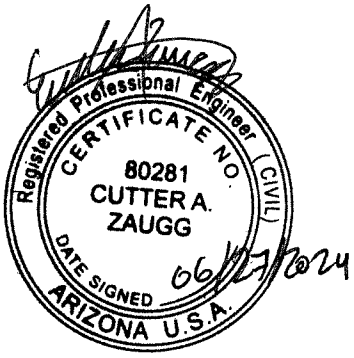
ALLEN

CONSULTING ENGINEERS, INC.

Water Report
for
26026 S. Ellsworth Road
Queen Creek, AZ 85142

(A.C.E. Job # 97839)



Prepared by:

Allen Consulting Engineers, Inc.
Cutter A. Zaugg, P.E.

June 27, 2024

4111 East Valley Auto Drive, #103, Mesa, Arizona 85206
Phone: 480-844-1666
Email: ace@allenconsultengr.com

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SITE DESCRIPTION

The project is a proposed commerical site located at 26026 S. Ellsworth Road and is within a portion of the southeast quarter of Section 33, Township 2 South, Range 7 East, of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is approximately 4.188 net acres in size. Four 7,661 S.F. buildings are proposed for the site for a total area of 30,644 S.F.

EXISTING WATER SYSTEM

There is an existing 8" water main in San Tan Boulevard. There is an existing fire hydrant near southwest corner of the intersection of San Tan Boulevard and Ellsworth Road. The Town of Queen Creek is the water service provider for the site.

PROPOSED WATER SYSTEM DESIGN

An 8" water main with 6" fire lines are proposed for the site. The fire lines will serve the buildings fire sprinkler system. There is one existing fire hydrant and three proposed fire hydrants that will provide fire protection for this site. All of these fire hydrants will be served by the 8" existing water line in San Tan Boulevard. One of the existing fire hydrants is located at the northeast corner of this site and there are three proposed fire hydrants that will be located within the property boundary. The total area of the proposed building is 30,644 S.F.

FIRE HYDRANT FLOW TEST

A fire hydrant flow test was not done at this time. The static pressure is assumed to be 60 psi at node 1, the existing fire hydrant, on the Water Model Map in Appendix A.

METHODOLOGY

The required fire flow for this project was selected from Table B105.1 in the 2018 International Fire Code for building type V-B. The building is to have an automatic fire sprinkler system which allows a 50% reduction in fire flow demand per Section 903.3.1.1. A fire flow of 2,375 gpm is the required minimum fire flow allowed.

Design Criteria:

Minimum Pressures:	40 psi @ peak hour 20 psi @ maximum day demand + fire flow
Land Use Demands:	Buildings = 0.4 gpd/S.F. @ 30,644 S.F. =12,258 gpd or 8.5 gpm
Peaking Factors Used:	Maximum Day = 2 x Average Day Demand = 17 gpm Peak Hour = 3.0 x Average Day Demand = 25.5 gpm
Fire Flows:	4,750 gpm with 50% Reduction Factor = 2,375 gpm

COMPUTER MODEL MAXIMUM DAY, PEAK HOUR, AND MAXIMUM DAY PLUS FIRE FLOW OF 2,392 GPM

The maximum day flow for this site of 17 gpm and the peak hour flow is 25.5 gpm. The fire flow is 2,375 gpm.

In Appendix B, the computer model calculated the water system with fire flows at nodes 6,9 and 12 of 798 gpm, 797 gpm, and 797 gpm respectively. The minimum pressure in the system occurs at node12 with a pressure of 52.62 psi which exceeds the minimum pressure of 20 psi. The maximum velocity in the system is 9.50 feet per second which meets the requirement of having a maximum velocity less than 10 feet per second.

RESULTS

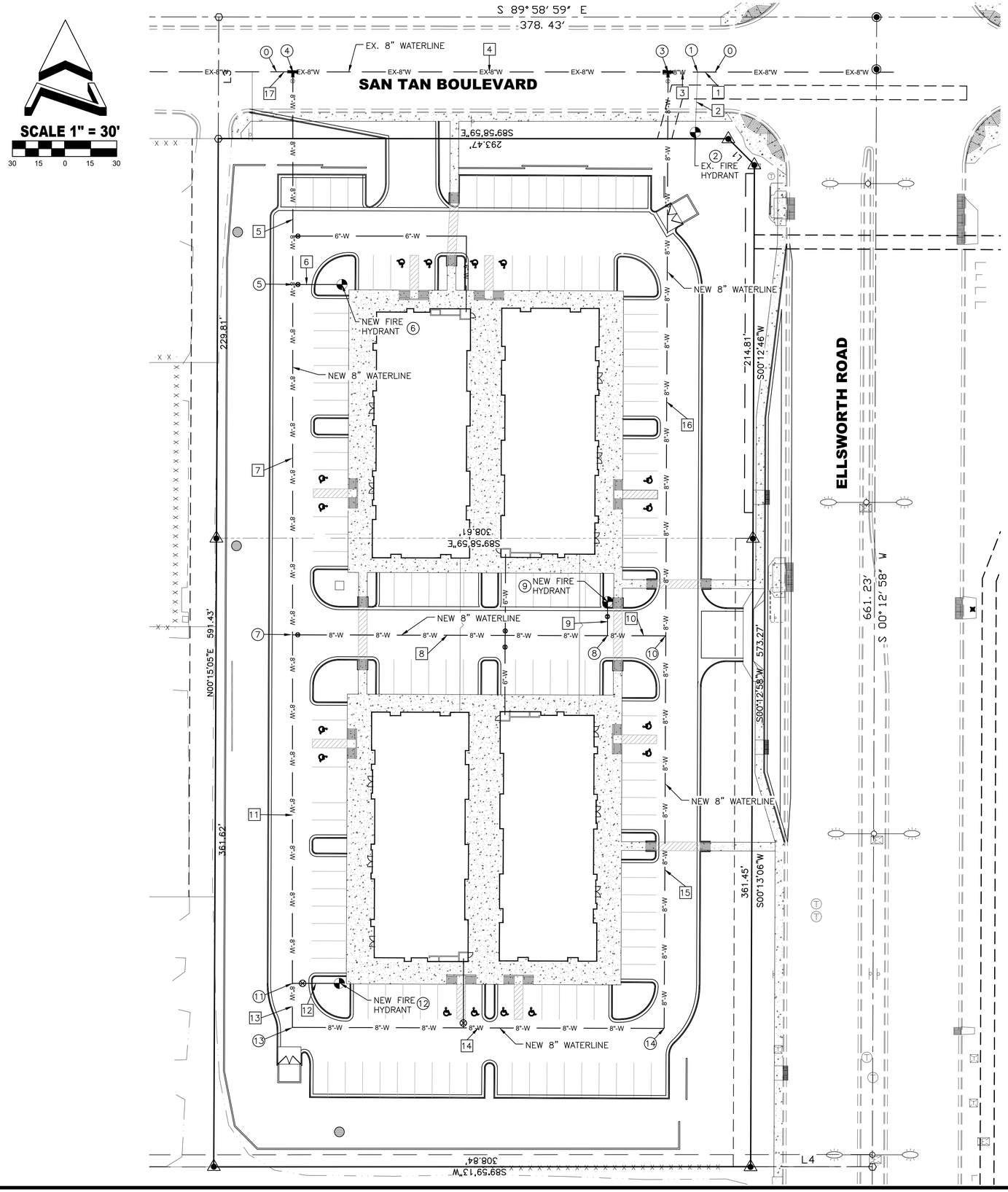
This water report used the actual fire flow test that were conducted by EJ FLOW TEST LLC, as shown in Appendix A. The proposed system meets the requirements for a maximum velocity of 10 feet per second and a minimum pressure of 20 psi.

Therefore, this proposed system will meet average day, maximum day, peak hour, sprinklers, and maximum day plus fire flow demand requirements for the site.

APPENDIX A
Water Model

WATER MODEL MAP

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 SOUTH, RANGE 7 EAST OF THE G.&S.R.B.&M., MARICOPA COUNTY, ARIZONA.



LEGEND

- (#) NODE
- [#] PIPE
- ⊗ *WATER VALVE*
- *FIRE HYDRANT*
- *TAPPING TEE AND VALVE*

Professional Engineer — CERTIFICATE NO. 80281 — CUTTER A. ZAUGG — 12/1/2024 — ARIZONA, U.S.A.

Contact Arizona 811 at least two full working days before you begin excavation — ARIZONA811 — Call 811 or click Arizona811.com

DATE
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ALLEN CONSULTING ENGINEERS, INC.
4111 E. VALLEY AUTO DRIVE, SUITE 103
MESA, ARIZONA 85206
PHONE (480) 844-1666
E-MAIL: ace@allenconsultengr.com

APN'S 304-91-045J & 304-91-045K
26026 S. ELLSWORTH ROAD
QUEEN CREEK, AZ 85142
WATER MODEL MAP

JOB NUMBER	97839	SHEET	1	OF	1
DRAWING	WATER MODEL				
DRAFTSMAN		CHECKED BY		DATE	06/27/2024

APPENDIX B

Max Day + Fire Flow, Max Day, Peak Hour

Allen Consulting Engineers, Inc.
4111 E. Valley Auto Drive
Suite 103
Mesa, AZ 85206

Water Report
Max Day + Fire Flow (2392 gpm)

June 27, 2024

Number of pipes: 17
Number of junction nodes: 14
Flow unit of measure: GPM
File name: 97839

Summary of Input Data

Pipe Data:

Pipe	Node #1	Node #2	Dia (in)	Length (ft)	H-W Coeff	Minor Fact	Pump Type	FGN Grade
1	0	1	8.0	10.0	130.0	0.0	-	1554.69
2	1	2	8.0	35.0	130.0	0.0	-	-
3	1	3	8.0	17.0	130.0	0.0	-	-
4	3	4	8.0	216.0	130.0	0.0	-	-
5	4	5	8.0	122.0	130.0	0.0	-	-
6	5	6	6.0	28.0	130.0	0.0	-	-
7	5	7	8.0	202.0	130.0	0.0	-	-
8	7	8	8.0	181.0	130.0	0.0	-	-
9	8	9	6.0	20.0	130.0	0.0	-	-
10	8	10	8.0	34.0	130.0	0.0	-	-
11	7	11	8.0	200.0	130.0	0.0	-	-
12	11	12	6.0	27.0	130.0	0.0	-	-
13	11	13	8.0	25.0	130.0	0.0	-	-
14	13	14	8.0	214.0	130.0	0.0	-	-
15	14	10	8.0	226.0	130.0	0.0	-	-
16	10	3	8.0	324.0	130.0	0.0	-	-
17	0	4	8.0	10.0	130.0	0.0	-	1554.69

Junction Node Data:

Node #	Demand (GPM)	Elev (ft)	Connecting Pipes
1	0.00	1419.40	1, 2, 3
2	0.00	1419.69	2
3	0.00	1418.50	3, 4, 16
4	0.00	1422.60	4, 5, 17
5	0.00	1423.40	5, 6, 7
6	797.98	1423.00	6
7	0.00	1423.30	7, 8, 11
8	0.00	1424.30	8, 9, 10
9	797.00	1424.30	9
10	0.00	1424.30	10, 15, 16
11	0.00	1424.30	11, 12, 13
12	797.00	1424.85	12
13	0.00	1424.00	13, 14
14	0.00	1424.00	14, 15

Simulation Results

Number of trials: 6
Convergence : 0.0011

Pipe	Nodes (Q--->)		Dia (in)	Length (ft)	Flow (GPM)	Vel (fps)	Losses (ft) Head	Minor	Pump Head	Hd Loss /1000 ft
1	0	1	8.0	10.0	903.39	5.77	0.15	0.00	-	15.13
2	1	2	8.0	35.0	0.00	0.00	0.00	0.00	-	0.00
3	1	3	8.0	17.0	903.39	5.77	0.26	0.00	-	15.13
4	4	3	8.0	216.0	67.79	0.43	0.03	0.00	-	0.13
5	4	5	8.0	122.0	1420.79	9.07	4.27	0.00	-	35.01
6	5	6	6.0	28.0	797.98	9.05	1.37	0.00	-	48.82
7	5	7	8.0	202.0	622.80	3.97	1.54	0.00	-	7.60
8	7	8	8.0	181.0	153.14	0.98	0.10	0.00	-	0.57
9	8	9	6.0	20.0	797.00	9.04	0.97	0.00	-	48.71
10	10	8	8.0	34.0	643.85	4.11	0.27	0.00	-	8.08
11	7	11	8.0	200.0	469.66	3.00	0.90	0.00	-	4.51
12	11	12	6.0	27.0	797.00	9.04	1.32	0.00	-	48.71
13	13	11	8.0	25.0	327.33	2.09	0.06	0.00	-	2.31
14	14	13	8.0	214.0	327.33	2.09	0.49	0.00	-	2.31
15	10	14	8.0	226.0	327.33	2.09	0.52	0.00	-	2.31
16	3	10	8.0	324.0	971.19	6.20	5.61	0.00	-	17.31
17	0	4	8.0	10.0	1488.58	9.50	0.38	0.00	-	38.17

Summary of inflows (+) and outflows (-):

Pipe #	Flow (GPM)
1	903.39+
17	1488.58+

Net system demand: 2392 GPM

Maximum-Minimum Summary:

Pipe #	Vel (fps)	Pipe #	HL/1000 ft	Node #	Press (psi)
17	9.50	6	48.82	3	58.84
5	9.07	9	48.71	1	58.56
6	9.05	12	48.71	2	58.43
13	2.09	14	2.31	11	53.43
8	0.98	8	0.57	9	53.35
4	0.43	4	0.13	12	52.62

NOTE: 'HL/1000 ft' does NOT include Minor Losses; and Pipes with zero flow are not included under Minimum 'Vel (fps)'.

Allen Consulting Engineers, Inc.
4111 E. Valley Auto Drive
Suite 103
Mesa, AZ 85206

Water Report
Max Day Demand

June 27, 2024

Number of pipes: 17
Number of junction nodes: 14
Flow unit of measure: GPM
File name: 97839

Summary of Input Data

Pipe Data:

Pipe	Node #1	Node #2	Dia (in)	Length (ft)	H-W Coeff	Minor Fact	Pump Type	FGN Grade
1	0	1	8.0	10.0	130.0	0.0	-	1554.69
2	1	2	8.0	35.0	130.0	0.0	-	-
3	1	3	8.0	17.0	130.0	0.0	-	-
4	3	4	8.0	216.0	130.0	0.0	-	-
5	4	5	8.0	122.0	130.0	0.0	-	-
6	5	6	6.0	28.0	130.0	0.0	-	-
7	5	7	8.0	202.0	130.0	0.0	-	-
8	7	8	8.0	181.0	130.0	0.0	-	-
9	8	9	6.0	20.0	130.0	0.0	-	-
10	8	10	8.0	34.0	130.0	0.0	-	-
11	7	11	8.0	200.0	130.0	0.0	-	-
12	11	12	6.0	27.0	130.0	0.0	-	-
13	11	13	8.0	25.0	130.0	0.0	-	-
14	13	14	8.0	214.0	130.0	0.0	-	-
15	14	10	8.0	226.0	130.0	0.0	-	-
16	10	3	8.0	324.0	130.0	0.0	-	-
17	0	4	8.0	10.0	130.0	0.0	-	1554.69

Junction Node Data:

Node #	Demand (GPM)	Elev (ft)	Connecting Pipes
1	0.00	1419.40	1, 2, 3
2	0.00	1419.69	2
3	0.00	1418.50	3, 4, 16
4	0.00	1422.60	4, 5, 17
5	0.00	1423.40	5, 6, 7
6	6.01	1423.00	6
7	0.00	1423.30	7, 8, 11
8	0.00	1424.30	8, 9, 10
9	6.01	1424.30	9
10	0.00	1424.30	10, 15, 16
11	0.00	1424.30	11, 12, 13
12	4.98	1424.85	12
13	0.00	1424.00	13, 14
14	0.00	1424.00	14, 15

Simulation Results

Number of trials: 16
Convergence : 0.0026

Pipe	Nodes (Q--->)		Dia (in)	Length (ft)	Flow (GPM)	Vel (fps)	Losses (ft) Head	Losses (ft) Minor	Pump Head	Hd Loss /1000 ft
1	0	1	8.0	10.0	6.40	0.04	0.00	0.00	-	0.00
2	1	2	8.0	35.0	0.00	0.00	0.00	0.00	-	0.00
3	1	3	8.0	17.0	6.40	0.04	0.00	0.00	-	0.00
4	4	3	8.0	216.0	0.44	0.00	0.00	0.00	-	0.00
5	4	5	8.0	122.0	10.17	0.06	0.00	0.00	-	0.00
6	5	6	6.0	28.0	6.01	0.07	0.00	0.00	-	0.00
7	5	7	8.0	202.0	4.16	0.03	0.00	0.00	-	0.00
8	7	8	8.0	181.0	1.25	0.01	0.00	0.00	-	0.00
9	8	9	6.0	20.0	6.01	0.07	0.00	0.00	-	0.00
10	10	8	8.0	34.0	4.77	0.03	0.00	0.00	-	0.00
11	7	11	8.0	200.0	2.91	0.02	0.00	0.00	-	0.00
12	11	12	6.0	27.0	4.98	0.06	0.00	0.00	-	0.00
13	13	11	8.0	25.0	2.07	0.01	0.00	0.00	-	0.00
14	14	13	8.0	214.0	2.07	0.01	0.00	0.00	-	0.00
15	10	14	8.0	226.0	2.07	0.01	0.00	0.00	-	0.00
16	3	10	8.0	324.0	6.84	0.04	0.00	0.00	-	0.00
17	0	4	8.0	10.0	10.61	0.07	0.00	0.00	-	0.00

Summary of inflows (+) and outflows (-):

Pipe #	Flow (GPM)
1	6.40+
17	10.61+

Net system demand: 17 GPM

Maximum-Minimum Summary:

Pipe #	Vel (fps)	Pipe #	HL/1000 ft	Node #	Press (psi)
6	0.07	6	0.01	3	59.02
9	0.07	9	0.01	1	58.63
17	0.07	12	0.00	2	58.50
13	0.01	8	0.00	11	56.50
8	0.01	7	0.00	9	56.50
4	0.00	4	0.00	12	56.26

NOTE: 'HL/1000 ft' does NOT include Minor Losses; and Pipes with zero flow are not included under Minimum 'Vel (fps)'.

Allen Consulting Engineers, Inc.
4111 E. Valley Auto Drive
Suite 103
Mesa, AZ 85206

Water Report
Peak Hour Demand

June 27, 2024

Number of pipes: 17
Number of junction nodes: 14
Flow unit of measure: GPM
File name: 97839

Summary of Input Data

Pipe Data:

Pipe	Node #1	Node #2	Dia (in)	Length (ft)	H-W Coeff	Minor Fact	Pump Type	FGN Grade
1	0	1	8.0	10.0	130.0	0.0	-	1554.69
2	1	2	8.0	35.0	130.0	0.0	-	-
3	1	3	8.0	17.0	130.0	0.0	-	-
4	3	4	8.0	216.0	130.0	0.0	-	-
5	4	5	8.0	122.0	130.0	0.0	-	-
6	5	6	6.0	28.0	130.0	0.0	-	-
7	5	7	8.0	202.0	130.0	0.0	-	-
8	7	8	8.0	181.0	130.0	0.0	-	-
9	8	9	6.0	20.0	130.0	0.0	-	-
10	8	10	8.0	34.0	130.0	0.0	-	-
11	7	11	8.0	200.0	130.0	0.0	-	-
12	11	12	6.0	27.0	130.0	0.0	-	-
13	11	13	8.0	25.0	130.0	0.0	-	-
14	13	14	8.0	214.0	130.0	0.0	-	-
15	14	10	8.0	226.0	130.0	0.0	-	-
16	10	3	8.0	324.0	130.0	0.0	-	-
17	0	4	8.0	10.0	130.0	0.0	-	1554.69

Junction Node Data:

Node #	Demand (GPM)	Elev (ft)	Connecting Pipes
1	0.00	1419.40	1, 2, 3
2	0.00	1419.69	2
3	0.00	1418.50	3, 4, 16
4	0.00	1422.60	4, 5, 17
5	0.00	1423.40	5, 6, 7
6	8.48	1423.00	6
7	0.00	1423.30	7, 8, 11
8	0.00	1424.30	8, 9, 10
9	8.48	1424.30	9
10	0.00	1424.30	10, 15, 16
11	0.00	1424.30	11, 12, 13
12	8.48	1424.85	12
13	0.00	1424.00	13, 14
14	0.00	1424.00	14, 15

Simulation Results

Number of trials: 15
Convergence : 0.0042

Pipe	Nodes (Q--->)		Dia (in)	Length (ft)	Flow (GPM)	Vel (fps)	Losses (ft) Head	Losses (ft) Minor	Pump Head	Hd Loss /1000 ft
1	0	1	8.0	10.0	9.61	0.06	0.00	0.00	-	0.00
2	1	2	8.0	35.0	0.00	0.00	0.00	0.00	-	0.00
3	1	3	8.0	17.0	9.61	0.06	0.00	0.00	-	0.00
4	4	3	8.0	216.0	0.72	0.00	0.00	0.00	-	0.00
5	4	5	8.0	122.0	15.12	0.10	0.00	0.00	-	0.00
6	5	6	6.0	28.0	8.48	0.10	0.00	0.00	-	0.00
7	5	7	8.0	202.0	6.63	0.04	0.00	0.00	-	0.00
8	7	8	8.0	181.0	1.63	0.01	0.00	0.00	-	0.00
9	8	9	6.0	20.0	8.48	0.10	0.00	0.00	-	0.00
10	10	8	8.0	34.0	6.85	0.04	0.00	0.00	-	0.00
11	7	11	8.0	200.0	5.00	0.03	0.00	0.00	-	0.00
12	11	12	6.0	27.0	8.48	0.10	0.00	0.00	-	0.00
13	13	11	8.0	25.0	3.48	0.02	0.00	0.00	-	0.00
14	14	13	8.0	214.0	3.48	0.02	0.00	0.00	-	0.00
15	10	14	8.0	226.0	3.48	0.02	0.00	0.00	-	0.00
16	3	10	8.0	324.0	10.34	0.07	0.00	0.00	-	0.00
17	0	4	8.0	10.0	15.84	0.10	0.00	0.00	-	0.00

Summary of inflows (+) and outflows (-):

Pipe #	Flow (GPM)
1	9.61+
17	15.83+

Net system demand: 25.5 GPM

Maximum-Minimum Summary:

Pipe #	Vel (fps)	Pipe #	HL/1000 ft	Node #	Press (psi)
17	0.10	6	0.01	3	59.02
5	0.10	9	0.01	1	58.63
6	0.10	12	0.01	2	58.50
13	0.02	13	0.00	11	56.50
8	0.01	8	0.00	9	56.50
4	0.00	4	0.00	12	56.26

NOTE: 'HL/1000 ft' does NOT include Minor Losses; and Pipes with zero flow are not included under Minimum 'Vel (fps)'.