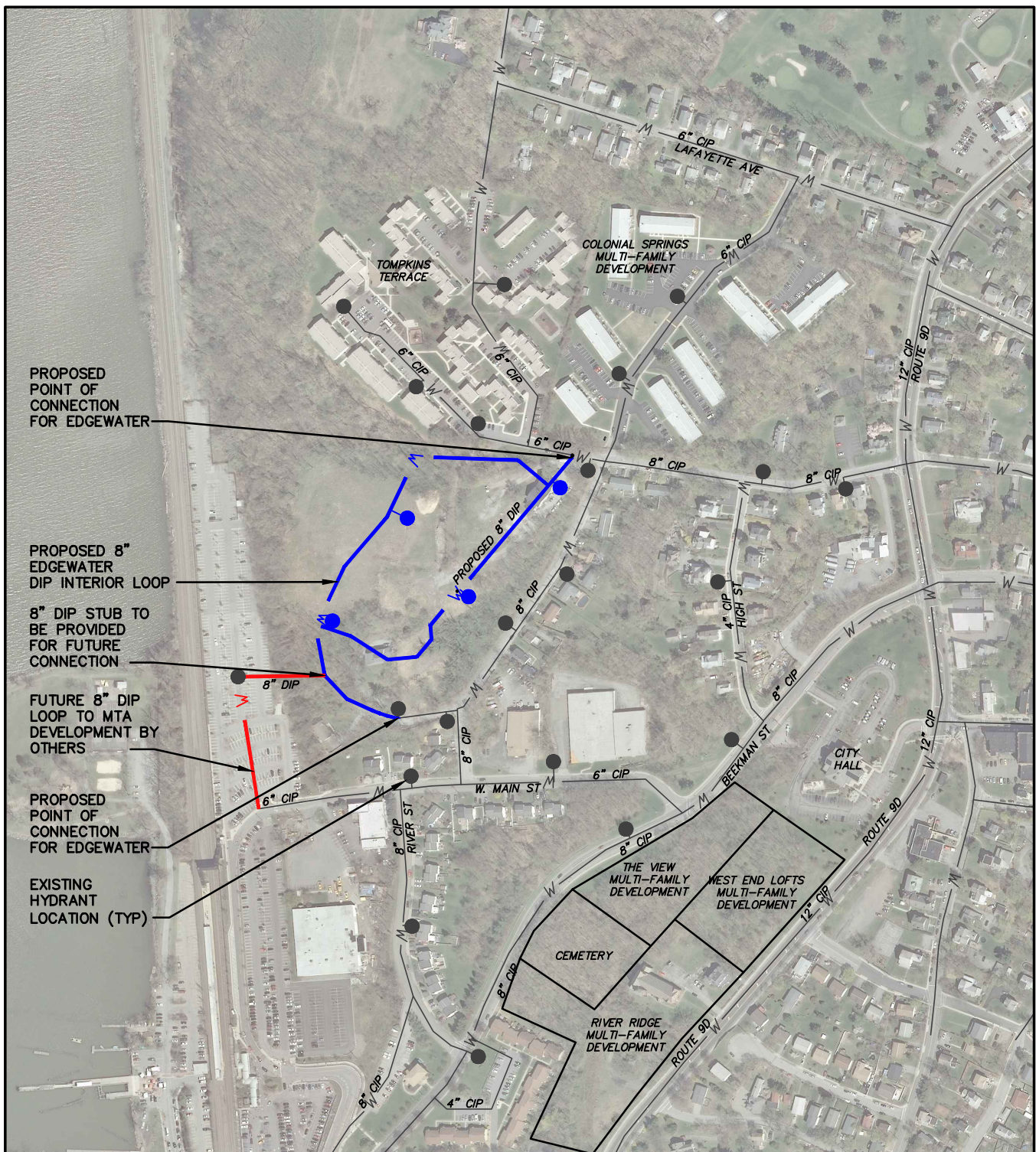
Hydrant ID	Fire Flow (gpm)	Elevation (ft)	Static Pressure (psi)
1 (Near Tompkins Ave entrance)	2711	112	98
2 (Near walking path pavilion)	2772	90	107
3 (South of Buildings 4 and 5)	2824	71	115
4 (Southeast of Buildings 2 and 3)	2741	101	102

Anticipated available pressure at highest fixture within each building

Building	Static Pressure (psi)
1	73
2	72
3	72
4	72
5	102
6	86
7	83

APPENDIX B

Water Main Loop Map



WATER MAIN MAP

SCALE: 1" = 400'
DATE: MAY 2, 2017

C:\Drawings\HLD.bmp

PREPARED FOR:
SCENIC BEACON DEVELOPMENTS, LLC
9-11 CREEK DRIVE
CITY OF BEACON
DUTCHESS COUNTY, NEW YORK
TAX PARCEL 5954-25-566983, 574979, 582985, & 5955-19-590022

PREPARED BY:
HUDSON LAND DESIGN
PROFESSIONAL ENGINEERING
174 MAIN STREET
BEACON, NY 12508
PH: 845-440-6926