

PRELIMINARY ENGINEER'S REPORT

SANITARY SEWER AND WATER

WESTWOOD COUNTRY CLUB
TOWN OF AMHERST, NEW YORK

Prepared for:

MENSCH
Capital Partners, LLC

MENSCH CAPITAL PARTNERS, LLC
350 Essjay Road, Suite 304
Williamsville, NY 14221


Prepared by:



Locally-owned and Operated since 1933

3556 LAKESHORE ROAD
SUITE 500
BUFFALO, NY 14219-1494
FAX: (716) 826-7958

12J5-0026D



May 2014

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	SANITARY SEWER	1
2.1	Proposed Flows	1
2.2	Future Commercial Development	2
2.3	Total Proposed Flows	2
2.4	Additional Flows	2
2.5	Total Proposed Flows	3
2.6	Proposed Sanitary Sewer Design	3
2.7	Receiving Sewer Capacities	3
3.0	WATER	4
3.1	Source of Supply	4
3.2	Pipe Design	4
	3.2.1 General	4
3.3	System Design	5

APPENDICES

APPENDIX A	ECWA Hydrant Flow Test Results
APPENDIX B	Average Day Hydraulic Model Run Results
APPENDIX C	Maximum Day Hydraulic Model Run Results
APPENDIX D	Maximum Day Plus Fire Flow Hydraulic Model Run Results
APPENDIX E	Peak Hour Hydraulic Model Run Results
APPENDIX F	Hydraulic Model Layout

**PRELIMINARY ENGINEER'S REPORT
WESTWOOD COUNTRY CLUB
SANITARY SEWER AND WATER
Mensch Capital Partners, LLC**



1.0 INTRODUCTION

The proposed Westwood Development Project is located in the Town of Amherst, extending between Sheridan Drive and Maple Road, bordered by Frankhauser Road to the west and Ellicott Creek to the east. Access points to the development will be at the north and south, at Maple Road and Sheridan Drive, respectively. See Figure attached.

This report will evaluate the estimated sanitary sewer flow of the proposed development and the corresponding on-site sanitary sewer requirements. A preliminary investigation of the downstream capacity of the receiving sewers will also be evaluated.

2.0 SANITARY SEWER

2.1 Proposed Flows

The proposed development consists of both residential and commercial buildings as presented in the Tables below.

Future Residential Development:

		<i>Future Residential Development</i>						<i>Total</i>
		<i>Apartments</i>	<i>Single Family Homes</i>	<i>Patio Homes</i>	<i>Townhomes</i>	<i>Apartments</i>	<i>Community Building</i>	
Equivalent Dwelling Units	<i>Residential</i>	352	46	108	127	56	2	691
	Total:	352	46	108	127	56	2	691
Ultimate Service	<i>Occupancy Rate</i>	2	3.5	3.5	2	2	1.5	
	<i>Peaking Factor</i>	4.00	4.18	4.03	4.11	4.23	4.45	
	<i>Average Daily Sewer Flow (ADSF) (gpd)</i>	70,400	16,100	37,800	25,400	11,200	300	161,200
	<i>Maximum Daily Flow (Assumes a peaking factor of 2.0)</i>	140,800	32,200	75,600	50,800	22,400	600	322,400
	<i>Peak Hour Sewer Flow (PHSF) (gpm)</i>	281,600	67,313	152,474	104,352	47,374	1,336	654,448

Note: Flow production (including infiltration) = 100 gpcd (10 States Standards)

2.2 Future Commercial Development

Commercial:				
Use Component	Units		Average Daily Flow (gpd)	Total Flow (gpd)
Hotel	130	(Rooms)	120	15,600
Retail/Shopping	115,000	(Sqft)	0.1	11,500
Office	200,000	(Sqft)	0.1	20,000
Senior Living	296	residents	125	37,000
Sub Total - Commercial				84,100
Max Daily Flow (Assumes a peaking factor of 2.0)				168,200
Peak Hourly Flow (Assume peaking factor of 4.1)				344,900

The total flows, from both the residential and commercial sections of the proposed development, are presented below.

2.3 Total Proposed Flows

	Residential Flows (gpd)	Commercial Flow (gpd)	Total Flow (gpd)
Average Daily Flow	161,200	84,100	245,300
Maximum Daily Flow	322,400	168,200	490,600
Peak Hourly Flow	654,500	344,900	999,400

2.4 Additional Flows

The Town currently has sewer flow issues in the neighborhood to the northwest of the proposed development during wet weather events. These issues include sanitary and storm sewer surcharges, basement flooding, and street flooding. It is proposed that a wet weather relief pump station be installed at the north end of the proposed Westwood Development (near Maple Road), to alleviate some of these sanitary sewer flow issues. The excess flow will be pumped to the proposed sanitary sewer and then flow by gravity through the proposed development to the existing 36-inch sewer on Sheridan. The pump station will only start when there is excess flow during wet weather events.

It is proposed that a 15-inch sewer be installed to convey both the proposed development wastewater flows and the proposed wet weather relief pump station flows to the existing sewer on Sheridan Drive (details in following section). The full flow capacity of the 15-inch line is 1.62 mgd, and the expected maximum daily flows from the proposed development are approximately 0.49 mgd. Therefore, the 15-inch line can handle an additional 1.13 mgd. To prevent potential sewer backups and surcharging, the pump station will be designed so that the total flow (including Westwood Development flows) is slightly less than the maximum capacity of the proposed sewer (see chart below). Therefore, it is anticipated that a relief pump station with a maximum design capacity of 1.00 mgd (1,000,000 gpd) will be constructed.

2.5 Total Proposed Flows

	Residential Flows (gpd)	Commercial Flow (gpd)	Relief Pump Station (gpd)	Total Flow (gpd)
Average Daily Flow	161,200	84,100	N/A	245,300
Maximum Daily Flow	322,400	168,200	1,000,000	1,490,600
Peak Hourly Flow	654,500	344,900	120,000	1,119,400

2.6 Proposed Sanitary Sewer Design

The proposed sanitary sewer will be designed to carry the maximum daily flow of 1,490,600 gpd. A 15-inch gravity sewer at a 0.15% slope and a roughness coefficient of 0.013 will allow for a full flow capacity of 1,620,000 gpd, which is sufficient for the proposed peak hourly flow. See FlowMaster Calculation No. 1 for more details. It is proposed that approximately 4,700 linear feet of sanitary sewer, starting at the north end of the Westwood Development, near Maple Road, will convey flow south through the development to the existing 36-inch sanitary sewer on Sheridan Drive (Town of Amherst). The starting invert elevation of the sanitary sewer at Maple Road will be approximately 590' (8-foot depth), and end at Sheridan Road at an elevation of 582.5' (20-foot depth).

The proposed 15-inch sewer will connect to an existing drop manhole on Sheridan Drive, at Fenwick Drive. The existing manhole is approximately 22 feet deep and has one (1) 12-inch connection and two (2) 36-inch connections. The bottom of the existing manhole is a 6' x 6' concrete chamber with an invert elevation of 581.19 feet.

The entire Westwood Development can be served with gravity sewers. The residential and commercial areas tributary to the 15-inch sanitary sewer will be serviced by 8 and 10-inch sewers.

Depending on the final layout and depth of the sanitary sewer, it may be necessary to use fill to raise the grades in the northern portion (residential section) of the development to ensure proper minimum cover.

2.7 Receiving Sewer Capacities

The receiving 36-inch sewer on Sheridan Drive has a design capacity of 17.2 mgd (See FlowMaster Calculation Sheet No. 2). The average and maximum daily flows in the 36-inch sewer are estimated by Town personnel to be well below the design capacity, but no flow data is available. According to Town personnel, the 36-inch sewer has capacity to handle the proposed additional flow during average daily flows. However, flow metering and sewer modeling will be required to adequately determine the sewer capacity.

The 36-inch sewer flows to a 54-inch sewer approximately 4000-feet downstream of the proposed connection point. The capacity of the 54-inch sewer is 36.4 mgd (See FlowMaster Calculation Sheet No. 3). According to Town flow meter data, the average and maximum daily flows in the 54-inch sewer are 8.05 mgd and 9.55 mgd, respectively. It is our understanding that the 54-inch sewer becomes surcharged during storm events due to I/I issues in the Town. However, flow monitoring and sewer modeling will need to be completed for a full evaluation of sewer capacity.

3.0 WATER

3.1 Source of Supply

The Erie County Water Authority (ECWA) currently supplies water to the Town of Amherst under the terms of a Lease Management Agreement. The ECWA would also operate and maintain the new Westwood Development waterlines under the terms of the Lease Management Agreement. The available water source for the proposed multi-use development is an 8-inch diameter (D.I.P.) water main located on the south side of Maple Road and a 16-inch diameter (D.I.P.) on Sheridan Drive. Each of these water mains would be tapped and interconnected through the proposed multiuse development. The proposed water mains will be constructed in accordance ECWA standards and turned over to the ECWA for operation and maintenance. All commercial services will be isolated from the supply by a Reduced Pressure Zone Backflow Preventer (RPZBP).

3.2 Pipe Design

There will be approximately 20,158 lineal feet of proposed water mains for the new development. The water mains will be 8 and 10-inch diameter (C-900 PVC and Class 52 Ductile Iron) waterline, including the appropriate number of hydrant assemblies, and appurtenant facilities for proper operation and isolation for maintenance purposes

3.2.1 General

Town of Amherst and ECWA specifications will be followed during construction of the water distribution improvements. Valves and hydrants will be provided at locations in accordance with Recommended Standards for Water Works.

3.2.1.1 Thrust Restraint

Thrust restraint calculations will be based on a test pressure of 175 psi, where the following conditions exist:

- For all horizontal and vertical bends equal to or greater than 11¼°
- At dead ends
- At tees
- At all valves, in both directions (assumed fully closed).

3.2.1.2 Trenching, Bedding and Backfill Material

The centerline of the water main will be located within the right-of-way, in a suitable location for construction. The new waterline will be placed in a separate trench a minimum of ten (10) feet from sewer alignments.

The depth of cover over the 8 and 10-inch pipe will be a minimum of 5 feet. The pipe will be bedded on 6-inches of #1 Crushed Stone, and filled to 12-inches above the top of the pipe. Where the waterline is within the pavement, five (5) feet of pavement edge, or driveways, compacted NYSDOT #2 crushed stone will be required to backfill the trench for full depth.

3.2.1.3 Linings and Coatings

Cement mortar lining, as specified in AWWA C104, is required for the ductile iron pipe. Asphaltic coating is required on the outside of the pipe.

3.2.1.4 Pressure and Leakage Testing

Pressure and leakage testing will be performed in accordance with AWWA standards and the ECWA's standard specifications, at a test pressure of 175 psi.

3.2.1.5 Disinfection

Disinfection will be performed in accordance with NYSDOH and AWWA standards. Sampling points will be located at the beginning and end of each pipe section, and at intervals not exceeding 1000 feet.

Fire protection will be provided by proposed hydrant assemblies located along the proposed roads for the residential areas and at each commercial building as required by New York State Building Code and New York State Health Department.

3.3 System Design

The ECWA conducted hydrant flow tests on April 24, 2014 (Refer to data in Appendix A). The representative static gauge pressures at the proposed points of connection are estimated to be approximately 92 and 84 psi.

Referring to the ECWA test:

- Centerline elevation of the pressure hydrant gauge is approximated to be 598.0± feet for the Maple Road hydrant flow test. Ground elevation at the point of connection to the proposed works is approximated to be 596.5± feet. ECWA reported a measured hydrant flow of 2,326 gpm and a residual pressure of 78 psi.
- Centerline elevation of the pressure hydrant gauge is approximated to be 605.0± feet for the Sheridan Drive hydrant flow test. Ground elevation at the point of connection to the proposed works is approximated to be 603.5± feet. ECWA reported a measured hydrant flow of 2,372 gpm and a residual pressure of 72 psi.
- Calculated supply available at a 20 psi residual pressure. According to ECWA, a calculated 5,632 gpm± is available at the Maple Road test hydrant located approximately 451± lf from the point of connection, and a calculated 5,875± gpm is available at the Sheridan Drive test hydrant located approximately 950± lf from the point of connection.

As it pertains to the hydraulic model, hydrant test data was translated to the location of the proposed inter-connection. The three (3) operating points listed below for each specified hydrant test were input as respective pump curves to establish the apparent performance related characteristics of the supply.

Test No.1 Maple Rd. location

<u>Demand</u>	<u>Pressure/Head</u>
0 gpm	92 psi / 212.52' of H ₂ O
2,326 gpm	78 psi / 180.18' of H ₂ O
5,632 gpm	20 psi / 46.20' of H ₂ O

Test No.2 Sheridan Dr at North Forest Rd. location

<u>Demand</u>	<u>Pressure/Head</u>
0 gpm	84 psi / 194.04' of H ₂ O
2,372 gpm	72 psi / 166.32' of H ₂ O
5,857 gpm	20 psi / 46.20' of H ₂ O

The estimated average daily, maximum daily and peak hourly demand for this project is calculated as follows:

Westwood Development - Projected Water Flows

Use Component	Units	Average Daily Flow Rate (gpd)	TOTAL (gpd)
<u>Residential:</u>			
Apartments	352	200	70,400
Single Family Homes	46	350	16,100
Patio Homes	108	350	37,800
Townhomes	127	200	25,400
Apartments	56	200	11,200
Community Building	2	150	300
Sub Total - Residential.....			191,200
Max Daily Flow (Assumes a peaking factor of 2.0)			322,400
<u>Commercial:</u>			
Hotel	130 (Rooms)	120	15,600
Retail/Shopping	115,000 (Sqft)	0.1	11,500
Office	200,000 (Sqft)	0.1	20,000
Senior Living	296 residents	125	37,000
Sub Total - Commercial.....			84,100
Max Daily Flow (Assumes a peaking factor of 2.0)			168,200
TOTAL ADF			245,300
TOTAL Max Day			490,600
Peak Hour (Assumes an average day to peak hour factor of 2.5)			613,250

Average Daily demand for the mixed use development is estimated at 245,300 gpd, with a Maximum daily flow of 490,600 gpd.

Max Daily Demand assumes a factor of 2.0 over the average day demands. The Peak Hourly Flow (PHF) assumes a factor of 2.5 over the average day demands.

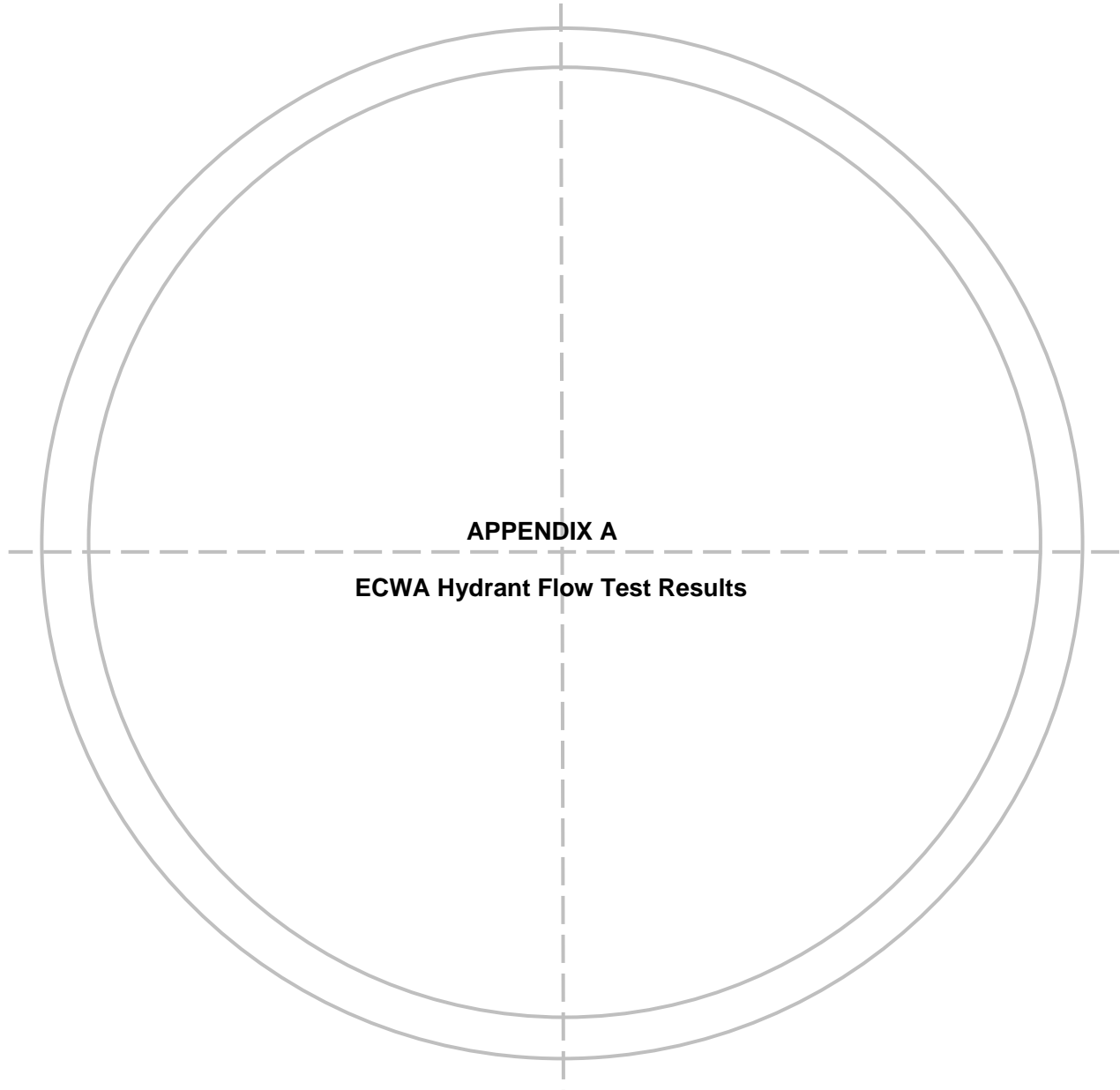
The following table summarizes the Hydraulic Model runs analyzing average day flows, maximum day flows, maximum day flows with fire flows and peak hourly flows. Results are reported for three (3) locations:

- Senior housing complex in the approximate middle of the proposed development,
- Hotel/commercial development in the southern portion of the development, and
- Residential development area in the north and central areas of the development.

The results listed below show that day-to-day operation pressures are sufficient and meet recommended Ten State Standards and that a fire flow of 5,750 gpm (8,280,000 gpd) can be obtained at the senior living complex while maintaining 20 psi at the same location.

It is determined that approximately 4,450± gpm is available at the center of the proposed site. Note, any increase in domestic demand (e.g., maximum day scenario), decreases the amount of water available for emergency demand. (See Appendices for Hydraulic Model Reports)

Flow Condition	Senior Living Complex J23 Pressure (PSI)	Hotel/Commercial Center J33 Pressure (PSI)	Residential Center J14 Pressure (PSI)	Total Flow/Demand gpd
Average Day	86.1	85.7	86.9	245,304
Maximum Day	85.4	85.2	86.3	490,605
Maximum Day with Fire Flow	19.0	54.0	32.1	8,770,605
Peak Hourly	85.0	84.9	85.8	613,254



RESIDUAL HYDRANT

LOCATION.....: 335 MAPLE RD SIDE: S
1ST HYD E/O DONNA LEA

TOWN OF AMHERST

WATER DISTRICT: 315 SIZE OF MAIN: 8
FIRE DISTRICT.: 22021 SIZE BRANCH.: 6

PERFORMED BY: BM, RLS

COMMENTS.....: HYDRANT FLOW TEST VALARIE SARCIONE
NUSSBAUMER & CLARKE, 716-827-8000, 716-826-7958
E-MAIL: VSARCIONE@NUSSCLARKE.COM

DISCHRG COEF: .90
PRESSURE RDGS: ELVTN USGS(FT): .0 STATIC(Psi): 92 RESIDUAL(Psi): 78
TOTAL FLOW(GPM): 2,326 GALLONS USED: 6,960
REQUIRED RESIDUAL PRESSURE...: 20 FLOW AT REQD RESIDUAL PRESSURE.: 5,632

HYD FL NO LOCATION OF FLOW HYDRANTS

J06-C53. 415 MAPLE RD 2ND HYD E/O DONNA LEA

TOWN OF AMHERST SS: S

NZLE SIZE PITOT FLOW WATER DST: 315 FIRE: 22021 SIZE MAIN: 8 BRCH: 6
1. 2.50 48.0 1,163 COMMENTS:
2. 2.50 48.0 1,163
3. TOT FLOW: 2,326

RESIDUAL HYDRANT

LOCATION.....: 4480 SHERIDAN DR SIDE: N
1ST HYD W/O MORGAN PKY
@ C/O NORTH FOREST
TOWN OF AMHERST

WATER DISTRICT: 315 SIZE OF MAIN: 16
FIRE DISTRICT.: 22021 SIZE BRANCH.: 6

PERFORMED BY: BM, RLS

COMMENTS.....: HYDRANT FLOW TEST VALARIE SARCIONE
NUSSBAUMER & CLARKE, 716-827-8000, 716-826-7958
E-MAIL: VSARCIONE@NUSSCLARKE.COM

DISCHRG COEF: .90
PRESSURE RDGS: ELVTN USGS(FT): .0 STATIC(Psi): 84 RESIDUAL(Psi): 72
TOTAL FLOW(GPM): 2,372 GALLONS USED: 7,140
REQUIRED RESIDUAL PRESSURE...: 20 FLOW AT REQD RESIDUAL PRESSURE.: 5,857

HYD FL NO LOCATION OF FLOW HYDRANTS

J06-G63 761 NORTH FOREST RD 1ST HYD N/O SHERIDAN DR
TOWN OF AMHERST SS: E

NZLE SIZE PITOT FLOW WATER DST: 315 FIRE: 22021 SIZE MAIN: 8 BRCH: 6
1. 2.50 50.0 1,186 COMMENTS:
2. 2.50 50.0 1,186
3. TOT FLOW: 2,372

APPENDIX B

Average Day Hydraulic Model Run Results

**Active Scenario: Avg Day - North Forest On
FlexTable: Junction Table**

Current Time: 0.000 hours Demand: 170 gpm

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
28	J-1	598.00	<Collection: 1 items>	0	798.95	86.9
29	J-2	596.00	<Collection: 1 items>	7,700	798.95	87.8
33	J-4	595.00	<Collection: 1 items>	8,050	798.95	88.2
37	J-5	598.00	<Collection: 1 items>	4,000	798.95	86.9
39	J-6	598.00	<Collection: 1 items>	0	798.95	86.9
41	J-7	597.00	<Collection: 1 items>	6,000	798.95	87.4
44	J-8	598.00	<Collection: 1 items>	3,200	798.95	86.9
46	J-9	598.00	<Collection: 1 items>	150	798.95	86.9
48	J-10	598.00	<Collection: 1 items>	8,750	798.95	86.9
50	J-11	598.00	<Collection: 1 items>	1,600	798.95	86.9
52	J-12	598.00	<Collection: 1 items>	0	798.95	86.9
54	J-13	598.00	<Collection: 1 items>	1,600	798.95	86.9
56	J-14	598.00	<Collection: 1 items>	1,600	798.95	86.9
59	J-15	598.00	<Collection: 1 items>	5,250	798.95	86.9
61	J-16	594.00	<Collection: 1 items>	4,900	798.95	88.7
65	J-17	598.00	<Collection: 1 items>	2,800	798.96	86.9
67	J-18	597.00	<Collection: 1 items>	4,200	798.96	87.4
69	J-19	598.00	<Collection: 1 items>	3,850	798.97	86.9
71	J-20	600.00	<Collection: 1 items>	2,800	798.98	86.1
73	J-21	598.00	<Collection: 1 items>	2,450	798.96	86.9
78	J-23	600.00	<Collection: 1 items>	37,000	798.97	86.1
80	J-24	601.00	<Collection: 1 items>	26,686	799.07	85.7
82	J-25	601.00	<Collection: 1 items>	44,128	799.11	85.7
84	J-26	603.00	<Collection: 1 items>	20,000	799.22	84.9
86	J-27	605.00	<Collection: 1 items>	0	799.30	84.1
88	J-28	600.00	<Collection: 1 items>	0	799.11	86.1
90	J-29	601.00	<Collection: 1 items>	7,400	799.09	85.7
92	J-30	600.00	<Collection: 1 items>	0	799.13	86.2
94	J-31	600.00	<Collection: 1 items>	800	799.15	86.2
96	J-32	601.00	<Collection: 1 items>	800	799.15	85.7
98	J-33	601.00	<Collection: 1 items>	26,686	799.12	85.7
101	J-34	601.00	<Collection: 1 items>	1,600	799.18	85.7
103	J-35	601.00	<Collection: 1 items>	1,600	799.18	85.7
105	J-36	602.00	<Collection: 1 items>	150	799.21	85.3
107	J-37	602.00	<Collection: 1 items>	1,600	799.22	85.3
109	J-38	603.00	<Collection: 1 items>	1,600	799.23	84.9
111	J-39	604.00	<Collection: 1 items>	1,600	799.24	84.5
113	J-40	604.00	<Collection: 1 items>	0	799.24	84.5
115	J-41	605.00	<Collection: 1 items>	0	799.30	84.1
117	J-42	603.00	<Collection: 1 items>	0	799.22	84.9
123	J-43	605.00	<Collection: 1 items>	0	799.33	84.1
125	J-44	605.00	<Collection: 1 items>	0	799.33	84.1
127	J-45	604.00	<Collection: 1 items>	(N/A)	(N/A)	(N/A)
133	J-46	601.00	<Collection: 1 items>	0	799.30	85.8

**Active Scenario: Avg Day - North Forest On
FlexTable: Junction Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
134	J-47	602.00	<Collection: 1 items>	0	799.30	85.4
136	J-48	603.00	<Collection: 1 items>	0	799.30	84.9
138	J-49	604.00	<Collection: 1 items>	0	799.30	84.5
141	J-50	605.00	<Collection: 1 items>	0	799.30	84.1
162	J-54	595.27	<Collection: 1 items>	3,150	798.95	88.1
171	J-57	601.00	<Collection: 1 items>	0	799.30	85.8
173	J-58	601.00	<Collection: 1 items>	0	799.30	85.8
176	J-59	595.00	<Collection: 1 items>	0	798.95	88.2
187	J-62	599.00	<Collection: 1 items>	0	798.95	86.5
216	J-65	602.00	<Collection: 1 items>	1,600	799.22	85.3

Active Scenario: Avg Day - North Forest On
FlexTable: Pipe Table

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen- Williams C	Flow (gpd)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	589	J-1	J-2	8.0	120.0	-1	0.00	0.000
36	P-5	420	J-2	J-4	8.0	120.0	-5,841	0.03	0.000
38	P-6	461	J-2	J-5	8.0	120.0	-104	0.00	0.000
40	P-7	126	J-5	J-6	8.0	120.0	1	0.00	0.000
42	P-8	516	J-5	J-7	8.0	120.0	-4,105	0.02	0.000
43	P-9	458	J-7	J-4	8.0	120.0	-3,206	0.01	0.000
45	P-10	1,094	J-7	J-8	8.0	120.0	-6,899	0.03	0.000
47	P-11	174	J-8	J-9	8.0	120.0	-11,699	0.05	0.000
49	P-12	396	J-9	J-10	8.0	120.0	-15,049	0.07	0.000
51	P-13	275	J-8	J-11	8.0	120.0	1,600	0.01	0.000
53	P-14	114	J-9	J-12	8.0	120.0	3,200	0.01	0.000
55	P-15	152	J-12	J-13	8.0	120.0	1,600	0.01	0.000
57	P-16	148	J-12	J-14	8.0	120.0	1,600	0.01	0.000
58	P-17	981	J-4	J-10	8.0	120.0	-12,890	0.06	0.000
60	P-18	311	J-10	J-15	8.0	120.0	-8,339	0.04	0.000
63	P-20	307	J-16	J-4	8.0	120.0	4,207	0.02	0.000
64	P-21	926	J-16	J-15	8.0	120.0	-14,013	0.06	0.000
66	P-22	271	J-15	J-17	8.0	120.0	-27,602	0.12	0.000
68	P-23	371	J-17	J-18	8.0	120.0	-20,557	0.09	0.000
70	P-24	721	J-18	J-19	8.0	120.0	-24,757	0.11	0.000
72	P-25	550	J-19	J-20	8.0	120.0	-28,607	0.13	0.000
74	P-26	642	J-20	J-21	8.0	120.0	40,645	0.18	0.000
75	P-27	363	J-21	J-10	8.0	120.0	28,350	0.13	0.000
76	P-28	516	J-17	J-21	8.0	120.0	-9,845	0.04	0.000
79	P-29	181	J-20	J-23	8.0	120.0	37,000	0.16	0.000
81	P-30	519	J-20	J-24	8.0	120.0	-109,052	0.48	0.000
83	P-31	385	J-24	J-25	8.0	120.0	-86,022	0.38	0.000
85	P-32	597	J-25	J-26	8.0	120.0	-110,458	0.49	0.000
87	P-33	413	J-26	J-27	8.0	120.0	-114,593	0.51	0.000
89	P-34	195	J-25	J-28	8.0	120.0	0	0.00	0.000
91	P-35	491	J-24	J-29	8.0	120.0	-49,716	0.22	0.000
93	P-36	795	J-29	J-30	8.0	120.0	-57,116	0.25	0.000
95	P-37	108	J-30	J-31	8.0	120.0	-103,494	0.46	0.000
97	P-38	363	J-31	J-32	8.0	120.0	800	0.00	0.000
99	P-39	493	J-25	J-33	8.0	120.0	-19,692	0.09	0.000
100	P-40	419	J-33	J-30	8.0	120.0	-46,378	0.21	0.000
102	P-41	210	J-31	J-34	8.0	120.0	-105,094	0.47	0.000
104	P-42	372	J-34	J-35	8.0	120.0	1,600	0.01	0.000
106	P-43	179	J-34	J-36	8.0	120.0	-108,294	0.48	0.000
110	P-45	186	J-37	J-38	8.0	120.0	-38,816	0.17	0.000
112	P-46	378	J-38	J-39	8.0	120.0	-40,416	0.18	0.000
114	P-47	145	J-39	J-40	8.0	120.0	-42,016	0.19	0.000
116	P-48	244	J-40	J-41	8.0	120.0	-130,709	0.58	0.000
118	P-49	114	J-36	J-42	8.0	120.0	-72,827	0.32	0.000

**Active Scenario: Avg Day - North Forest On
FlexTable: Pipe Table**

Current Time: 0.000 hours

Length (User Defined) (ft)
0
250
0
0
0
1
0
0
1
0
0

Active Scenario: Avg Day - North Forest On
FlexTable: Pump Table

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpd)	Pump Head (ft)
169	PMP-1	601.00	Sunrise/Sheridan	Off	600.50	799.30	0	0.00
206	PMP-3	604.92	North Forest	On	605.50	799.33	245,304	193.83
213	PMP-4	598.00	Donna Lee	Off	598.00	798.95	0	0.00

**Active Scenario: Avg Day - North Forest On
FlexTable: Reservoir Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpd)	Hydraulic Grade (ft)
130	R-2	0.00	<None>	(N/A)	(N/A)
168	R-3	600.50	<None>	-1	600.50
200	R-4	598.00	<None>	-1	598.00
203	R-5	605.50	<None>	245,304	605.50

APPENDIX C

Maximum Day Hydraulic Model Run Results

**Active Scenario: Max Day - North Forest On
FlexTable: Junction Table**

Current Time: 0.000 hours Demand: 341 gpm

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
28	J-1	598.00	<Collection: 1 items>	0	797.40	86.3
29	J-2	596.00	<Collection: 1 items>	15,400	797.40	87.1
33	J-4	595.00	<Collection: 1 items>	16,100	797.40	87.6
37	J-5	598.00	<Collection: 1 items>	8,000	797.40	86.3
39	J-6	598.00	<Collection: 1 items>	0	797.40	86.3
41	J-7	597.00	<Collection: 1 items>	12,000	797.40	86.7
44	J-8	598.00	<Collection: 1 items>	6,400	797.41	86.3
46	J-9	598.00	<Collection: 1 items>	300	797.41	86.3
48	J-10	598.00	<Collection: 1 items>	17,500	797.42	86.3
50	J-11	598.00	<Collection: 1 items>	3,200	797.41	86.3
52	J-12	598.00	<Collection: 1 items>	0	797.41	86.3
54	J-13	598.00	<Collection: 1 items>	3,200	797.41	86.3
56	J-14	598.00	<Collection: 1 items>	3,200	797.41	86.3
59	J-15	598.00	<Collection: 1 items>	10,500	797.42	86.3
61	J-16	594.00	<Collection: 1 items>	9,800	797.40	88.0
65	J-17	598.00	<Collection: 1 items>	5,600	797.43	86.3
67	J-18	597.00	<Collection: 1 items>	8,400	797.44	86.7
69	J-19	598.00	<Collection: 1 items>	7,700	797.47	86.3
71	J-20	600.00	<Collection: 1 items>	5,600	797.50	85.4
73	J-21	598.00	<Collection: 1 items>	4,900	797.44	86.3
78	J-23	600.00	<Collection: 1 items>	74,000	797.49	85.4
80	J-24	601.00	<Collection: 1 items>	53,372	797.83	85.2
82	J-25	601.00	<Collection: 1 items>	88,257	797.99	85.2
84	J-26	603.00	<Collection: 1 items>	40,000	798.39	84.5
86	J-27	605.00	<Collection: 1 items>	0	798.68	83.8
88	J-28	600.00	<Collection: 1 items>	0	797.99	85.7
90	J-29	601.00	<Collection: 1 items>	14,400	797.91	85.2
92	J-30	600.00	<Collection: 1 items>	0	798.06	85.7
94	J-31	600.00	<Collection: 0 items>	1,600	798.13	85.7
96	J-32	601.00	<Collection: 0 items>	1,600	798.13	85.3
98	J-33	601.00	<Collection: 1 items>	53,371	798.01	85.2
101	J-34	601.00	<Collection: 0 items>	3,200	798.25	85.3
103	J-35	601.00	<Collection: 0 items>	3,200	798.25	85.3
105	J-36	602.00	<Collection: 1 items>	300	798.36	85.0
107	J-37	602.00	<Collection: 0 items>	3,200	798.40	85.0
109	J-38	603.00	<Collection: 0 items>	3,200	798.42	84.5
111	J-39	604.00	<Collection: 0 items>	3,200	798.46	84.1
113	J-40	604.00	<Collection: 1 items>	0	798.47	84.1
115	J-41	605.00	<Collection: 1 items>	0	798.69	83.8
117	J-42	603.00	<Collection: 1 items>	0	798.40	84.5
123	J-43	605.00	<Collection: 1 items>	0	798.77	83.8
125	J-44	605.00	<Collection: 1 items>	0	798.77	83.8
127	J-45	604.00	<Collection: 1 items>	(N/A)	(N/A)	(N/A)
133	J-46	601.00	<Collection: 1 items>	0	798.68	85.5

**Active Scenario: Max Day - North Forest On
FlexTable: Junction Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
134	J-47	602.00	<Collection: 1 items>	0	798.68	85.1
136	J-48	603.00	<Collection: 1 items>	0	798.68	84.7
138	J-49	604.00	<Collection: 1 items>	0	798.68	84.2
141	J-50	605.00	<Collection: 1 items>	0	798.68	83.8
162	J-54	595.27	<Collection: 1 items>	6,300	797.40	87.5
171	J-57	601.00	<Collection: 1 items>	0	798.68	85.5
173	J-58	601.00	<Collection: 1 items>	0	798.68	85.5
176	J-59	595.00	<Collection: 1 items>	0	797.40	87.6
187	J-62	599.00	<Collection: 1 items>	0	797.40	85.8
216	J-65	602.00	<Collection: 0 items>	3,600	798.38	85.0

**Active Scenario: Max Day - North Forest On
FlexTable: Pipe Table**

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen- Williams C	Flow (gpd)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	589	J-1	J-2	8.0	120.0	-1	0.00	0.000
36	P-5	420	J-2	J-4	8.0	120.0	-11,681	0.05	0.000
38	P-6	461	J-2	J-5	8.0	120.0	-208	0.00	0.000
40	P-7	126	J-5	J-6	8.0	120.0	0	0.00	0.000
42	P-8	516	J-5	J-7	8.0	120.0	-8,208	0.04	0.000
43	P-9	458	J-7	J-4	8.0	120.0	-6,411	0.03	0.000
45	P-10	1,094	J-7	J-8	8.0	120.0	-13,797	0.06	0.000
47	P-11	174	J-8	J-9	8.0	120.0	-23,397	0.10	0.000
49	P-12	396	J-9	J-10	8.0	120.0	-30,097	0.13	0.000
51	P-13	275	J-8	J-11	8.0	120.0	3,200	0.01	0.000
53	P-14	114	J-9	J-12	8.0	120.0	6,400	0.03	0.000
55	P-15	152	J-12	J-13	8.0	120.0	3,200	0.01	0.000
57	P-16	148	J-12	J-14	8.0	120.0	3,200	0.01	0.000
58	P-17	981	J-4	J-10	8.0	120.0	-25,779	0.11	0.000
60	P-18	311	J-10	J-15	8.0	120.0	-16,678	0.07	0.000
63	P-20	307	J-16	J-4	8.0	120.0	8,413	0.04	0.000
64	P-21	926	J-16	J-15	8.0	120.0	-28,025	0.12	0.000
66	P-22	271	J-15	J-17	8.0	120.0	-55,203	0.24	0.000
68	P-23	371	J-17	J-18	8.0	120.0	-41,113	0.18	0.000
70	P-24	721	J-18	J-19	8.0	120.0	-49,513	0.22	0.000
72	P-25	550	J-19	J-20	8.0	120.0	-57,213	0.25	0.000
74	P-26	642	J-20	J-21	8.0	120.0	81,288	0.36	0.000
75	P-27	363	J-21	J-10	8.0	120.0	56,699	0.25	0.000
76	P-28	516	J-17	J-21	8.0	120.0	-19,690	0.09	0.000
79	P-29	181	J-20	J-23	8.0	120.0	74,000	0.33	0.000
81	P-30	519	J-20	J-24	8.0	120.0	-218,101	0.97	0.001
83	P-31	385	J-24	J-25	8.0	120.0	-171,868	0.76	0.000
85	P-32	597	J-25	J-26	8.0	120.0	-220,756	0.98	0.001
87	P-33	413	J-26	J-27	8.0	120.0	-229,153	1.02	0.001
89	P-34	195	J-25	J-28	8.0	120.0	1	0.00	0.000
91	P-35	491	J-24	J-29	8.0	120.0	-99,605	0.44	0.000
93	P-36	795	J-29	J-30	8.0	120.0	-114,005	0.51	0.000
95	P-37	108	J-30	J-31	8.0	120.0	-206,746	0.92	0.001
97	P-38	363	J-31	J-32	8.0	120.0	1,600	0.01	0.000
99	P-39	493	J-25	J-33	8.0	120.0	-39,370	0.17	0.000
100	P-40	419	J-33	J-30	8.0	120.0	-92,741	0.41	0.000
102	P-41	210	J-31	J-34	8.0	120.0	-209,946	0.93	0.001
104	P-42	372	J-34	J-35	8.0	120.0	3,200	0.01	0.000
106	P-43	179	J-34	J-36	8.0	120.0	-216,346	0.96	0.001
110	P-45	186	J-37	J-38	8.0	120.0	-77,709	0.34	0.000
112	P-46	378	J-38	J-39	8.0	120.0	-80,909	0.36	0.000
114	P-47	145	J-39	J-40	8.0	120.0	-84,109	0.37	0.000
116	P-48	244	J-40	J-41	8.0	120.0	-261,449	1.16	0.001
118	P-49	114	J-36	J-42	8.0	120.0	-145,737	0.65	0.000

**Active Scenario: Max Day - North Forest On
FlexTable: Pipe Table**

Current Time: 0.000 hours

Length (User
Defined)
(ft)

0
250
0
0
0
1
0
0
1
0
0

Active Scenario: Max Day - North Forest On
FlexTable: Pump Table

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpd)	Pump Head (ft)
169	PMP-1	601.00	Sunrise/Sheridan	Off	600.50	798.68	0	0.00
206	PMP-3	604.92	North Forest	On	605.50	798.78	490,605	193.28
213	PMP-4	598.00	Donna Lee	Off	598.00	797.40	0	0.00

**Active Scenario: Max Day - North Forest On
FlexTable: Reservoir Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpd)	Hydraulic Grade (ft)
130	R-2	0.00	<None>	(N/A)	(N/A)
168	R-3	600.50	<None>	-1	600.50
200	R-4	598.00	<None>	-1	598.00
203	R-5	605.50	<None>	490,605	605.50

APPENDIX D

Maximum Day Plus Fire Flow Hydraulic Model Run Results

**Active Scenario: Max Day Fire Flow, Both On
FlexTable: Junction Table**

Current Time: 0.000 hours Demand: 4,841 gpm

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
28	J-1	598.00	<Collection: 1 items>	0	744.25	63.3
29	J-2	596.00	<Collection: 1 items>	15,400	693.13	42.0
33	J-4	595.00	<Collection: 1 items>	16,100	684.94	38.9
37	J-5	598.00	<Collection: 1 items>	8,000	689.24	39.5
39	J-6	598.00	<Collection: 1 items>	0	689.24	39.5
41	J-7	597.00	<Collection: 1 items>	12,000	684.96	38.1
44	J-8	598.00	<Collection: 1 items>	6,400	676.86	34.1
46	J-9	598.00	<Collection: 1 items>	300	675.60	33.6
48	J-10	598.00	<Collection: 1 items>	17,500	672.78	32.4
50	J-11	598.00	<Collection: 1 items>	3,200	676.86	34.1
52	J-12	598.00	<Collection: 1 items>	0	675.60	33.6
54	J-13	598.00	<Collection: 1 items>	3,200	675.60	33.6
56	J-14	598.00	<Collection: 1 items>	3,200	675.60	33.6
59	J-15	598.00	<Collection: 1 items>	10,500	672.15	32.1
61	J-16	594.00	<Collection: 1 items>	9,800	684.53	39.2
65	J-17	598.00	<Collection: 1 items>	5,600	665.85	29.4
67	J-18	597.00	<Collection: 1 items>	8,400	660.79	27.6
69	J-19	598.00	<Collection: 1 items>	7,700	651.09	23.0
71	J-20	600.00	<Collection: 1 items>	6,485,600	643.79	18.9
73	J-21	598.00	<Collection: 1 items>	4,900	664.94	29.0
78	J-23	600.00	<Collection: 1 items>	74,000	643.78	18.9
80	J-24	601.00	<Collection: 1 items>	53,372	704.15	44.6
82	J-25	601.00	<Collection: 1 items>	88,257	724.40	53.4
84	J-26	603.00	<Collection: 1 items>	40,000	746.35	62.0
86	J-27	605.00	<Collection: 1 items>	0	759.68	66.9
88	J-28	600.00	<Collection: 1 items>	0	724.40	53.8
90	J-29	601.00	<Collection: 1 items>	14,400	712.92	48.4
92	J-30	600.00	<Collection: 1 items>	0	727.41	55.1
94	J-31	600.00	<Collection: 0 items>	1,600	731.17	56.7
96	J-32	601.00	<Collection: 0 items>	1,600	731.17	56.3
98	J-33	601.00	<Collection: 1 items>	53,371	725.89	54.0
101	J-34	601.00	<Collection: 0 items>	3,200	738.49	59.5
103	J-35	601.00	<Collection: 0 items>	3,200	738.49	59.5
105	J-36	602.00	<Collection: 1 items>	300	744.77	61.8
107	J-37	602.00	<Collection: 0 items>	3,200	746.75	62.6
109	J-38	603.00	<Collection: 0 items>	3,200	747.64	62.6
111	J-39	604.00	<Collection: 0 items>	3,200	749.45	62.9
113	J-40	604.00	<Collection: 1 items>	0	750.15	63.2
115	J-41	605.00	<Collection: 1 items>	0	760.36	67.2
117	J-42	603.00	<Collection: 1 items>	0	746.66	62.2
123	J-43	605.00	<Collection: 1 items>	0	764.16	68.9
125	J-44	605.00	<Collection: 1 items>	0	764.16	68.9
127	J-45	604.00	<Collection: 1 items>	(N/A)	(N/A)	(N/A)
133	J-46	601.00	<Collection: 1 items>	0	759.68	68.7

**Active Scenario: Max Day Fire Flow, Both On
FlexTable: Junction Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
134	J-47	602.00	<Collection: 1 items>	0	759.68	68.2
136	J-48	603.00	<Collection: 1 items>	0	759.68	67.8
138	J-49	604.00	<Collection: 1 items>	0	759.68	67.4
141	J-50	605.00	<Collection: 1 items>	0	759.68	66.9
162	J-54	595.27	<Collection: 1 items>	6,300	689.98	41.0
171	J-57	601.00	<Collection: 1 items>	0	759.68	68.7
173	J-58	601.00	<Collection: 1 items>	0	759.68	68.7
176	J-59	595.00	<Collection: 1 items>	0	744.25	64.6
187	J-62	599.00	<Collection: 1 items>	0	744.25	62.8
216	J-65	602.00	<Collection: 0 items>	3,600	745.85	62.2

Active Scenario: Max Day Fire Flow, Both On
FlexTable: Pipe Table

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazer- Williams C	Flow (gpd)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	589	J-1	J-2	8.0	120.0	3,084,802	13.67	0.087
36	P-5	420	J-2	J-4	8.0	120.0	1,377,548	6.11	0.020
38	P-6	461	J-2	J-5	8.0	120.0	876,174	3.88	0.008
40	P-7	126	J-5	J-6	8.0	120.0	1	0.00	0.000
42	P-8	516	J-5	J-7	8.0	120.0	868,173	3.85	0.008
43	P-9	458	J-7	J-4	8.0	120.0	40,020	0.18	0.000
45	P-10	1,094	J-7	J-8	8.0	120.0	816,153	3.62	0.007
47	P-11	174	J-8	J-9	8.0	120.0	806,553	3.58	0.007
49	P-12	396	J-9	J-10	8.0	120.0	799,853	3.55	0.007
51	P-13	275	J-8	J-11	8.0	120.0	3,200	0.01	0.000
53	P-14	114	J-9	J-12	8.0	120.0	6,400	0.03	0.000
55	P-15	152	J-12	J-13	8.0	120.0	3,200	0.01	0.000
57	P-16	148	J-12	J-14	8.0	120.0	3,200	0.01	0.000
58	P-17	981	J-4	J-10	8.0	120.0	1,078,212	4.78	0.012
60	P-18	311	J-10	J-15	8.0	120.0	404,177	1.79	0.002
63	P-20	307	J-16	J-4	8.0	120.0	-323,256	1.43	0.001
64	P-21	926	J-16	J-15	8.0	120.0	1,122,835	4.98	0.013
66	P-22	271	J-15	J-17	8.0	120.0	1,516,512	6.72	0.023
68	P-23	371	J-17	J-18	8.0	120.0	1,135,197	5.03	0.014
70	P-24	721	J-18	J-19	8.0	120.0	1,126,797	4.99	0.013
72	P-25	550	J-19	J-20	8.0	120.0	1,119,097	4.96	0.013
74	P-26	642	J-20	J-21	8.0	120.0	-1,827,204	8.10	0.033
75	P-27	363	J-21	J-10	8.0	120.0	-1,456,388	6.46	0.022
76	P-28	516	J-17	J-21	8.0	120.0	375,715	1.67	0.002
79	P-29	181	J-20	J-23	8.0	120.0	74,000	0.33	0.000
81	P-30	519	J-20	J-24	8.0	120.0	-3,613,299	16.02	0.116
83	P-31	385	J-24	J-25	8.0	120.0	-2,353,700	10.43	0.053
85	P-32	597	J-25	J-26	8.0	120.0	-1,940,059	8.60	0.037
87	P-33	413	J-26	J-27	8.0	120.0	-1,807,216	8.01	0.032
89	P-34	195	J-25	J-28	8.0	120.0	1	0.00	0.000
91	P-35	491	J-24	J-29	8.0	120.0	-1,312,971	5.82	0.018
93	P-36	795	J-29	J-30	8.0	120.0	-1,327,371	5.88	0.018
95	P-37	108	J-30	J-31	8.0	120.0	-1,882,640	8.34	0.035
97	P-38	363	J-31	J-32	8.0	120.0	1,600	0.01	0.000
99	P-39	493	J-25	J-33	8.0	120.0	-501,898	2.22	0.003
100	P-40	419	J-33	J-30	8.0	120.0	-555,269	2.46	0.004
102	P-41	210	J-31	J-34	8.0	120.0	-1,885,840	8.36	0.035
104	P-42	372	J-34	J-35	8.0	120.0	3,200	0.01	0.000
106	P-43	179	J-34	J-36	8.0	120.0	-1,892,240	8.39	0.035
110	P-45	186	J-37	J-38	8.0	120.0	-641,779	2.84	0.005
112	P-46	378	J-38	J-39	8.0	120.0	-644,979	2.86	0.005
114	P-47	145	J-39	J-40	8.0	120.0	-648,179	2.87	0.005
116	P-48	244	J-40	J-41	8.0	120.0	-2,078,583	9.21	0.042
118	P-49	114	J-36	J-42	8.0	120.0	-1,257,561	5.57	0.016

**Active Scenario: Max Day Fire Flow, Both On
FlexTable: Pipe Table**

Current Time: 0.000 hours

Length (User
Defined)
(ft)

0
250
0
0
0
1
0
0
1
0
0

Active Scenario: Max Day Fire Flow, Both On
FlexTable: Pump Table

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpd)	Pump Head (ft)
169	PMP-1	601.00	Sunrise/Sheridan	Off	600.50	759.68	0	0.00
206	PMP-3	604.92	North Forest	On	605.50	764.34	3,885,802	158.84
213	PMP-4	598.00	Donna Lee	On	598.00	782.75	3,084,802	184.75

**Active Scenario: Max Day Fire Flow, Both On
FlexTable: Reservoir Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpd)	Hydraulic Grade (ft)
130	R-2	0.00	<None>	(N/A)	(N/A)
168	R-3	600.50	<None>	-1	600.50
200	R-4	598.00	<None>	3,084,802	598.00
203	R-5	605.50	<None>	3,885,802	605.50

APPENDIX E

Peak Hour Hydraulic Model Run Results

**Active Scenario: Peak Hour - North Forest On
FlexTable: Junction Table**

Current Time: 0.000 hours Demand: 426 gpm

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
28	J-1	598.00	<Collection: 1 items>	0	796.31	85.8
29	J-2	596.00	<Collection: 1 items>	19,250	796.31	86.7
33	J-4	595.00	<Collection: 1 items>	20,125	796.31	87.1
37	J-5	598.00	<Collection: 0 items>	10,000	796.31	85.8
39	J-6	598.00	<Collection: 1 items>	0	796.31	85.8
41	J-7	597.00	<Collection: 1 items>	15,000	796.31	86.2
44	J-8	598.00	<Collection: 1 items>	8,000	796.32	85.8
46	J-9	598.00	<Collection: 1 items>	375	796.32	85.8
48	J-10	598.00	<Collection: 1 items>	21,875	796.33	85.8
50	J-11	598.00	<Collection: 1 items>	4,000	796.32	85.8
52	J-12	598.00	<Collection: 1 items>	0	796.32	85.8
54	J-13	598.00	<Collection: 1 items>	4,000	796.32	85.8
56	J-14	598.00	<Collection: 1 items>	4,000	796.32	85.8
59	J-15	598.00	<Collection: 1 items>	13,125	796.33	85.8
61	J-16	594.00	<Collection: 1 items>	12,250	796.31	87.5
65	J-17	598.00	<Collection: 1 items>	7,000	796.35	85.8
67	J-18	597.00	<Collection: 1 items>	10,500	796.37	86.3
69	J-19	598.00	<Collection: 1 items>	9,625	796.41	85.8
71	J-20	600.00	<Collection: 1 items>	7,000	796.46	85.0
73	J-21	598.00	<Collection: 1 items>	6,125	796.36	85.8
78	J-23	600.00	<Collection: 1 items>	92,500	796.43	85.0
80	J-24	601.00	<Collection: 1 items>	66,614	796.96	84.8
82	J-25	601.00	<Collection: 1 items>	110,521	797.20	84.9
84	J-26	603.00	<Collection: 1 items>	50,000	797.80	84.3
86	J-27	605.00	<Collection: 1 items>	0	798.23	83.6
88	J-28	600.00	<Collection: 1 items>	0	797.20	85.3
90	J-29	601.00	<Collection: 1 items>	18,500	797.07	84.8
92	J-30	600.00	<Collection: 1 items>	0	797.31	85.4
94	J-31	600.00	<Collection: 1 items>	2,000	797.40	85.4
96	J-32	601.00	<Collection: 1 items>	2,000	797.40	85.0
98	J-33	601.00	<Collection: 1 items>	66,614	797.22	84.9
101	J-34	601.00	<Collection: 1 items>	4,000	797.59	85.1
103	J-35	601.00	<Collection: 1 items>	4,000	797.59	85.1
105	J-36	602.00	<Collection: 1 items>	375	797.76	84.7
107	J-37	602.00	<Collection: 1 items>	4,000	797.82	84.7
109	J-38	603.00	<Collection: 1 items>	4,000	797.84	84.3
111	J-39	604.00	<Collection: 1 items>	4,000	797.90	83.9
113	J-40	604.00	<Collection: 1 items>	0	797.93	83.9
115	J-41	605.00	<Collection: 1 items>	0	798.26	83.6
117	J-42	603.00	<Collection: 1 items>	0	797.81	84.3
123	J-43	605.00	<Collection: 1 items>	0	798.38	83.7
125	J-44	605.00	<Collection: 1 items>	0	798.38	83.7
127	J-45	604.00	<Collection: 1 items>	(N/A)	(N/A)	(N/A)
133	J-46	601.00	<Collection: 1 items>	0	798.23	85.3

**Active Scenario: Peak Hour - North Forest On
FlexTable: Junction Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand Collection	Demand (gpd)	Hydraulic Grade (ft)	Pressure (psi)
134	J-47	602.00	<Collection: 1 items>	0	798.23	84.9
136	J-48	603.00	<Collection: 1 items>	0	798.23	84.5
138	J-49	604.00	<Collection: 1 items>	0	798.23	84.0
141	J-50	605.00	<Collection: 1 items>	0	798.23	83.6
162	J-54	595.27	<Collection: 1 items>	7,875	796.31	87.0
171	J-57	601.00	<Collection: 1 items>	0	798.23	85.3
173	J-58	601.00	<Collection: 1 items>	0	798.23	85.3
176	J-59	595.00	<Collection: 1 items>	0	796.31	87.1
187	J-62	599.00	<Collection: 1 items>	0	796.31	85.4
216	J-65	602.00	<Collection: 1 items>	4,000	797.79	84.7

**Active Scenario: Peak Hour - North Forest On
FlexTable: Pipe Table**

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen- Williams C	Flow (gpd)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	589	J-1	J-2	8.0	120.0	-2	0.00	0.000
36	P-5	420	J-2	J-4	8.0	120.0	-14,601	0.06	0.000
38	P-6	461	J-2	J-5	8.0	120.0	-260	0.00	0.000
40	P-7	126	J-5	J-6	8.0	120.0	1	0.00	0.000
42	P-8	516	J-5	J-7	8.0	120.0	-10,261	0.05	0.000
43	P-9	458	J-7	J-4	8.0	120.0	-8,014	0.04	0.000
45	P-10	1,094	J-7	J-8	8.0	120.0	-17,247	0.08	0.000
47	P-11	174	J-8	J-9	8.0	120.0	-29,247	0.13	0.000
49	P-12	396	J-9	J-10	8.0	120.0	-37,622	0.17	0.000
51	P-13	275	J-8	J-11	8.0	120.0	4,000	0.02	0.000
53	P-14	114	J-9	J-12	8.0	120.0	8,000	0.04	0.000
55	P-15	152	J-12	J-13	8.0	120.0	4,000	0.02	0.000
57	P-16	148	J-12	J-14	8.0	120.0	4,000	0.02	0.000
58	P-17	981	J-4	J-10	8.0	120.0	-32,225	0.14	0.000
60	P-18	311	J-10	J-15	8.0	120.0	-20,847	0.09	0.000
63	P-20	307	J-16	J-4	8.0	120.0	10,516	0.05	0.000
64	P-21	926	J-16	J-15	8.0	120.0	-35,032	0.16	0.000
66	P-22	271	J-15	J-17	8.0	120.0	-69,004	0.31	0.000
68	P-23	371	J-17	J-18	8.0	120.0	-51,392	0.23	0.000
70	P-24	721	J-18	J-19	8.0	120.0	-61,892	0.27	0.000
72	P-25	550	J-19	J-20	8.0	120.0	-71,517	0.32	0.000
74	P-26	642	J-20	J-21	8.0	120.0	101,611	0.45	0.000
75	P-27	363	J-21	J-10	8.0	120.0	70,874	0.31	0.000
76	P-28	516	J-17	J-21	8.0	120.0	-24,612	0.11	0.000
79	P-29	181	J-20	J-23	8.0	120.0	92,500	0.41	0.000
81	P-30	519	J-20	J-24	8.0	120.0	-272,628	1.21	0.001
83	P-31	385	J-24	J-25	8.0	120.0	-214,971	0.95	0.001
85	P-32	597	J-25	J-26	8.0	120.0	-276,156	1.22	0.001
87	P-33	413	J-26	J-27	8.0	120.0	-286,484	1.27	0.001
89	P-34	195	J-25	J-28	8.0	120.0	1	0.00	0.000
91	P-35	491	J-24	J-29	8.0	120.0	-124,271	0.55	0.000
93	P-36	795	J-29	J-30	8.0	120.0	-142,771	0.63	0.000
95	P-37	108	J-30	J-31	8.0	120.0	-258,722	1.15	0.001
97	P-38	363	J-31	J-32	8.0	120.0	2,000	0.01	0.000
99	P-39	493	J-25	J-33	8.0	120.0	-49,337	0.22	0.000
100	P-40	419	J-33	J-30	8.0	120.0	-115,951	0.51	0.000
102	P-41	210	J-31	J-34	8.0	120.0	-262,722	1.16	0.001
104	P-42	372	J-34	J-35	8.0	120.0	4,000	0.02	0.000
106	P-43	179	J-34	J-36	8.0	120.0	-270,722	1.20	0.001
110	P-45	186	J-37	J-38	8.0	120.0	-97,039	0.43	0.000
112	P-46	378	J-38	J-39	8.0	120.0	-101,039	0.45	0.000
114	P-47	145	J-39	J-40	8.0	120.0	-105,039	0.47	0.000
116	P-48	244	J-40	J-41	8.0	120.0	-326,769	1.45	0.001
118	P-49	114	J-36	J-42	8.0	120.0	-182,058	0.81	0.000

**Active Scenario: Peak Hour - North Forest On
FlexTable: Pipe Table**

Current Time: 0.000 hours

Length (User Defined) (ft)
0
250
0
0
0
1
0
0
1
0
0

Active Scenario: Peak Hour - North Forest On
FlexTable: Pump Table

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpd)	Pump Head (ft)
169	PMP-1	601.00	Sunrise/Sheridan	Off	600.50	798.23	0	0.00
206	PMP-3	604.92	North Forest	On	605.50	798.39	613,256	192.89
213	PMP-4	598.00	Donna Lee	Off	598.00	796.31	0	0.00

**Active Scenario: Peak Hour - North Forest On
FlexTable: Reservoir Table**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpd)	Hydraulic Grade (ft)
130	R-2	0.00	<None>	(N/A)	(N/A)
168	R-3	600.50	<None>	-1	600.50
200	R-4	598.00	<None>	-1	598.00
203	R-5	605.50	<None>	613,256	605.50

APPENDIX F
Hydrant Model Layout

Active Scenario: Max Day Fire Flow - Maple On, Middle
Scenario: Max Day Fire Flow - Maple On, Middle

