PRELIMINARY WATER AND WASTEWATER BASIS OF DESIGN REPORT

Artesia

PRELIMINARY Basis of Design Report

- ☐ ACCEPTED
- ☑ ACCEPTED AS NOTED
- ☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY RSacks **DATE** 9/13/2022

Prepared For:

STREET LIGHT RESIDENTIAL
5080 N. 40th Street, Suite 475
Phoenix, AZ 85018

See site plan for additional valve locations
Also, valves within multi family developments and a maximum 500' separation

Registered Professional Engineer (Civil)
CERTIFICATE NO.
62869
SHANE R. JOHANNSEN
Date Signed 9/9/22
ARIZONA, U.S.A.

Kimley»Horn

291743000
September 2022

15-DR-2022
9/12/2022

ARTESIA

Preliminary Water and Wastewater Basis of Design Report

LOCATED IN SCOTTSDALE, ARIZONA

SEPTEMBER 2022 | VERSION 2.0

Prepared By:

Kimley»Horn

15-DR-2022
9/12/2022

Contents

Appendices

Figures

1. INTRODUCTION

1.1 PROJECT NAME, LOCATION, SIZE AND BRIEF DESCRIPTION

This Water and Wastewater Basis of Design Report has been prepared to support the redesign of the Artesia project, a mixed-use development consisting of single and multi-family residences, and existing commercial located in the City of Scottsdale, Arizona. The site is positioned in the southwest quarter of Section 2, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. This parcel is bordered to the north by the Mummy Mountain Wash and to the south by the Traviata condominium development. The site is further bound on the east by McCormick Ranch Golf Club and Indian Bend Wash. The eastern portion of the site is a backwater area for the Indian Bend Wash. It is bound on the west by Scottsdale Road. See Figure 1, Vicinity Map for the location of the site.

In 2006, the site was originally approved as 2-ZN-2005 for 480 residential units on 39+/- acres with an additional 5 acres of commercial property along the Scottsdale Road frontage. In 2008, the project was designed, platted and based on information available all street and utility improvements were constructed in full. The commercial portion of the site was developed and is currently occupied by the Blue 32 Sports Grill, Roka Akor restaurant and nearby retail shops. The live/work units along the Hummingbird entry road were constructed along with 64 luxury condo units and 23 golf townhomes in the northeast corner of the site. An underground parking garage was constructed in the center of the site. The planned 4 story luxury condominium units and the remaining brownstone and golf condominiums along the eastern and southern boundary of the development also were not constructed before the project was put on hold.

The project was rezoned in 2014 to increase density/units while at the same time providing more open space than the prior design. Additional units were added by providing additional floors/building height along with smaller units within the redeveloped portions of the site.

The updated site layout includes modifications to the existing loop road system and is intended to match the design from 2007 as much as possible. More significant modifications will be made to planning area 3 (PA-3) While the site layout remains very similar to the 2008 plans, the project will be developed in 3 planning areas as follows:

Planning Area 1 – Consists of refining the central residential towers and constructing the vertical portion of the development over the existing underground garage structures. Existing water, wastewater, and storm infrastructure will be modified where appropriate and continue to be utilized.

Planning Area 2 – Rezoned in 2014 to allow for more density and the development of multi-level residential. However, for this report, it is assumed that this area will remain as originally designed and constructed in 2008 since final product has not been determined for this area. All existing utility systems will be modified to accommodate the proposed site plan and continue to be utilized.

Planning Area 3 – Significant design changes are proposed which include demolition of portions of the existing surface parking and loop road system. New street parking and updates to the loop road system are proposed to allow for construction of multi-family residential structures.

VICINITY MAP FOR SFI–ARTESIA SCOTTSDALE, ARIZONA

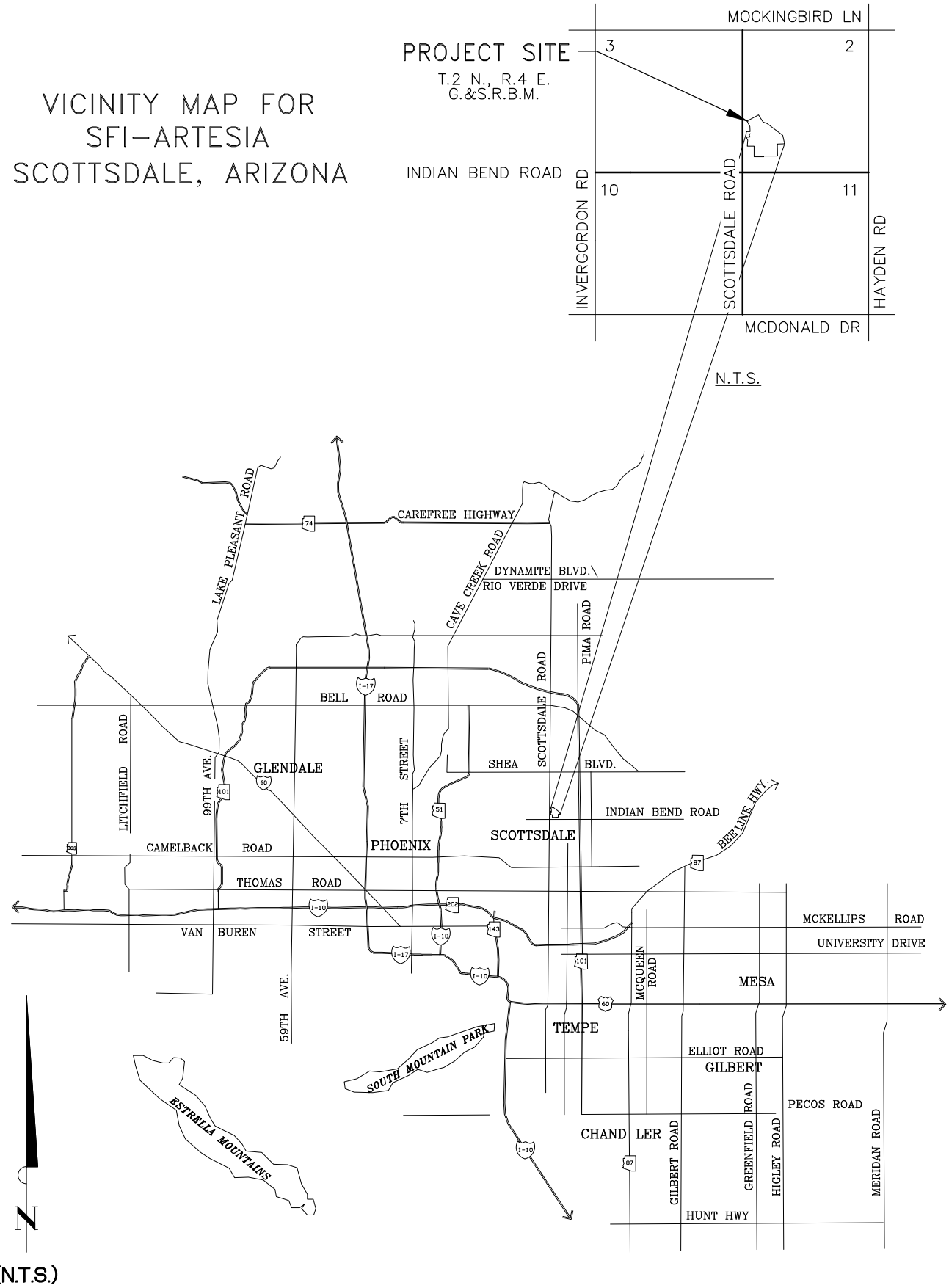

FIGURE 1

Kimley»Horn

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9/12/2022

1.2 TYPE OF REPORT

This Preliminary Water & Wastewater Basis of Design Report has been prepared to support the refinement of the Artesia development.

2. EXISTING CONDITIONS

2.1 ZONING AND LAND USE

The project site currently contains two zoning districts. The existing development all of which fronts Scottsdale Road, is zoned C-1 PCD – Neighborhood Commercial, Planned Community Development District. The proposed improvements in PA-1,2, and 3 are zoned R-5 PCD – Multiple-Family Residential, Planned Community Development District.

The existing (constructed) development consists of 93 dwelling units, 20,800 square feet of retail, unfinished underground parking, spine roads with surface parking, and water/sewer infrastructure. The dwelling units and retail will remain. Existing spine roads, infrastructure, and utilities will be upgraded, demolished, or abandoned as required to accommodate the proposed improvements.

2.2 EXISTING TOPOGRAPHY/IMPROVEMENTS

The majority of the site slopes generally to the outfall at the east end of the site. The north end of the site slopes to the Mummy Mountain Wash. The site is not currently landscaped.

2.3 EXISTING WATER INFRASTRUCTURE

There is a 10-inch asbestos cement pipe (ACP) water main located along Scottsdale Road adjacent to the project site. This water line is in the City's pressure zone 2A. An 8-inch water distribution main is currently located within the project site. This water main provides looped distribution throughout the site and connects to the 10-inch main in Scottsdale Road at two points as well as a third connection to the water line located at the southeast corner of the site. See Appendix F, "Water & Wastewater Basis of Design Report" for more information on the existing water infrastructure.

A prior fire hydrant flow test was conducted by EJ Flow Tests on June 13, 2014 at the fire hydrant at the east end of the site (near proposed Planning Area 1) with the flowing hydrant located in the southeast of the site (proposed Planning Area 3). The test yielded a static pressure of 70.2 pounds per square inch (psi) and a residual pressure of 41.2 psi with the hydrant flowing at 1,501 gallons per minute (gpm). The estimated flow at 20 psi residual was approximately 2,019 gpm.

EJ Flow Tests performed a fire hydrant flow test on April 14, 2022 at the fire hydrant located in the southeast portion of PA-2. The flow hydrant was located in the eastern region of PA-3.The test yielded a static pressure of 82.0 psi and a residual pressure of 50.0 psi at a flow of 1,573 gpm. The data was further evaluated using a 10 psi safety factor thereby reducing the static pressure to 72.0 psi and the residual

pressure to 40.0 psi. With this information the estimated flow at 20 psi is approximately 2,044 gpm. See Appendix A for the Fire Hydrant Flow Test Report from EJ Flow Tests.

2.4 EXISTING WASTEWATER INFRASTRUCTURE

There is a 36-inch sanitary sewer line located along the west side of Scottsdale Road adjacent to the project site. Currently, the site is served by multiple 8-inch and 12-inch private sewer lines which connect to the 36-inch line at the south entrance to the property. In order to avoid improvements within Scottsdale Road, the onsite 12-inch main (constructed 2007) was connected to the existing 8-inch sewer connection located immediately south of the Blue 32 restaurant.

3. PROPOSED CONDITIONS

3.1 PROPOSED WATER DISTRIBUTION SYSTEM

The existing 8-inch water mains described in section 2.1 above will have to be modified to accommodate the proposed development as they will interfere with multiple building foundations. The existing connections to the 10-inch main in Scottsdale Road as well as the connection at the southeast corner of the site will remain. Existing ater mains throughout the property are contained in public water easements that vary between 16’ and 20’ in width. In cases where the proposed buildings conflict with existing water lines and easement, new water mains will be installed to ensure supply throughout the site. Approximately 6,380 feet of water line will be abandoned or demolished. The new water system will require approximately 2,980 feet of new pipe. Proposed water lines have been laid out to avoid parking stalls, structures, and walls. All proposed water mains will be placed in 16’ easements.

Units will not be metered separately. A single meter and associated back flow preventer will be in place on each building.

A separate fire loop is not required to serve the proposed development. Each building will have fire risers providing adequate sprinkler flows. Internal backflow prevention will be provided on each fire riser. Refer to Appendix B: Water Layout for a general overview of the on-site water distribution system.

3.2 DOMESTIC WATER DEMANDS

According to the guidelines outlined in the City of Scottsdale’s *Design Standards and Policies Manual, Section 6,* the Artesia project will provide the following demands to the City of Scottsdale’s existing distribution system:

Average Day Demand:

Residential: 185.3 GPD/unit = 0.27 GPM/unit * (High Density Condominium)

**Per Figure 6-1.2 Average Day Water Demands from the City of Scottsdale Design Standards & Policies Manual the above flow in GPM assumes a 12-hour active water use period per 24-hour day*.

Artesia (93 units existing, 547 units proposed): (0.27 GPM/unit) x (640 units) = 172 GPM

Commercial: 0.8 GPD/sq. ft. = 0.00111 GPM/sq. ft *.

**Per Figure 6-1.2 Average Day Water Demands from the City of Scottsdale Design Standards & Policies Manual the above flow in GPM assumes a 12-hour active water use period per 24-hour day*.

Artesia (Existing): (0.00111 GPM/sq. ft.) x (20,800 sq. ft.) = 22.2 GPM

Artesia Demands:

Average Day Demand = 172 GPM + 22.2 GPM = 194.2 GPM

Peak Hour Demand = (3.5) x (ADF) = 679.7 GPM

Maximum Day Demand = (2) x (ADF) = 388.4 GPM

It should be noted that the average day demand for the previously approved 2018 development was calculated to be 94 GPM. Based on updated design criteria listed in the 2018 *Design Standards & Policies Manual* this would equate to an average day demand of 171.7 GPM. Therefore, the proposed development will add 22.5 GPM of demand to the existing system. Irrigation meters have not been included in the above demands.

3.3 WATER DESIGN CRITERIA

Demands were calculated based on the 2018 City of Scottsdale *Design Standards & Policies Manual*. The average daily consumptive rates were assumed as follows: for residential sites, a demand of 0.27 gallons per minute per unit was used. This is the design demand for high density condominiums. The maximum day demand and peak hour demand were calculated by multiplying the average day demands by a peaking factor of 2 and 3.5 respectively.

The static pressure in the City's distribution system should not exceed 120 pounds per square inch (psi), and the system shall be designed to maintain a minimum residual pressure of 50 psi at the highest, finish floor elevation to be served by system pressure under normal daily operating conditions. The system will maintain a minimum of 30 psi at the hydrant tee/tap under design fire flow requirements.

3.4 FIRE FLOW REQUIREMENTS

Per the City of Scottsdale *Design Standards & Policies Manual* water distribution facilities shall be sized to supply the water demands and deliver a minimum fire flow of 1,500 gpm. Fire hydrants are to be spaced no more than 700 feet apart; the proposed structures will be located within 600 feet of a fire hydrant. All distances are to be measured along the street or roadway in which a fire hose would be laid.

3.5 NETWORK ANALYSIS

The network analysis for the distribution system was created using WaterCAD Connect Edition 10 to demonstrate that the design standards outlined in section 3.3 will be met. Appendix D includes the proposed distribution network for the project site. A calibration model was created to ensure accurate simulation of the existing system and include the fire flow test data provided by EJ Flow Tests. See Appendix A for EJ Flow Test Summary. The analysis model was then created to simulate the proposed system and analyze average day, maximum day, peak hour, and maximum day plus fire flow demand conditions. See Appendix D for detailed water network analysis.

3.6 PROPOSED WASTEWATER COLLECTION SYSTEM

Approximately 1,980 feet of existing sewer pipe will be abandoned or demolished to avoid conflicts with the proposed development. The proposed wastewater collection system modifications will consist of approximately 2,540 feet of new 8-inch and 12-inch pipes. This system will be private and will be designed with a minimum full flow velocity of 2.0 fps as per the Arizona Administrative Code (AAC) and the 2012 Uniform Plumbing Code. The system will be constructed with a minimum cover of 4 feet as per the City of Scottsdale Design Standards. In most areas however the cover will be 7 feet or greater. A 6-foot minimum horizontal separation between the sewer and water lines will maintain adequate separation to prevent encroachment into the public water easements.

For residential construction, 8-inch and 12-inch sanitary sewer lines will be designed using 100 gallons per capita per day (gpcd) and a peaking factor of 4, as per the City of Scottsdale's Design Standards & Policies Manual. Refer to Appendix E: Sewer Calculations.

3.7 WASTEWATER HYDRAULIC DESIGN

The on-site sewer collection system is to be almost entirely private and will be designed in accordance with the Uniform Plumbing Code and Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control". The proposed 12" connection from the Secondary Entry Drive to the existing manhole in Scottsdale Road and the line tying back into the existing manhole will be the only public sewer on-site and has therefore been placed inside a proposed PUE. All lines will be designed with a minimum mean full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013. The depth to diameter (d/D) ratio for all sanitary sewer pipes will be no greater than 0.65 in the ultimate peak flow condition. The criteria used in design (i.e. velocity and slope) do not meet City of Scottsdale requirements. All sanitary sewer lines will be privately maintained.

A drop of 0.1 feet will be present across the bench of each manhole. Manholes are required at every intersecting angle of sewer pipes other than 180 degrees and are to be spaced no greater than 500 feet apart. All sewer lines are to be installed with no less than 4 feet of cover above the top of the pipe.

All proposed sewer lines have been designed with minimum slopes of 0.33%. This slope generates a full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013 for 8-inch pipes. See Appendix A for sewer layout and Appendix B for sewer flow calculations.

4. SUMMARY

The Artesia development will utilize the existing water and wastewater infrastructure within the project site. Existing water and wastewater utilities will be modified and improved to meet current design demands and applicable standards. All materials shall be disposed of in compliance with county, state, and federal EPA regulations.

The water distribution system connections to the existing 10-inch water line located in Scottsdale Road and the existing 8-inch system at the southeast corner of the site will remain. The onsite water system will be looped and will provide sufficient pressure and fire flow to serve both the proposed and existing development and meet the City of Scottsdale requirements. The water system improvements will be done is such a way as to maintain distribution to the existing buildings as well as the condominiums south of the site.

The modified wastewater collection system will tie into the existing 36-inch sanitary sewer line located in Scottsdale Road. The existing 8-inch connection to the sewer line in Scottsdale Road will be abandoned and a new public 12-inch connection will be installed to handle the additional demand. The existing system will remain private and will adequately serve the sewer needs of both the proposed and existing development. The wastewater collection system has been designed to meet the requirements of the AAC and the 2021 Uniform Plumbing Code.

5. REFERENCES

City of Scottsdale. *Design Standards & Policies Manual.* City of Scottsdale Planning, Building & Zoning, Arizona, 2018.

Kimley-Horn and Associates, Inc. *Water & Wastewater Basis of Design Report, Starpointe-Artesia,* August 2006.

Kimley-Horn and Associates, Inc. *Water & Wastewater Basis of Design Report, SFI-Artesia,* September 2014.

Kimley-Horn and Associates, Inc. *Water & Wastewater Basis of Design Report, Artesia,* July 2018.

WaterCAD Connect Edition 10, Bentley Systems, Inc.

Uniform Plumbing Code. 2021.

APPENDIX

Appendix A: Fire Hydrant Flow Test Report

Flow Test Summary

Project Name:	EJFT 22154 - Artesia
Project Address:	North Scottsdale Road & East Indian Bend Road, Scottsdale, Az 85253
Date of Flow Test:	2022-04-14
Time of Flow Test:	7:23 AM
Data Reliable Until:	2022-10-14
Conducted By:	Steven Saethre & Caleb Crabbs (EJ Flow Test) 602.999.7637
Witnessed By:	Christopher Mendez (City of Scottsdale) 602.908.9046
City Forces Contacted:	City of Scottsdale (602.908.9046)
Permit Number:	C68359

Note Scottsdale requires a max static pressure of 72 psi for safety factor.

Raw Flow Test Data

Static Pressure:	82.0 PSI
Residual Pressure:	50.0 PSI
Flowing GPM:	1,573
GPM @ 20 PSI:	2,248

Data with a 10 PSI Safety Factor

Static Pressure:	72.0 PSI
Residual Pressure:	40.0 PSI
Flowing GPM:	1,573
GPM @ 20 PSI:	2,044

Hydrant F_1

Pitot Pressure (1):	24	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	2.5	inches
Pitot Pressure (2):	20	PSI
Coefficient of Discharge (2):	0.9	
Hydrant Orifice Diameter (2):	2.5	inches

Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
541 ft (measured linearly)

Static-Residual Elevation
1291 ft (above sea level)

Flow Hydrant (F_1) Elevation
1296 ft (above sea level)

Elevation & distance values are approximate

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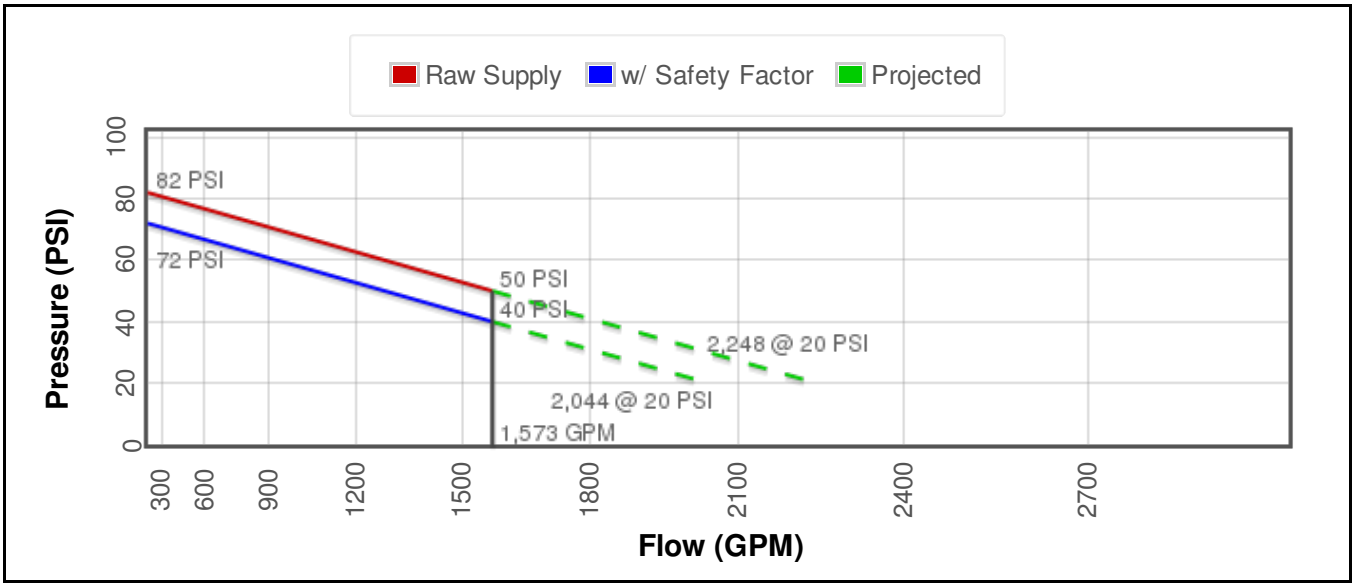
Flow Test Summary

Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph



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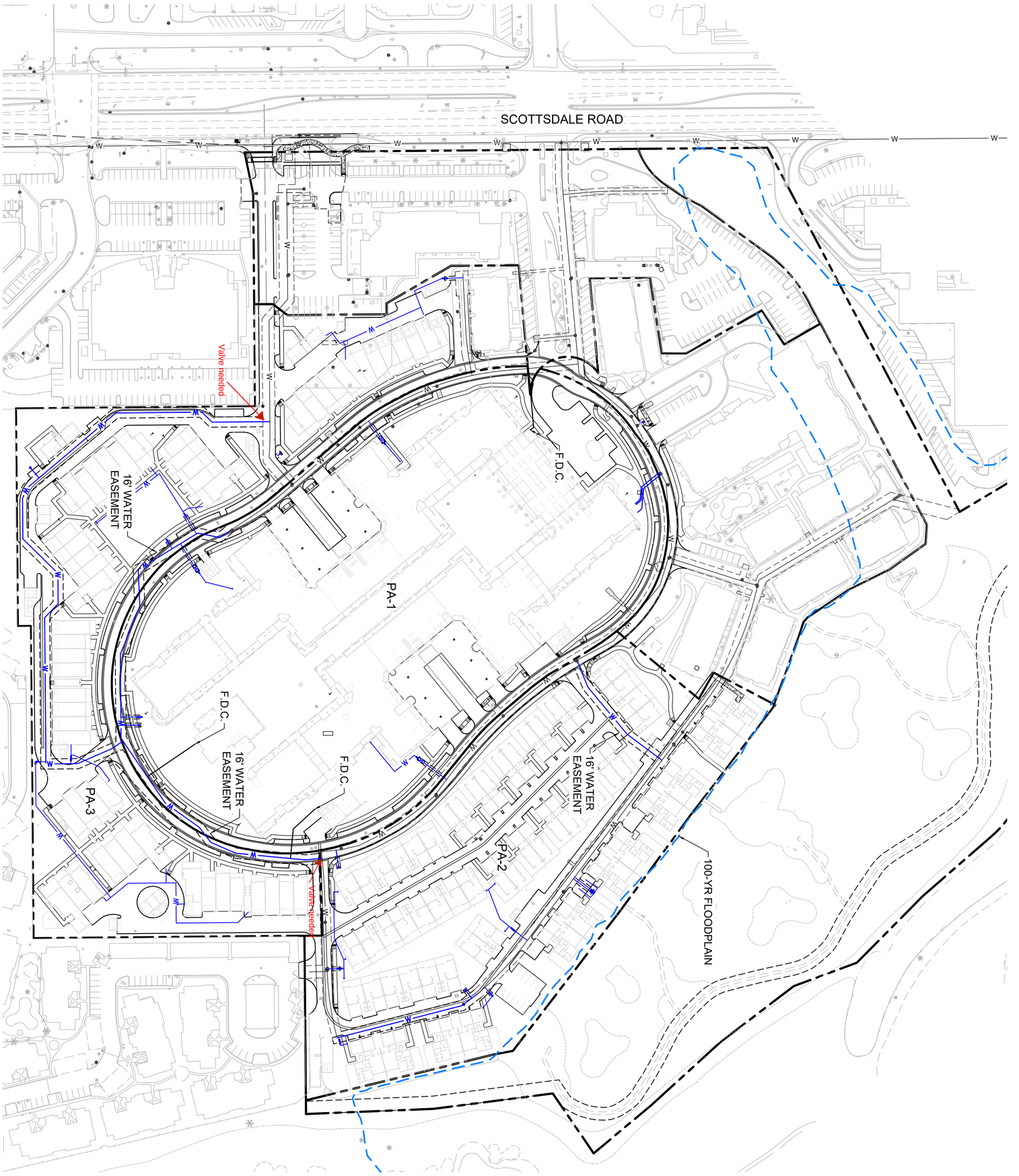
Appendix B: Water Layout



LEGEND

RIGHT-OF-WAY

FLOODPLAIN BOUNDARY

PROPOSED WATER

EXISTING WATER

GRAPHIC SCALE IN FEET
0 40 80 160

NORTH

ARTESIA
PROPOSED ON-SITE

SCALE (H): 1"=XX'
SCALE (V): NONE
DESIGNED BY: SRJ
DRAWN BY: SRJ
CHECKED BY: CB
DATE: 05/2022

Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

NO.	REVISION	DATE

PROJECT NO.
DRAWING NAME.
1 OF 1

15-DR-2022
9/12/2022

Appendix C: Sewer Layout

LEGEND

- RIGHT-OF-WAY
- FLOODPLAIN BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER

NORTH

GRAPHIC SCALE IN FEET
0 40 80 160

NO.	REVISION	DATE

Kimley»Horn

SCALE (H): 1"=XX'
SCALE (V): NONE
DESIGNED BY: SRJ
DRAWN BY: SRJ
CHECKED BY: CB
DATE: 05/2022

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

ARTESIA
PROPOSED ON-SITE

PROJECT NO.

DRAWING NAME

1 OF 1

15-DR-2022
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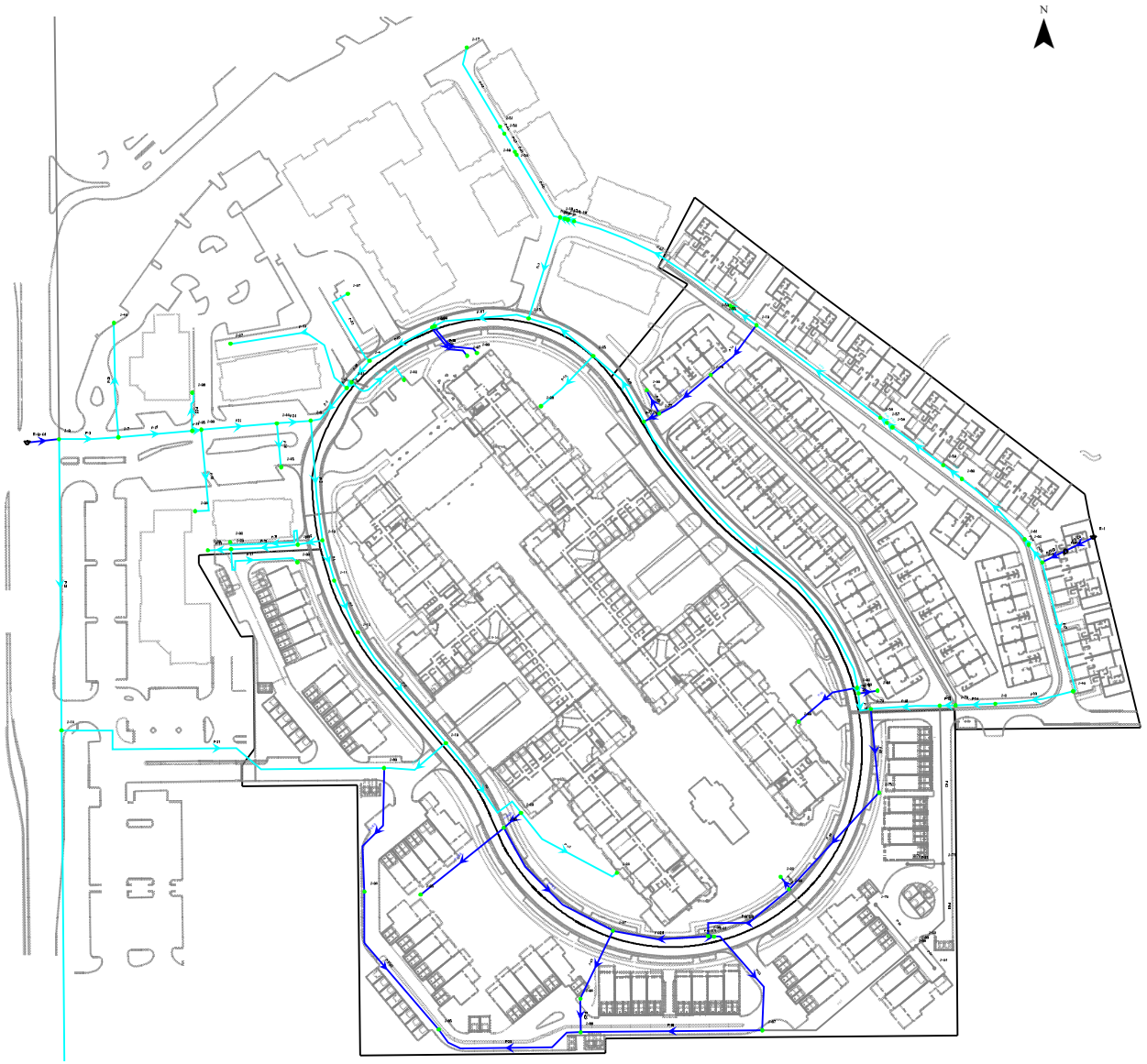
Appendix D: Water Network Analysis



Artesia Water Model

Average Day Scenario

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
J-1	1,290.93	PA-2	1.07	1,371.78	35	True
J-2	1,290.29	PA-2	1.07	1,367.21	33	True
J-3	1,290.85	PA-2	1.07	1,366.03	33	True
J-4	1,294.22	COM	1.11	1,359.43	28	True
J-5	1,294.45	COM	1.11	1,358.67	28	True
J-6	1,294.99	COM	1.11	1,357.61	27	True
J-7	1,296.67	<None>	0.00	1,353.47	25	True
J-9	1,259.81	<None>	0.00	1,352.21	40	True
J-10	1,293.66	PA-1	10.13	1,357.61	28	True
J-11	1,293.35	PA-1	10.13	1,357.61	28	True
J-12	1,292.93	PA-1	10.13	1,357.62	28	True
J-13	1,293.78	PA-1	10.13	1,357.63	28	True
J-14	1,273.63	<None>	0.00	1,353.35	34	True
J-15	1,294.12	COM	1.11	1,363.19	30	True
J-16	1,289.00	<None>	0.00	1,363.77	32	True
J-18	1,289.00	<None>	0.00	1,363.85	32	True
J-19	1,293.31	PA-2	1.07	1,365.02	31	True
J-20	1,293.27	PA-3	(N/A)	(N/A)	(N/A)	False
J-21	1,292.96	PA-1	10.13	1,359.60	29	True
J-22	1,293.02	PA-1	10.13	1,361.22	30	True
J-23	1,293.54	PA-1	10.13	1,358.14	28	True
J-24	1,293.97	PA-1	10.13	1,358.14	28	True
J-25	1,293.87	COM	1.11	1,363.73	30	True
J-26	1,294.19	PA-1	10.13	1,363.73	30	True
J-27	1,289.00	COM	1.11	1,358.67	30	True
J-28	1,288.00	COM	1.11	1,357.61	30	True
J-29	1,288.00	COM	1.11	1,357.61	30	True
J-30	1,232.03	PA-3	1.11	1,357.61	54	True
J-31	1,288.83	COM	1.11	1,357.61	30	True
J-32	1,288.00	COM	1.11	1,357.61	30	True
J-33	1,295.90	COM	1.11	1,355.25	26	True
J-34	1,288.00	COM	1.11	1,355.25	29	True
J-35	1,295.98	COM	1.11	1,355.06	26	True
J-36	1,290.00	COM	1.11	1,355.06	28	True
J-37	1,289.00	<None>	0.00	1,359.43	30	True
J-39	1,200.00	<None>	0.00	1,353.35	66	True
J-40	1,290.16	PA-2	1.07	1,368.90	34	True
J-41	1,294.43	COM	1.11	1,358.83	28	True
J-42	1,294.63	PA-1	10.13	1,358.83	28	True
J-43	1,291.00	COM	1.11	1,353.47	27	True
J-44	1,295.54	COM	1.11	1,356.88	27	True
J-45	1,294.87	COM	1.11	1,356.88	27	True
J-46	1,289.00	<None>	0.00	1,363.82	32	True
J-47	1,289.00	<None>	0.00	1,363.80	32	True
J-48	1,200.00	<None>	0.00	1,363.77	71	True
J-50	1,289.00	<None>	0.00	1,363.77	32	True
J-51	1,289.00	<None>	0.00	1,363.77	32	True
J-52	1,289.00	<None>	0.00	1,363.77	32	True
J-53	1,293.54	PA-2	1.07	1,364.84	31	True
J-55	1,293.51	PA-2	1.07	1,364.85	31	True
J-56	1,292.30	PA-2	1.07	1,367.80	33	True
J-57	1,292.24	PA-2	1.07	1,367.96	33	True
J-58	1,292.19	PA-2	1.07	1,368.08	33	True
J-59	1,291.78	PA-2	1.07	1,369.24	34	True

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
J-60	1,291.64	PA-2	1.07	1,369.66	34	True
J-61	1,290.86	PA-2	1.07	1,371.25	35	True
J-62	1,290.85	PA-2	1.07	1,371.37	35	True
J-63	1,293.68	PA-3	1.11	1,357.41	28	True
J-65	1,295.96	PA-3	1.11	1,358.42	27	True
J-66	1,295.17	PA-3	1.11	1,358.96	28	True
J-67	1,293.54	PA-3	1.11	1,359.35	28	True
J-68	1,293.37	PA-3	(N/A)	(N/A)	(N/A)	False
J-69	1,293.37	PA-3	(N/A)	(N/A)	(N/A)	False
J-70	1,293.26	PA-3	(N/A)	(N/A)	(N/A)	False
J-71	1,292.77	PA-3	(N/A)	(N/A)	(N/A)	False
J-72	1,293.05	PA-3	(N/A)	(N/A)	(N/A)	False
J-73	1,291.45	PA-2	1.07	1,364.56	32	True
J-75	1,292.40	PA-3	1.11	1,363.26	31	True
J-76	1,293.39	PA-2	1.07	1,364.35	31	True
J-77	1,293.06	PA-2	1.07	1,364.43	31	True
J-78	1,293.31	PA-2	1.07	1,364.71	31	True
J-79	1,290.70	PA-2	1.07	1,366.36	33	True
J-80	1,291.71	PA-2	1.07	1,364.55	32	True
J-81	1,292.01	PA-2	1.07	1,364.55	31	True
J-82	1,291.74	PA-2	1.07	1,364.54	31	True
J-83	1,292.25	PA-1	10.13	1,364.54	31	True
J-84	1,295.40	PA-3	1.11	1,358.96	27	True
J-85	1,294.98	PA-3	1.11	1,358.25	27	True
J-86	1,293.90	COM	1.11	1,360.96	29	True
J-87	1,294.25	PA-1	10.13	1,360.96	29	True
J-88	1,293.87	COM	1.11	1,361.03	29	True
J-89	1,294.19	PA-1	10.13	1,361.03	29	True
J-90	1,293.93	PA-2	1.07	1,364.43	30	True
J-91	1,293.34	PA-3	(N/A)	(N/A)	(N/A)	False
J-93	1,293.01	<None>	0.00	1,361.22	30	True
J-94	1,294.70	<None>	0.00	1,357.86	27	True
J-95	1,293.79	<None>	0.00	1,358.25	28	True
J-96	1,292.96	<None>	0.00	1,359.61	29	True
J-97	1,293.28	<None>	0.00	1,358.98	28	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-1	J-5	J-6	70	8.0	Existing	130.0	900.70	5.75	15.049	True
P-2	J-9	J-7	83	8.0	Existing	130.0	-908.32	5.80	15.286	True
P-3	J-6	J-10	167	8.0	Existing	130.0	-16.49	0.11	0.009	True
P-4	J-10	J-11	58	8.0	Existing	130.0	-32.17	0.21	0.031	True
P-5	J-11	J-12	79	8.0	Existing	130.0	-42.30	0.27	0.052	True
P-6	J-12	J-13	197	8.0	Existing	130.0	-52.43	0.33	0.078	True
P-7	J-15	J-16	147	8.0	Existing	130.0	-437.48	2.79	3.950	True
P-9	J-13	J-23	166	8.0	Existing	130.0	-382.18	2.44	3.076	True
P-10	J-23	J-24	165	8.0	Existing	130.0	10.13	0.06	0.004	True
P-11	J-25	J-15	106	8.0	Existing	130.0	501.39	3.20	5.085	True
P-12	J-25	J-26	101	8.0	Existing	130.0	10.13	0.06	0.004	True
P-13	J-5	J-27	207	8.0	Existing	130.0	1.11	0.01	0.000	True
P-14	J-29	J-28	33	8.0	Existing	130.0	1.11	0.01	0.000	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-15	J-29	J-30	135	8.0	Existing	130.0	1.11	0.01	0.000	True
P-16	J-10	J-31	35	8.0	Existing	130.0	5.55	0.04	0.000	True
P-17	J-31	J-29	93	8.0	Existing	130.0	3.33	0.02	0.000	True
P-18	J-31	J-32	133	8.0	Existing	130.0	1.11	0.01	0.000	True
P-19	J-33	J-34	132	8.0	Existing	130.0	1.11	0.01	0.000	True
P-20	J-33	J-35	12	8.0	Existing	130.0	911.65	5.82	15.390	True
P-21	J-35	J-7	103	8.0	Existing	130.0	909.43	5.80	15.320	True
P-22	J-35	J-36	56	8.0	Existing	130.0	1.11	0.01	0.000	True
P-23	J-4	J-37	120	8.0	Existing	130.0	0.00	0.00	0.000	True
P-25	J-9	J-14	404	10.0	Existing	130.0	-655.92	2.68	2.821	True
P-26	J-14	J-39	941	10.0	Existing	130.0	0.00	0.00	0.000	True
P-27	J-1	J-40	187	8.0	Existing	130.0	911.58	5.82	15.388	True
P-28	J-40	J-2	110	8.0	Existing	130.0	910.51	5.81	15.354	True
P-30	J-4	J-41	39	8.0	Existing	130.0	914.16	5.83	15.469	True
P-31	J-41	J-5	10	8.0	Existing	130.0	902.92	5.76	15.121	True
P-32	J-41	J-42	100	8.0	Existing	130.0	10.13	0.06	0.004	True
P-33	J-7	J-43	159	8.0	Existing	130.0	1.11	0.01	0.000	True
P-34	J-6	J-44	47	8.0	Existing	130.0	916.09	5.85	15.531	True
P-35	J-44	J-33	105	8.0	Existing	130.0	913.87	5.83	15.460	True
P-36	J-44	J-45	61	8.0	Existing	130.0	1.11	0.01	0.000	True
P-37	J-46	J-18	9	8.0	Existing	130.0	-437.48	2.79	3.945	True
P-38	J-16	J-47	7	8.0	Existing	130.0	-437.48	2.79	3.955	True
P-39	J-47	J-46	4	8.0	Existing	130.0	-437.48	2.79	3.969	True
P-40	J-16	J-50	108	8.0	Existing	130.0	0.00	0.00	0.000	True
P-41	J-50	J-48	5	8.0	Existing	130.0	0.00	0.00	0.000	True
P-43	J-48	J-52	29	8.0	Existing	130.0	0.00	0.00	0.000	True
P-44	J-52	J-51	11	8.0	Existing	130.0	0.00	0.00	0.000	True
P-45	J-18	J-53	249	8.0	Existing	130.0	-437.48	2.79	3.951	True
P-46	J-53	J-55	5	8.0	Existing	130.0	-438.55	2.80	3.954	True
P-47	J-55	J-19	41	8.0	Existing	130.0	-439.62	2.81	3.986	True
P-48	J-19	J-56	215	8.0	Existing	130.0	-831.48	5.31	12.978	True
P-49	J-56	J-57	12	8.0	Existing	130.0	-832.55	5.31	13.004	True
P-50	J-57	J-58	10	8.0	Existing	130.0	-833.62	5.32	13.050	True
P-51	J-58	J-59	88	8.0	Existing	130.0	-834.69	5.33	13.070	True
P-52	J-59	J-60	32	8.0	Existing	130.0	-835.76	5.33	13.102	True
P-53	J-60	J-61	121	8.0	Existing	130.0	-836.83	5.34	13.134	True
P-54	J-61	J-62	9	8.0	Existing	130.0	-837.90	5.35	13.159	True
P-55	J-62	J-1	31	8.0	Existing	130.0	-838.97	5.35	13.197	True
P-56	J-13	J-63	100	8.0	Existing	130.0	319.62	2.04	2.210	True
P-57	J-63	J-14	486	8.0	Existing	130.0	655.92	4.19	8.365	True
P-59	J-65	J-66	217	8.0	Proposed	130.0	-338.52	2.16	2.457	True
P-60	J-66	J-67	253	8.0	Proposed	130.0	-263.01	1.68	1.540	True
P-61	J-67	J-68	250	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-62	J-68	J-69	6	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-63	J-69	J-20	12	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-64	J-68	J-70	80	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-65	J-3	J-71	219	8.0	Existing	130.0	(N/A)	(N/A)	(N/A)	False
P-66	J-71	J-20	120	8.0	Existing	130.0	(N/A)	(N/A)	(N/A)	False
P-67	J-71	J-72	49	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-68	J-3	J-73	96	8.0	Existing	130.0	907.30	5.79	15.255	True
P-69	J-73	J-75	117	8.0	Proposed	130.0	766.77	4.89	11.170	True
P-70	J-76	J-25	118	8.0	Existing	130.0	512.63	3.27	5.299	True
P-71	J-76	J-77	24	8.0	Proposed	130.0	-387.58	2.47	3.157	True
P-72	J-77	J-78	90	8.0	Proposed	130.0	-389.72	2.49	3.189	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-73	J-78	J-19	95	8.0	Proposed	130.0	-390.79	2.49	3.206	True
P-74	J-2	J-79	55	8.0	Existing	130.0	909.44	5.80	15.323	True
P-75	J-79	J-3	22	8.0	Existing	130.0	908.37	5.80	15.287	True
P-76	J-78	J-79	579	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-77	J-73	J-80	38	8.0	Existing	130.0	139.46	0.89	0.476	True
P-78	J-80	J-81	27	8.0	Proposed	130.0	1.07	0.01	0.000	True
P-79	J-80	J-82	8	8.0	Existing	130.0	137.32	0.88	0.467	True
P-80	J-82	J-76	482	8.0	Existing	130.0	126.12	0.80	0.395	True
P-81	J-82	J-83	97	8.0	Proposed	130.0	10.13	0.06	0.003	True
P-82	J-21	J-67	161	8.0	Proposed	130.0	264.12	1.69	1.552	True
P-83	J-66	J-84	46	8.0	Proposed	130.0	-76.62	0.49	0.158	True
P-85	J-86	J-4	98	8.0	Existing	130.0	915.28	5.84	15.505	True
P-86	J-86	J-87	68	8.0	Proposed	130.0	10.13	0.06	0.004	True
P-87	J-15	J-88	133	8.0	Existing	130.0	937.76	5.99	16.217	True
P-88	J-88	J-86	4	8.0	Existing	130.0	926.52	5.91	15.847	True
P-89	J-88	J-89	76	8.0	Proposed	130.0	10.13	0.06	0.003	True
P-90	J-77	J-90	37	8.0	Proposed	130.0	1.07	0.01	0.000	True
P-91	J-69	J-91	40	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-29(1)	R-1	PMP-1	43	100.0	Existing	130.0	1,751.62	0.07	0.000	True
P-29(2)	PMP-1	J-1	36	100.0	Existing	130.0	1,751.62	0.07	0.000	True
P-8(2)	J-93	J-22	23	8.0	Existing	130.0	10.13	0.06	0.000	True
P-63	J-93	J-75	183	8.0	Proposed	130.0	-765.66	4.89	11.140	True
P-58(1)	J-63	J-94	183	8.0	Proposed	130.0	-337.41	2.15	2.442	True
P-58(2)	J-94	J-65	230	8.0	Proposed	130.0	-337.41	2.15	2.442	True
P-84(1)	J-23	J-95	31	8.0	Proposed	130.0	-402.44	2.57	3.388	True
P-84(2)	J-95	J-85	148	8.0	Proposed	130.0	1.11	0.01	0.000	True
P-8(1)(1)	J-21	J-96	9	8.0	Existing	130.0	-274.25	1.75	1.672	True
P-8(1)(2)	J-96	J-93	148	8.0	Existing	130.0	-755.53	4.82	10.868	True
P-66(1)	J-95	J-97	215	8.0	Proposed	130.0	-403.55	2.58	3.402	True
P-66(2)	J-97	J-96	134	8.0	Proposed	130.0	-481.28	3.07	4.715	True
P-67	J-84	J-97	105	8.0	Proposed	130.0	-77.73	0.50	0.161	True

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
117	R-1	1,296.00	<None>	1,751.62	1,296.00
295	R-2	1,352.21	<None>	-1,564.23	1,352.21

Pump Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)
250	PMP-1	1,296.00	Supply Curve Pump	On	1,296.00	1,371.78	1,751.62

Pump Head (ft)
75.78

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
J-1	1,290.93	PA-2	2.14	1,370.38	34	True
J-2	1,290.29	PA-2	2.14	1,365.77	33	True
J-3	1,290.85	PA-2	2.14	1,364.58	32	True
J-4	1,294.22	COM	2.22	1,358.21	28	True
J-5	1,294.45	COM	2.22	1,357.52	27	True
J-6	1,294.99	COM	2.22	1,356.58	27	True
J-7	1,296.67	<None>	0.00	1,353.22	24	True
J-9	1,259.81	<None>	0.00	1,352.21	40	True
J-10	1,293.66	PA-1	20.26	1,356.57	27	True
J-11	1,293.35	PA-1	20.26	1,356.57	27	True
J-12	1,292.93	PA-1	20.26	1,356.58	28	True
J-13	1,293.78	PA-1	20.26	1,356.59	27	True
J-14	1,273.63	<None>	0.00	1,353.13	34	True
J-15	1,294.12	COM	2.22	1,361.76	29	True
J-16	1,289.00	<None>	0.00	1,362.33	32	True
J-18	1,289.00	<None>	0.00	1,362.41	32	True
J-19	1,293.31	PA-2	2.14	1,363.56	30	True
J-20	1,293.27	PA-3	(N/A)	(N/A)	(N/A)	False
J-21	1,292.96	PA-1	20.26	1,358.35	28	True
J-22	1,293.02	PA-1	20.26	1,359.88	29	True
J-23	1,293.54	PA-1	20.26	1,357.01	27	True
J-24	1,293.97	PA-1	20.26	1,357.01	27	True
J-25	1,293.87	COM	2.22	1,362.27	30	True
J-26	1,294.19	PA-1	20.26	1,362.27	29	True
J-27	1,289.00	COM	2.22	1,357.52	30	True
J-28	1,288.00	COM	2.22	1,356.57	30	True
J-29	1,288.00	COM	2.22	1,356.57	30	True
J-30	1,232.03	PA-3	2.22	1,356.57	54	True
J-31	1,288.83	COM	2.22	1,356.57	29	True
J-32	1,288.00	COM	2.22	1,356.57	30	True
J-33	1,295.90	COM	2.22	1,354.65	25	True
J-34	1,288.00	COM	2.22	1,354.65	29	True
J-35	1,295.98	COM	2.22	1,354.50	25	True
J-36	1,290.00	COM	2.22	1,354.50	28	True
J-37	1,289.00	<None>	0.00	1,358.21	30	True
J-39	1,200.00	<None>	0.00	1,353.13	66	True
J-40	1,290.16	PA-2	2.14	1,367.47	33	True
J-41	1,294.43	COM	2.22	1,357.66	27	True
J-42	1,294.63	PA-1	20.26	1,357.66	27	True
J-43	1,291.00	COM	2.22	1,353.22	27	True
J-44	1,295.54	COM	2.22	1,355.98	26	True
J-45	1,294.87	COM	2.22	1,355.98	26	True
J-46	1,289.00	<None>	0.00	1,362.38	32	True
J-47	1,289.00	<None>	0.00	1,362.36	32	True
J-48	1,200.00	<None>	0.00	1,362.33	70	True
J-50	1,289.00	<None>	0.00	1,362.33	32	True
J-51	1,289.00	<None>	0.00	1,362.33	32	True
J-52	1,289.00	<None>	0.00	1,362.33	32	True
J-53	1,293.54	PA-2	2.14	1,363.38	30	True
J-55	1,293.51	PA-2	2.14	1,363.40	30	True
J-56	1,292.30	PA-2	2.14	1,366.35	32	True
J-57	1,292.24	PA-2	2.14	1,366.51	32	True
J-58	1,292.19	PA-2	2.14	1,366.63	32	True
J-59	1,291.78	PA-2	2.14	1,367.80	33	True

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
J-60	1,291.64	PA-2	2.14	1,368.22	33	True
J-61	1,290.86	PA-2	2.14	1,369.84	34	True
J-62	1,290.85	PA-2	2.14	1,369.96	34	True
J-63	1,293.68	PA-3	2.22	1,356.42	27	True
J-65	1,295.96	PA-3	2.22	1,357.30	27	True
J-66	1,295.17	PA-3	2.22	1,357.77	27	True
J-67	1,293.54	PA-3	2.22	1,358.13	28	True
J-68	1,293.37	PA-3	(N/A)	(N/A)	(N/A)	False
J-69	1,293.37	PA-3	(N/A)	(N/A)	(N/A)	False
J-70	1,293.26	PA-3	(N/A)	(N/A)	(N/A)	False
J-71	1,292.77	PA-3	(N/A)	(N/A)	(N/A)	False
J-72	1,293.05	PA-3	(N/A)	(N/A)	(N/A)	False
J-73	1,291.45	PA-2	2.14	1,363.11	31	True
J-75	1,292.40	PA-3	2.22	1,361.85	30	True
J-76	1,293.39	PA-2	2.14	1,362.89	30	True
J-77	1,293.06	PA-2	2.14	1,362.97	30	True
J-78	1,293.31	PA-2	2.14	1,363.25	30	True
J-79	1,290.70	PA-2	2.14	1,364.91	32	True
J-80	1,291.71	PA-2	2.14	1,363.09	31	True
J-81	1,292.01	PA-2	2.14	1,363.09	31	True
J-82	1,291.74	PA-2	2.14	1,363.08	31	True
J-83	1,292.25	PA-1	20.26	1,363.08	31	True
J-84	1,295.40	PA-3	2.22	1,357.78	27	True
J-85	1,294.98	PA-3	2.22	1,357.11	27	True
J-86	1,293.90	COM	2.22	1,359.61	28	True
J-87	1,294.25	PA-1	20.26	1,359.61	28	True
J-88	1,293.87	COM	2.22	1,359.68	28	True
J-89	1,294.19	PA-1	20.26	1,359.68	28	True
J-90	1,293.93	PA-2	2.14	1,362.97	30	True
J-91	1,293.34	PA-3	(N/A)	(N/A)	(N/A)	False
J-93	1,293.01	<None>	0.00	1,359.88	29	True
J-94	1,294.70	<None>	0.00	1,356.81	27	True
J-95	1,293.79	<None>	0.00	1,357.11	27	True
J-96	1,292.96	<None>	0.00	1,358.37	28	True
J-97	1,293.28	<None>	0.00	1,357.79	28	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-1	J-5	J-6	70	8.0	Existing	130.0	845.03	5.39	13.373	True
P-2	J-9	J-7	83	8.0	Existing	130.0	-806.23	5.15	12.258	True
P-3	J-6	J-10	167	8.0	Existing	130.0	21.04	0.13	0.015	True
P-4	J-10	J-11	58	8.0	Existing	130.0	-10.32	0.07	0.004	True
P-5	J-11	J-12	79	8.0	Existing	130.0	-30.58	0.20	0.029	True
P-6	J-12	J-13	197	8.0	Existing	130.0	-50.84	0.32	0.073	True
P-7	J-15	J-16	147	8.0	Existing	130.0	-433.51	2.77	3.885	True
P-9	J-13	J-23	166	8.0	Existing	130.0	-345.47	2.21	2.551	True
P-10	J-23	J-24	165	8.0	Existing	130.0	20.26	0.13	0.013	True
P-11	J-25	J-15	106	8.0	Existing	130.0	487.84	3.11	4.835	True
P-12	J-25	J-26	101	8.0	Existing	130.0	20.26	0.13	0.015	True
P-13	J-5	J-27	207	8.0	Existing	130.0	2.22	0.01	0.001	True
P-14	J-29	J-28	33	8.0	Existing	130.0	2.22	0.01	0.000	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-15	J-29	J-30	135	8.0	Existing	130.0	2.22	0.01	0.001	True
P-16	J-10	J-31	35	8.0	Existing	130.0	11.10	0.07	0.004	True
P-17	J-31	J-29	93	8.0	Existing	130.0	6.66	0.04	0.001	True
P-18	J-31	J-32	133	8.0	Existing	130.0	2.22	0.01	0.000	True
P-19	J-33	J-34	132	8.0	Existing	130.0	2.22	0.01	0.000	True
P-20	J-33	J-35	12	8.0	Existing	130.0	812.89	5.19	12.446	True
P-21	J-35	J-7	103	8.0	Existing	130.0	808.45	5.16	12.321	True
P-22	J-35	J-36	56	8.0	Existing	130.0	2.22	0.01	0.000	True
P-23	J-4	J-37	120	8.0	Existing	130.0	0.00	0.00	0.000	True
P-25	J-9	J-14	404	10.0	Existing	130.0	-585.35	2.39	2.285	True
P-26	J-14	J-39	941	10.0	Existing	130.0	0.00	0.00	0.000	True
P-27	J-1	J-40	187	8.0	Existing	130.0	916.75	5.85	15.550	True
P-28	J-40	J-2	110	8.0	Existing	130.0	914.61	5.84	15.483	True
P-30	J-4	J-41	39	8.0	Existing	130.0	871.95	5.57	14.171	True
P-31	J-41	J-5	10	8.0	Existing	130.0	849.47	5.42	13.504	True
P-32	J-41	J-42	100	8.0	Existing	130.0	20.26	0.13	0.013	True
P-33	J-7	J-43	159	8.0	Existing	130.0	2.22	0.01	0.000	True
P-34	J-6	J-44	47	8.0	Existing	130.0	821.77	5.25	12.699	True
P-35	J-44	J-33	105	8.0	Existing	130.0	817.33	5.22	12.572	True
P-36	J-44	J-45	61	8.0	Existing	130.0	2.22	0.01	0.000	True
P-37	J-46	J-18	9	8.0	Existing	130.0	-433.51	2.77	3.892	True
P-38	J-16	J-47	7	8.0	Existing	130.0	-433.51	2.77	3.885	True
P-39	J-47	J-46	4	8.0	Existing	130.0	-433.51	2.77	3.885	True
P-40	J-16	J-50	108	8.0	Existing	130.0	0.00	0.00	0.000	True
P-41	J-50	J-48	5	8.0	Existing	130.0	0.00	0.00	0.000	True
P-43	J-48	J-52	29	8.0	Existing	130.0	0.00	0.00	0.000	True
P-44	J-52	J-51	11	8.0	Existing	130.0	0.00	0.00	0.000	True
P-45	J-18	J-53	249	8.0	Existing	130.0	-433.51	2.77	3.885	True
P-46	J-53	J-55	5	8.0	Existing	130.0	-435.65	2.78	3.927	True
P-47	J-55	J-19	41	8.0	Existing	130.0	-437.79	2.79	3.954	True
P-48	J-19	J-56	215	8.0	Existing	130.0	-832.46	5.31	13.007	True
P-49	J-56	J-57	12	8.0	Existing	130.0	-834.60	5.33	13.067	True
P-50	J-57	J-58	10	8.0	Existing	130.0	-836.74	5.34	13.137	True
P-51	J-58	J-59	88	8.0	Existing	130.0	-838.88	5.35	13.193	True
P-52	J-59	J-60	32	8.0	Existing	130.0	-841.02	5.37	13.254	True
P-53	J-60	J-61	121	8.0	Existing	130.0	-843.16	5.38	13.318	True
P-54	J-61	J-62	9	8.0	Existing	130.0	-845.30	5.40	13.384	True
P-55	J-62	J-1	31	8.0	Existing	130.0	-847.44	5.41	13.444	True
P-56	J-13	J-63	100	8.0	Existing	130.0	274.37	1.75	1.666	True
P-57	J-63	J-14	486	8.0	Existing	130.0	585.35	3.74	6.775	True
P-59	J-65	J-66	217	8.0	Proposed	130.0	-315.42	2.01	2.155	True
P-60	J-66	J-67	253	8.0	Proposed	130.0	-249.43	1.59	1.396	True
P-61	J-67	J-68	250	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-62	J-68	J-69	6	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-63	J-69	J-20	12	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-64	J-68	J-70	80	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-65	J-3	J-71	219	8.0	Existing	130.0	(N/A)	(N/A)	(N/A)	False
P-66	J-71	J-20	120	8.0	Existing	130.0	(N/A)	(N/A)	(N/A)	False
P-67	J-71	J-72	49	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-68	J-3	J-73	96	8.0	Existing	130.0	908.19	5.80	15.283	True
P-69	J-73	J-75	117	8.0	Proposed	130.0	753.03	4.81	10.802	True
P-70	J-76	J-25	118	8.0	Existing	130.0	510.31	3.26	5.255	True
P-71	J-76	J-77	24	8.0	Proposed	130.0	-386.11	2.46	3.132	True
P-72	J-77	J-78	90	8.0	Proposed	130.0	-390.39	2.49	3.200	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-73	J-78	J-19	95	8.0	Proposed	130.0	-392.53	2.51	3.232	True
P-74	J-2	J-79	55	8.0	Existing	130.0	912.47	5.82	15.415	True
P-75	J-79	J-3	22	8.0	Existing	130.0	910.33	5.81	15.348	True
P-76	J-78	J-79	579	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-77	J-73	J-80	38	8.0	Existing	130.0	153.03	0.98	0.565	True
P-78	J-80	J-81	27	8.0	Proposed	130.0	2.14	0.01	0.000	True
P-79	J-80	J-82	8	8.0	Existing	130.0	148.75	0.95	0.543	True
P-80	J-82	J-76	482	8.0	Existing	130.0	126.35	0.81	0.396	True
P-81	J-82	J-83	97	8.0	Proposed	130.0	20.26	0.13	0.013	True
P-82	J-21	J-67	161	8.0	Proposed	130.0	251.65	1.61	1.419	True
P-83	J-66	J-84	46	8.0	Proposed	130.0	-68.20	0.44	0.126	True
P-85	J-86	J-4	98	8.0	Existing	130.0	874.17	5.58	14.239	True
P-86	J-86	J-87	68	8.0	Proposed	130.0	20.26	0.13	0.013	True
P-87	J-15	J-88	133	8.0	Existing	130.0	919.13	5.87	15.625	True
P-88	J-88	J-86	4	8.0	Existing	130.0	896.65	5.72	14.924	True
P-89	J-88	J-89	76	8.0	Proposed	130.0	20.26	0.13	0.013	True
P-90	J-77	J-90	37	8.0	Proposed	130.0	2.14	0.01	0.000	True
P-91	J-69	J-91	40	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-29(1)	R-1	PMP-1	43	100.0	Existing	130.0	1,766.34	0.07	0.000	True
P-29(2)	PMP-1	J-1	36	100.0	Existing	130.0	1,766.34	0.07	0.000	True
P-8(2)	J-93	J-22	23	8.0	Existing	130.0	20.26	0.13	0.011	True
P-63	J-93	J-75	183	8.0	Proposed	130.0	-750.81	4.79	10.743	True
P-58(1)	J-63	J-94	183	8.0	Proposed	130.0	-313.20	2.00	2.128	True
P-58(2)	J-94	J-65	230	8.0	Proposed	130.0	-313.20	2.00	2.128	True
P-84(1)	J-23	J-95	31	8.0	Proposed	130.0	-385.99	2.46	3.132	True
P-84(2)	J-95	J-85	148	8.0	Proposed	130.0	2.22	0.01	0.000	True
P-8(1)(1)	J-21	J-96	9	8.0	Existing	130.0	-271.91	1.74	1.631	True
P-8(1)(2)	J-96	J-93	148	8.0	Existing	130.0	-730.55	4.66	10.212	True
P-66(1)	J-95	J-97	215	8.0	Proposed	130.0	-388.21	2.48	3.167	True
P-66(2)	J-97	J-96	134	8.0	Proposed	130.0	-458.63	2.93	4.312	True
P-67	J-84	J-97	105	8.0	Proposed	130.0	-70.42	0.45	0.134	True

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
117	R-1	1,296.00	<None>	1,766.34	1,296.00
295	R-2	1,352.21	<None>	-1,391.57	1,352.21

Pump Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)
250	PMP-1	1,296.00	Supply Curve Pump	On	1,296.00	1,370.38	1,766.34

Pump Head (ft)
74.38

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
J-1	1,290.93	PA-2	3.75	1,368.46	34	True
J-2	1,290.29	PA-2	3.75	1,363.79	32	True
J-3	1,290.85	PA-2	3.75	1,362.59	31	True
J-4	1,294.22	COM	3.88	1,356.58	27	True
J-5	1,294.45	COM	3.88	1,355.99	27	True
J-6	1,294.99	COM	3.88	1,355.21	26	True
J-7	1,296.67	<None>	0.00	1,352.90	24	True
J-9	1,259.81	<None>	0.00	1,352.21	40	True
J-10	1,293.66	PA-1	35.46	1,355.19	27	True
J-11	1,293.35	PA-1	35.46	1,355.19	27	True
J-12	1,292.93	PA-1	35.46	1,355.19	27	True
J-13	1,293.78	PA-1	35.46	1,355.20	27	True
J-14	1,273.63	<None>	0.00	1,352.84	34	True
J-15	1,294.12	COM	3.88	1,359.82	28	True
J-16	1,289.00	<None>	0.00	1,360.38	31	True
J-18	1,289.00	<None>	0.00	1,360.45	31	True
J-19	1,293.31	PA-2	3.75	1,361.57	30	True
J-20	1,293.27	PA-3	(N/A)	(N/A)	(N/A)	False
J-21	1,292.96	PA-1	35.46	1,356.68	28	True
J-22	1,293.02	PA-1	35.46	1,358.06	28	True
J-23	1,293.54	PA-1	35.46	1,355.51	27	True
J-24	1,293.97	PA-1	35.46	1,355.50	27	True
J-25	1,293.87	COM	3.88	1,360.29	29	True
J-26	1,294.19	PA-1	35.46	1,360.29	29	True
J-27	1,289.00	COM	3.88	1,355.99	29	True
J-28	1,288.00	COM	3.88	1,355.19	29	True
J-29	1,288.00	COM	3.88	1,355.19	29	True
J-30	1,232.03	PA-3	3.88	1,355.19	53	True
J-31	1,288.83	COM	3.88	1,355.19	29	True
J-32	1,288.00	COM	3.88	1,355.19	29	True
J-33	1,295.90	COM	3.88	1,353.87	25	True
J-34	1,288.00	COM	3.88	1,353.87	28	True
J-35	1,295.98	COM	3.88	1,353.76	25	True
J-36	1,290.00	COM	3.88	1,353.76	28	True
J-37	1,289.00	<None>	0.00	1,356.58	29	True
J-39	1,200.00	<None>	0.00	1,352.84	66	True
J-40	1,290.16	PA-2	3.75	1,365.51	33	True
J-41	1,294.43	COM	3.88	1,356.10	27	True
J-42	1,294.63	PA-1	35.46	1,356.10	27	True
J-43	1,291.00	COM	3.88	1,352.90	27	True
J-44	1,295.54	COM	3.88	1,354.79	26	True
J-45	1,294.87	COM	3.88	1,354.79	26	True
J-46	1,289.00	<None>	0.00	1,360.42	31	True
J-47	1,289.00	<None>	0.00	1,360.40	31	True
J-48	1,200.00	<None>	0.00	1,360.38	69	True
J-50	1,289.00	<None>	0.00	1,360.38	31	True
J-51	1,289.00	<None>	0.00	1,360.38	31	True
J-52	1,289.00	<None>	0.00	1,360.38	31	True
J-53	1,293.54	PA-2	3.75	1,361.39	29	True
J-55	1,293.51	PA-2	3.75	1,361.41	29	True
J-56	1,292.30	PA-2	3.75	1,364.37	31	True
J-57	1,292.24	PA-2	3.75	1,364.52	31	True
J-58	1,292.19	PA-2	3.75	1,364.65	31	True
J-59	1,291.78	PA-2	3.75	1,365.83	32	True

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
J-60	1,291.64	PA-2	3.75	1,366.26	32	True
J-61	1,290.86	PA-2	3.75	1,367.91	33	True
J-62	1,290.85	PA-2	3.75	1,368.03	33	True
J-63	1,293.68	PA-3	3.88	1,355.10	27	True
J-65	1,295.96	PA-3	3.88	1,355.81	26	True
J-66	1,295.17	PA-3	3.88	1,356.18	26	True
J-67	1,293.54	PA-3	3.88	1,356.48	27	True
J-68	1,293.37	PA-3	(N/A)	(N/A)	(N/A)	False
J-69	1,293.37	PA-3	(N/A)	(N/A)	(N/A)	False
J-70	1,293.26	PA-3	(N/A)	(N/A)	(N/A)	False
J-71	1,292.77	PA-3	(N/A)	(N/A)	(N/A)	False
J-72	1,293.05	PA-3	(N/A)	(N/A)	(N/A)	False
J-73	1,291.45	PA-2	3.75	1,361.12	30	True
J-75	1,292.40	PA-3	3.88	1,359.93	29	True
J-76	1,293.39	PA-2	3.75	1,360.90	29	True
J-77	1,293.06	PA-2	3.75	1,360.97	29	True
J-78	1,293.31	PA-2	3.75	1,361.26	29	True
J-79	1,290.70	PA-2	3.75	1,362.93	31	True
J-80	1,291.71	PA-2	3.75	1,361.10	30	True
J-81	1,292.01	PA-2	3.75	1,361.10	30	True
J-82	1,291.74	PA-2	3.75	1,361.09	30	True
J-83	1,292.25	PA-1	35.46	1,361.09	30	True
J-84	1,295.40	PA-3	3.88	1,356.19	26	True
J-85	1,294.98	PA-3	3.88	1,355.59	26	True
J-86	1,293.90	COM	3.88	1,357.80	28	True
J-87	1,294.25	PA-1	35.46	1,357.80	27	True
J-88	1,293.87	COM	3.88	1,357.86	28	True
J-89	1,294.19	PA-1	35.46	1,357.86	28	True
J-90	1,293.93	PA-2	3.75	1,360.97	29	True
J-91	1,293.34	PA-3	(N/A)	(N/A)	(N/A)	False
J-93	1,293.01	<None>	0.00	1,358.06	28	True
J-94	1,294.70	<None>	0.00	1,355.41	26	True
J-95	1,293.79	<None>	0.00	1,355.59	27	True
J-96	1,292.96	<None>	0.00	1,356.70	28	True
J-97	1,293.28	<None>	0.00	1,356.20	27	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-1	J-5	J-6	70	8.0	Existing	130.0	759.83	4.85	10.983	True
P-2	J-9	J-7	83	8.0	Existing	130.0	-652.71	4.17	8.290	True
P-3	J-6	J-10	167	8.0	Existing	130.0	76.04	0.49	0.154	True
P-4	J-10	J-11	58	8.0	Existing	130.0	21.16	0.14	0.015	True
P-5	J-11	J-12	79	8.0	Existing	130.0	-14.30	0.09	0.006	True
P-6	J-12	J-13	197	8.0	Existing	130.0	-49.75	0.32	0.071	True
P-7	J-15	J-16	147	8.0	Existing	130.0	-426.94	2.73	3.776	True
P-9	J-13	J-23	166	8.0	Existing	130.0	-289.74	1.85	1.842	True
P-10	J-23	J-24	165	8.0	Existing	130.0	35.46	0.23	0.038	True
P-11	J-25	J-15	106	8.0	Existing	130.0	466.45	2.98	4.449	True
P-12	J-25	J-26	101	8.0	Existing	130.0	35.46	0.23	0.037	True
P-13	J-5	J-27	207	8.0	Existing	130.0	3.88	0.02	0.001	True
P-14	J-29	J-28	33	8.0	Existing	130.0	3.88	0.02	0.004	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-15	J-29	J-30	135	8.0	Existing	130.0	3.88	0.02	0.001	True
P-16	J-10	J-31	35	8.0	Existing	130.0	19.43	0.12	0.014	True
P-17	J-31	J-29	93	8.0	Existing	130.0	11.66	0.07	0.004	True
P-18	J-31	J-32	133	8.0	Existing	130.0	3.88	0.02	0.000	True
P-19	J-33	J-34	132	8.0	Existing	130.0	3.88	0.02	0.000	True
P-20	J-33	J-35	12	8.0	Existing	130.0	664.36	4.24	8.559	True
P-21	J-35	J-7	103	8.0	Existing	130.0	656.59	4.19	8.381	True
P-22	J-35	J-36	56	8.0	Existing	130.0	3.88	0.02	0.002	True
P-23	J-4	J-37	120	8.0	Existing	130.0	0.00	0.00	0.000	True
P-25	J-9	J-14	404	10.0	Existing	130.0	-477.80	1.95	1.569	True
P-26	J-14	J-39	941	10.0	Existing	130.0	0.00	0.00	0.000	True
P-27	J-1	J-40	187	8.0	Existing	130.0	923.48	5.89	15.762	True
P-28	J-40	J-2	110	8.0	Existing	130.0	919.73	5.87	15.644	True
P-30	J-4	J-41	39	8.0	Existing	130.0	806.94	5.15	12.276	True
P-31	J-41	J-5	10	8.0	Existing	130.0	767.60	4.90	11.201	True
P-32	J-41	J-42	100	8.0	Existing	130.0	35.46	0.23	0.038	True
P-33	J-7	J-43	159	8.0	Existing	130.0	3.88	0.02	0.001	True
P-34	J-6	J-44	47	8.0	Existing	130.0	679.90	4.34	8.939	True
P-35	J-44	J-33	105	8.0	Existing	130.0	672.13	4.29	8.752	True
P-36	J-44	J-45	61	8.0	Existing	130.0	3.88	0.02	0.000	True
P-37	J-46	J-18	9	8.0	Existing	130.0	-426.94	2.73	3.773	True
P-38	J-16	J-47	7	8.0	Existing	130.0	-426.94	2.73	3.779	True
P-39	J-47	J-46	4	8.0	Existing	130.0	-426.94	2.73	3.773	True
P-40	J-16	J-50	108	8.0	Existing	130.0	0.00	0.00	0.000	True
P-41	J-50	J-48	5	8.0	Existing	130.0	0.00	0.00	0.000	True
P-43	J-48	J-52	29	8.0	Existing	130.0	0.00	0.00	0.000	True
P-44	J-52	J-51	11	8.0	Existing	130.0	0.00	0.00	0.000	True
P-45	J-18	J-53	249	8.0	Existing	130.0	-426.94	2.73	3.776	True
P-46	J-53	J-55	5	8.0	Existing	130.0	-430.69	2.75	3.846	True
P-47	J-55	J-19	41	8.0	Existing	130.0	-434.43	2.77	3.900	True
P-48	J-19	J-56	215	8.0	Existing	130.0	-832.91	5.32	13.019	True
P-49	J-56	J-57	12	8.0	Existing	130.0	-836.65	5.34	13.129	True
P-50	J-57	J-58	10	8.0	Existing	130.0	-840.40	5.36	13.236	True
P-51	J-58	J-59	88	8.0	Existing	130.0	-844.14	5.39	13.347	True
P-52	J-59	J-60	32	8.0	Existing	130.0	-847.89	5.41	13.457	True
P-53	J-60	J-61	121	8.0	Existing	130.0	-851.63	5.44	13.567	True
P-54	J-61	J-62	9	8.0	Existing	130.0	-855.38	5.46	13.676	True
P-55	J-62	J-1	31	8.0	Existing	130.0	-859.12	5.48	13.788	True
P-56	J-13	J-63	100	8.0	Existing	130.0	204.53	1.31	0.967	True
P-57	J-63	J-14	486	8.0	Existing	130.0	477.80	3.05	4.652	True
P-59	J-65	J-66	217	8.0	Proposed	130.0	-281.04	1.79	1.741	True
P-60	J-66	J-67	253	8.0	Proposed	130.0	-228.98	1.46	1.191	True
P-61	J-67	J-68	250	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-62	J-68	J-69	6	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-63	J-69	J-20	12	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-64	J-68	J-70	80	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-65	J-3	J-71	219	8.0	Existing	130.0	(N/A)	(N/A)	(N/A)	False
P-66	J-71	J-20	120	8.0	Existing	130.0	(N/A)	(N/A)	(N/A)	False
P-67	J-71	J-72	49	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-68	J-3	J-73	96	8.0	Existing	130.0	908.50	5.80	15.291	True
P-69	J-73	J-75	117	8.0	Proposed	130.0	732.03	4.67	10.251	True
P-70	J-76	J-25	118	8.0	Existing	130.0	505.79	3.23	5.169	True
P-71	J-76	J-77	24	8.0	Proposed	130.0	-383.50	2.45	3.096	True
P-72	J-77	J-78	90	8.0	Proposed	130.0	-390.99	2.50	3.210	True

Pipe Table - Time: 0.00 hours

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Notes	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-73	J-78	J-19	95	8.0	Proposed	130.0	-394.73	2.52	3.265	True
P-74	J-2	J-79	55	8.0	Existing	130.0	915.99	5.85	15.526	True
P-75	J-79	J-3	22	8.0	Existing	130.0	912.24	5.82	15.410	True
P-76	J-78	J-79	579	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-77	J-73	J-80	38	8.0	Existing	130.0	172.73	1.10	0.707	True
P-78	J-80	J-81	27	8.0	Proposed	130.0	3.75	0.02	0.000	True
P-79	J-80	J-82	8	8.0	Existing	130.0	165.24	1.05	0.648	True
P-80	J-82	J-76	482	8.0	Existing	130.0	126.04	0.80	0.394	True
P-81	J-82	J-83	97	8.0	Proposed	130.0	35.46	0.23	0.038	True
P-82	J-21	J-67	161	8.0	Proposed	130.0	232.87	1.49	1.229	True
P-83	J-66	J-84	46	8.0	Proposed	130.0	-55.94	0.36	0.089	True
P-85	J-86	J-4	98	8.0	Existing	130.0	810.82	5.18	12.388	True
P-86	J-86	J-87	68	8.0	Proposed	130.0	35.46	0.23	0.038	True
P-87	J-15	J-88	133	8.0	Existing	130.0	889.50	5.68	14.705	True
P-88	J-88	J-86	4	8.0	Existing	130.0	850.16	5.43	13.527	True
P-89	J-88	J-89	76	8.0	Proposed	130.0	35.46	0.23	0.039	True
P-90	J-77	J-90	37	8.0	Proposed	130.0	3.75	0.02	0.000	True
P-91	J-69	J-91	40	8.0	Proposed	130.0	(N/A)	(N/A)	(N/A)	False
P-29(1)	R-1	PMP-1	43	100.0	Existing	130.0	1,786.34	0.07	0.000	True
P-29(2)	PMP-1	J-1	36	100.0	Existing	130.0	1,786.34	0.07	0.000	True
P-8(2)	J-93	J-22	23	8.0	Existing	130.0	35.46	0.23	0.037	True
P-63	J-93	J-75	183	8.0	Proposed	130.0	-728.14	4.65	10.150	True
P-58(1)	J-63	J-94	183	8.0	Proposed	130.0	-277.16	1.77	1.697	True
P-58(2)	J-94	J-65	230	8.0	Proposed	130.0	-277.16	1.77	1.697	True
P-84(1)	J-23	J-95	31	8.0	Proposed	130.0	-360.65	2.30	2.764	True
P-84(2)	J-95	J-85	148	8.0	Proposed	130.0	3.88	0.02	0.001	True
P-8(1)(1)	J-21	J-96	9	8.0	Existing	130.0	-268.32	1.71	1.590	True
P-8(1)(2)	J-96	J-93	148	8.0	Existing	130.0	-692.69	4.42	9.254	True
P-66(1)	J-95	J-97	215	8.0	Proposed	130.0	-364.53	2.33	2.818	True
P-66(2)	J-97	J-96	134	8.0	Proposed	130.0	-424.36	2.71	3.734	True
P-67	J-84	J-97	105	8.0	Proposed	130.0	-59.83	0.38	0.099	True

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
117	R-1	1,296.00	<None>	1,786.34	1,296.00
295	R-2	1,352.21	<None>	-1,130.51	1,352.21

Pump Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)
250	PMP-1	1,296.00	Supply Curve Pump	On	1,296.00	1,368.46	1,786.34

Pump Head (ft)
72.46

Fire Flow Report - Time: 0.00 hours

Label	Zone	Fire Flow (Needed) (gpm)	Demand (gpm)	Fire Flow (Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Satisfies Fire Flow Constraints?
J-1	PA-2	0.00	2.14	1,501.00	27	0	1.43	P-27	True
J-2	PA-2	0.00	2.14	1,501.00	27	0	7.46	P-27	True
J-3	PA-2	0.00	2.14	1,501.00	26	0	7.05	P-27	True
J-4	COM	0.00	2.22	1,501.00	25	0	6.77	P-87	True
J-5	COM	0.00	2.22	1,501.00	25	0	6.56	P-87	True
J-6	COM	0.00	2.22	1,501.00	24	0	6.27	P-87	True
J-7	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-9	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-10	PA-1	0.00	20.26	1,501.00	24	0	6.01	P-87	True
J-11	PA-1	0.00	20.26	1,501.00	24	0	5.99	P-27	True
J-12	PA-1	0.00	20.26	1,501.00	24	0	6.00	P-27	True
J-13	PA-1	0.00	20.26	1,501.00	24	0	6.03	P-27	True
J-14	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-15	COM	0.00	2.22	1,501.00	25	0	5.98	P-55	True
J-16	<None>	0.00	0.00	1,501.00	26	0	6.11	P-55	True
J-18	<None>	0.00	0.00	1,501.00	26	0	6.13	P-55	True
J-19	PA-2	0.00	2.14	1,501.00	25	0	6.36	P-55	True
J-20	PA-3	0.00	(N/A)	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-21	PA-1	0.00	20.26	1,501.00	24	0	8.12	P-8(1)(1)	True
J-22	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-23	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-24	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-25	COM	0.00	2.22	1,501.00	25	0	6.01	P-55	True
J-26	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-27	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-28	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-29	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-30	PA-3	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-31	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-32	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-33	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-34	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-35	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-36	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-37	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-39	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-40	PA-2	0.00	2.14	1,501.00	27	0	8.18	P-27	True
J-41	COM	0.00	2.22	1,501.00	25	0	6.60	P-87	True
J-42	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-43	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-44	COM	0.00	2.22	1,501.00	24	0	7.30	P-34	True
J-45	COM	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-46	<None>	0.00	0.00	1,501.00	26	0	6.12	P-55	True
J-47	<None>	0.00	0.00	1,501.00	26	0	6.12	P-55	True
J-48	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-50	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-51	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-52	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-53	PA-2	0.00	2.14	1,501.00	25	0	7.43	P-47	True
J-55	PA-2	0.00	2.14	1,501.00	25	0	7.50	P-47	True
J-56	PA-2	0.00	2.14	1,501.00	26	0	7.36	P-55	True
J-57	PA-2	0.00	2.14	1,501.00	26	0	7.42	P-55	True

Fire Flow Report - Time: 0.00 hours

Label	Zone	Fire Flow (Needed) (gpm)	Demand (gpm)	Fire Flow (Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Satisfies Fire Flow Constraints?
J-58	PA-2	0.00	2.14	1,501.00	26	0	7.48	P-55	True
J-59	PA-2	0.00	2.14	1,501.00	26	0	8.05	P-55	True
J-60	PA-2	0.00	2.14	1,501.00	26	0	8.31	P-55	True
J-61	PA-2	0.00	2.14	1,501.00	27	0	9.90	P-55	True
J-62	PA-2	0.00	2.14	1,501.00	27	0	10.11	P-55	True
J-63	PA-3	0.00	2.22	1,501.00	24	0	6.03	P-27	True
J-65	PA-3	0.00	2.22	1,501.00	22	0	6.07	P-27	True
J-66	PA-3	0.00	2.22	1,501.00	23	0	6.09	P-27	True
J-67	PA-3	0.00	2.22	1,501.00	23	0	6.11	P-27	True
J-68	PA-3	0.00	(N/A)	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-69	PA-3	0.00	(N/A)	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-70	PA-3	0.00	(N/A)	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-71	PA-3	0.00	(N/A)	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-72	PA-3	0.00	(N/A)	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-73	PA-2	0.00	2.14	1,501.00	26	0	6.61	P-27	True
J-75	PA-3	0.00	2.22	1,501.00	25	0	7.79	P-69	True
J-76	PA-2	0.00	2.14	1,501.00	25	0	6.03	P-55	True
J-77	PA-2	0.00	2.14	1,501.00	25	0	6.08	P-55	True
J-78	PA-2	0.00	2.14	1,501.00	25	0	6.23	P-55	True
J-79	PA-2	0.00	2.14	1,501.00	26	0	7.16	P-27	True
J-80	PA-2	0.00	2.14	1,501.00	26	0	6.93	P-77	True
J-81	PA-2	0.00	2.14	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-82	PA-2	0.00	2.14	1,501.00	26	0	6.86	P-77	True
J-83	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-84	PA-3	0.00	2.22	1,501.00	23	0	6.09	P-27	True
J-85	PA-3	0.00	2.22	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-86	COM	0.00	2.22	1,501.00	25	0	7.24	P-87	True
J-87	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-88	COM	0.00	2.22	1,501.00	25	0	7.26	P-87	True
J-89	PA-1	0.00	20.26	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-90	PA-2	0.00	2.14	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-91	PA-3	0.00	(N/A)	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-93	<None>	0.00	0.00	1,501.00	25	0	6.76	P-69	True
J-94	<None>	0.00	0.00	1,501.00	23	0	6.06	P-27	True
J-95	<None>	0.00	0.00	(N/A)	(N/A)	0	(N/A)	(N/A)	(N/A)
J-96	<None>	0.00	0.00	1,501.00	25	0	6.12	P-69	True
J-97	<None>	0.00	0.00	1,501.00	24	0	6.09	P-27	True

Appendix E: Sewer Calculations

Worksheet for Max Capacity

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.003 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	948.80 gpm

Results	
Discharge	948.80 gpm
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	7.5 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	2.69 ft/s
Velocity Head	0.11 ft
Specific Energy	1.11 ft
Froude Number	(N/A)
Maximum Discharge	1,020.63 gpm
Discharge Full	948.80 gpm
Slope Full	0.003 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	12.0 in
Critical Depth	7.5 in
Channel Slope	0.003 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Design Flow

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.003 ft/ft
Diameter	12.0 in
Discharge	428.00 gpm

Results	
Normal Depth	5.7 in
Flow Area	0.4 ft²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.9 in
Top Width	1.00 ft
Critical Depth	4.9 in
Percent Full	47.1 %
Critical Slope	0.005 ft/ft
Velocity	2.62 ft/s
Velocity Head	0.11 ft
Specific Energy	0.58 ft
Froude Number	0.766
Maximum Discharge	1,020.63 gpm
Discharge Full	948.80 gpm
Slope Full	0.001 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	5.7 in
Critical Depth	4.9 in
Channel Slope	0.003 ft/ft
Critical Slope	0.005 ft/ft

Appendix F: Approved 2018 Water & Wastewater Basis of Design Report

WATER AND WASTEWATER BASIS OF DESIGN REPORT

Artesia

FINAL Basis of Design Report

☑ APPROVED

☐ APPROVED AS NOTED

☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE

SCOTTSDALE WATER

9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rsacks DATE 7/3/2018

07/03/2018

Prepared For:

Meritage Homes
8800 E. Raintree Drive, Suite 300
Scottsdale, AZ 85260

Kimley»Horn

191166007
June 2018

15-DR-2022
9/12/2022

ARTESIA

Water and Wastewater Basis of Design Report

LOCATED IN SCOTTSDALE, ARIZONA

JUNE 2018 | VERSION 5

Registered Professional Engineer (Civil)
CERTIFICATE NO.
30886
MICHAEL L
DELMARTER
Date Signed 06/19/18
ARIZONA, U.S.A.
Expires 12/31/18

Prepared By:

Kimley»Horn

15-DR-2022
9/12/2022

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1. INTRODUCTION

1.1 PROJECT NAME, LOCATION, SIZE AND BRIEF DESCRIPTION

This Water and Wastewater Basis of Design Report has been prepared to support the redesign of the project formerly known as Starpointe-Artesia, a mixed-use development consisting of single and multi-family residences, and a commercial site located in the City of Scottsdale, Arizona. The site is positioned in the southwest quarter of Section 2, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. This parcel is bordered to the north by the Mummy Mountain Wash and to the south by existing condominiums. The site is further bound on the east by McCormick Ranch Golf Club and Indian Bend Wash. The eastern portion of the site is a backwater area for the Indian Bend Wash. It is bound on the west by Scottsdale Road. See Figure 1, Vicinity Map for the location of the site.

The site was originally approved as 2-ZN-2005 for 480 residential units on 39+/- acres with an additional 5 acres of commercial property along the Scottsdale Road frontage. In 2008, the project was engineered, platted and the onsite circulation system and infrastructure was constructed in full. The commercial portion of the site was developed and is currently occupied by the Blue 32 and Roka Akor restaurants along with other retail shops. The live/work units along the Hummingbird entry road were also constructed along with 64 luxury condo units and 23 golf townhomes in the northeast corner of the site. An underground parking garage was constructed in the center of the site under the planned 4 story luxury condominium units, however, the vertical portion of the units were not constructed. The remaining brownstone and golf condominiums along the eastern and southern boundary also were not constructed before the project was put on hold.

The project was rezoned in 2014 to add additional density/units while at the same time providing more open space than the original design. The additional units were added by providing additional floors/building height along with smaller units within the redeveloped portions of the site.

Meritage Homes is currently developing plans to construct the remainder of the project from where it was left by the original developer while at the same time refining the building products to match today's market conditions. While the site layout remains very similar to the 2008 plans, the project will be developed in 3 phases as follows:

Planning Area 1 – Consists of refining the central residential towers and constructing the vertical portion of the development over the existing underground garage structures. Existing utility systems constructed with the original construction will continue to be utilized.

Planning Area 2 – Was rezoned in 2014 to allow for more density and development of a tower product. However, for this report, it is assumed that this area will remain as originally designed and constructed in 2008 since final product has not been determined for this area. All existing utility systems will continue to be utilized as currently installed.

Planning Area 3 – Reconfigures the 10 original brownstone products into 9 multi-family buildings. New water and sewer connections will be constructed and tie into the existing water and sewer systems.

VICINITY MAP FOR ARTESIA SCOTTSDALE, ARIZONA

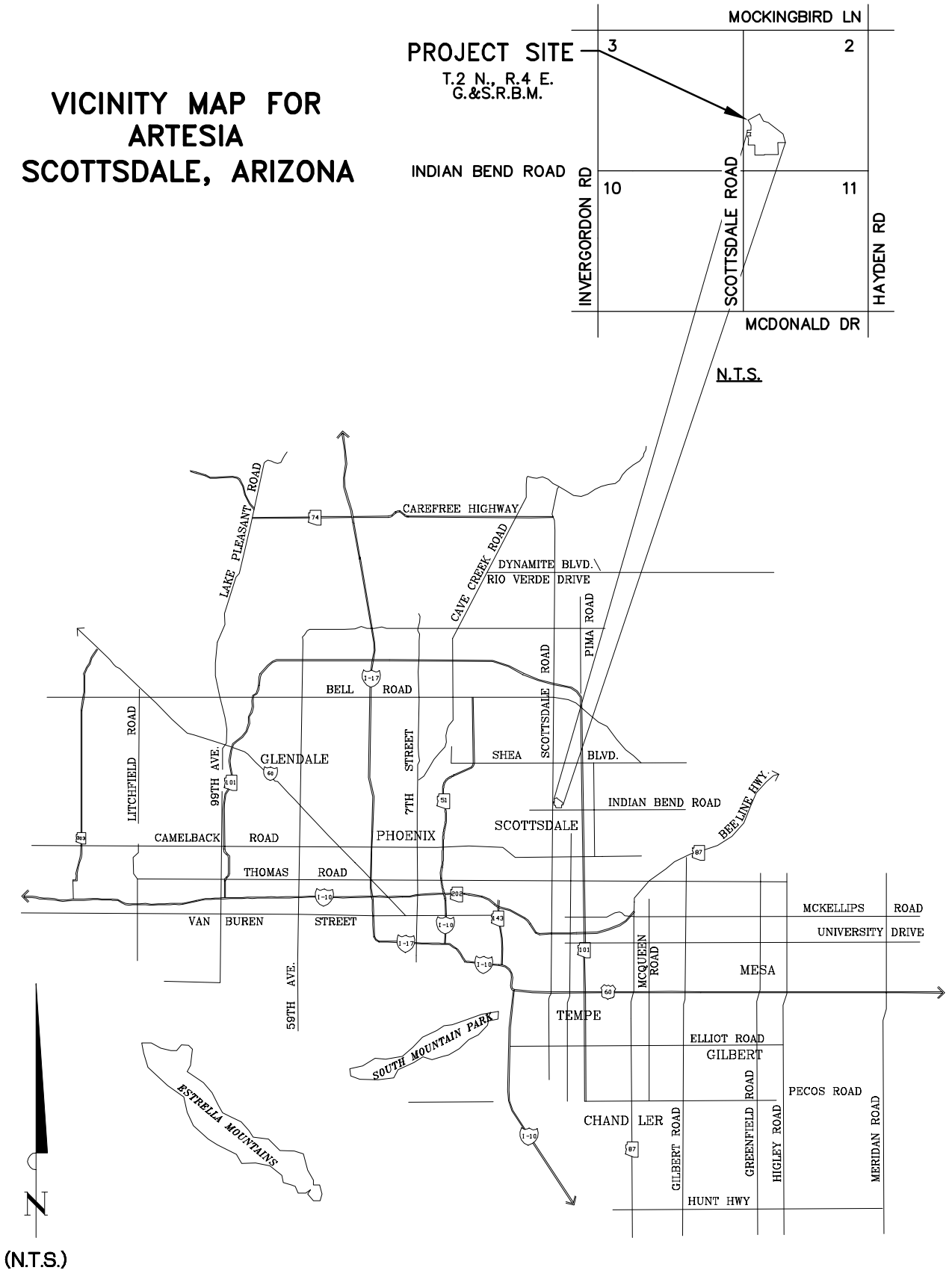

FIGURE 1

Kimley»Horn

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1.2 TYPE OF REPORT

This Preliminary Water & Wastewater Basis of Design Report has been prepared to support the refinement of the Artesia development.

2. EXISTING CONDITIONS

2.1 ZONING AND LAND USE

The project site currently contains two zoning districts. The majority of the site is zoned R-5 (PCD) – Multiple-Family Residential, Planned Community Development District. A small portion of the site, all of which fronts Scottsdale Road, is currently zoned C-1 (PCD) – Neighborhood Commercial, Planned Community Development District.

The existing (constructed) development consists of 93 dwelling units, 20,800 square feet of retail, unfinished underground parking, spine roads with surface parking, and water/sewer infrastructure. The dwelling units and retail will remain. Existing spine roads, infrastructure, and utilities will be improved, demolished, or abandoned as required to make way for the proposed development.

2.2 EXISTING TOPOGRAPHY/IMPROVEMENTS

The majority of the site slopes generally to the outfall at the east end of the site. The north end of the site slopes to the Mummy Mountain Wash. The site is not landscaped.

2.3 EXISTING WATER INFRASTRUCTURE

There is a ten (10) inch ACP water main located along Scottsdale Road adjacent to the project site. This water line is in the City's pressure zone 2A. An eight (8) inch water distribution main is currently located within the project site. This water main provides looped distribution throughout the site and connects to the ten (10) inch main in Scottsdale Road at two points as well as a third connection to the water line located at the southeast corner of the site. See Appendix G, "Water & Wastewater Basis of Design Report: Starpointe-Artesia" for more information on the existing water infrastructure.

A fire hydrant flow test was conducted by Alliance Fire Protection Co. on December 1, 2005 at the fire hydrant near the south entrance to the property with the flowing hydrant located at the north entrance to the property. The test yielded a static pressure of 84 pounds per square inch (psi) and a residual pressure of 60 psi with the hydrant flowing at 1278 gallons per minute (gpm). The estimated flow at 30 psi residual was approximately 1950 gpm. See Appendix G for the Fire Hydrant Flow Test Report from Alliance Fire Protection.

A second fire hydrant flow test was conducted by EJ Flow Tests on June 13, 2014 at the fire hydrant at the east end of the site (near proposed Planning Area 1) with the flowing hydrant located in the southeast of the site (proposed Planning Area 3). The test yielded a static pressure of 70.2 pounds per square inch (psi) and a residual pressure of 41.2 psi with the hydrant flowing at 1,501 gallons per minute (gpm). The

estimated flow at 20 psi residual was approximately 2,019 gpm. The original analysis (see Appendix G) predicted a pressure of 56.01 psi with a flow of 1500 gpm. See Appendix A for the Fire Hydrant Flow Test Report from EJ Flow Tests.

2.4 EXISTING WASTEWATER INFRASTRUCTURE

There is a 36 inch sanitary sewer line located in Scottsdale Road adjacent to the project site. Currently, the site is served by multiple eight (8) inch and twelve (12) inch private sewer lines which connect to the 36 inch line at the south entrance to the property. In order to avoid improvements within Scottsdale Road, the onsite 12" main (constructed 2007) was connected to the existing 8" sewer connection located immediately south of the Blue 32 restaurant. This condition, while approved by the City of Scottsdale, yielded a d/D of 0.75. The existing sewer was designed to maintain a minimum mean full flow velocity of 2.0 fps. See Appendix G, "Water & Wastewater Basis of Design Report: Starpointe-Artesia" for more information on the existing wastewater infrastructure.

3. PROPOSED CONDITIONS

3.1 PROPOSED WATER DISTRIBUTION SYSTEM

The existing 8 inch water mains described above will have to be modified to accommodate the proposed development as they will interfere with multiple building foundations. The existing connections to the 10 inch main in Scottsdale Road as well as the connection at the southeast corner of the site will remain. Water mains throughout the property are contained in a public water easement that varies between 16 and 20 feet in width. In cases where the proposed buildings conflict with existing water lines and easement, new water mains will be installed and public water easement dedicated to ensure supply throughout the site. Approximately 1,430 feet of water line will be abandoned or demolished. The new water system will require approximately 1,740 feet of new pipe. Water lines have been laid out to avoid parking stalls, structures, and walls. Refer to Appendix B: Water Demand Calculations and Appendix C: Water Layout for more information on the water distribution system.

Units will not be metered separately. A single meter and associated back flow preventer will be in place on each building, i.e. each townhouse group (3-plex, 4-plex or 5-plex) and apartment building will have one meter and backflow preventer.

A separate fire loop is not required to serve the proposed development. Each building will have fire risers providing adequate sprinkler flows. Internal backflow prevention will be provided on each fire riser.

3.2 DOMESTIC WATER DEMANDS

According to the guidelines provided in the City of Scottsdale's *Design Standards and Policies, Section 6,* the Artesia project provides the following demands to the City of Scottsdale's existing system:

Average Day Demand:

Residential: 185.3 GPD/unit = 0.129 GPM/unit (High Density Condominium)

SFI-Artesia (93 units existing, 543 units proposed): (0.129 GPM/unit) x (636 units) = 82 GPM

Commercial: 0.8 GPD/sq. ft. = 0.00058 GPM/sq. ft.

SFI-Artesia (Existing): (0.00058 GPM/sq. ft.) x (20,800 sq. ft.) = 12 GPM

Artesia Demands:

Average Day Demand = 82 GPM + 12 GPM = 94 GPM

Peak Hour Demand = (3.5) x (ADF) = 329 GPM

Maximum Day Demand = (2) x (ADF) = 188 GPM

It should be noted that the average day demand for the original development was calculated to be 73 GPM. Therefore, the proposed development will add 21 GPM of demand to the existing system. Irrigation meters have not been included in the above demands. They will be added in the final report.

3.3 WATER DESIGN CRITERIA

Demands were based on the City of Scottsdale Design Standards. The average daily consumptive rates were assumed as follows: for residential sites, a demand of 185.3 gallons per day per unit was used. This is the design demand for high density condominiums. The maximum day demand and peak hour demand were calculated by multiplying the average day demands by peaking factors of 2 and 3.5 respectively.

The static pressure in the distribution system should not exceed 120 pounds per square inch (psi), and the system shall be designed to maintain a minimum residual pressure of 50 psi at the highest, finish floor level to be served by system pressure under normal daily operating conditions. The system will maintain 30 psi minimum pressure under design fire flow requirements.

3.4 FIRE FLOW REQUIREMENTS

Per the City of Scottsdale Design Standards & Policies Manual water distribution facilities shall be sized to deliver a minimum fire flow of 1,500 gallons per minute (gpm) plus fire allowance for the fire sprinkler systems for commercial and multi-family residential properties. The largest proposed building is 206,400 square feet of livable area with a 78,000 square foot underground garage. The construction type for the livable area and underground garage are VA and IA, respectively. This building will be broken up into four (4) sections separated with firewalls. The largest of the four sections will be approximately 60,380 SF. According to IFC Table B105.1 the required flow is 4,500 gpm. After reducing 50% for automatic sprinkler system and 25% for Group R (Residential) the required fire flow is 1,688 gpm. The original development, with similar sized structures, was required to provide 1,500 gpm. The proposed system will also be required to provide a minimum of 1,688 gpm of fire flow. Fire hydrants are to be spaced no more than 700 feet apart

and all sides of the buildings must be within 350 feet of a fire hydrant. All distances are to be measured along the street or roadway in which a fire hose would be laid.

3.5 NETWORK ANALYSIS

The network analysis for the distribution system was created using WaterCAD V8i to demonstrate that the design standards outlined in section 3.3 will be met. Appendix C illustrates the proposed distribution network for the project site. A calibration model was created to ensure accurate simulation of the existing system and the Fire Flow Test performed by EJ Flow Tests. See Appendix A for EJ Flow Test Summary. The analysis model was then created to simulate the proposed system and analyze average day, maximum day, peak hour, and maximum day plus fire flow demand conditions. Water demands were broken into contribution areas and point loaded at nodes along the distribution mains. See Appendix D for detailed water network analysis.

3.6 PROPOSED WASTEWATER COLLECTION SYSTEM

The existing public wastewater collection system will have to be modified to accommodate the new development. The proposed development includes relocating the south entrance from Scottsdale Road. This will require a new 12" sewer connection (SS#1 and SS#1B) to be installed across Scottsdale Road to handle the additional demand. The invert of the new 12" connection (SS#1) will be installed to match the crown of the existing 36" sewer line in Scottsdale Road at the existing manhole (SSMH#1A). The existing connection point to the 36" inch sewer line in Scottsdale Road will continue to serve the site during construction of the new line, but the new sewer connection will serve the entire Artesia project post-construction. See Appendix F for sewer layout.

Approximately 1,980 feet of existing sewer pipe will be abandoned or demolished to avoid conflicts with the proposed development. The proposed wastewater collection system modifications will consist of approximately 2,540 feet of new 8 inch and 12 inch pipes. This system will be private and will be designed with a minimum full flow velocity of 2.0 fps as per the Arizona Administrative Code (AAC) and the 2012 Uniform Plumbing Code. The system will be constructed with a minimum cover of 4 feet as per the City of Scottsdale Design Standards. In most areas however the cover will be 7 feet or greater. A 6 foot minimum horizontal separation between the sewer and water lines will maintain adequate separation to prevent encroachment into the public water easements.

For residential construction, 8 inch and 12 inch sanitary sewer lines will be designed using 100 gallons per capita per day (gpcd) and a peaking factor of 4, as per the City of Scottsdale's Design Standards & Policies Manual. For commercial construction the manual states that a design flow of 0.5 gallons per square foot per day (gpsfd) and a peaking factor of 3 should be used. Refer to Appendix E: Sewer Demand and Flow Calculations and Appendix F: Sewer Layout for more detailed information regarding the wastewater collection system.

In addition, preliminary calculations have been performed to determine that the existing sewer system has the capacity to handle the backwash from the proposed swimming pools. At its most critical point the 8" sewer just upstream of the confluence with the 12" sewer at SSMH#3 has 0.0843 mgd (58.5 gpm) excess capacity during peak flow conditions. Therefore, both pools proposed in PA #1 will be equipped with surge tanks designed to bleed backwash into the sewer system at rates equal to or less than 58.5 gpm. These

tanks are envisioned to consist of standpipes buried in the courtyard areas that are sized for the backflow rate x duration less 58 gpm. They will be equipped with p traps and tie into the adjacent sanitary sewer located in the courtyard. At this point, pool design has not been finalized. Preliminary design indicates backwash rate may vary between 90 and 120 gpm for an approximate 10 minute timeframe. The worst case scenario would occur if backwash occur during peak flow conditions. In all likelihood, this timing would never occur but design will assume for this condition.

Sample surge tank calculation (worst case) 120 gpm-58 gpm = 62 gpm x 10 minutes = 620 gallon surge tank/standpipe with 3" orifice (approx. 5 foot tall x 5' diameter pipe) – Final design to be provided with pool design.

3.7 WASTEWATER HYDRAULIC DESIGN

The on-site sewer collection system is to be almost entirely private and will be designed in accordance with the Uniform Plumbing Code and Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control". The proposed 12" connection from the Secondary Entry Drive to the existing manhole in Scottsdale Road and the line tying back into the existing manhole will be the only public sewer on-site and has therefore been placed inside a proposed PUE. All lines will be designed with a minimum mean full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013. The depth to diameter (d/D) ratio for all sanitary sewer pipes will be no greater than 0.65 in the ultimate peak flow condition. Refer to Appendix E for detailed wastewater calculations. The criteria used in design (i.e. velocity and slope) do not meet City of Scottsdale requirements. All sanitary sewer lines will be privately maintained.

A drop of 0.1 feet will be present across the trough of each manhole. Manholes are required at every intersecting angle of sewer pipes other than 180 degrees and are to be spaced no greater than 500 feet apart. All sewer lines are to be installed with no less than 4 feet of cover over the top of the pipe.

All proposed sewer lines have been designed with minimum slopes of 0.33%. This slope generates a full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013 for 8 inch pipes. See Appendix A for sewer plan and Appendix B for sewer demand and flow calculations.

4. SUMMARY

For the Artesia project, the existing water and wastewater infrastructure within the project site will modified and improved to meet current design needs and standards. All materials shall be disposed of in compliance with applicable county, state, and EPA regulations.

The water distribution system connections to the existing ten (10) inch water line located in Scottsdale Road and the existing 8 inch system at the southeast corner of the site will remain. The onsite water system will be looped and will provide sufficient pressure and fire flow to serve both the proposed and existing development and meet the City of Scottsdale requirements. The water system improvements will be done is such a way as to maintain distribution to the existing buildings as well as the condominiums south of the site.

The modified wastewater collection system will tie into the existing 36 inch sanitary sewer line located in Scottsdale Road. The existing 8 inch connection to the sewer line in Scottsdale Road will be abandoned and a new public 12 inch connection will be installed to handle the additional demand. The existing system will remain private and will adequately serve the sewer needs of both the proposed and existing development. The wastewater collection system has been designed to meet the requirements of the AAC and the 2012 Uniform Plumbing Code.

Table 1 on the following page provides a summary of the existing and proposed buildings. Refer to Appendix C: Water Layout and Appendix F: Sewer Layout for building locations.

Table 1: Building Summary

Building	Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Status
1	Residential	-	55	Proposed (2017)
2	Residential	-	60	Proposed (2017)
3	Residential	-	67	Proposed (2017)
4	Residential	-	67	Proposed (2017)
5	Residential	-	10	Proposed (2017)
6	Residential	-	6	Proposed (2017)
7	Residential	-	6	Proposed (2017)
8	Residential	-	9	Proposed (2017)
9	Residential	-	9	Proposed (2017)
10	Residential	-	6	Proposed (2017)
11	Residential	-	9	Proposed (2017)
12	Residential	-	6	Proposed (2017)
13	Residential	-	6	Proposed (2017)
14	Residential	-	9	Proposed (2017)
15	Residential	-	92	Proposed (2006)
16	Residential	-	126	Proposed (2006)
17	Commercial/Retail	10,400	0	Existing
18	Commercial/Retail	10,400	0	Existing
19	Residential	-	4	Existing
20	Residential	-	5	Existing
21	Residential	-	61	Existing
22-27	Residential	-	23	Existing
Total		20,800	636	

5. REFERENCES

City of Phoenix, City *of Phoenix Design Services Manual for Water and Wastewater Systems.* City of Phoenix Water Services Department, 2017.

City of Scottsdale. *Design Standards & Policies Manual.* City of Scottsdale Planning, Building & Zoning, Arizona, 2009.

Kimley-Horn and Associates, Inc. *Water & Wastewater Basis of Design Report, Starpointe-Artesia,* August 2006.

Kimley-Horn and Associates, Inc. *Water & Wastewater Basis of Design Report, SFI-Artesia,* September 2014.

2012. WaterCAD v8.1, Bentley Systems, Inc.

Uniform Plumbing Code. 2012.

2009. FlowMaster v8.1, Bentley Systems, Inc.

APPENDIX

Appendix A: Fire Hydrant Flow Test Report

E·J Flow Tests

FLOW TESTING SERVICES

Flow Test Summary

EJ Flow Tests Project Name:	SFI Artesia
EJ Flow Tests Project No.:	14066
Project Address:	North Scottsdale Road and East Indian Bend Road, Scottsdale, Arizona 85253
Date of Flow Test:	June 13, 2014
Time of Flow Test:	8:00 AM
Data is Current and Reliable Until:	December 13, 2014

Raw Test Data:

Static Pressure: (measured in pounds per square inch)	78.0	psi
Residual Pressure: (measured in pounds per square inch)	49.0	psi
Pitot Pressure: (measured in pounds per square inch)	20.0	psi
Number of Outlets Flowed:	2	
Fire Hydrant Orifice Diameter: (measured in inches)	2.5	inches
Coefficient of Discharge: (0.9 smooth/round outlet, 0.8 square/sharp outlet, 0.7 square/raised outlet)	0.9	
Flowing GPM: (measured in gallons per minute)	1,501	
GPM at 20 PSI:	2,183	

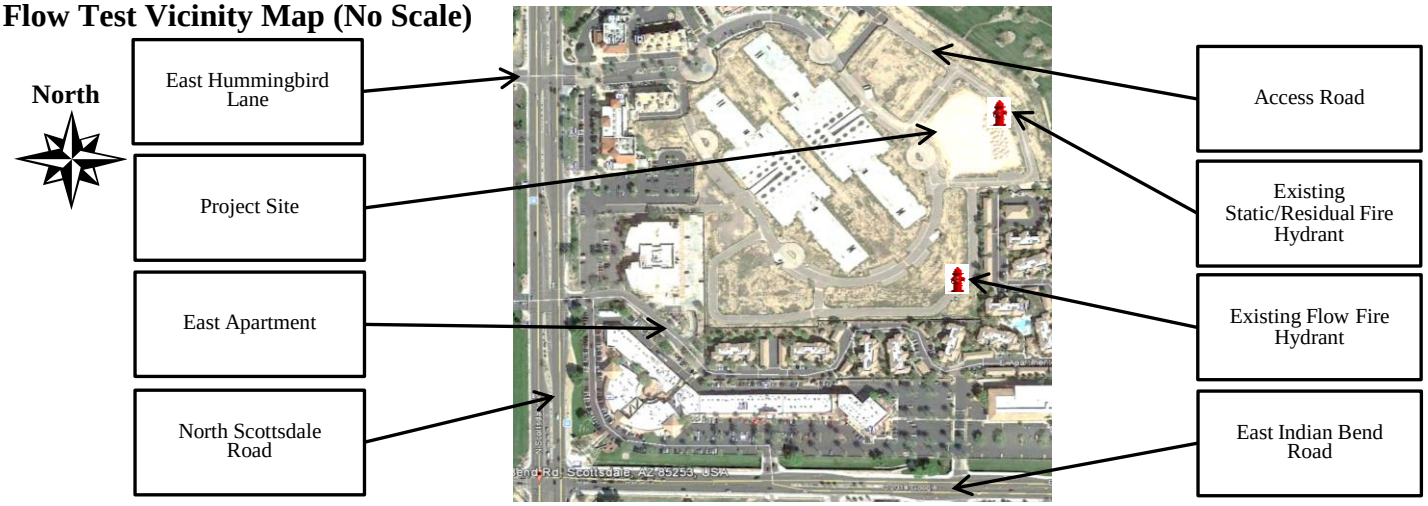
Data with minimum safety factor of: 10% :

Static Pressure: (measured in pounds per square inch)	70.2	psi
Residual Pressure: (measured in pounds per square inch)	41.2	psi
Main Size: (measured in inches)	8	
Approximate Distance Between Hydrants: (measured in feet)	535	ft
Approx. Static/Residual Hydrant Elevation: (measured above sea level)	1,293	ft
Approx. Flow Hydrant Elevation: (measured above sea level)	1,298	ft
Flowing GPM: (measured in gallons per minute)	1,501	
GPM at 20 PSI:	2,019	

Conducted by/Witnessed by/City Forces Contacted:

Conducted by:	Cesar R., Eric S., & Austin G. (EJ Flow Tests) 602.999.7637
Witnessed by:	Phil Cipolla (City of Scottsdale) 602.828.0847
City Forces Contacted:	City of Scottsdale (Permit #C45318)

Flow Test Vicinity Map (No Scale)



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Appendix B: Water Demand Calculations

2006-DEVELOPMENT WATER DEMAND CALCULATIONS

10-Aug-06

KHA No. 091505005

Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Average Residential Day Demand (per unit)*	Average Commercial Day Demand (per sq. ft.)*	Average Day Demand (GPM)	Max Day Demand (GPM)	Peak Hour Demand (GPM)
Residential	-	480	185.3	N/A	61.8	123.5	216.2
Commercial/Retail	20,800	0	N/A	0.8	11.6	23.1	40.4
GRAND TOTAL		**480**			**73**	**147**	**257**

* Residential and Commercial average day water demands are in gallons per day.

Average day demand values are from figure 6.1-2 in the City of Scottsdale Design Standards & Policies Manual

POST-DEVELOPMENT WATER DEMAND CALCULATIONS

10-Jul-17

KH No. 191166007

Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Average Residential Day Demand (per unit)*	Average Commercial Day Demand (per sq. ft.)*	Average Day Demand (GPM)	Max Day Demand (GPM)	Peak Hour Demand (GPM)
Residential	-	636	185.3	N/A	82	164	287
Commercial/Retail	20,800	0	N/A	0.8	12	24	42
GRAND TOTAL		**636**			**94**	**188**	**329**

* Residential and Commercial average day water demands are in gallons per day.

Average day demand values are from figure 6.1-2 in the City of Scottsdale Design Standards & Policies Manual

Max Day Demand = 2 * Average Day Demand

Peak Hour Demand = 3.5 * Average Day Demand

POST-DEVELOPMENT WATER DEMAND CALCULATIONS

10-Jul-17

KH No. 191166007

Building	Junction	Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Average Residential Day Demand (per unit)*	Average Commercial Day Demand (per sq. ft.)*	Average Day Demand (GPM)	Max Day Demand (GPM)	Peak Hour Demand (GPM)
1	J-47	Residential	-	55	185.3	-	7	14	25
2	J-35	Residential	-	60	185.3	-	8	15	27
3	J-39	Residential	-	67	185.3	-	9	17	30
4	J-17	Residential	-	67	185.3	-	9	17	30
5	J-46	Residential	-	10	185.3	-	1	3	5
6	J-6	Residential	-	6	185.3	-	1	2	3
7	J-8	Residential	-	6	185.3	-	1	2	3
8	J-12	Residential	-	9	185.3	-	1	2	4
9	J-15	Residential	-	9	185.3	-	1	2	4
10	J-14	Residential	-	6	185.3	-	1	2	3
11	J-18	Residential	-	9	185.3	-	1	2	4
12	J-20	Residential	-	6	185.3	-	1	2	3
13	J-21	Residential	-	6	185.3	-	1	2	3
14	J-40	Residential	-	9	185.3	-	1	2	4
15	J-28	Residential	-	92	185.3	-	12	24	41
16	J-30	Residential	-	126	185.3	-	16	32	57
17	J-3	Commercial/Retail	10,400	0	-	0.8	6	12	20
18	J-49	Commercial/Retail	10,400	0	-	0.8	6	12	20
19	J-45	Residential	-	4	185.3	-	1	1	2
20	J-43	Residential	-	5	185.3	-	1	1	2
21	J-42	Residential	-	61	185.3	-	8	16	27
22-27	J-32	Residential	-	23	185.3	-	3	6	10
GRAND TOTAL			**20,800**	**636**			**93**	**187**	**327**

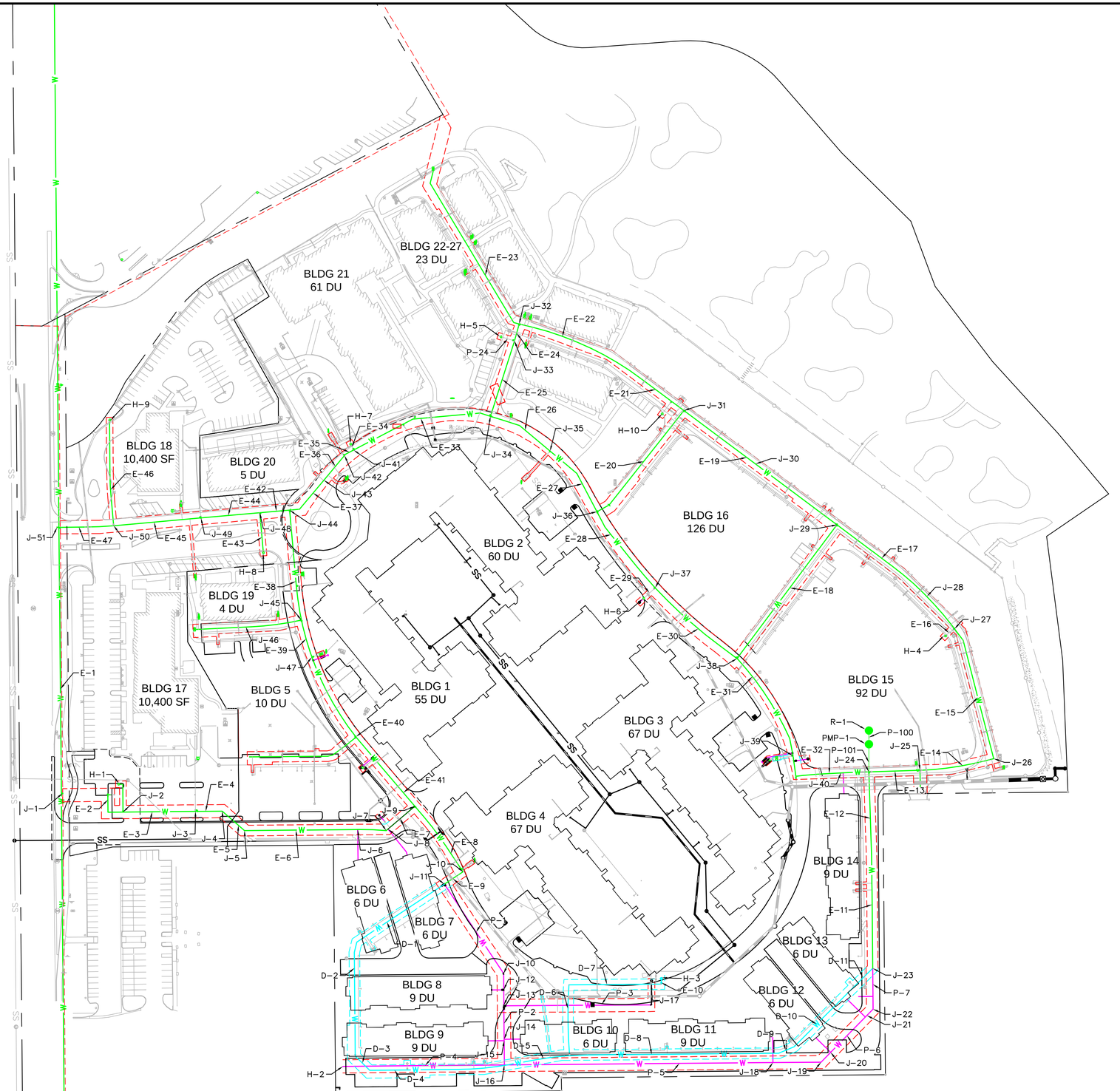
* Residential and Commercial average day water demands are in gallons per day.

Average day demand values are from figure 6.1-2 in the City of Scottsdale Design Standards & Policies Manual

Max Day Demand = 2 * Average Day Demand

Peak Hour Demand = 3.5 * Average Day Demand

Appendix C: Water Layout



LEGEND

- W — PROPOSED 8" WATER LINE
- W — EXISTING 8" WATER LINE TO REMAIN
- W — EXISTING 8" WATER LINE TO BE ABANDONED/DEMOLISHED
- PROPOSED/REMAINING PUBLIC WATER LINE EASEMENT
- PUBLIC WATER LINE EASEMENT TO BE ABANDONED
- PROPOSED FIRE HYDRANT
- EXISTING FIRE HYDRANT TO REMAIN
- EXISTING FIRE HYDRANT TO BE REMOVED/RELOCATED

NORTH

GRAPHIC SCALE IN FEET
0 40 80 160

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APPENDIX C: WATER LAYOUT

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Appendix D: Water Network Analysis

Active Scenario: Calibration

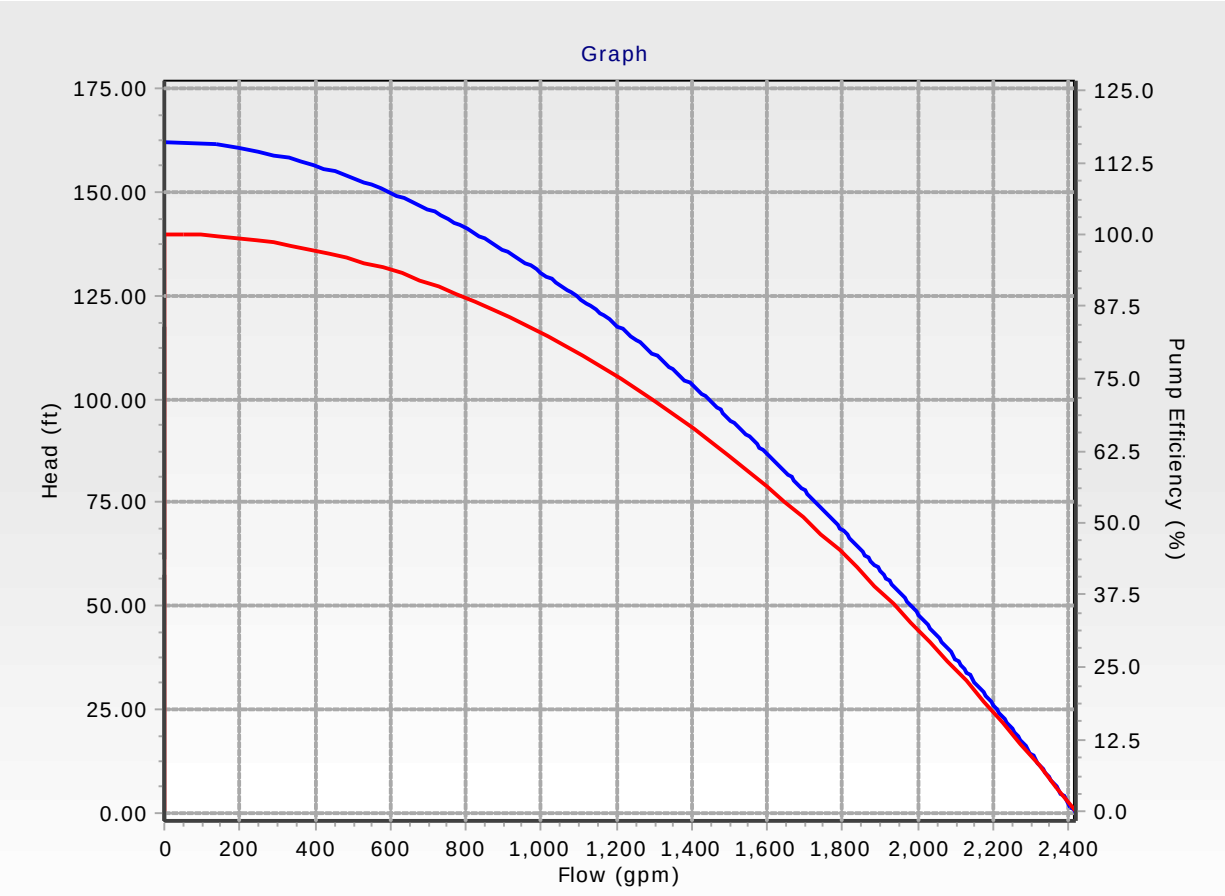
Pump Definition Detailed Report: 2014-06-13 Flow Test

Element Details			
ID	175	Notes	
Label	2014-06-13 Flow Test		

Pump Definition Type			
Pump Definition Type	Standard (3 Point)	Design Head	95.17 ft
Shutoff Flow	0 gpm	Maximum Operating Flow	2,019 gpm
Shutoff Head	162.16 ft	Maximum Operating Head	46.20 ft
Design Flow	1,501 gpm		

Pump Efficiency Type			
Pump Efficiency Type	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0 gpm		

Transient (Physical)			
Inertia (Pump and Motor)	0.000 lb·ft²	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True


Graph
175.00
150.00
125.00
100.00
75.00
50.00
25.00
0.00
Head (ft)
125.0
112.5
100.0
87.5
75.0
62.5
50.0
37.5
25.0
12.5
0.0
Pump Efficiency (%)
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
Flow (gpm)

Active Scenario: Calibration

FlexTable: Pump Table

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
168	PMP-1	93.00	2014-06-13 FLow Test	On	93.20	188.37	1,501	95.17

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Active Scenario: Calibration

FlexTable: Reservoir Table

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
169	R-1	93.20	1,501	93.20

Active Scenario: Calibration

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-91	0.58
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-91	0.58
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	-230	1.47
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-105	0.67
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-105	0.67
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-105	0.67
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-105	0.67
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-105	0.67
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-105	0.67
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-334	2.13
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-244	1.56
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-113	0.72
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-113	0.72
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-113	0.72
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-105	0.67
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	230	1.47
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	230	1.47
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	230	1.47
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-334	2.13
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-334	2.13
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-334	2.13
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-221	1.41
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	1,167	7.45
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	1,167	7.45

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Active Scenario: Calibration

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	-334	2.13
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	-334	2.13
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	1,501	0.06
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	-105	0.67
D-1	J-4	J-101	6.0	43	Ductile Iron	130.0	False	105	1.19
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	105	0.67
D-2	J-101	J-8	6.0	216	Ductile Iron	130.0	False	105	1.19
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	-334	2.13
D-3	J-10	J-11	6.0	207	Ductile Iron	130.0	False	-334	3.80
E-8	J-11	J-7	6.0	123	Ductile Iron	130.0	False	-334	3.80
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
D-5	J-16	J-102	6.0	142	Ductile Iron	130.0	False	0	0.00
D-4	J-102	J-14	6.0	72	Ductile Iron	130.0	False	-334	3.80
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	-334	2.13
D-6	J-102	J-19	6.0	218	Ductile Iron	130.0	False	334	3.80
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	-334	2.13
D-7	J-21	J-103	6.0	129	Ductile Iron	130.0	False	334	3.80
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	1,167	7.45
D-9	J-103	J-24	6.0	39	Ductile Iron	130.0	False	-1,167	13.24
D-8	H-100	J-103	6.0	12	Ductile Iron	130.0	False	-1,501	17.03
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-221	1.41
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-226	1.44
D-15	J-40	J-106	6.0	204	Ductile Iron	130.0	False	5	0.06
D-16	J-106	J-35	6.0	110	Ductile Iron	130.0	False	113	1.29
D-14	J-106	J-105	6.0	289	Ductile Iron	130.0	False	-109	1.23
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-226	1.44
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-244	1.56
D-13	J-105	J-42	6.0	253	Ductile Iron	130.0	False	-18	0.20
D-12	J-105	J-104	6.0	238	Ductile Iron	130.0	False	-91	1.03
D-10	J-104	J-29	6.0	206	Ductile Iron	130.0	False	-91	1.03
D-11	H-101	J-104	6.0	17	Ductile Iron	130.0	False	0	0.00
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	1,501	0.06

Active Scenario: Calibration

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-29	83.33	0	0	188.33	45.4	H-100	-4.2	45.4	770
J-28	87.00	0	0	188.35	43.9	H-100	-5.1	43.9	771
J-27	82.67	0	0	188.37	45.7	H-100	-2.6	45.7	771
J-17	90.00	0	0	180.95	39.4	H-4	-24.4	39.4	691
J-13	91.00	0	0	182.08	39.4	H-100	-18.6	39.4	700
J-7	88.70	0	0	185.88	42.0	H-100	-13.5	42.0	736
J-6	88.70	0	0	185.96	42.1	H-100	-13.4	42.1	737
J-2	91.00	0	0	186.24	41.2	H-100	-15.9	41.2	740
J-1	91.00	0	0	186.27	41.2	H-100	-15.8	41.2	741
J-53	90.00	0	0	186.39	41.7	H-100	-14.6	41.7	742
J-52	89.00	0	0	186.41	42.1	H-100	-13.9	42.1	742
J-51	89.50	0	0	186.45	41.9	H-100	-13.6	41.9	743
J-50	90.50	0	0	186.47	41.5	H-100	-13.5	41.5	743
J-47	90.50	0	0	186.48	41.5	H-100	-13.3	41.5	744
J-44	90.60	0	0	186.82	41.6	H-100	-12.6	41.6	748
J-38	91.00	0	0	187.34	41.7	H-100	-11.1	41.7	756
J-41	89.50	0	0	187.76	42.5	H-100	-9.0	42.5	762
J-43	88.00	0	0	188.18	43.3	H-100	-6.3	43.3	768
J-37	90.50	0	0	187.38	41.9	H-100	-11.1	41.9	756
J-36	89.67	0	0	187.39	42.3	H-100	-10.8	42.3	756
J-35	90.00	0	0	187.45	42.2	H-100	-11.0	42.2	757
J-3	92.00	0	0	186.21	40.8	H-100	-16.4	40.8	740
J-49	87.00	0	0	186.22	42.9	H-100	-12.4	42.9	739
J-48	89.00	0	0	186.28	42.1	H-100	-13.2	42.1	740
J-46	90.60	0	0	186.66	41.6	H-100	-12.9	41.6	746
J-45	90.60	0	0	186.77	41.6	H-100	-12.7	41.6	748
J-39	91.00	0	0	187.45	41.7	H-100	-10.8	41.7	757
J-26	86.00	0	0	185.47	43.0	H-100	-7.9	43.0	743
J-25	88.00	0	0	182.80	41.0	H-100	-12.0	41.0	719

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Active Scenario: Calibration

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-20	89.70	0	0	178.69	38.5	H-100	-18.8	38.5	682
J-14	90.67	0	0	181.66	39.4	H-100	-18.6	39.4	697
J-12	90.80	0	0	182.51	39.7	H-100	-18.2	39.7	703
J-4	91.51	0	0	186.20	41.0	H-100	-16.2	41.0	740
J-101	91.00	0	0	186.15	41.2	H-100	-16.0	41.2	739
J-8	89.33	0	0	185.90	41.8	H-100	-13.9	41.8	736
J-10	90.90	0	0	182.67	39.7	H-100	-18.1	39.7	704
J-11	84.30	0	0	184.68	43.4	H-100	-13.3	43.4	721
J-16	90.00	0	0	180.95	39.4	H-100	-23.7	39.4	693
J-102	90.00	0	0	180.95	39.4	H-100	-18.7	39.4	693
J-19	89.63	0	0	178.82	38.6	H-100	-18.8	38.6	682
J-21	89.37	0	0	178.53	38.6	H-100	-18.7	38.6	681
J-103	88.40	0	0	177.27	38.5	H-100	-17.9	38.5	676
J-24	88.00	0	0	181.16	40.3	H-100	-13.8	40.3	706
J-40	90.31	0	0	187.59	42.1	H-100	-9.9	42.1	759
J-106	88.80	0	0	187.59	42.7	H-100	-9.8	42.7	759
J-105	86.60	0	0	187.94	43.8	H-100	-7.7	43.8	764
J-42	88.77	0	0	187.95	42.9	H-100	-7.7	42.9	765
J-104	85.33	0	0	188.15	44.5	H-100	-7.3	44.5	767

Active Scenario: Calibration

FlexTable: Hydrant Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-3	95.75	0	0	700	182.08	37.3
H-4	93.50	0	0	685	180.95	37.8
H-10	93.30	0	0	762	187.76	40.9
H-9	95.30	0	0	757	187.38	39.8
H-11	95.00	0	0	749	186.82	39.7
H-12	94.40	0	0	744	186.47	39.8
H-1	96.80	0	0	740	186.24	38.7
H-13	95.90	0	0	730	186.41	39.2
H-100	98.00	1,501	0	662	175.40	33.5
H-101	93.00	0	0	767	188.15	41.2

Active Scenario: Average Day Demand

FlexTable: Pump Table

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	254.91	101	161.71

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Active Scenario: Average Day Demand

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	101	93.20

Active Scenario: Average Day Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-33	0.21
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-33	0.21
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-33	0.21
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	7	0.05
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	4	0.03
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-2	0.01
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-2	0.01
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-2	0.01
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-2	0.01
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-8	0.05
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-8	0.05
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-22	0.14
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-37	0.24
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-2	0.01
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-2	0.01
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-5	0.03
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-5	0.03
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-2	0.01
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-3	0.02

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Active Scenario: Average Day Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	6	0.04
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	5	0.03
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-13	0.08
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-14	0.09
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-22	0.14
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-19	0.12
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-5	0.03
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-21	0.14
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-33	0.21
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	30	0.19
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	28	0.18
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	22	0.14
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	22	0.14
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	20	0.13
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	20	0.13
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	26	0.17
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	101	0.00
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-21	0.14
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	4	0.03
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	4	0.03
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	16	0.10
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	16	0.10
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	18	0.12
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	18	0.12
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	24	0.16
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	24	0.16
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	26	0.17
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	26	0.17
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	26	0.17
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	26	0.17

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Active Scenario: Average Day Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-28	0.18
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-28	0.18
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-28	0.18
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-28	0.18
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	101	0.00

Active Scenario: Average Day Demand

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	0	254.88	71.3	H-8	51.4	71.3	2,147
J-32	85.33	0	0	254.89	73.4	H-7	53.5	73.4	2,159
J-30	83.33	0	0	254.90	74.2	H-7	55.5	74.2	2,253
J-29	83.33	0	0	254.90	74.2	H-7	55.6	74.2	2,263
J-28	87.00	0	0	254.90	72.6	H-5	54.6	72.6	2,278
J-27	82.67	0	0	254.91	74.5	H-5	57.0	74.5	2,280
J-22	89.00	0	0	254.90	71.8	H-5	52.4	71.8	2,146
J-15	90.00	0	0	254.89	71.3	H-4	51.0	71.3	2,123
J-17	90.00	0	0	254.89	71.3	H-4	49.3	71.3	2,020
J-13	91.00	0	0	254.89	70.9	H-3	50.3	70.9	2,088
J-7	88.70	9	0	254.88	71.9	H-1	51.5	71.9	2,118
J-6	88.70	0	0	254.88	71.9	H-1	51.4	71.9	2,101
J-5	88.70	0	0	254.88	71.9	H-1	51.3	71.9	2,096
J-2	91.00	0	0	254.88	70.9	H-1	49.3	70.9	2,027
J-1	91.00	0	0	254.88	70.9	H-1	49.2	70.9	2,040
J-53	90.00	0	0	254.88	71.3	H-13	49.9	71.3	2,060
J-52	89.00	0	0	254.88	71.8	H-13	50.5	71.8	2,052
J-51	89.50	6	0	254.88	71.6	H-13	50.9	71.6	2,087
J-50	90.50	0	0	254.88	71.1	H-13	50.7	71.1	2,104
J-47	90.50	0	0	254.88	71.1	H-13	50.9	71.1	2,117
J-44	90.60	0	0	254.88	71.1	H-11	51.2	71.1	2,140
J-38	91.00	0	0	254.88	70.9	H-9	51.7	70.9	2,190
J-41	89.50	0	0	254.89	71.6	H-10	52.4	71.6	2,201
J-43	88.00	9	0	254.90	72.2	H-1	54.1	72.2	2,276
J-37	90.50	0	0	254.88	71.1	H-9	51.6	71.1	2,163
J-36	89.67	3	0	254.88	71.5	H-9	52.0	71.5	2,169
J-35	90.00	0	0	254.88	71.3	H-8	51.5	71.3	2,164
J-3	92.00	6	0	254.88	70.5	H-1	49.2	70.5	2,050
J-49	87.00	8	0	254.88	72.6	H-1	52.1	72.6	2,119

Active Scenario: Average Day Demand

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-48	89.00	1	0	254.88	71.8	H-1	51.1	71.8	2,113
J-46	90.60	1	0	254.88	71.1	H-13	51.0	71.1	2,133
J-45	90.60	8	0	254.88	71.1	H-1	51.3	71.1	2,150
J-39	91.00	9	0	254.89	70.9	H-9	51.8	70.9	2,212
J-33	88.90	16	0	254.88	71.8	H-8	52.2	71.8	2,181
J-31	86.00	12	0	254.89	73.1	H-7	54.1	73.1	2,232
J-26	86.00	2	0	254.90	73.1	H-5	54.8	73.1	2,230
J-25	88.00	2	0	254.90	72.2	H-5	53.4	72.2	2,193
J-20	89.70	2	0	254.89	71.5	H-5	51.7	71.5	2,162
J-18	89.50	2	0	254.89	71.6	H-4	51.4	71.6	2,140
J-14	90.67	2	0	254.89	71.0	H-3	50.6	71.0	2,118
J-12	90.80	2	0	254.88	71.0	H-3	50.3	71.0	2,114
J-9	91.00	2	0	254.88	70.9	H-3	50.3	70.9	2,122
J-23	88.00	0	0	254.90	72.2	H-5	53.0	72.2	2,159
J-4	91.51	0	0	254.88	70.7	H-1	49.3	70.7	2,051
J-8	89.33	0	0	254.88	71.6	H-1	51.0	71.6	2,115
J-10	90.90	0	0	254.88	70.9	H-3	50.2	70.9	2,120
J-16	90.00	0	0	254.89	71.3	H-4	50.0	71.3	2,064
J-19	89.63	0	0	254.89	71.5	H-4	51.5	71.5	2,159
J-21	89.37	0	0	254.90	71.6	H-5	52.0	71.6	2,154
J-24	88.00	0	0	254.90	72.2	H-5	53.1	72.2	2,171
J-40	90.31	0	0	254.89	71.2	H-1	51.9	71.2	2,216
J-42	88.77	0	0	254.90	71.9	H-10	53.0	71.9	2,235

Active Scenario: Average Day Demand

FlexTable: Hydrant Table

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-8	94.00	0	2,098	254.88	69.6
H-7	93.00	0	2,118	254.89	70.0
H-6	90.00	0	2,215	254.90	71.3
H-5	98.00	0	2,099	254.90	67.9
H-3	95.75	0	2,043	254.89	68.9
H-4	93.50	0	1,975	254.89	69.8
H-2	93.00	0	2,081	254.88	70.0
H-10	93.30	0	2,145	254.89	69.9
H-9	95.30	0	2,113	254.88	69.0
H-11	95.00	0	2,117	254.88	69.2
H-12	94.40	0	1,989	254.88	69.4
H-1	96.80	0	1,937	254.88	68.4
H-13	95.90	0	1,787	254.88	68.8

Active Scenario: Max Day Demand

FlexTable: Pump Table

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	253.72	202	160.52

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Active Scenario: Max Day Demand

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	202	93.20

Active Scenario: Max Day Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-67	0.42
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-67	0.42
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-67	0.42
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	15	0.09
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	9	0.05
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-3	0.02
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-3	0.02
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-3	0.02
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-3	0.02
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-15	0.10
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-15	0.10
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-43	0.28
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-75	0.48
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-5	0.03
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-5	0.03
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-11	0.07
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-11	0.07
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-3	0.02
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-6	0.04

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Active Scenario: Max Day Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	11	0.07
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	10	0.06
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-26	0.17
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-27	0.18
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-43	0.28
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-39	0.25
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-11	0.07
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-43	0.27
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-67	0.42
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	61	0.39
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	57	0.36
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	45	0.28
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	45	0.28
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	41	0.26
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	41	0.26
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	53	0.34
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	202	0.01
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-43	0.27
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	9	0.05
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	9	0.05
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	33	0.21
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	33	0.21
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	37	0.23
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	37	0.23
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	49	0.31
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	49	0.31
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	53	0.34
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	53	0.34
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	53	0.34
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	53	0.34

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Active Scenario: Max Day Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-57	0.36
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-57	0.36
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-57	0.36
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-57	0.36
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	202	0.01

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Active Scenario: Max Day Demand

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	0	253.64	70.8	H-8	48.3	70.8	2,053
J-32	85.33	0	0	253.66	72.8	H-7	50.4	72.8	2,066
J-30	83.33	0	0	253.70	73.7	H-7	52.4	73.7	2,154
J-29	83.33	0	0	253.70	73.7	H-7	52.6	73.7	2,163
J-28	87.00	0	0	253.71	72.1	H-5	51.6	72.1	2,176
J-27	82.67	0	0	253.72	74.0	H-5	54.0	74.0	2,179
J-22	89.00	0	0	253.69	71.3	H-5	49.3	71.3	2,052
J-15	90.00	0	0	253.66	70.8	H-4	47.9	70.8	2,032
J-17	90.00	0	0	253.66	70.8	H-4	46.1	70.8	1,937
J-13	91.00	0	0	253.65	70.4	H-3	47.1	70.4	1,998
J-7	88.70	18	0	253.63	71.4	H-1	48.5	71.4	2,032
J-6	88.70	0	0	253.63	71.4	H-1	48.1	71.4	2,007
J-5	88.70	0	0	253.63	71.4	H-1	48.0	71.4	2,003
J-2	91.00	0	0	253.63	70.4	H-1	46.1	70.4	1,939
J-1	91.00	0	0	253.63	70.4	H-1	46.0	70.4	1,951
J-53	90.00	0	0	253.63	70.8	H-13	46.7	70.8	1,970
J-52	89.00	0	0	253.63	71.2	H-13	47.3	71.2	1,963
J-51	89.50	12	0	253.63	71.0	H-13	47.8	71.0	2,001
J-50	90.50	0	0	253.63	70.6	H-13	47.4	70.6	2,010
J-47	90.50	0	0	253.63	70.6	H-13	47.7	70.6	2,023
J-44	90.60	0	0	253.63	70.5	H-11	48.0	70.5	2,045
J-38	91.00	0	0	253.64	70.4	H-9	48.5	70.4	2,092
J-41	89.50	0	0	253.67	71.0	H-10	49.3	71.0	2,106
J-43	88.00	18	0	253.70	71.7	H-1	51.3	71.7	2,182
J-37	90.50	0	0	253.64	70.6	H-9	48.4	70.6	2,067
J-36	89.67	6	0	253.64	70.9	H-9	48.9	70.9	2,076
J-35	90.00	0	0	253.64	70.8	H-8	48.4	70.8	2,069
J-3	92.00	12	0	253.63	69.9	H-1	46.1	69.9	1,967
J-49	87.00	16	0	253.63	72.1	H-1	49.1	72.1	2,033

Active Scenario: Max Day Demand

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-48	89.00	1	0	253.63	71.2	H-1	47.9	71.2	2,019
J-46	90.60	1	0	253.63	70.5	H-1	47.8	70.5	2,037
J-45	90.60	16	0	253.63	70.5	H-1	48.3	70.5	2,061
J-39	91.00	18	0	253.65	70.4	H-1	48.9	70.4	2,121
J-33	88.90	32	0	253.64	71.3	H-8	49.5	71.3	2,102
J-31	86.00	24	0	253.68	72.5	H-7	51.3	72.5	2,146
J-26	86.00	4	0	253.71	72.6	H-5	51.8	72.6	2,133
J-25	88.00	4	0	253.70	71.7	H-5	50.4	71.7	2,099
J-20	89.70	4	0	253.68	70.9	H-5	48.6	70.9	2,069
J-18	89.50	4	0	253.67	71.0	H-4	48.3	71.0	2,050
J-14	90.67	4	0	253.66	70.5	H-3	47.5	70.5	2,027
J-12	90.80	4	0	253.64	70.5	H-3	47.2	70.5	2,024
J-9	91.00	4	0	253.63	70.4	H-1	47.1	70.4	2,033
J-23	88.00	0	0	253.69	71.7	H-5	49.9	71.7	2,065
J-4	91.51	0	0	253.63	70.1	H-1	46.1	70.1	1,961
J-8	89.33	0	0	253.63	71.1	H-1	47.8	71.1	2,020
J-10	90.90	0	0	253.64	70.4	H-3	47.0	70.4	2,027
J-16	90.00	0	0	253.66	70.8	H-4	46.9	70.8	1,977
J-19	89.63	0	0	253.67	71.0	H-4	48.4	71.0	2,066
J-21	89.37	0	0	253.68	71.1	H-5	48.9	71.1	2,060
J-24	88.00	0	0	253.70	71.7	H-5	50.0	71.7	2,076
J-40	90.31	0	0	253.66	70.7	H-1	48.8	70.7	2,115
J-42	88.77	0	0	253.69	71.4	H-10	50.0	71.4	2,137

Active Scenario: Max Day Demand

FlexTable: Hydrant Table

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-8	94.00	0	2,008	253.64	69.1
H-7	93.00	0	2,028	253.66	69.5
H-6	90.00	0	2,121	253.70	70.8
H-5	98.00	0	2,009	253.69	67.4
H-3	95.75	0	1,956	253.65	68.3
H-4	93.50	0	1,896	253.66	69.3
H-2	93.00	0	1,991	253.63	69.5
H-10	93.30	0	2,054	253.67	69.4
H-9	95.30	0	2,021	253.64	68.5
H-11	95.00	0	2,024	253.63	68.6
H-12	94.40	0	1,905	253.63	68.9
H-1	96.80	0	1,856	253.63	67.9
H-13	95.90	0	1,718	253.63	68.2

Active Scenario: Peak Hour Demand

FlexTable: Pump Table

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	250.81	351	157.61

Active Scenario: Peak Hour Demand

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	351	93.20

Active Scenario: Peak Hour Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-116	0.74
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-116	0.74
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-116	0.74
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	25	0.16
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	14	0.09
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-6	0.04
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-6	0.04
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-6	0.04
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-6	0.04
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-27	0.17
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-27	0.17
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-76	0.48
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-130	0.83
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-9	0.05
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-9	0.05
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-18	0.11
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-18	0.11
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-6	0.04
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-10	0.07

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Active Scenario: Peak Hour Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	19	0.12
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	18	0.11
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-46	0.29
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-48	0.30
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-76	0.48
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-67	0.43
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-18	0.11
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-74	0.47
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-116	0.74
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	105	0.67
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	98	0.63
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	77	0.49
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	77	0.49
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	70	0.45
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	70	0.45
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	91	0.58
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	351	0.01
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-74	0.47
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	14	0.09
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	14	0.09
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	56	0.36
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	56	0.36
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	63	0.40
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	63	0.40
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	84	0.54
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	84	0.54
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	91	0.58
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	91	0.58
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	91	0.58
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	91	0.58

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Active Scenario: Peak Hour Demand

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-99	0.63
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-99	0.63
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-99	0.63
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-99	0.63
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	351	0.01

Active Scenario: Peak Hour Demand

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	0	250.59	69.5	H-8	43.2	69.5	1,915
J-32	85.33	0	0	250.63	71.5	H-7	45.4	71.5	1,929
J-30	83.33	0	0	250.73	72.4	H-7	47.5	72.4	2,008
J-29	83.33	0	0	250.75	72.4	H-7	47.7	72.4	2,016
J-28	87.00	0	0	250.78	70.9	H-5	46.7	70.9	2,026
J-27	82.67	0	0	250.81	72.7	H-5	49.2	72.7	2,029
J-22	89.00	0	0	250.71	70.0	H-5	44.3	70.0	1,914
J-15	90.00	0	0	250.64	69.5	H-4	42.8	69.5	1,897
J-17	90.00	0	0	250.64	69.5	H-4	41.1	69.5	1,813
J-13	91.00	0	0	250.60	69.1	H-3	42.0	69.1	1,864
J-7	88.70	32	0	250.54	70.0	H-1	43.8	70.0	1,906
J-6	88.70	0	0	250.54	70.0	H-1	43.0	70.0	1,868
J-5	88.70	0	0	250.54	70.0	H-1	42.9	70.0	1,864
J-2	91.00	0	0	250.54	69.0	H-1	40.9	69.0	1,808
J-1	91.00	0	0	250.54	69.0	H-1	40.8	69.0	1,819
J-53	90.00	0	0	250.54	69.5	H-13	41.5	69.5	1,836
J-52	89.00	0	0	250.54	69.9	H-13	42.1	69.9	1,830
J-51	89.50	21	0	250.54	69.7	H-13	42.9	69.7	1,874
J-50	90.50	0	0	250.54	69.2	H-13	42.2	69.2	1,872
J-47	90.50	0	0	250.54	69.2	H-1	42.5	69.2	1,882
J-44	90.60	0	0	250.55	69.2	H-11	42.8	69.2	1,904
J-38	91.00	0	0	250.59	69.0	H-1	43.4	69.0	1,945
J-41	89.50	0	0	250.67	69.7	H-10	44.3	69.7	1,964
J-43	88.00	32	0	250.75	70.4	H-1	46.7	70.4	2,043
J-37	90.50	0	0	250.59	69.3	H-9	43.4	69.3	1,926
J-36	89.67	9	0	250.59	69.6	H-9	43.9	69.6	1,937
J-35	90.00	0	0	250.59	69.5	H-8	43.3	69.5	1,928
J-3	92.00	20	0	250.54	68.6	H-1	41.2	68.6	1,842
J-49	87.00	28	0	250.54	70.8	H-1	44.3	70.8	1,905

Active Scenario: Peak Hour Demand

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-48	89.00	2	0	250.54	69.9	H-1	42.8	69.9	1,880
J-46	90.60	2	0	250.55	69.2	H-1	42.7	69.2	1,896
J-45	90.60	28	0	250.55	69.2	H-1	43.5	69.2	1,930
J-39	91.00	32	0	250.60	69.1	H-1	44.2	69.1	1,986
J-33	88.90	56	0	250.59	70.0	H-8	45.1	70.0	1,986
J-31	86.00	42	0	250.68	71.2	H-7	46.8	71.2	2,021
J-26	86.00	7	0	250.78	71.3	H-5	47.0	71.3	1,990
J-25	88.00	7	0	250.75	70.4	H-5	45.6	70.4	1,959
J-20	89.70	7	0	250.68	69.6	H-5	43.7	69.6	1,933
J-18	89.50	7	0	250.65	69.7	H-4	43.4	69.7	1,917
J-14	90.67	7	0	250.62	69.2	H-3	42.5	69.2	1,893
J-12	90.80	7	0	250.57	69.1	H-3	42.2	69.1	1,890
J-9	91.00	7	0	250.56	69.0	H-1	42.0	69.0	1,899
J-23	88.00	0	0	250.72	70.4	H-5	44.9	70.4	1,925
J-4	91.51	0	0	250.54	68.8	H-1	40.9	68.8	1,828
J-8	89.33	0	0	250.55	69.8	H-1	42.6	69.8	1,879
J-10	90.90	0	0	250.57	69.1	H-3	41.9	69.1	1,890
J-16	90.00	0	0	250.64	69.5	H-4	41.9	69.5	1,849
J-19	89.63	0	0	250.67	69.7	H-3	43.4	69.7	1,927
J-21	89.37	0	0	250.70	69.8	H-5	43.9	69.8	1,920
J-24	88.00	0	0	250.73	70.4	H-5	45.1	70.4	1,935
J-40	90.31	0	0	250.63	69.4	H-1	43.8	69.4	1,965
J-42	88.77	0	0	250.71	70.1	H-10	45.0	70.1	1,992

Active Scenario: Peak Hour Demand

FlexTable: Hydrant Table

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-8	94.00	0	1,875	250.59	67.7
H-7	93.00	0	1,895	250.63	68.2
H-6	90.00	0	1,983	250.73	69.5
H-5	98.00	0	1,876	250.71	66.1
H-3	95.75	0	1,827	250.60	67.0
H-4	93.50	0	1,777	250.64	68.0
H-2	93.00	0	1,858	250.54	68.2
H-10	93.30	0	1,919	250.67	68.1
H-9	95.30	0	1,885	250.59	67.2
H-11	95.00	0	1,886	250.55	67.3
H-12	94.40	0	1,781	250.54	67.6
H-1	96.80	0	1,735	250.54	66.5
H-13	95.90	0	1,613	250.54	66.9

Active Scenario: Max Day Plus Fire

FlexTable: Pump Table

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	253.72	202	160.52

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Active Scenario: Max Day Plus Fire

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	202	93.20

Active Scenario: Max Day Plus Fire

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-67	0.42
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-67	0.42
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-67	0.42
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	15	0.09
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	9	0.05
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-3	0.02
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-3	0.02
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-3	0.02
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-3	0.02
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-15	0.10
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-15	0.10
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-43	0.28
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-75	0.48
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-5	0.03
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-5	0.03
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-11	0.07
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-11	0.07
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-3	0.02
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-6	0.04

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Active Scenario: Max Day Plus Fire

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	11	0.07
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	10	0.06
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-26	0.17
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-27	0.18
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-43	0.28
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-39	0.25
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-11	0.07
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-43	0.27
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-67	0.42
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	61	0.39
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	57	0.36
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	45	0.28
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	45	0.28
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	41	0.26
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	41	0.26
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	53	0.34
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	202	0.01
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-43	0.27
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	9	0.05
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	9	0.05
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	33	0.21
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	33	0.21
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	37	0.23
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	37	0.23
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	49	0.31
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	49	0.31
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	53	0.34
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	53	0.34
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	53	0.34
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	53	0.34

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Active Scenario: Max Day Plus Fire

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-57	0.36
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-57	0.36
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-57	0.36
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-57	0.36
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	202	0.01

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Active Scenario: Max Day Plus Fire

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	0	253.64	70.8	H-8	30.2	70.8	1,680
J-32	85.33	0	0	253.66	72.8	H-7	32.5	72.8	1,693
J-30	83.33	0	0	253.70	73.7	H-1	35.4	73.7	1,763
J-29	83.33	0	0	253.70	73.7	H-1	35.8	73.7	1,766
J-28	87.00	0	0	253.71	72.1	H-5	35.2	72.1	1,769
J-27	82.67	0	0	253.72	74.0	H-5	38.1	74.0	1,771
J-22	89.00	0	0	253.69	71.3	H-5	31.7	71.3	1,669
J-15	90.00	0	0	253.66	70.8	H-3	29.4	70.8	1,663
J-17	90.00	0	0	253.66	70.8	H-4	26.0	70.8	1,587
J-13	91.00	0	0	253.65	70.4	H-3	28.4	70.4	1,630
J-7	88.70	18	0	253.63	71.4	H-1	29.4	71.4	1,658
J-6	88.70	0	0	253.63	71.4	H-1	29.5	71.4	1,634
J-5	88.70	0	0	253.63	71.4	H-1	29.3	71.4	1,630
J-2	91.00	0	0	253.63	70.4	H-1	26.5	70.4	1,579
J-1	91.00	0	0	253.63	70.4	H-1	26.3	70.4	1,589
J-53	90.00	0	0	253.63	70.8	H-13	27.2	70.8	1,607
J-52	89.00	0	0	253.63	71.2	H-13	28.0	71.2	1,601
J-51	89.50	12	0	253.63	71.0	H-13	28.6	71.0	1,634
J-50	90.50	0	0	253.63	70.6	H-13	28.9	70.6	1,639
J-47	90.50	0	0	253.63	70.6	H-1	29.3	70.6	1,647
J-44	90.60	0	0	253.63	70.5	H-1	29.9	70.5	1,667
J-38	91.00	0	0	253.64	70.4	H-1	31.1	70.4	1,703
J-41	89.50	0	0	253.67	71.0	H-10	32.0	71.0	1,725
J-43	88.00	18	0	253.70	71.7	H-1	34.3	71.7	1,779
J-37	90.50	0	0	253.64	70.6	H-9	30.8	70.6	1,687
J-36	89.67	6	0	253.64	70.9	H-9	31.0	70.9	1,696
J-35	90.00	0	0	253.64	70.8	H-8	30.4	70.8	1,692
J-3	92.00	12	0	253.63	69.9	H-1	26.3	69.9	1,604
J-49	87.00	16	0	253.63	72.1	H-1	30.0	72.1	1,658

Active Scenario: Max Day Plus Fire

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-48	89.00	1	0	253.63	71.2	H-1	29.2	71.2	1,644
J-46	90.60	1	0	253.63	70.5	H-1	29.6	70.5	1,659
J-45	90.60	16	0	253.63	70.5	H-1	29.8	70.5	1,680
J-39	91.00	18	0	253.65	70.4	H-1	31.0	70.4	1,730
J-33	88.90	32	1,688	253.64	71.3	H-8	21.7	71.3	1,725
J-31	86.00	24	1,688	253.68	72.5	H-7	24.7	72.5	1,763
J-26	86.00	4	0	253.71	72.6	H-5	35.2	72.6	1,735
J-25	88.00	4	0	253.70	71.7	H-5	33.3	71.7	1,707
J-20	89.70	4	0	253.68	70.9	H-5	30.5	70.9	1,683
J-18	89.50	4	0	253.67	71.0	H-3	29.9	71.0	1,678
J-14	90.67	4	0	253.66	70.5	H-3	28.8	70.5	1,655
J-12	90.80	4	0	253.64	70.5	H-3	28.3	70.5	1,652
J-9	91.00	4	0	253.63	70.4	H-1	28.2	70.4	1,660
J-23	88.00	0	0	253.69	71.7	H-5	32.4	71.7	1,679
J-4	91.51	0	0	253.63	70.1	H-1	26.7	70.1	1,597
J-8	89.33	0	0	253.63	71.1	H-1	29.1	71.1	1,644
J-10	90.90	0	0	253.64	70.4	H-3	28.3	70.4	1,654
J-16	90.00	0	0	253.66	70.8	H-4	27.5	70.8	1,620
J-19	89.63	0	0	253.67	71.0	H-5	30.3	71.0	1,683
J-21	89.37	0	0	253.68	71.1	H-5	31.0	71.1	1,675
J-24	88.00	0	0	253.70	71.7	H-5	32.7	71.7	1,688
J-40	90.31	0	0	253.66	70.7	H-1	31.4	70.7	1,721
J-42	88.77	0	0	253.69	71.4	H-1	32.9	71.4	1,746

15-DR-2022
9/12/2022

Active Scenario: Max Day Plus Fire

FlexTable: Hydrant Table

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-8	94.00	0	1,643	253.64	69.1
H-7	93.00	0	1,662	253.66	69.5
H-6	90.00	0	1,746	253.70	70.8
H-5	98.00	0	1,634	253.69	67.4
H-3	95.75	0	1,597	253.65	68.3
H-4	93.50	0	1,554	253.66	69.3
H-2	93.00	0	1,630	253.63	69.5
H-10	93.30	0	1,683	253.67	69.4
H-9	95.30	0	1,650	253.64	68.5
H-11	95.00	0	1,653	253.63	68.6
H-12	94.40	0	1,559	253.63	68.9
H-1	96.80	0	1,513	253.63	67.9
H-13	95.90	0	1,404	253.63	68.2

Appendix E: Sewer Demand and Flow Calculations

2006-DEVELOPMENT WASTEWATER GENERATION RATES

10-Aug-06

KHA No. 091505005

Area	Contributing Area (SF)	Dwelling Units	Residential Density (persons per dwelling unit)	Daily Flow by Use (GPCD or GPSFD)	Total Average Daily Demand (GPD)	Total Average Daily Demand (MGD)	Peak Hour Demand (MGD)
Commercial	20,800	-		0.5	10,400	0.0104	0.0416
Dwelling Units	-	480	2.5	100.0	120,000	0.1200	0.4800
Total	**20,800**	**0**			**130,400**	**0.1304**	**0.5216**

Residential and Commercial flows are based on City of Scottsdale Design Standards & Policies Manual

POST-DEVELOPMENT WASTEWATER GENERATION RATES

18-Aug-17

KHA No. 191166007

Pipe	Contributing Area (SF)	Total Dwelling Units/EDU	Residential Density (persons per dwelling unit)	Daily Flow by Use (GPCD or GPSFD)	Total Average Daily Demand (GPD)	Total Average Daily Demand (MGD)	Peak Hour Demand (MGD)
SS#1	-	0	1.70	100	0	0.0000	0.0000
SS#1A		0	1.70	100	0		
SS#1B		0	1.70	100	0		
SS#2	-	0	1.70	100	0	0.0000	0.0000
SS#3	-	12	1.70	100	2,040	0.0020	0.0082
SS#4	-	0	1.70	100	0	0.0000	0.0000
SS#6	-	0	1.70	100	0	0.0000	0.0000
SS#7	-	0	1.70	100	0	0.0000	0.0000
SS#8	5,200	2	1.70	100	2,940	0.0029	0.0118
SS#9	0	25	1.70	100	4,250	0.0043	0.0128
SS#10	-	12	1.70	100	2,040	0.0020	0.0082
SS#11	-	0	1.70	100	0	0.0000	0.0000
SS#12	5,200	0	-	0.5	2,600	0.0026	0.0104
SS#13	0	0	1.70	100	0	0.0000	0.0000
SS#14	10,400	25	1.70	100	9,450	0.0095	0.0378
SS#15	-	0	1.70	100	0	0.0000	0.0000
SS#16	-	0	1.70	100	0	0.0000	0.0000
SS#17	-	0	1.70	100	0	0.0000	0.0000
SS#18	-	0	1.70	100	0	0.0000	0.0000
SS#19	-	45	1.70	100	7,650	0.0077	0.0306
SS#20	-	0	1.70	100	0	0.0000	0.0000
SS#21	-	0	1.70	100	0	0.0000	0.0000
SS#22	-	41	1.70	100	6,970	0.0070	0.0279
SS#23	-	0	1.70	100	0	0.0000	0.0000
SS#24	-	15	1.70	100	2,550	0.0026	0.0102
SS#25	-	0	1.70	100	0	0.0000	0.0000
SS#26	-	71	1.70	100	12,070	0.0121	0.0483
SS#30	-	0	1.70	100	0	0.0000	0.0000
SS#31	-	0	1.70	100	0	0.0000	0.0000
SS#32	-	34	1.70	100	5,780	0.0058	0.0231
SS#33	-	0	1.70	100	0	0.0000	0.0000
SS#34	-	0	1.70	100	0	0.0000	0.0000
SS#38	-	0	1.70	100	0	0.0000	0.0000
SS#41	-	0	1.70	100	0	0.0000	0.0000
SS#42	-	0	1.70	100	0	0.0000	0.0000
SS#43	-	30	1.70	100	5,100	0.0051	0.0204
SS#44	-	50	1.70	100	8,500	0.0085	0.0340
SS#45	-	20	1.70	100	3,400	0.0034	0.0136
SS#46	-	0	1.70	100	0	0.0000	0.0000
SS#47	-	81	1.70	100	13,770	0.0138	0.0551
SS#50	-	30	1.70	100	5,100	0.0051	0.0204
SS#51	-	15	1.70	100	2,550	0.0026	0.0102
SS#52	-	0	1.70	100	0	0.0000	0.0000
SS#53	-	0	1.70	100	0	0.0000	0.0000
SS#54	-	33	1.70	100	5,610	0.0056	0.0224
SS#55	-	0	1.70	100	0	0.0000	0.0000
SS#56	-	50	1.70	100	8,500	0.0085	0.0340
SS#57	-	0	1.70	100	0	0.0000	0.0000
SS#58	-	0	1.70	100	0	0.0000	0.0000
SS#59	-	0	1.70	100	0	0.0000	0.0000
SS#60	-	6	1.70	100	1,020	0.0010	0.0041
SS#61	-	9	1.70	100	1,530	0.0015	0.0061
SS#62	-	12	1.70	100	2,040	0.0020	0.0082
SS#63	-	0	1.70	100	0	0.0000	0.0000
SS#64	-	18	1.70	100	3,060	0.0031	0.0122
Total	**20,800**	**636**			**118,520**	**0.1185**	**0.4698**

Residential density of 1.70 persons per dwelling unit has been approved by City of Scottsdale
Residential and Commercial flows are based on City of Scottsdale Design Standards & Policies Manual

POST-DEVELOPMENT WASTEWATER FLOW CALCULATIONS

18-Aug-17

KH No. 191166007

Pipe	Upstream MH	Upstream Rim	Upstream Inv	Upstream Cover	Downstream MH	Downstream Rim	Downstream Inv	Downstream Cover (ft)	Length (ft)	Diameter (in)	Slope	Flow (mgd)	Cumulative Flow (mgd)	Peaking Factor	Peak Flow (mgd)	Cumulative Peak Flow (mgd)	d (ft)	d/D	q/Q	Full Flow (mgd)	Area (sf)	Flowing Full Velocity (ft/s)	Peak Flow Velocity (ft/s)
SS#1	SSMH #1C	1296.92	1278.26	17.7	SSMH #1A	1297.57	1277.80	18.8	155	12	0.0030	0.0000	0.1185	4	0.0000	**0.4741**	0.42	0.42	0.38	1.2544	0.79	2.5	0.9
SS#1A	SSMH #1B	1296.48	1278.44	17.0	SSMH #1C	1296.92	1278.36	17.6	25	12	0.0032	0.0000	0.1185	4	0.0000	**0.4741**	0.42	0.42	0.36	1.3025	0.79	2.6	0.9
SS#1B	SSMH #1	1295.12	1278.90	15.2	SSMH #1B	1296.48	1278.54	16.9	129	12	0.0028	0.0000	0.1185	4	0.0000	**0.4741**	0.43	0.43	0.39	1.2164	0.79	2.4	0.9
SS#2	SSMH #2A	1293.00	1279.67	12.3	SSMH #1	1295.12	1279.00	15.1	222	12	0.0030	0.0000	0.1185	4	0.0000	**0.4741**	0.42	0.42	0.37	1.2649	0.79	2.5	0.9
SS#3	SSMH #2	1292.81	1280.02	11.8	SSMH #2A	1293.00	1279.77	12.2	115	12	0.0022	0.0020	0.1155	4	0.0082	**0.4618**	0.47	0.47	0.43	1.0736	0.79	2.1	0.9
SS#4	SSMH #3	1292.40	1280.18	11.2	SSMH #2	1292.81	1280.12	11.7	19	12	0.0032	0.0000	0.1134	4	0.0000	**0.4537**	0.41	0.41	0.35	1.2939	0.79	2.5	0.9
SS#6	SSMH #4	1292.98	1280.76	11.6	SSMH #3	1292.40	1280.28	11.5	147	8	0.0033	0.0000	0.0505	4	0.0000	**0.2021**	0.31	0.47	0.45	0.4463	0.35	2.0	0.9
SS#7	SSMH #47	1292.79	1284.42	7.7	SSMH #4	1292.98	1280.86	11.5	48	8	0.0742	0.0000	0.0029	4	0.0000	**0.0118**	0.04	0.06	0.01	2.1268	0.35	9.4	0.1
SS#8	SSMH #60	1296.30	1289.70	5.9	SSMH #47	1292.79	1284.52	7.6	166	8	0.0312	0.0029	0.0029	4	0.0118	**0.0118**	0.04	0.06	0.01	1.3796	0.35	6.1	0.1
SS#9	SSMH #5	1293.30	1281.11	11.5	SSMH #4	1292.98	1280.86	11.5	77	8	0.0032	0.0043	0.0476	4	0.0170	**0.1903**	0.30	0.45	0.43	0.4450	0.35	2.0	0.8
SS#10	SSMH #6	1293.86	1281.66	11.5	SSMH #5	1293.30	1281.21	11.4	135	8	0.0033	0.0020	0.0433	4	0.0082	**0.1733**	0.29	0.44	0.38	0.4509	0.35	2.0	0.8
SS#11	SSMH #7	1294.22	1282.11	11.4	SSMH #6	1293.86	1281.76	11.4	105	8	0.0033	0.0000	0.0413	4	0.0000	**0.1652**	0.28	0.42	0.37	0.4509	0.35	2.0	0.7
SS#12	SSMH #52	1295.64	1288.55	6.8	SSMH #7	1294.22	1282.21	11.7	177	4	0.0358	0.0026	0.0026	3	0.0078	**0.0078**	0.04	0.12	0.03	0.2328	0.09	4.1	0.1
SS#13	SSMH #8	1294.41	1282.73	11.0	SSMH #7	1294.22	1282.21	11.3	157	8	0.0033	0.0000	0.0387	4	0.0000	**0.1548**	0.27	0.41	0.34	0.4495	0.35	2.0	0.7
SS#14	SSMH #46	1294.49	1285.44	8.4	SSMH #8	1294.41	1282.83	10.9	78	8	0.0335	0.0095	0.0095	4	0.0378	**0.0378**	0.07	0.11	0.03	1.4286	0.35	6.3	0.2
SS#15	SSMH #9	1294.56	1283.09	10.8	SSMH #8	1294.41	1282.83	10.9	79	8	0.0033	0.0000	0.0292	4	0.0000	**0.1170**	0.23	0.35	0.26	0.4480	0.35	2.0	0.5
SS#16	SSMH #10	1294.08	1283.38	10.0	SSMH #9	1294.56	1283.19	10.7	58	8	0.0033	0.0000	0.0292	4	0.0000	**0.1170**	0.23	0.35	0.26	0.4470	0.35	2.0	0.5
SS#17	SSMH #11	1295.05	1283.75	10.6	SSMH #10	1294.08	1283.48	9.9	82	8	0.0033	0.0000	0.0292	4	0.0000	**0.1170**	0.23	0.35	0.26	0.4481	0.35	2.0	0.5
SS#18	SSMH #31	1294.50	1284.81	9.0	SSMH #11	1295.05	1283.85	10.5	38	8	0.0253	0.0000	0.0077	4	0.0000	**0.0306**	0.07	0.11	0.02	1.2413	0.35	5.5	0.1
SS#19	SSMH #51	1294.10	1287.82	5.6	SSMH #31	1294.50	1284.91	8.9	198	8	0.0147	0.0077	0.0077	4	0.0306	**0.0306**	0.08	0.12	0.03	0.9468	0.35	4.2	0.1
SS#20	SSMH #12	1295.02	1284.14	10.2	SSMH #11	1295.05	1283.85	10.5	119	8	0.0024	0.0000	0.0216	4	0.0000	**0.0864**	0.20	0.30	0.22	0.3855	0.35	1.7	0.4
SS#21	SSMH #48	1295.06	1286.04	8.4	SSMH #12	1295.02	1284.24	10.1	68	8	0.0265	0.0000	0.0070	4	0.0000	**0.0279**	0.07	0.11	0.02	1.2706	0.35	5.6	0.1
SS#22	SSMH #49	1295.48	1288.23	6.6	SSMH #48	1295.06	1286.14	8.3	79	8	0.0265	0.0070	0.0070	4	0.0279	**0.0279**	0.07	0.11	0.02	1.2703	0.35	5.6	0.1
SS#23	SSMH #13	1295.10	1284.39	10.0	SSMH #12	1295.02	1284.24	10.1	45	8	0.0033	0.0000	0.0146	4	0.0000	**0.0585**	0.16	0.24	0.13	0.4509	0.35	2.0	0.3
SS#24	SSMH #32	1294.57	1289.31	4.6	SSMH #13	1295.10	1284.49	9.9	203	8	0.0237	0.0026	0.0026	4	0.0102	**0.0102**	0.04	0.06	0.01	1.2034	0.35	5.3	0.0
SS#25	SSMH #33	1294.93	1284.85	9.4	SSMH #13	1295.10	1284.49	9.9	39	8	0.0092	0.0000	0.0121	4	0.0000	**0.0483**	0.11	0.17	0.06	0.7503	0.35	3.3	0.2
SS#26	SSMH #34	1294.35	1285.67	8.0	SSMH #33	1294.93	1284.95	9.3	114	8	0.0063	0.0121	0.0121	4	0.0483	**0.0483**	0.13	0.20	0.08	0.6206	0.35	2.8	0.2
SS#30	SSMH #14	1292.89	1280.41	11.8	SSMH #3	1292.40	1280.28	11.5	41	8	0.0033	0.0000	0.0629	4	0.0000	**0.2516**	0.36	0.54	0.56	0.4486	0.35	2.0	1.1
SS#31	SSMH #15	1294.26	1280.71	12.9	SSMH #14	1292.89	1280.51	11.7	60	8	0.0033	0.0000	0.0629	4	0.0000	**0.2516**	0.36	0.54	0.56	0.4509	0.35	2.0	1.1
SS#32	SSMH #16	1294.40	1281.25	12.5	SSMH #15	1294.26	1280.81	12.8	133	8	0.0033	0.0058	0.0629	4	0.0231	**0.2516**	0.36	0.54	0.56	0.4492	0.35	2.0	1.1
SS#33	SSMH #17	1294.14	1281.45	12.0	SSMH #16	1294.40	1281.35	12.4	87	8	0.0011	0.0000	0.0571	4	0.0000	**0.2285**	0.31	0.47	0.86	0.2648	0.35	1.2	1.0
SS#34	SSMH #18	1293.45	1283.51	9.3	SSMH #17	1294.14	1281.55	11.9	184	8	0.0107	0.0000	0.0218	4	0.0000	**0.0870**	0.16	0.24	0.11	0.8060	0.35	3.6	0.4
SS#38	SSMH #79	1295.49	1281.60	13.2	SSMH #17	1294.14	1281.55	11.9	32	8	0.0016	0.0000	0.0354	4	0.0000	**0.1414**	0.31	0.47	0.46	0.3087	0.35	1.4	0.6
SS#41	SSMH #24	1292.52	1284.73	7.1	SSMH #23	1293.00	1284.08	8.3	188	8	0.0035	0.0000	0.0308	4	0.0000	**0.1231**	0.24	0.36	0.27	0.4592	0.35	2.0	0.5
SS#42	SSMH #25	1291.25	1285.24	5.3	SSMH #24	1292.52	1284.83	7.0	125	8	0.0033	0.0000	0.0308	4	0.0000	**0.1231**	0.25	0.38	0.28	0.4473	0.35	2.0	0.5
SS#43	SSMH #26	1290.46	1285.78	4.0	SSMH #25	1291.25	1285.34	5.2	133	8	0.0033	0.0051	0.0136	4	0.0204	**0.0544**	0.16	0.24	0.12	0.4492	0.35	2.0	0.2
SS#44	SSMH #27	1290.08	1286.08	3.3	SSMH #26	1290.46	1285.88	3.9	61	8	0.0033	0.0085	0.0085	4	0.0340	**0.0340**	0.12	0.18	0.08	0.4472	0.35	2.0	0.2
SS#45	SSMH #37	1292.11	1285.83	5.6	SSMH #25	1291.25	1285.34	5.2	106	8	0.0046	0.0034	0.0172	4	0.0136	**0.0687**	0.15	0.23	0.13	0.5310	0.35	2.4	0.3
SS#46	SSMH #38	1292.61	1286.31	5.6	SSMH #37	1292.11	1285.93	5.5	83	8	0.0046	0.0000	0.0138	4	0.0000	**0.0551**	0.14	0.21	0.10	0.5284	0.35	2.3	0.2
SS#47	SSMH #39	*1292.91*	*1286.90*	*5.3*	SSMH #38	1292.61	1286.41	5.5	106	8	0.0046	0.0138	0.0138	4	0.0551	**0.0551**	0.14	0.21	0.10	0.5310	0.35	2.4	0.2
SS#50	SSMH #70	1295.37	1288.69	6.0	SSMH #72	1295.14	1288.36	6.1	58	8	0.0057	0.0051	0.0051	4	0.0204	**0.0204**	0.08	0.12	0.03	0.5891	0.35	2.6	0.1
SS#51	SSMH #71	1294.00	1288.68	4.7	SSMH #72	1295.14	1288.36	6.1	62	8	0.0052	0.0026	0.0026	4	0.0102	**0.0102**	0.06	0.09	0.02	0.5611	0.35	2.5	0.0
SS#53	SSMH #72	1295.14	1288.26	6.2	SSMH #74	1294.75	1286.52	7.6	335	8	0.0052	0.0000	0.0077	4	0.0000	**0.0306**	0.11	0.17	0.05	0.5628	0.35	2.5	0.1
SS#54	SSMH #43	1295.00	1289.51	4.8	SSMH #74	1294.75	1286.52	7.6	61	8	0.0490	0.0056	0.0056	4	0.0224	**0.0224**	0.09	0.14	0.01	1.7290	0.35	7.7	0.1
SS#55	SSMH #74	1294.75	1286.42	7.7	SSMH #75	1294.50	1286.12	7.7	57	8	0.0053	0.0000	0.0133	4	0.0000	**0.0530**	0.14	0.21	0.09	0.5666	0.35	2.5	0.2
SS#56	SSMH #75	1294.50	1286.02	7.8	SSMH #76	1294.53	1285.21	8.7	155	8	0.0052	0.0085	0.0218	4	0.0340	**0.0870**	0.18	0.27	0.15	0.5646	0.35	2.5	0.4
SS#57	SSMH #76	1294.53	1285.11	8.8	SSMH #77	1294.66	1284.72	9.3	76	8	0.0051	0.0000	0.0218	4	0.0000	**0.0870**	0.18	0.27	0.16	0.5594	0.35	2.5	0.4
SS#58	SSMH #77	1294.66	1284.62	9.4	SSMH #78	1293.06	1284.27	8.1	66	8	0.0053	0.0000	0.0218	4	0.0000	**0.0870**	0.18	0.27	0.15	0.5687	0.35	2.5	0.4
SS#59	SSMH #78	1293.06	1284.17	8.2	SSMH #18	1293.45	1283.61	9.2	107	8	0.0052	0.0000	0.0218	4	0.0000	**0.0870**	0.18	0.27	0.15	0.5650	0.35	2.5	0.4
SS#60	SSMH #80	1294.47	1282.79	11.0	SSMH #79	1295.49	1281.70	13.1	309	8	0.0035	0.0010	0.0354	4	0.0041	**0.1414**	0.25	0.38	0.30	0.4638	0.35	2.1	0.6
SS#61	SSMH #81	1293.46	1283.24	9.6	SSMH #80	1294.47	1282.89	10.9	100	8	0.0035	0.0015	0.0343	4	0.0061	**0.1374**	0.25	0.38	0.30	0.4620	0.35	2.0	0.6
SS#62	SSMH #82	1293.04	1283.77	8.6	SSMH #81	1293.46	1283.34	9.5	120	8	0.0036	0.0020	0.0328	4	0.0082	**0.1312**	0.24	0.36	0.28	0.4675	0.35	2.1	0.6
SS#63	SSMH #23	1293.00	1283.98	8.4	SSMH #82	1293.04	1283.87	8.5	31	8	0.0037	0.0000	0.0308	4	0.0000	**0.1231**	0.23	0.35	0.26	0.4750	0.35	2.1	0.5
SS#64	SSMH #83	1295.62	1290.19	4.8	SSMH #2A	1293.00	1279.77	12.6	223	8	0.0467	0.0031	0.0031	4	0.0122	**0.0122**	0.07	0.11	0.01	1.6882	0.35	7.5	0.1
													0.1155	1.8079	211.0000	0.4592							

All lines have a peaking factor of 4
Pipes are sized to ensure a full flow velocity of at least 2.0 fps

Pipe Size (in)	8	10	12
Min. Slope	0.0033	0.0025	0.002

Max d/D = 0.65

Appendix F: Sewer Layout


LEGEND
PROPOSED SANITARY SEWER
EXISTING SANITARY SEWER TO REMAIN
EXISTING SANITARY SEWER TO BE ABANDONED/DEMOLISHED
PROPOSED SANITARY SEWER MANHOLE
EXISTING SANITARY SEWER MANHOLE TO REMAIN
EXISTING SANITARY SEWER MANHOLE TO BE ABANDONED/DEMOLISHED
BLDG 22-27
23 DU
BLDG 21
61 DU
BLDG 18
10,400 SF
BLDG 20
5 DU
BLDG 19
4 DU
BLDG 17
10,400 SF
BLDG 5
10 DU
BLDG 1
55 DU
BLDG 2
60 DU
BLDG 16
126 DU
BLDG 15
92 DU
BLDG 3
67 DU
BLDG 4
67 DU
BLDG 6
6 DU
BLDG 7
6 DU
BLDG 8
9 DU
BLDG 9
9 DU
BLDG 10
6 DU
BLDG 11
9 DU
BLDG 12
6 DU
BLDG 13
6 DU
BLDG 14
9 DU
CONNECT TO EXISTING LINE
NORTH
GRAPHIC SCALE IN FEET
0 40 80 160

Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

APPENDIX F: SEWER LAYOUT

15-DR-2022
9/12/2022

Appendix G: Water & Wastewater Basis of Design Report: SFI-Artesia

SFI-ARTESIA

Preliminary

Water and Wastewater Basis of Design Report

LOCATED IN SCOTTSDALE, ARIZONA

SEPTEMBER 2014 | VERSION 2

Prepared By:

Kimley»Horn

Contents

Appendices

Figures

1. INTRODUCTION

1.1 PROJECT NAME AND LOCATION

This Water and Wastewater Basis of Design Report has been prepared to support the rezoning of the project formerly known as Starpointe-Artesia, a mixed use development consisting of single and multi-family residences, and a commercial site located in the City of Scottsdale, Arizona. The site is positioned in the southwest quarter of Section 2, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. This parcel is bordered to the north by the Mummy Mountain Wash and to the south by existing condominiums. The site is further bound on the east by McCormick Ranch Golf Club and Indian Bend Wash. The eastern portion of the site is a backwater area for the Indian Bend Wash. It is bound on the west by Scottsdale Road. See Figure 1, Vicinity Map for the location of the site.

The site was originally approved as 2-ZN-2005 for 480 residential units on 39+/- acres with an additional 5 acres of commercial property along the Scottsdale Road frontage. In 2008, the project was engineered, platted and the onsite circulation system and infrastructure was constructed in full. The commercial portion of the site was developed and is currently occupied by the Blue 32 and Roka Akor restaurants along with other retail shops. The live/work units along the Hummingbird entry road were also constructed along with 64 luxury condo units and 23 golf townhomes in the northeast corner of the site. An underground parking garage was constructed in the center of the site under the planned 4 story luxury condominium units, however, the vertical portion of the units were not constructed. The remaining brownstone and golf condominiums along the eastern and southern boundary also were not constructed before the project was put on hold.

The proposed project is a rezoning of approximately 16.7 acres of the 44.27 acre property. The eastern and southern portions of the project are proposed to be redesigned to add additional density/units while at the same time providing more open space (84,000 sf +/-) than the original design. The additional units will be added by providing additional floors/building height along with smaller units within the redeveloped portions of the site. An underground parking structure will be constructed under the proposed units along the eastern boundary of the site. The portion of the site to be rezoned is currently unoccupied.

1.2 PROJECT SIZE AND TYPE OF REPORT

The proposed project is a redevelopment of approximately 19.26 acres of the 44.27 acre property. The original development proposed 480 new residential dwelling units and 20,800 square feet of retail area. The retail area and 93 of the 480 dwelling units (brownstone units and live/work units) were completed. The proposed development will construct an additional 591 dwelling units (condos and brownstone units) for a total of 684 dwelling units and 20,800 square feet of retail. Existing infrastructure will be improved as needed to meet current standards and proposed demands. Parking for the project will be provided utilizing existing underground parking garages, surface parking for guests, brownstone garages, and surface parking for the retail areas.

In 2006, both the water and sewer Basis of Design Reports were prepared and approved by the city with stipulations. See Appendix G, “Water & Wastewater Basis of Design Report: Starpoint-Artesia”.

This water basis of design report has been prepared as directed by stipulations from the City of Scottsdale in Case No. 2-ZN-2005.

Figure 1: Vicinity Map

VICINITY MAP FOR SFI–ARTESIA SCOTTSDALE, ARIZONA

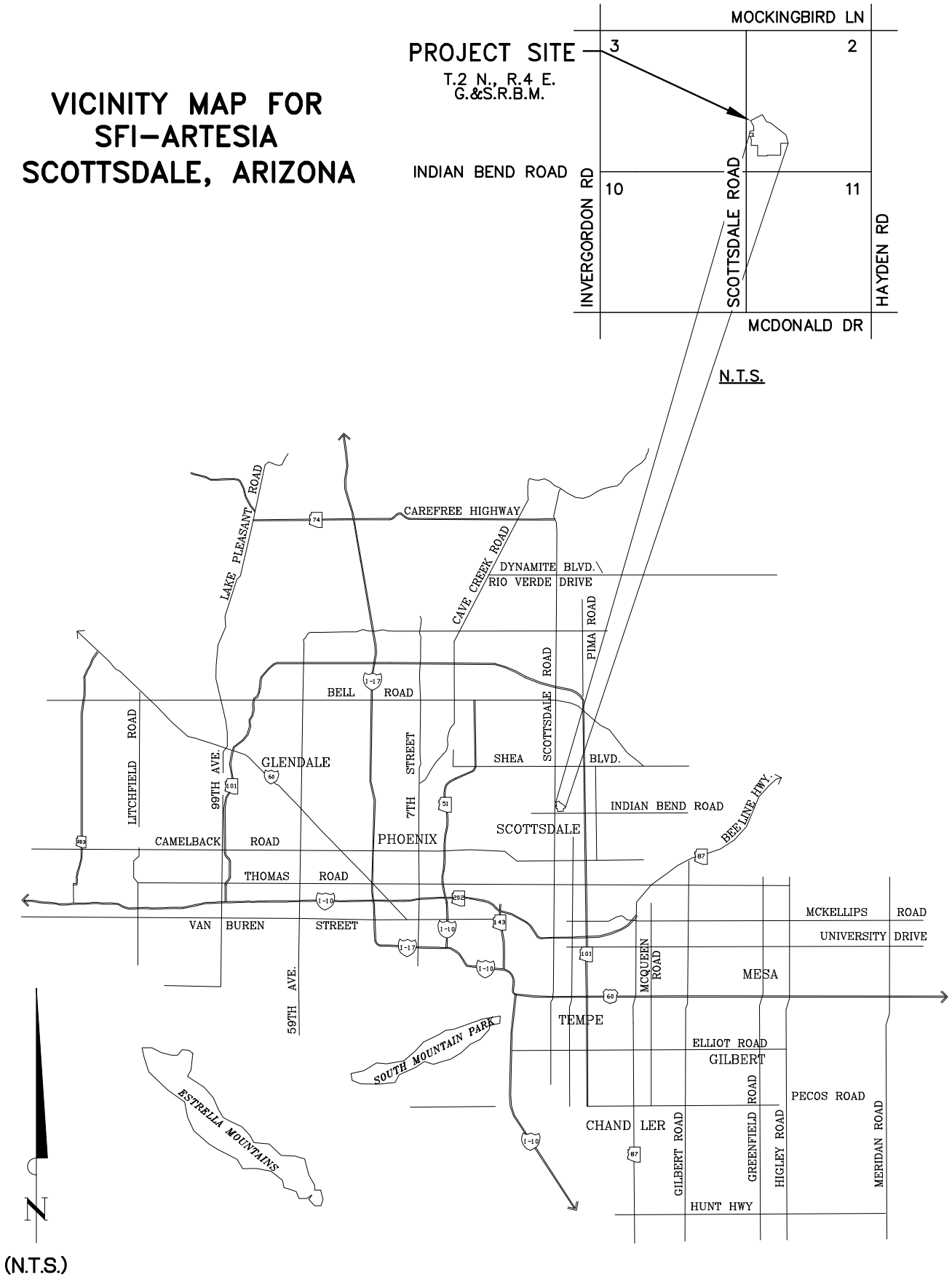


FIGURE 1

Kimley»Horn

15-DR-2022
9/12/2022

2. EXISTING CONDITIONS

2.1 ZONING AND LAND USE

The project site currently contains two zoning districts. The majority of the site is zoned R-5 (PCD) – Multiple-Family Residential, Planned Community Development District. A small portion of the site, all of which fronts Scottsdale Road, is currently zoned C-1 (PCD) – Neighborhood Commercial, Planned Community Development District.

The existing (constructed) development consists of 93 dwelling units, 20,800 square feet of retail, unfinished underground parking, spine roads with surface parking, and water/sewer infrastructure. The dwelling units and retail will remain. Existing spine roads, infrastructure, and utilities will be improved, demolished, or abandoned as required to make way for the proposed development.

2.2 EXISTING TOPOGRAPHY/IMPROVEMENTS

The majority of the site slopes generally to the outfall at the east end of the site. The north end of the site slopes to the Mummy Mountain Wash. The site is not landscaped.

2.3 EXISTING WATER INFRASTRUCTURE

There is a ten (10) inch ACP water main located along Scottsdale Road adjacent to the project site. This water line is in the City's pressure zone 2A. An eight (8) inch water distribution main is currently located within the project site. This water main provides looped distribution throughout the site and connects to the ten (10) inch main in Scottsdale Road at two points as well as a third connection to the water line located at the southeast corner of the site. See Appendix G, "Water & Wastewater Basis of Design Report: Starpoint-Artesia" for more information on the existing water infrastructure.

A fire hydrant flow test was conducted by Alliance Fire Protection Co. on December 1, 2005 at the fire hydrant near the south entrance to the property with the flowing hydrant located at the north entrance to the property. The test yielded a static pressure of 84 pounds per square inch (psi) and a residual pressure of 60 psi with the hydrant flowing at 1278 gallons per minute (gpm). The estimated flow at 30 psi residual was approximately 1950 gpm. See Appendix G for the Fire Hydrant Flow Test Report from Alliance Fire Protection.

A second fire hydrant flow test was conducted by EJ Flow Tests on June 13, 2014 at the fire hydrant at the east end of the site (near proposed Phase 1) with the flowing hydrant located in the southeast of the site (proposed Phase 3). The test yielded a static pressure of 70.2 pounds per square inch (psi) and a residual pressure of 41.2 psi with the hydrant flowing at 1,501 gallons per minute (gpm). The estimated flow at 20 psi residual was approximately 2,019 gpm. The original analysis (see Appendix G) predicted a pressure of 56.01 psi with a flow of 1500 gpm. See Appendix A for the Fire Hydrant Flow Test Report from EJ Flow Tests.

2.4 EXISTING WASTEWATER INFRASTRUCTURE

There is a 36 inch sanitary sewer line located in Scottsdale Road adjacent to the project site. Currently, the site is served by multiple eight (8) inch and twelve (12) inch private sewer lines which connect to the 36 inch line at the south entrance to the property. In order to avoid improvements within Scottsdale Road, the onsite 12" main (constructed 2007) was connected to the existing 8" sewer connection located immediately south of the Blue 32 restaurant. This condition, while approved by the City of Scottsdale, yielded a d/D of 0.75. The existing sewer was designed to maintain a minimum mean full flow velocity of 2.0 fps. See Appendix G, "Water & Wastewater Basis of Design Report: Starpointe-Artesia" for more information on the existing wastewater infrastructure.

3. PROPOSED CONDITIONS

3.1 PROPOSED WATER DISTRIBUTION SYSTEM

The existing 8 inch water mains described above will have to be modified to accommodate the proposed development as they will interfere with multiple building foundations. The existing connections to the 10 inch main in Scottsdale Road as well as the connection at the southeast corner of the site will remain. Water mains throughout the property are contained in a public water easement that varies between 16 and 20 feet in width. In cases where the proposed buildings conflict with existing water lines and easement, new water mains will be installed and public water easement dedicated to ensure supply throughout the site. Approximately 2,627 feet of water line will be abandoned or demolished. The new water system will require approximately 2,208 feet of new pipe. Water lines have been laid out to avoid parking stalls structures and walls. Refer to Appendix B: Water Demand Calculations and Appendix C: Water Layout for more information on the water distribution system.

Units will not be metered separately. A single meter and associated back flow preventor will be in place on each building, i.e. each townhouse group (3-plex, 4-plex or 5-plex) and apartment building will have one meter and backflow preventor.

A separate fire loop is not required to serve the proposed development. Each building will have fire risers providing adequate sprinkler flows. Internal backflow prevention will be provided on each fire riser.

3.2 DOMESTIC WATER DEMANDS

According to the guidelines provided in the City of Scottsdale's *Design Standards and Policies, Section 6,* the SFI-Artesia project provides the following demands to the City of Scottsdale's existing system:

Average Day Demand:

Residential: 185.3 GPD/unit = 0.129 GPM/unit (High Density Condominium)

SFI-Artesia (93 units existing, 591 units proposed): (0.129 GPM/unit) x (684 units) = 88 GPM

Commercial: 0.8 GPD/sq.ft. = 0.00056 GPM/sq.ft.

SFI-Artesia (Existing): (0.00056 GPM/sq.ft.) x (20,800 sq.ft.) = 12 GPM

SFI-Artesia Demands:

Average Day Demand = 88 GPM + 12 GPM = 100 GPM

Peak Hour Demand = (3.5) x (ADF) = 350 GPM

Maximum Day Demand = (2) x (ADF) = 200 GPM

It should be noted that the average day demand for the original development was calculated to be 73 GPM. Therefore the proposed development will add 27 GPM of demand to the existing system. Irrigation meters have not been included in the above demands. They will be added in the final report.

3.3 WATER DESIGN CRITERIA

Demands were based on the City of Scottsdale Design Standards. The average daily consumptive rates were assumed as follows: for residential sites, a demand of 185.3 gallons per day per unit was used. This is the design demand for high density condominiums. The maximum day demand and peak hour demand were calculated by multiplying the average day demands by peaking factors of 2 and 3.5 respectively.

The static pressure in the distribution system should not exceed 120 pounds per square inch (psi), and the system shall be designed to maintain a minimum residual pressure of 50 psi at the highest, finish floor level to be served by system pressure under normal daily operating conditions. The system will maintain 30 psi minimum pressure under design fire flow requirements.

3.4 FIRE FLOW REQUIREMENTS

Per the City of Scottsdale Design Standards & Policies Manual water distribution facilities shall be sized to deliver a minimum fire flow of 1,500 gallons per minute (gpm) plus fire allowance for the fire sprinkler systems for commercial and multi-family residential properties. The largest proposed building is 206,400 square feet of livable area with a 78,000 square foot underground garage. The construction type for the livable area and underground garage are VA and IA, respectively. This building will be broken up into four (4) sections separated with firewalls. The largest of the four sections will be approximately 60,380 SF. According to IFC Table B105.1 the required flow is 4,500 gpm. After reducing 50% for automatic sprinkler system and 25% for Group R (Residential) the required fire flow is 1,688 gpm. The original development, with similar sized structures, was required to provide 1,500 gpm. The proposed system will also be required to provide a minimum of 1,688 gpm of fire flow. Fire hydrants are to be spaced no more than 700 feet apart and all sides of the buildings must be within 350 feet of a fire hydrant. All distances are to be measured along the street or roadway in which a fire hose would be laid.

3.5 NETWORK ANALYSIS

The network analysis for the distribution system was created using WaterCAD V8i to demonstrate that the design standards outlined in section 3.3 will be met. Appendix C illustrates the proposed distribution network for the project site. A calibration model was created to ensure accurate simulation of the existing system and the Fire Flow Test performed by EJ Flow Tests. See Appendix A for EJ Flow Test Summary. The analysis model was then created to simulate the proposed system and analyze average day, maximum day, peak hour, and maximum day plus fire flow demand conditions. Water demands were broken into contribution areas and point loaded at nodes along the distribution mains. See Appendix D for detailed water network analysis.

3.6 PROPOSED WASTEWATER COLLECTION SYSTEM

The existing public wastewater collection system will have to be modified to accommodate the new development. The proposed development includes relocating the south entrance from Scottsdale Road. This will require a new 12” sewer connection to be installed in Scottsdale Road to handle the additional demand. The invert of the new 12” connection will be installed to match the crown of the existing 36” sewer line in Scottsdale Road. The existing connection point to the 36” inch sewer line in Scottsdale Road will be abandoned upon construction of the new sewer connection.

Approximately 2,686 feet of existing sewer pipe will be abandoned or demolished to avoid conflicts with the proposed development. The proposed wastewater collection system modifications will consist of approximately 894 feet of new 8 inch and 12 inch pipes. This system will be private and will be designed with a minimum full flow velocity of 2.0 fps as per the 2012 Uniform Plumbing Code. The system will be constructed with a minimum cover of 4 feet as per the City of Scottsdale Design Standards. In most areas however the cover will be 7 feet or greater. A 9 foot minimum horizontal separation between the sewer and water lines will maintain adequate separation to prevent encroachment into the 16 foot public water easement. A 10 foot minimum horizontal separation between the sewer and water lines will maintain adequate separation to prevent encroachment into the 20 foot public water easement.

For residential construction, 8 inch and 12 inch sanitary sewer lines will be designed using 100 gallons per capita per day (gpcd) and a peaking factor of 4, as per the City of Scottsdale's Design Standards & Policies Manual. For commercial construction the manual states that a design flow of 0.5 gallons per square foot per day (gpsfd) and a peaking factor of 3 should be used. Refer to Appendix E: Sewer Demand and Flow Calculations and Appendix F: Sewer Layout for more detailed information regarding the wastewater collection system.

3.7 WASTEWATER HYDRAULIC DESIGN

The on-site sewer collection system is to be entirely private and will be designed in accordance with the Uniform Plumbing Code and Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control". All lines will be designed with a minimum mean full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013. The depth to diameter (d/D) ratio for all sanitary sewer pipes will be no greater than 0.65 in the ultimate peak flow condition. Refer to Appendix E for detailed wastewater calculations. The criteria used in design (i.e. velocity and slope) do not meet City of Scottsdale requirements. All sanitary sewer lines will be privately maintained.

A drop of 0.1 feet will be present across the trough of each manhole. Manholes are required at every intersecting angle of sewer pipes other than 180 degrees and are to be spaced no greater than 500 feet apart. All sewer lines are to be installed with no less than 4 feet of cover over the top of the pipe.

All proposed sewer lines have been designed with minimum slopes of 0.33%. This slope generates a full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013 for 8 inch pipes. See Appendix A for sewer plan and Appendix B for sewer demand and flow calculations.

4. SUMMARY

For the SFI-Artesia project, the existing water and wastewater infrastructure within the project site will modified and improved to meet current design needs and standards. All materials shall be disposed of in compliance with applicable county, state, and EPA regulations.

The water distribution system connections to the existing ten (10) inch water line located in Scottsdale Road and the existing 8 inch system at the southeast corner of the site will remain. The onsite water system will be looped and will provide sufficient pressure and fire flow to serve both the proposed and existing development and meet the City of Scottsdale requirements. The water system improvements will be done is such a way as to maintain distribution to the existing buildings as well as the condominiums south of the site.

The modified wastewater collection system will tie into the existing 36 inch sanitary sewer line located in Scottsdale Road. The existing 8 inch connection to the sewer line in Scottsdale Road will be abandoned and a new 12 inch connection will be installed to handle the additional demand. The system will remain private and will adequately serve the sewer needs of both the proposed and existing development. The wastewater collection system has been designed to meet the requirements of the 2012 Uniform Plumbing Code.

Table 1 on the following page provides a summary of the existing and proposed buildings. Refer to Appendix C: Water Layout and Appendix F: Sewer Layout for building locations.

Table 1: Building Summary

Building	Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Status
1	Residential	-	92	Proposed (2014)
2	Residential	-	126	Proposed (2014)
4	Residential	-	15	Proposed (2014)
4A	Residential	-	15	Proposed (2014)
5	Residential	-	15	Proposed (2014)
5A	Residential	-	15	Proposed (2014)
6	Residential	-	15	Proposed (2014)
6A	Residential	-	15	Proposed (2014)
7	Residential	-	15	Proposed (2014)
8	Residential	-	69	Proposed (2006)
9	Residential	-	69	Proposed (2006)
10	Residential	-	61	Proposed (2006)
11	Residential	-	69	Proposed (2006)
12	Commercial/Retail	10,400	0	Existing
13	Commercial/Retail	10,400	0	Existing
14	Residential	-	4	Existing
15	Residential	-	5	Existing
16	Residential	-	61	Existing
17-22	Residential	-	23	Existing
Total		20,800	684	

5. REFERENCES

City of Phoenix, *City of Phoenix Design Services Manual for Water and Wastewater Systems.* City of Phoenix Water Services Department, 2004.

City of Scottsdale. *Design Standards & Policies Manual.* City of Scottsdale Planning, Building & Zoning, Arizona, 2004.

Kimley-Horn and Associates, Inc. *Water & Wastewater Basis of Design Report, Starpoint-Artesia,* August 2006.

2012. WaterCAD v8.1, Bentley Systems, Inc.

Uniform Plumbing Code. 2012.

2009. FlowMaster v8.1, Bentley Systems, Inc.

APPENDIX

Appendix A: Fire Hydrant Flow Test Report

E·J Flow Tests

FLOW TESTING SERVICES

Flow Test Summary

EJ Flow Tests Project Name:	SFI Artesia
EJ Flow Tests Project No.:	14066
Project Address:	North Scottsdale Road and East Indian Bend Road, Scottsdale, Arizona 85253
Date of Flow Test:	June 13, 2014
Time of Flow Test:	8:00 AM
Data is Current and Reliable Until:	December 13, 2014

Raw Test Data:

Static Pressure: (measured in pounds per square inch)	78.0	psi
Residual Pressure: (measured in pounds per square inch)	49.0	psi
Pitot Pressure: (measured in pounds per square inch)	20.0	psi
Number of Outlets Flowed:	2	
Fire Hydrant Orifice Diameter: (measured in inches)	2.5	inches
Coefficient of Discharge: (0.9 smooth/round outlet, 0.8 square/sharp outlet, 0.7 square/raised outlet)	0.9	
Flowing GPM: (measured in gallons per minute)	1,501	
GPM at 20 PSI:	2,183	

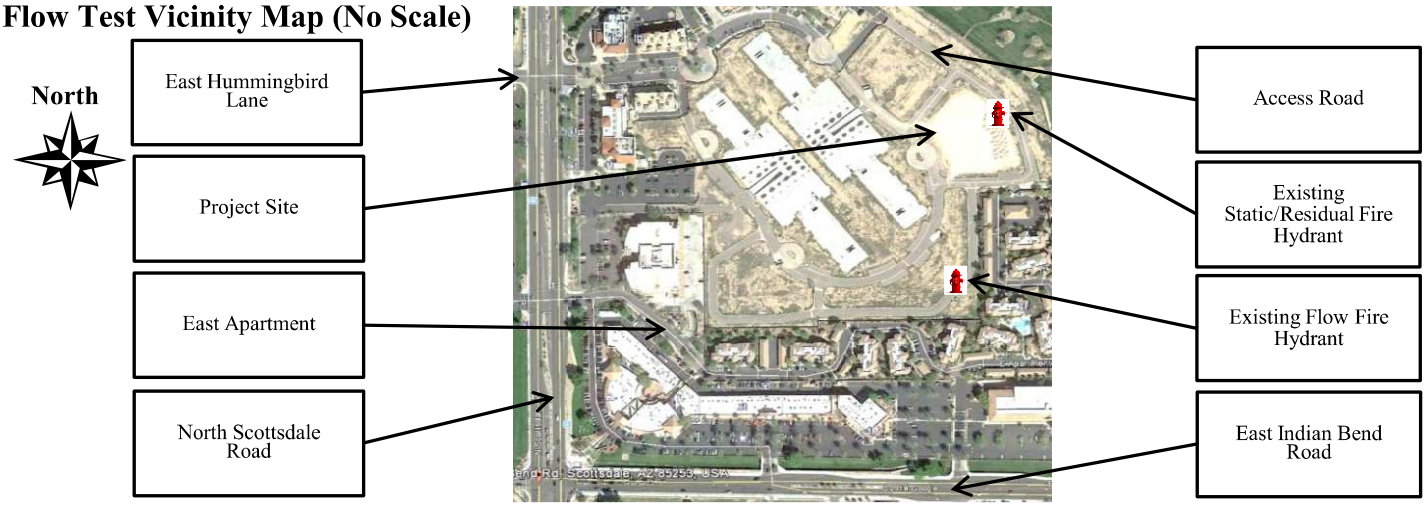
Data with minimum safety factor of: 10% :

Static Pressure: (measured in pounds per square inch)	70.2	psi
Residual Pressure: (measured in pounds per square inch)	41.2	psi
Main Size: (measured in inches)	8	
Approximate Distance Between Hydrants: (measured in feet)	535	ft
Approx. Static/Residual Hydrant Elevation: (measured above sea level)	1,293	ft
Approx. Flow Hydrant Elevation: (measured above sea level)	1,298	ft
Flowing GPM: (measured in gallons per minute)	1,501	
GPM at 20 PSI:	2,019	

Conducted by/Witnessed by/City Forces Contacted:

Conducted by:	Cesar R., Eric S., & Austin G. (EJ Flow Tests) 602.999.7637
Witnessed by:	Phil Cipolla (City of Scottsdale) 602.828.0847
City Forces Contacted:	City of Scottsdale (Permit #C45318)

Flow Test Vicinity Map (No Scale)



15-DR-2022
9/12/2022

Appendix B: Water Demand Calculations

2006-DEVELOPMENT WATER DEMAND CALCULATIONS

10-Aug-06

KHA No. 091505005

Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Average Residential Day Demand (per unit)*	Average Commercial Day Demand (per sq. ft.)*	Average Day Demand (GPM)	Max Day Demand (GPM)	Peak Hour Demand (GPM)
Residential	-	480	185.3	N/A	61.8	123.5	216.2
Commercial/Retail	20,800	0	N/A	0.8	11.6	23.1	40.4
GRAND TOTAL		**480**			**73**	**147**	**257**

* Residential and Commercial average day water demands are in gallons per day.

Average day demand values are from figure 6.1-2 in the City of Scottsdale Design Standards & Policies Manual

POST-DEVELOPMENT WATER DEMAND CALCULATIONS

22-Sep-14

KHA No. 191675002

Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Average Residential Day Demand (per unit)*	Average Commercial Day Demand (per sq. ft.)*	Average Day Demand (GPM)	Max Day Demand (GPM)	Peak Hour Demand (GPM)
Residential	-	684	185.3	N/A	88	176	308
Commercial/Retail	20,800	0	N/A	0.8	12	24	42
GRAND TOTAL		**684**			**100**	**200**	**350**

* Residential and Commercial average day water demands are in gallons per day.

Average day demand values are from figure 6.1-2 in the City of Scottsdale Design Standards & Policies Manual

Max Day Demand = 2 * Average Day Demand

Peak Hour Demand = 3.5 * Average Day Demand

POST-DEVELOPMENT WATER DEMAND CALCULATIONS

22-Sep-14

KHA No. 191675002

Building	Junction	Parcel and Projected Land Use	Area (sq. ft.)	Total Dwelling Units (DU)	Average Residential Day Demand (per unit)*	Average Commercial Day Demand (per sq. ft.)*	Average Day Demand (GPM)	Max Day Demand (GPM)	Peak Hour Demand (GPM)
1	J-31	Residential	-	92	185.3	-	12	24	41
2	J-33	Residential	-	126	185.3	-	16	32	57
4	J-26	Residential	-	15	185.3	-	2	4	7
4A	J-25	Residential	-	15	185.3	-	2	4	7
5	J-20	Residential	-	15	185.3	-	2	4	7
5A	J-18	Residential	-	15	185.3	-	2	4	7
6	J-14	Residential	-	15	185.3	-	2	4	7
6A	J-12	Residential	-	15	185.3	-	2	4	7
7	J-9	Residential	-	15	185.3	-	2	4	7
8	J-11	Residential	-	69	185.3	-	9	18	31
9	J-43	Residential	-	69	185.3	-	9	18	31
10	J-49	Residential	-	61	185.3	-	8	16	27
11	J-39	Residential	-	69	185.3	-	9	18	31
12	J-3	Commercial/Retail	10,400	0	-	0.8	6	12	20
13	J-51	Commercial/Retail	10,400	0	-	0.8	6	12	20
14	J-48	Residential	-	4	185.3	-	1	1	2
15	J-46	Residential	-	5	185.3	-	1	1	2
16	J-45	Residential	-	61	185.3	-	8	16	27
17-22	J-36	Residential	-	23	185.3	-	3	6	10
GRAND TOTAL			**20,800**	**684**			**100**	**199**	**349**

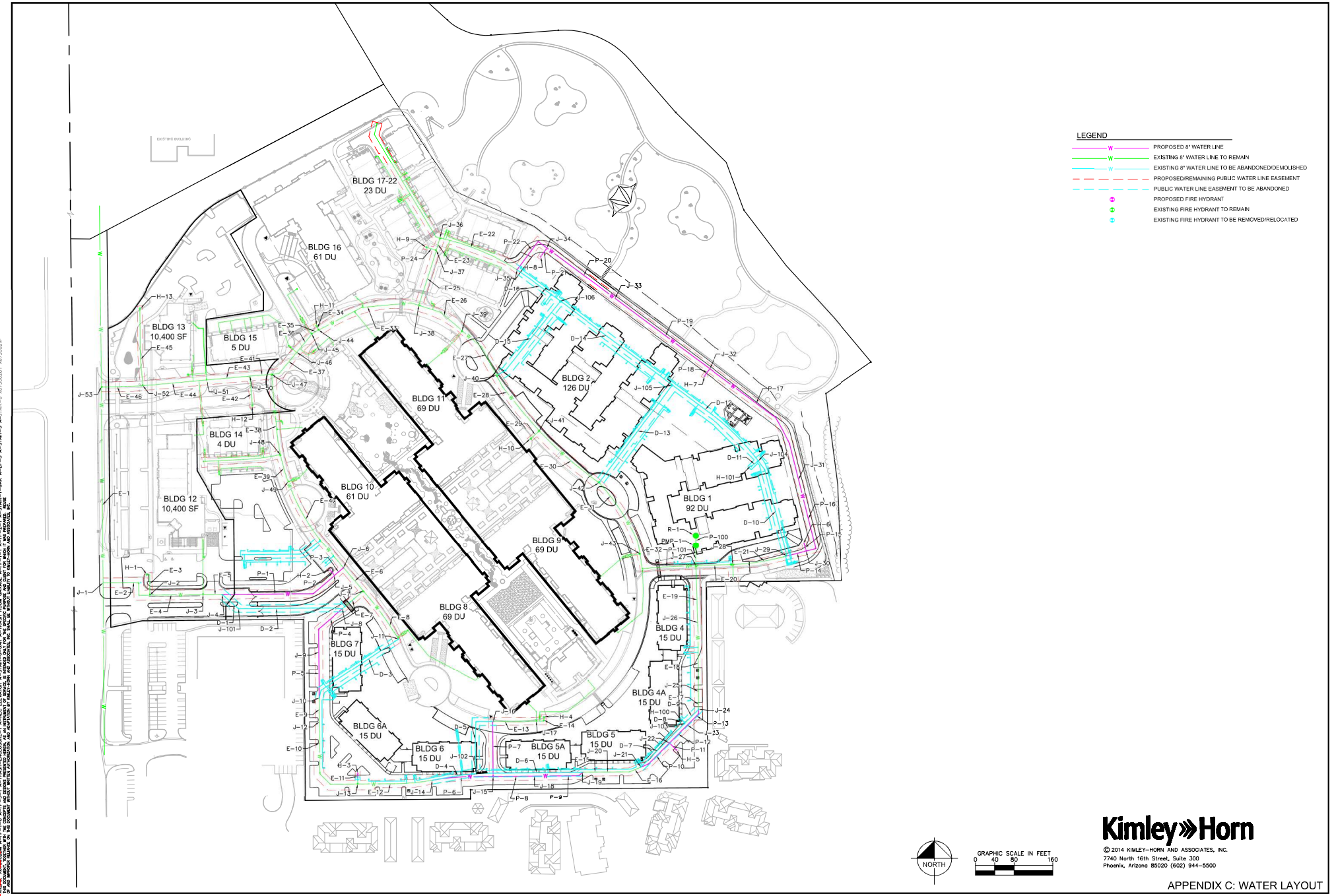
* Residential and Commercial average day water demands are in gallons per day.

Average day demand values are from figure 6.1-2 in the City of Scottsdale Design Standards & Policies Manual

Max Day Demand = 2 * Average Day Demand

Peak Hour Demand = 3.5 * Average Day Demand

Appendix C: Water Layout



Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

APPENDIX C: WATER LAYOUT

Appendix D: Water Network Analysis

Active Scenario: Calibration

Pump Definition Detailed Report: 2014-06-13 FLow Test

Element Details			
ID	175	Notes	
Label	2014-06-13 FLow Test		

Pump Definition Type			
Pump Definition Type	Standard (3 Point)	Design Head	95.17 ft
Shutoff Flow	0 gpm	Maximum Operating Flow	2,019 gpm
Shutoff Head	162.16 ft	Maximum Operating Head	46.20 ft
Design Flow	1,501 gpm		

Pump Efficiency			
Pump Efficiency	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0 gpm		

Transient (Physical)			
Inertia (Pump and Motor)	0.000 lb·ft²	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True

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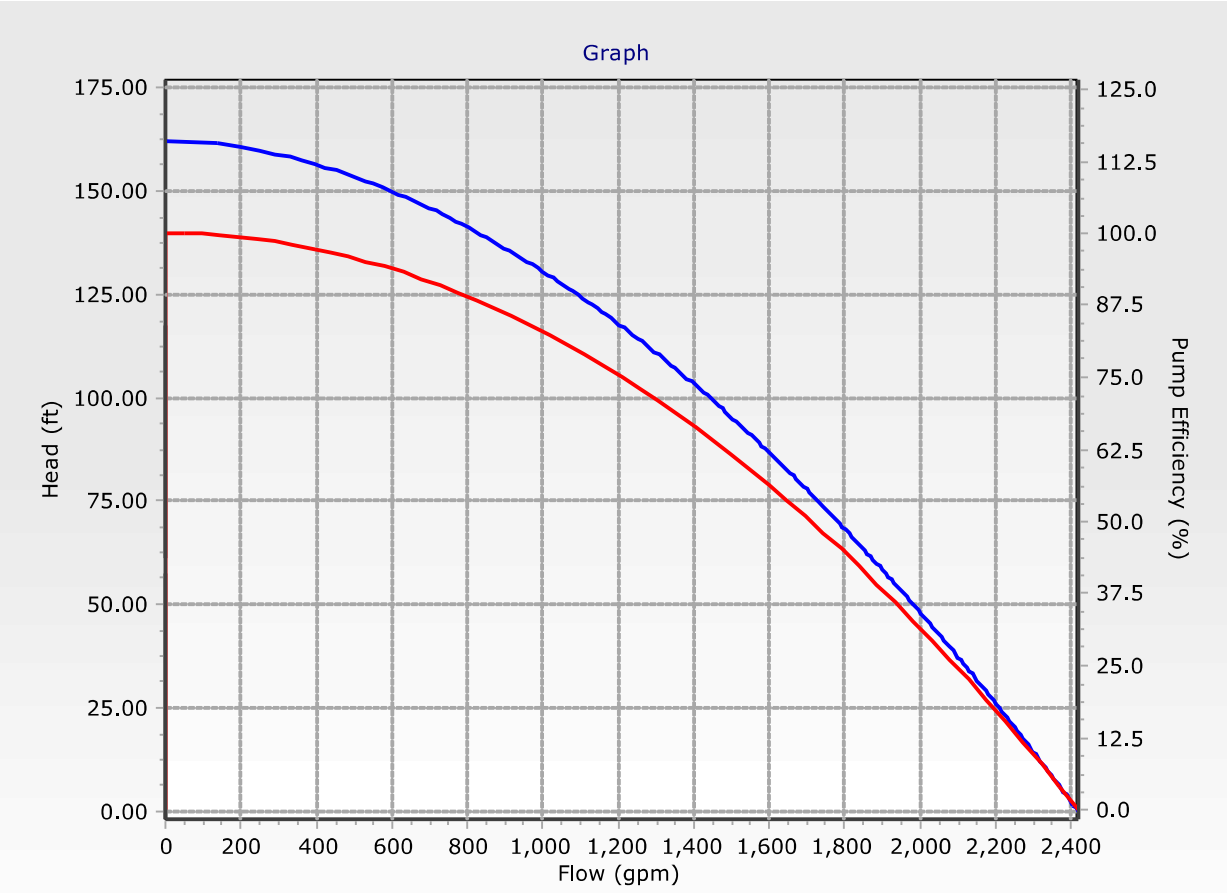
Active Scenario: Calibration

Pump Definition Detailed Report: 2014-06-13 FLow Test



Active Scenario: Calibration

FlexTable: Pump Table (2014-09-22 WaterCAD Calibration.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	188.37	1,501	95.17

Active Scenario: Calibration

FlexTable: Reservoir Table (2014-09-22 WaterCAD Calibration.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	1,501	93.20

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-755-1666

Active Scenario: Calibration

FlexTable: Pipe Table (2014-09-22 WaterCAD Calibration.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
D-1	J-4	J-101	6.0	43	Ductile Iron	130.0	False	105	1.19
D-2	J-101	J-8	6.0	216	Ductile Iron	130.0	False	105	1.19
D-3	J-10	J-11	6.0	207	Ductile Iron	130.0	False	-334	3.80
D-4	J-102	J-14	6.0	72	Ductile Iron	130.0	False	-334	3.80
D-5	J-16	J-102	6.0	142	Ductile Iron	130.0	False	0	0.00
D-6	J-102	J-19	6.0	218	Ductile Iron	130.0	False	334	3.80
D-7	J-21	J-103	6.0	129	Ductile Iron	130.0	False	334	3.80
D-8	H-100	J-103	6.0	12	Ductile Iron	130.0	False	-1,501	17.03
D-9	J-103	J-24	6.0	39	Ductile Iron	130.0	False	-1,167	13.24
D-10	J-104	J-29	6.0	206	Ductile Iron	130.0	False	-91	1.03
D-11	H-101	J-104	6.0	17	Ductile Iron	130.0	False	0	0.00
D-12	J-105	J-104	6.0	238	Ductile Iron	130.0	False	-91	1.03
D-13	J-105	J-42	6.0	253	Ductile Iron	130.0	False	-18	0.20
D-14	J-106	J-105	6.0	289	Ductile Iron	130.0	False	-109	1.23
D-15	J-40	J-106	6.0	204	Ductile Iron	130.0	False	5	0.06
D-16	J-106	J-35	6.0	110	Ductile Iron	130.0	False	113	1.29
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-105	0.67
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-105	0.67
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-105	0.67
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	-105	0.67
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	-230	1.47
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	105	0.67
E-8	J-11	J-7	6.0	123	Ductile Iron	130.0	False	-334	3.80
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	-334	2.13
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	-334	2.13
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	-334	2.13
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	-334	2.13
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	-334	2.13
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	1,167	7.45
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	1,167	7.45
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	1,167	7.45
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-91	0.58

Active Scenario: Calibration

FlexTable: Pipe Table (2014-09-22 WaterCAD Calibration.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-91	0.58
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-113	0.72
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-113	0.72
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-113	0.72
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-221	1.41
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-221	1.41
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-226	1.44
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-226	1.44
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-244	1.56
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-244	1.56
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-334	2.13
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-334	2.13
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-334	2.13
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-334	2.13
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	230	1.47
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	230	1.47
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	230	1.47
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-105	0.67
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-105	0.67
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-105	0.67
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-105	0.67
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	1,501	0.06
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	1,501	0.06

Active Scenario: Calibration

FlexTable: Junction Table (2014-09-22 WaterCAD Calibration.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-1	91.00	0	0	186.27	41.2	H-100	-15.8	41.2	741
J-2	91.00	0	0	186.24	41.2	H-100	-15.9	41.2	740
J-3	92.00	0	0	186.21	40.8	H-100	-16.4	40.8	740
J-4	91.51	0	0	186.20	41.0	H-100	-16.2	41.0	740
J-6	88.70	0	0	185.96	42.1	H-100	-13.4	42.1	737
J-7	88.70	0	0	185.88	42.0	H-100	-13.5	42.0	736
J-8	89.33	0	0	185.90	41.8	H-100	-13.9	41.8	736
J-10	90.90	0	0	182.67	39.7	H-100	-18.1	39.7	704
J-11	84.30	0	0	184.68	43.4	H-100	-13.3	43.4	721
J-12	90.80	0	0	182.51	39.7	H-100	-18.2	39.7	703
J-13	91.00	0	0	182.08	39.4	H-100	-18.6	39.4	700
J-14	90.67	0	0	181.66	39.4	H-100	-18.6	39.4	697
J-16	90.00	0	0	180.95	39.4	H-100	-23.7	39.4	693
J-17	90.00	0	0	180.95	39.4	H-4	-24.4	39.4	691
J-19	89.63	0	0	178.82	38.6	H-100	-18.8	38.6	682
J-20	89.70	0	0	178.69	38.5	H-100	-18.8	38.5	682
J-21	89.37	0	0	178.53	38.6	H-100	-18.7	38.6	681
J-24	88.00	0	0	181.16	40.3	H-100	-13.8	40.3	706
J-25	88.00	0	0	182.80	41.0	H-100	-12.0	41.0	719
J-26	86.00	0	0	185.47	43.0	H-100	-7.9	43.0	743
J-27	82.67	0	0	188.37	45.7	H-100	-2.6	45.7	771
J-28	87.00	0	0	188.35	43.9	H-100	-5.1	43.9	771
J-29	83.33	0	0	188.33	45.4	H-100	-4.2	45.4	770
J-35	90.00	0	0	187.45	42.2	H-100	-11.0	42.2	757
J-36	89.67	0	0	187.39	42.3	H-100	-10.8	42.3	756
J-37	90.50	0	0	187.38	41.9	H-100	-11.1	41.9	756
J-38	91.00	0	0	187.34	41.7	H-100	-11.1	41.7	756
J-39	91.00	0	0	187.45	41.7	H-100	-10.8	41.7	757
J-40	90.31	0	0	187.59	42.1	H-100	-9.9	42.1	759
J-41	89.50	0	0	187.76	42.5	H-100	-9.0	42.5	762
J-42	88.77	0	0	187.95	42.9	H-100	-7.7	42.9	765
J-43	88.00	0	0	188.18	43.3	H-100	-6.3	43.3	768

Active Scenario: Calibration

FlexTable: Junction Table (2014-09-22 WaterCAD Calibration.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-44	90.60	0	0	186.82	41.6	H-100	-12.6	41.6	748
J-45	90.60	0	0	186.77	41.6	H-100	-12.7	41.6	748
J-46	90.60	0	0	186.66	41.6	H-100	-12.9	41.6	746
J-47	90.50	0	0	186.48	41.5	H-100	-13.3	41.5	744
J-48	89.00	0	0	186.28	42.1	H-100	-13.2	42.1	740
J-49	87.00	0	0	186.22	42.9	H-100	-12.4	42.9	739
J-50	90.50	0	0	186.47	41.5	H-100	-13.5	41.5	743
J-51	89.50	0	0	186.45	41.9	H-100	-13.6	41.9	743
J-52	89.00	0	0	186.41	42.1	H-100	-13.9	42.1	742
J-53	90.00	0	0	186.39	41.7	H-100	-14.6	41.7	742
J-101	91.00	0	0	186.15	41.2	H-100	-16.0	41.2	739
J-102	90.00	0	0	180.95	39.4	H-100	-18.7	39.4	693
J-103	88.40	0	0	177.27	38.5	H-100	-17.9	38.5	676
J-104	85.33	0	0	188.15	44.5	H-100	-7.3	44.5	767
J-105	86.60	0	0	187.94	43.8	H-100	-7.7	43.8	764
J-106	88.80	0	0	187.59	42.7	H-100	-9.8	42.7	759

Active Scenario: Calibration

FlexTable: Hydrant Table (2014-09-22 WaterCAD Calibration.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	96.80	0	0	740	186.24	38.7
H-3	95.75	0	0	700	182.08	37.3
H-4	93.50	0	0	685	180.95	37.8
H-9	95.30	0	0	757	187.38	39.8
H-10	93.30	0	0	762	187.76	40.9
H-11	95.00	0	0	749	186.82	39.7
H-12	94.40	0	0	744	186.47	39.8
H-13	95.90	0	0	730	186.41	39.2
H-100	98.00	1,501	0	662	175.40	33.5
H-101	93.00	0	0	767	188.15	41.2

Active Scenario: Average Day Demand
FlexTable: Pump Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	254.91	101	161.71

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Active Scenario: Average Day Demand
FlexTable: Reservoir Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	101	93.20

Active Scenario: Average Day Demand

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-2	0.01
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-2	0.01
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-2	0.01
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	4	0.03
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	7	0.05
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	16	0.10
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	18	0.12
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	20	0.13
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	20	0.13
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	24	0.16
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	26	0.17
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	26	0.17
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	28	0.18
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	30	0.19
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-33	0.21
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-33	0.21
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-5	0.03
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-2	0.01
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-2	0.01
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-19	0.12
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-28	0.18
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-28	0.18
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-28	0.18
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-28	0.18
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-37	0.24
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-22	0.14
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-22	0.14
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-14	0.09
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-13	0.08

Active Scenario: Average Day Demand

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	6	0.04
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	5	0.03
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-3	0.02
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-8	0.05
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-8	0.05
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-2	0.01
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-2	0.01
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	4	0.03
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	4	0.03
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	16	0.10
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	18	0.12
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	22	0.14
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	22	0.14
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	24	0.16
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	26	0.17
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	26	0.17
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	26	0.17
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-33	0.21
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-33	0.21
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-21	0.14
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-21	0.14
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-5	0.03
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-5	0.03
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	101	0.00
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	101	0.00

Active Scenario: Average Day Demand

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-1	91.00	0	0	254.88	70.9	H-1	49.2	70.9	2,040
J-2	91.00	0	0	254.88	70.9	H-1	49.3	70.9	2,027
J-3	92.00	6	0	254.88	70.5	H-1	49.2	70.5	2,050
J-4	91.51	0	0	254.88	70.7	H-1	49.3	70.7	2,051
J-5	88.70	0	0	254.88	71.9	H-1	51.3	71.9	2,096
J-6	88.70	0	0	254.88	71.9	H-1	51.4	71.9	2,101
J-7	88.70	9	0	254.88	71.9	H-1	51.5	71.9	2,118
J-8	89.33	0	0	254.88	71.6	H-1	51.0	71.6	2,115
J-9	91.00	2	0	254.88	70.9	H-3	50.3	70.9	2,122
J-10	90.90	0	0	254.88	70.9	H-3	50.2	70.9	2,120
J-12	90.80	2	0	254.88	71.0	H-3	50.3	71.0	2,114
J-13	91.00	0	0	254.89	70.9	H-3	50.3	70.9	2,088
J-14	90.67	2	0	254.89	71.0	H-3	50.6	71.0	2,118
J-15	90.00	0	0	254.89	71.3	H-4	51.0	71.3	2,123
J-16	90.00	0	0	254.89	71.3	H-4	50.0	71.3	2,064
J-17	90.00	0	0	254.89	71.3	H-4	49.3	71.3	2,020
J-18	89.50	2	0	254.89	71.6	H-4	51.4	71.6	2,140
J-19	89.63	0	0	254.89	71.5	H-4	51.5	71.5	2,159
J-20	89.70	2	0	254.89	71.5	H-5	51.7	71.5	2,162
J-21	89.37	0	0	254.90	71.6	H-5	52.0	71.6	2,154
J-22	89.00	0	0	254.90	71.8	H-5	52.4	71.8	2,146
J-23	88.00	0	0	254.90	72.2	H-5	53.0	72.2	2,159
J-24	88.00	0	0	254.90	72.2	H-5	53.1	72.2	2,171
J-25	88.00	2	0	254.90	72.2	H-5	53.4	72.2	2,193
J-26	86.00	2	0	254.90	73.1	H-5	54.8	73.1	2,230
J-27	82.67	0	0	254.91	74.5	H-5	57.0	74.5	2,280
J-28	87.00	0	0	254.90	72.6	H-5	54.6	72.6	2,278
J-29	83.33	0	0	254.90	74.2	H-7	55.6	74.2	2,263
J-30	83.33	0	0	254.90	74.2	H-7	55.5	74.2	2,253
J-31	86.00	12	0	254.89	73.1	H-7	54.1	73.1	2,232
J-32	85.33	0	0	254.89	73.4	H-7	53.5	73.4	2,159
J-33	88.90	16	0	254.88	71.8	H-8	52.2	71.8	2,181

Active Scenario: Average Day Demand

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	0	254.88	71.3	H-8	51.4	71.3	2,147
J-35	90.00	0	0	254.88	71.3	H-8	51.5	71.3	2,164
J-36	89.67	3	0	254.88	71.5	H-9	52.0	71.5	2,169
J-37	90.50	0	0	254.88	71.1	H-9	51.6	71.1	2,163
J-38	91.00	0	0	254.88	70.9	H-9	51.7	70.9	2,190
J-39	91.00	9	0	254.89	70.9	H-9	51.8	70.9	2,212
J-40	90.31	0	0	254.89	71.2	H-1	51.9	71.2	2,216
J-41	89.50	0	0	254.89	71.6	H-10	52.4	71.6	2,201
J-42	88.77	0	0	254.90	71.9	H-10	53.0	71.9	2,235
J-43	88.00	9	0	254.90	72.2	H-1	54.1	72.2	2,276
J-44	90.60	0	0	254.88	71.1	H-11	51.2	71.1	2,140
J-45	90.60	8	0	254.88	71.1	H-1	51.3	71.1	2,150
J-46	90.60	1	0	254.88	71.1	H-13	51.0	71.1	2,133
J-47	90.50	0	0	254.88	71.1	H-13	50.9	71.1	2,117
J-48	89.00	1	0	254.88	71.8	H-1	51.1	71.8	2,113
J-49	87.00	8	0	254.88	72.6	H-1	52.1	72.6	2,119
J-50	90.50	0	0	254.88	71.1	H-13	50.7	71.1	2,104
J-51	89.50	6	0	254.88	71.6	H-13	50.9	71.6	2,087
J-52	89.00	0	0	254.88	71.8	H-13	50.5	71.8	2,052
J-53	90.00	0	0	254.88	71.3	H-13	49.9	71.3	2,060

Active Scenario: Average Day Demand

FlexTable: Hydrant Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	96.80	0	1,937	254.88	68.4
H-2	93.00	0	2,081	254.88	70.0
H-3	95.75	0	2,043	254.89	68.9
H-4	93.50	0	1,975	254.89	69.8
H-5	98.00	0	2,099	254.90	67.9
H-6	90.00	0	2,215	254.90	71.3
H-7	93.00	0	2,118	254.89	70.0
H-8	94.00	0	2,098	254.88	69.6
H-9	95.30	0	2,113	254.88	69.0
H-10	93.30	0	2,145	254.89	69.9
H-11	95.00	0	2,117	254.88	69.2
H-12	94.40	0	1,989	254.88	69.4
H-13	95.90	0	1,787	254.88	68.8

Active Scenario: Max Day Demand

FlexTable: Pump Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	253.72	202	160.52

Active Scenario: Max Day Demand

FlexTable: Reservoir Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	202	93.20

Active Scenario: Max Day Demand

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-3	0.02
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-3	0.02
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-3	0.02
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	9	0.05
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	15	0.09
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	33	0.21
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	37	0.23
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	41	0.26
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	41	0.26
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	49	0.31
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	53	0.34
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	53	0.34
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	57	0.36
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	61	0.39
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-67	0.42
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-67	0.42
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-11	0.07
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-5	0.03
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-5	0.03
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-39	0.25
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-57	0.36
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-57	0.36
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-57	0.36
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-57	0.36
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-75	0.48
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-43	0.28
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-43	0.28
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-27	0.18
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-26	0.17

Active Scenario: Max Day Demand

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	11	0.07
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	10	0.06
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-6	0.04
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-15	0.10
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-15	0.10
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-3	0.02
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-3	0.02
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	9	0.05
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	9	0.05
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	33	0.21
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	37	0.23
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	45	0.28
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	45	0.28
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	49	0.31
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	53	0.34
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	53	0.34
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	53	0.34
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-67	0.42
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-67	0.42
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-43	0.27
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-43	0.27
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-11	0.07
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-11	0.07
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	202	0.01
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	202	0.01

Active Scenario: Max Day Demand

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-1	91.00	0	0	253.63	70.4	H-1	46.0	70.4	1,951
J-2	91.00	0	0	253.63	70.4	H-1	46.1	70.4	1,939
J-3	92.00	12	0	253.63	69.9	H-1	46.1	69.9	1,967
J-4	91.51	0	0	253.63	70.1	H-1	46.1	70.1	1,961
J-5	88.70	0	0	253.63	71.4	H-1	48.0	71.4	2,003
J-6	88.70	0	0	253.63	71.4	H-1	48.1	71.4	2,007
J-7	88.70	18	0	253.63	71.4	H-1	48.5	71.4	2,032
J-8	89.33	0	0	253.63	71.1	H-1	47.8	71.1	2,020
J-9	91.00	4	0	253.63	70.4	H-1	47.1	70.4	2,033
J-10	90.90	0	0	253.64	70.4	H-3	47.0	70.4	2,027
J-12	90.80	4	0	253.64	70.5	H-3	47.2	70.5	2,024
J-13	91.00	0	0	253.65	70.4	H-3	47.1	70.4	1,998
J-14	90.67	4	0	253.66	70.5	H-3	47.5	70.5	2,027
J-15	90.00	0	0	253.66	70.8	H-4	47.9	70.8	2,032
J-16	90.00	0	0	253.66	70.8	H-4	46.9	70.8	1,977
J-17	90.00	0	0	253.66	70.8	H-4	46.1	70.8	1,937
J-18	89.50	4	0	253.67	71.0	H-4	48.3	71.0	2,050
J-19	89.63	0	0	253.67	71.0	H-4	48.4	71.0	2,066
J-20	89.70	4	0	253.68	70.9	H-5	48.6	70.9	2,069
J-21	89.37	0	0	253.68	71.1	H-5	48.9	71.1	2,060
J-22	89.00	0	0	253.69	71.3	H-5	49.3	71.3	2,052
J-23	88.00	0	0	253.69	71.7	H-5	49.9	71.7	2,065
J-24	88.00	0	0	253.70	71.7	H-5	50.0	71.7	2,076
J-25	88.00	4	0	253.70	71.7	H-5	50.4	71.7	2,099
J-26	86.00	4	0	253.71	72.6	H-5	51.8	72.6	2,133
J-27	82.67	0	0	253.72	74.0	H-5	54.0	74.0	2,179
J-28	87.00	0	0	253.71	72.1	H-5	51.6	72.1	2,176
J-29	83.33	0	0	253.70	73.7	H-7	52.6	73.7	2,163
J-30	83.33	0	0	253.70	73.7	H-7	52.4	73.7	2,154
J-31	86.00	24	0	253.68	72.5	H-7	51.3	72.5	2,146
J-32	85.33	0	0	253.66	72.8	H-7	50.4	72.8	2,066
J-33	88.90	32	0	253.64	71.3	H-8	49.5	71.3	2,102

Active Scenario: Max Day Demand

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	0	253.64	70.8	H-8	48.3	70.8	2,053
J-35	90.00	0	0	253.64	70.8	H-8	48.4	70.8	2,069
J-36	89.67	6	0	253.64	70.9	H-9	48.9	70.9	2,076
J-37	90.50	0	0	253.64	70.6	H-9	48.4	70.6	2,067
J-38	91.00	0	0	253.64	70.4	H-9	48.5	70.4	2,092
J-39	91.00	18	0	253.65	70.4	H-1	48.9	70.4	2,121
J-40	90.31	0	0	253.66	70.7	H-1	48.8	70.7	2,115
J-41	89.50	0	0	253.67	71.0	H-10	49.3	71.0	2,106
J-42	88.77	0	0	253.69	71.4	H-10	50.0	71.4	2,137
J-43	88.00	18	0	253.70	71.7	H-1	51.3	71.7	2,182
J-44	90.60	0	0	253.63	70.5	H-11	48.0	70.5	2,045
J-45	90.60	16	0	253.63	70.5	H-1	48.3	70.5	2,061
J-46	90.60	1	0	253.63	70.5	H-1	47.8	70.5	2,037
J-47	90.50	0	0	253.63	70.6	H-13	47.7	70.6	2,023
J-48	89.00	1	0	253.63	71.2	H-1	47.9	71.2	2,019
J-49	87.00	16	0	253.63	72.1	H-1	49.1	72.1	2,033
J-50	90.50	0	0	253.63	70.6	H-13	47.4	70.6	2,010
J-51	89.50	12	0	253.63	71.0	H-13	47.8	71.0	2,001
J-52	89.00	0	0	253.63	71.2	H-13	47.3	71.2	1,963
J-53	90.00	0	0	253.63	70.8	H-13	46.7	70.8	1,970

Active Scenario: Max Day Demand

FlexTable: Hydrant Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	96.80	0	1,856	253.63	67.9
H-2	93.00	0	1,991	253.63	69.5
H-3	95.75	0	1,956	253.65	68.3
H-4	93.50	0	1,896	253.66	69.3
H-5	98.00	0	2,009	253.69	67.4
H-6	90.00	0	2,121	253.70	70.8
H-7	93.00	0	2,028	253.66	69.5
H-8	94.00	0	2,008	253.64	69.1
H-9	95.30	0	2,021	253.64	68.5
H-10	93.30	0	2,054	253.67	69.4
H-11	95.00	0	2,024	253.63	68.6
H-12	94.40	0	1,905	253.63	68.9
H-13	95.90	0	1,718	253.63	68.2

Active Scenario: Peak Hour Demand

FlexTable: Pump Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	250.81	351	157.61

Active Scenario: Peak Hour Demand

FlexTable: Reservoir Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	351	93.20

Active Scenario: Peak Hour Demand

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-6	0.04
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-6	0.04
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-6	0.04
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	14	0.09
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	25	0.16
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	56	0.36
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	63	0.40
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	70	0.45
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	70	0.45
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	84	0.54
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	91	0.58
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	91	0.58
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	98	0.63
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	105	0.67
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-116	0.74
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-116	0.74
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-18	0.11
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-9	0.05
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-9	0.05
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-67	0.43
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-99	0.63
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-99	0.63
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-99	0.63
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-99	0.63
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-130	0.83
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-76	0.48
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-76	0.48
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-48	0.30
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-46	0.29

Active Scenario: Peak Hour Demand

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	19	0.12
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	18	0.11
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-10	0.07
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-27	0.17
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-27	0.17
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-6	0.04
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-6	0.04
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	14	0.09
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	14	0.09
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	56	0.36
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	63	0.40
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	77	0.49
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	77	0.49
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	84	0.54
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	91	0.58
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	91	0.58
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	91	0.58
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-116	0.74
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-116	0.74
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-74	0.47
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-74	0.47
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-18	0.11
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-18	0.11
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	351	0.01
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	351	0.01

Active Scenario: Peak Hour Demand

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-1	91.00	0	0	250.54	69.0	H-1	40.8	69.0	1,819
J-2	91.00	0	0	250.54	69.0	H-1	40.9	69.0	1,808
J-3	92.00	20	0	250.54	68.6	H-1	41.2	68.6	1,842
J-4	91.51	0	0	250.54	68.8	H-1	40.9	68.8	1,828
J-5	88.70	0	0	250.54	70.0	H-1	42.9	70.0	1,864
J-6	88.70	0	0	250.54	70.0	H-1	43.0	70.0	1,868
J-7	88.70	32	0	250.54	70.0	H-1	43.8	70.0	1,906
J-8	89.33	0	0	250.55	69.8	H-1	42.6	69.8	1,879
J-9	91.00	7	0	250.56	69.0	H-1	42.0	69.0	1,899
J-10	90.90	0	0	250.57	69.1	H-3	41.9	69.1	1,890
J-12	90.80	7	0	250.57	69.1	H-3	42.2	69.1	1,890
J-13	91.00	0	0	250.60	69.1	H-3	42.0	69.1	1,864
J-14	90.67	7	0	250.62	69.2	H-3	42.5	69.2	1,893
J-15	90.00	0	0	250.64	69.5	H-4	42.8	69.5	1,897
J-16	90.00	0	0	250.64	69.5	H-4	41.9	69.5	1,849
J-17	90.00	0	0	250.64	69.5	H-4	41.1	69.5	1,813
J-18	89.50	7	0	250.65	69.7	H-4	43.4	69.7	1,917
J-19	89.63	0	0	250.67	69.7	H-3	43.4	69.7	1,927
J-20	89.70	7	0	250.68	69.6	H-5	43.7	69.6	1,933
J-21	89.37	0	0	250.70	69.8	H-5	43.9	69.8	1,920
J-22	89.00	0	0	250.71	70.0	H-5	44.3	70.0	1,914
J-23	88.00	0	0	250.72	70.4	H-5	44.9	70.4	1,925
J-24	88.00	0	0	250.73	70.4	H-5	45.1	70.4	1,935
J-25	88.00	7	0	250.75	70.4	H-5	45.6	70.4	1,959
J-26	86.00	7	0	250.78	71.3	H-5	47.0	71.3	1,990
J-27	82.67	0	0	250.81	72.7	H-5	49.2	72.7	2,029
J-28	87.00	0	0	250.78	70.9	H-5	46.7	70.9	2,026
J-29	83.33	0	0	250.75	72.4	H-7	47.7	72.4	2,016
J-30	83.33	0	0	250.73	72.4	H-7	47.5	72.4	2,008
J-31	86.00	42	0	250.68	71.2	H-7	46.8	71.2	2,021
J-32	85.33	0	0	250.63	71.5	H-7	45.4	71.5	1,929
J-33	88.90	56	0	250.59	70.0	H-8	45.1	70.0	1,986

Active Scenario: Peak Hour Demand

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	0	250.59	69.5	H-8	43.2	69.5	1,915
J-35	90.00	0	0	250.59	69.5	H-8	43.3	69.5	1,928
J-36	89.67	9	0	250.59	69.6	H-9	43.9	69.6	1,937
J-37	90.50	0	0	250.59	69.3	H-9	43.4	69.3	1,926
J-38	91.00	0	0	250.59	69.0	H-1	43.4	69.0	1,945
J-39	91.00	32	0	250.60	69.1	H-1	44.2	69.1	1,986
J-40	90.31	0	0	250.63	69.4	H-1	43.8	69.4	1,965
J-41	89.50	0	0	250.67	69.7	H-10	44.3	69.7	1,964
J-42	88.77	0	0	250.71	70.1	H-10	45.0	70.1	1,992
J-43	88.00	32	0	250.75	70.4	H-1	46.7	70.4	2,043
J-44	90.60	0	0	250.55	69.2	H-11	42.8	69.2	1,904
J-45	90.60	28	0	250.55	69.2	H-1	43.5	69.2	1,930
J-46	90.60	2	0	250.55	69.2	H-1	42.7	69.2	1,896
J-47	90.50	0	0	250.54	69.2	H-1	42.5	69.2	1,882
J-48	89.00	2	0	250.54	69.9	H-1	42.8	69.9	1,880
J-49	87.00	28	0	250.54	70.8	H-1	44.3	70.8	1,905
J-50	90.50	0	0	250.54	69.2	H-13	42.2	69.2	1,872
J-51	89.50	21	0	250.54	69.7	H-13	42.9	69.7	1,874
J-52	89.00	0	0	250.54	69.9	H-13	42.1	69.9	1,830
J-53	90.00	0	0	250.54	69.5	H-13	41.5	69.5	1,836

Active Scenario: Peak Hour Demand

FlexTable: Hydrant Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	96.80	0	1,735	250.54	66.5
H-2	93.00	0	1,858	250.54	68.2
H-3	95.75	0	1,827	250.60	67.0
H-4	93.50	0	1,777	250.64	68.0
H-5	98.00	0	1,876	250.71	66.1
H-6	90.00	0	1,983	250.73	69.5
H-7	93.00	0	1,895	250.63	68.2
H-8	94.00	0	1,875	250.59	67.7
H-9	95.30	0	1,885	250.59	67.2
H-10	93.30	0	1,919	250.67	68.1
H-11	95.00	0	1,886	250.55	67.3
H-12	94.40	0	1,781	250.54	67.6
H-13	95.90	0	1,613	250.54	66.9

Active Scenario: Max Day Plus Fire

FlexTable: Pump Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	93.00	2014-06-13 FLow Test	On	93.20	253.72	202	160.52

Active Scenario: Max Day Plus Fire

FlexTable: Reservoir Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	93.20	202	93.20

Active Scenario: Max Day Plus Fire

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-1	J-1	J-53	8.0	405	Ductile Iron	130.0	False	-3	0.02
E-2	J-2	J-1	8.0	122	Ductile Iron	130.0	False	-3	0.02
E-3	J-2	H-1	6.0	48	Ductile Iron	130.0	False	0	0.00
E-4	J-3	J-2	8.0	108	Ductile Iron	130.0	False	-3	0.02
E-5	J-4	J-3	8.0	43	Ductile Iron	130.0	False	9	0.05
E-6	J-7	J-6	8.0	63	Ductile Iron	130.0	False	15	0.09
E-7	J-8	J-7	8.0	55	Ductile Iron	130.0	False	33	0.21
E-9	J-12	J-10	8.0	65	Ductile Iron	130.0	False	37	0.23
E-10	J-13	J-12	8.0	181	Ductile Iron	130.0	False	41	0.26
E-11	J-13	H-3	6.0	22	Ductile Iron	130.0	False	0	0.00
E-12	J-14	J-13	8.0	175	Ductile Iron	130.0	False	41	0.26
E-13	J-16	J-17	8.0	90	Ductile Iron	130.0	False	0	0.00
E-14	J-17	H-4	6.0	24	Ductile Iron	130.0	False	0	0.00
E-15	J-20	J-19	8.0	54	Ductile Iron	130.0	False	49	0.31
E-16	J-21	J-20	8.0	70	Ductile Iron	130.0	False	53	0.34
E-17	J-25	J-24	8.0	68	Ductile Iron	130.0	False	53	0.34
E-18	J-26	J-25	8.0	110	Ductile Iron	130.0	False	57	0.36
E-19	J-27	J-26	8.0	119	Ductile Iron	130.0	False	61	0.39
E-20	J-28	J-27	8.0	77	Ductile Iron	130.0	False	-67	0.42
E-21	J-29	J-28	8.0	113	Ductile Iron	130.0	False	-67	0.42
E-22	J-36	J-35	8.0	174	Ductile Iron	130.0	False	-11	0.07
E-23	J-37	J-36	8.0	26	Ductile Iron	130.0	False	-5	0.03
E-24	J-37	H-9	6.0	22	Ductile Iron	130.0	False	0	0.00
E-25	J-38	J-37	8.0	120	Ductile Iron	130.0	False	-5	0.03
E-26	J-38	J-39	8.0	100	Ductile Iron	130.0	False	-39	0.25
E-27	J-39	J-40	8.0	124	Ductile Iron	130.0	False	-57	0.36
E-28	J-40	J-41	8.0	146	Ductile Iron	130.0	False	-57	0.36
E-29	J-41	H-10	6.0	24	Ductile Iron	130.0	False	0	0.00
E-30	J-41	J-42	8.0	165	Ductile Iron	130.0	False	-57	0.36
E-31	J-42	J-43	8.0	171	Ductile Iron	130.0	False	-57	0.36
E-32	J-43	J-27	8.0	141	Ductile Iron	130.0	False	-75	0.48
E-33	J-44	J-38	8.0	218	Ductile Iron	130.0	False	-43	0.28
E-34	J-44	H-11	6.0	10	Ductile Iron	130.0	False	0	0.00
E-35	J-45	J-44	8.0	18	Ductile Iron	130.0	False	-43	0.28
E-36	J-46	J-45	8.0	46	Ductile Iron	130.0	False	-27	0.18
E-37	J-47	J-46	8.0	74	Ductile Iron	130.0	False	-26	0.17

Active Scenario: Max Day Plus Fire

FlexTable: Pipe Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (Scaled) (ft)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
E-38	J-47	J-48	8.0	168	Ductile Iron	130.0	False	11	0.07
E-39	J-48	J-49	8.0	56	Ductile Iron	130.0	False	10	0.06
E-40	J-49	J-6	8.0	215	Ductile Iron	130.0	False	-6	0.04
E-41	J-50	J-47	8.0	45	Ductile Iron	130.0	False	-15	0.10
E-42	J-50	H-12	6.0	61	Ductile Iron	130.0	False	0	0.00
E-43	J-51	J-50	8.0	89	Ductile Iron	130.0	False	-15	0.10
E-44	J-52	J-51	8.0	133	Ductile Iron	130.0	False	-3	0.02
E-45	J-52	H-13	6.0	159	Ductile Iron	130.0	False	0	0.00
E-46	J-53	J-52	8.0	85	Ductile Iron	130.0	False	-3	0.02
P-1	J-5	J-4	8.0	245	Ductile Iron	130.0	False	9	0.05
P-2	J-5	H-2	6.0	14	Ductile Iron	130.0	False	0	0.00
P-3	J-6	J-5	8.0	24	Ductile Iron	130.0	False	9	0.05
P-4	J-9	J-8	8.0	145	Ductile Iron	130.0	False	33	0.21
P-5	J-10	J-9	8.0	62	Ductile Iron	130.0	False	37	0.23
P-6	J-15	J-14	8.0	105	Ductile Iron	130.0	False	45	0.28
P-7	J-15	J-16	8.0	113	Ductile Iron	130.0	False	0	0.00
P-8	J-18	J-15	8.0	82	Ductile Iron	130.0	False	45	0.28
P-9	J-19	J-18	8.0	106	Ductile Iron	130.0	False	49	0.31
P-10	J-22	J-21	8.0	78	Ductile Iron	130.0	False	53	0.34
P-11	J-22	H-5	6.0	21	Ductile Iron	130.0	False	0	0.00
P-12	J-23	J-22	8.0	50	Ductile Iron	130.0	False	53	0.34
P-13	J-24	J-23	8.0	44	Ductile Iron	130.0	False	53	0.34
P-14	J-30	J-29	8.0	41	Ductile Iron	130.0	False	-67	0.42
P-15	J-30	H-6	6.0	15	Ductile Iron	130.0	False	0	0.00
P-16	J-31	J-30	8.0	156	Ductile Iron	130.0	False	-67	0.42
P-17	J-32	J-31	8.0	320	Ductile Iron	130.0	False	-43	0.27
P-18	J-32	H-7	6.0	18	Ductile Iron	130.0	False	0	0.00
P-19	J-33	J-32	8.0	286	Ductile Iron	130.0	False	-43	0.27
P-20	J-34	J-33	8.0	132	Ductile Iron	130.0	False	-11	0.07
P-21	H-8	J-34	6.0	22	Ductile Iron	130.0	False	0	0.00
P-22	J-35	J-34	8.0	95	Ductile Iron	130.0	False	-11	0.07
P-100	R-1	PMP-1	100.0	30	Ductile Iron	130.0	False	202	0.01
P-101	PMP-1	J-27	100.0	16	Ductile Iron	130.0	False	202	0.01

Active Scenario: Max Day Plus Fire

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-1	91.00	0	1,500	253.63	70.4	H-1	26.3	70.4	1,589
J-2	91.00	0	1,500	253.63	70.4	H-1	26.5	70.4	1,579
J-3	92.00	12	1,500	253.63	69.9	H-1	26.3	69.9	1,604
J-4	91.51	0	1,500	253.63	70.1	H-1	26.7	70.1	1,597
J-5	88.70	0	1,500	253.63	71.4	H-1	29.3	71.4	1,630
J-6	88.70	0	1,500	253.63	71.4	H-1	29.5	71.4	1,634
J-7	88.70	18	1,500	253.63	71.4	H-1	29.4	71.4	1,658
J-8	89.33	0	1,500	253.63	71.1	H-1	29.1	71.1	1,644
J-9	91.00	4	1,500	253.63	70.4	H-1	28.2	70.4	1,660
J-10	90.90	0	1,500	253.64	70.4	H-3	28.3	70.4	1,654
J-12	90.80	4	1,500	253.64	70.5	H-3	28.3	70.5	1,652
J-13	91.00	0	1,500	253.65	70.4	H-3	28.4	70.4	1,630
J-14	90.67	4	1,500	253.66	70.5	H-3	28.8	70.5	1,655
J-15	90.00	0	1,500	253.66	70.8	H-3	29.4	70.8	1,663
J-16	90.00	0	1,500	253.66	70.8	H-4	27.5	70.8	1,620
J-17	90.00	0	1,500	253.66	70.8	H-4	26.0	70.8	1,587
J-18	89.50	4	1,500	253.67	71.0	H-3	29.9	71.0	1,678
J-19	89.63	0	1,500	253.67	71.0	H-5	30.3	71.0	1,683
J-20	89.70	4	1,500	253.68	70.9	H-5	30.5	70.9	1,683
J-21	89.37	0	1,500	253.68	71.1	H-5	31.0	71.1	1,675
J-22	89.00	0	1,500	253.69	71.3	H-5	31.7	71.3	1,669
J-23	88.00	0	1,500	253.69	71.7	H-5	32.4	71.7	1,679
J-24	88.00	0	1,500	253.70	71.7	H-5	32.7	71.7	1,688
J-25	88.00	4	1,500	253.70	71.7	H-5	33.3	71.7	1,707
J-26	86.00	4	1,500	253.71	72.6	H-5	35.2	72.6	1,735
J-27	82.67	0	1,500	253.72	74.0	H-5	38.1	74.0	1,771
J-28	87.00	0	1,500	253.71	72.1	H-5	35.2	72.1	1,769
J-29	83.33	0	1,500	253.70	73.7	H-1	35.8	73.7	1,766
J-30	83.33	0	1,500	253.70	73.7	H-1	35.4	73.7	1,763
J-31	86.00	24	1,688	253.68	72.5	H-7	24.7	72.5	1,763
J-32	85.33	0	1,500	253.66	72.8	H-7	32.5	72.8	1,693
J-33	88.90	32	1,688	253.64	71.3	H-8	21.7	71.3	1,725

Active Scenario: Max Day Plus Fire

FlexTable: Junction Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Fire Flow (Needed) (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Junction w/ Minimum Pressure (System)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Minimum) (psi)	Flow (Total Available) (gpm)
J-34	90.00	0	1,500	253.64	70.8	H-8	30.2	70.8	1,680
J-35	90.00	0	1,500	253.64	70.8	H-8	30.4	70.8	1,692
J-36	89.67	6	1,500	253.64	70.9	H-9	31.0	70.9	1,696
J-37	90.50	0	1,500	253.64	70.6	H-9	30.8	70.6	1,687
J-38	91.00	0	1,500	253.64	70.4	H-1	31.1	70.4	1,703
J-39	91.00	18	1,500	253.65	70.4	H-1	31.0	70.4	1,730
J-40	90.31	0	1,500	253.66	70.7	H-1	31.4	70.7	1,721
J-41	89.50	0	1,500	253.67	71.0	H-10	32.0	71.0	1,725
J-42	88.77	0	1,500	253.69	71.4	H-1	32.9	71.4	1,746
J-43	88.00	18	1,500	253.70	71.7	H-1	34.3	71.7	1,779
J-44	90.60	0	1,500	253.63	70.5	H-1	29.9	70.5	1,667
J-45	90.60	16	1,500	253.63	70.5	H-1	29.8	70.5	1,680
J-46	90.60	1	1,500	253.63	70.5	H-1	29.6	70.5	1,659
J-47	90.50	0	1,500	253.63	70.6	H-1	29.3	70.6	1,647
J-48	89.00	1	1,500	253.63	71.2	H-1	29.2	71.2	1,644
J-49	87.00	16	1,500	253.63	72.1	H-1	30.0	72.1	1,658
J-50	90.50	0	1,500	253.63	70.6	H-13	28.9	70.6	1,639
J-51	89.50	12	1,500	253.63	71.0	H-13	28.6	71.0	1,634
J-52	89.00	0	1,500	253.63	71.2	H-13	28.0	71.2	1,601
J-53	90.00	0	1,500	253.63	70.8	H-13	27.2	70.8	1,607

Active Scenario: Max Day Plus Fire

FlexTable: Hydrant Table (2014-09-22 WaterCAD.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	96.80	1,500	1,513	253.63	67.9
H-2	93.00	1,500	1,630	253.63	69.5
H-3	95.75	1,500	1,597	253.65	68.3
H-4	93.50	1,500	1,554	253.66	69.3
H-5	98.00	1,500	1,634	253.69	67.4
H-6	90.00	1,500	1,746	253.70	70.8
H-7	93.00	1,500	1,662	253.66	69.5
H-8	94.00	1,500	1,643	253.64	69.1
H-9	95.30	1,500	1,650	253.64	68.5
H-10	93.30	1,500	1,683	253.67	69.4
H-11	95.00	1,500	1,653	253.63	68.6
H-12	94.40	1,500	1,559	253.63	68.9
H-13	95.90	1,500	1,404	253.63	68.2

Appendix E: Sewer Demand and Flow Calculations

2006-DEVELOPMENT WASTEWATER GENERATION RATES

10-Aug-06

KHA No. 091505005

Area	Contributing Area (SF)	Dwelling Units	Residential Density (persons per dwelling unit)	Daily Flow by Use (GPCD or GPSFD)	Total Average Daily Demand (GPD)	Total Average Daily Demand (MGD)	Peak Hour Demand (MGD)
Commercial	20,800	-		0.5	10,400	0.0104	0.0416
Dwelling Units	-	480	2.5	100.0	120,000	0.1200	0.4800
Total	**20,800**	**0**			**130,400**	**0.1304**	**0.5216**

Residential and Commercial flows are based on City of Scottsdale Design Standards & Policies Manual

POST-DEVELOPMENT WASTEWATER GENERATION RATES

22-Sep-14

KHA No. 191675002

Pipe	Contributing Area (SF)	Total Dwelling Units/EDU	Residential Density (persons per dwelling unit)	Daily Flow by Use (GPCD or GPSFD)	Total Average Daily Demand (GPD)	Total Average Daily Demand (MGD)	Peak Hour Demand (MGD)
SS#1	-	0	1.70	100	0	0.0000	0.0000
SS#2	-	0	1.70	100	0	0.0000	0.0000
SS#3	-	0	1.70	100	0	0.0000	0.0000
SS#4	-	0	1.70	100	0	0.0000	0.0000
SS#5	-	30	1.70	100	5,100	0.0051	0.0204
SS#6	-	0	1.70	100	0	0.0000	0.0000
SS#7	-	0	1.70	100	0	0.0000	0.0000
SS#8	10,400	-	N/A	0.5	5,200	0.0052	0.0156
SS#9	-	15	1.70	100	2,550	0.0026	0.0102
SS#10	-	19	1.70	100	3,230	0.0032	0.0129
SS#11	-	0	1.70	100	0	0.0000	0.0000
SS#12	10,400	-	N/A	0.5	5,200	0.0052	0.0156
SS#13	-	0	1.70	100	0	0.0000	0.0000
SS#14	-	35	1.70	100	5,950	0.0060	0.0238
SS#15	-	0	1.70	100	0	0.0000	0.0000
SS#16	-	0	1.70	100	0	0.0000	0.0000
SS#17	-	0	1.70	100	0	0.0000	0.0000
SS#18	-	0	1.70	100	0	0.0000	0.0000
SS#19	-	97	1.70	100	16,490	0.0165	0.0660
SS#20	-	0	1.70	100	0	0.0000	0.0000
SS#21	-	0	1.70	100	0	0.0000	0.0000
SS#22	-	31	1.70	100	5,270	0.0053	0.0211
SS#23	-	0	1.70	100	0	0.0000	0.0000
SS#24	-	14	1.70	100	2,380	0.0024	0.0095
SS#25	-	0	1.70	100	0	0.0000	0.0000
SS#26	-	72	1.70	100	12,240	0.0122	0.0490
SS#27	-	12	1.70	100	2,040	0.0020	0.0082
SS#28	-	12	1.70	100	2,040	0.0020	0.0082
SS#29	-	42	1.70	100	7,140	0.0071	0.0286
SS#30	-	0	1.70	100	0	0.0000	0.0000
SS#31	-	0	1.70	100	0	0.0000	0.0000
SS#32	-	34	1.70	100	5,780	0.0058	0.0231
SS#33	-	0	1.70	100	0	0.0000	0.0000
SS#34	-	0	1.70	100	0	0.0000	0.0000
SS#35	-	0	1.70	100	0	0.0000	0.0000
SS#36	-	24	1.70	100	4,080	0.0041	0.0163
SS#37	-	46	1.70	100	7,820	0.0078	0.0313
SS#38	-	15	1.70	100	2,550	0.0026	0.0102
SS#39	-	30	1.70	100	5,100	0.0051	0.0204
SS#40	-	0	1.70	100	0	0.0000	0.0000
SS#41	-	15	1.70	100	2,550	0.0026	0.0102
SS#42	-	15	1.70	100	2,550	0.0026	0.0102
SS#43	-	0	1.70	100	0	0.0000	0.0000
SS#44	-	46	1.70	100	7,820	0.0078	0.0313
SS#45	-	11	1.70	100	1,870	0.0019	0.0075
SS#46	-	0	1.70	100	0	0.0000	0.0000
SS#47	-	69	1.70	100	11,730	0.0117	0.0469
Total	**20,800**	**684**			**126,680**	**0.1267**	**0.4963**

Residential density of 1.70 persons per dwelling unit has been approved by City of Scottsdale
Residential and Commercial flows are based on City of Scottsdale Design Standards & Policies Manual

POST-DEVELOPMENT WASTEWATER FLOW CALCULATIONS

22-Sep-14

KHA No. 191675002

Pipe	Upstream MH	Upstream Rim	Upstream Inv	Upstream Cover	Downstream MH	Downstream Rim	Downstream Inv	Downstream Cover (ft)	Length (ft)	Diameter (in)	Slope	Cumulative Peak Flow (mgd)	d (ft)	d/D	q/Q	Full Flow (mgd)	Area (sf)	Flowing Full Velocity (ft/s)	Peak Flow Velocity (ft/s)
SS#1	SSMH #1	1296.19	1278.90	16.3	SSMH #1A	unknown	unknown	unknown	208	12	0.0033	**0.4963**	0.42	0.42	0.38	1.3227	0.79	2.6	1.0
SS#2	SSMH #2A	1293.00	1279.70	12.3	SSMH #1	1296.19	1279.00	16.2	235	12	0.0030	**0.4963**	0.44	0.44	0.39	1.2612	0.79	2.5	1.0
SS#3	SSMH #2	1292.81	1280.02	11.8	SSMH #2A	1293.00	1279.80	12.2	102	12	0.0022	**0.4759**	0.46	0.46	0.44	1.08	0.79	2.1	0.9
SS#4	SSMH #3	1292.40	1280.18	11.2	SSMH #2	1292.81	1280.12	11.7	19	12	0.0032	**0.4759**	0.42	0.42	0.37	1.3025	0.79	2.6	0.9
SS#5	SSMH #44	1295.02	1289.02	5.3	SSMH #2A	1293.00	1279.80	12.5	183	8	0.0504	**0.0204**	0.05	0.08	0.01	1.7533	0.35	7.8	0.1
SS#6	SSMH #4	1292.98	1280.76	11.6	SSMH #3	1292.40	1280.28	11.5	147	8	0.0033	**0.2685**	0.37	0.56	0.60	0.4486	0.35	2.0	1.2
SS#7	SSMH #47	1292.79	1284.42	7.7	SSMH #4	1292.98	1280.86	11.5	48	8	0.0742	**0.0156**	0.04	0.06	0.01	2.127	0.35	9.4	0.1
SS#8	SSMH #60	1296.30	1289.70	5.9	SSMH #47	1292.79	1284.52	7.6	166	8	0.0312	**0.0156**	0.05	0.08	0.01	1.3795	0.35	6.1	0.1
SS#9	SSMH #5	1293.30	1281.11	11.5	SSMH #4	1292.98	1280.86	11.5	77	8	0.0032	**0.2529**	0.36	0.54	0.57	0.4418	0.35	2.0	1.1
SS#10	SSMH #6	1293.86	1281.66	11.5	SSMH #5	1293.30	1281.21	11.4	135	8	0.0033	**0.2427**	0.35	0.53	0.54	0.4486	0.35	2.0	1.1
SS#11	SSMH #7	1294.22	1282.11	11.4	SSMH #6	1293.86	1281.76	11.4	105	8	0.0033	**0.2298**	0.34	0.51	0.51	0.4486	0.35	2.0	1.0
SS#12	SSMH #52	1295.64	1288.55	6.8	SSMH #7	1294.22	1282.44	11.4	177	4	0.0345	**0.0156**	0.06	0.18	0.07	0.2285	0.09	4.1	0.3
SS#13	SSMH #8	1294.41	1282.73	11.0	SSMH #7	1294.22	1282.21	11.3	157	8	0.0033	**0.2142**	0.32	0.48	0.48	0.4486	0.35	2.0	0.9
SS#14	SSMH #46	1294.49	1285.44	8.4	SSMH #8	1294.41	1282.83	10.9	78	8	0.0335	**0.0238**	0.06	0.09	0.02	1.4294	0.35	6.3	0.1
SS#15	SSMH #9	1294.56	1283.09	10.8	SSMH #8	1294.41	1282.83	10.9	79	8	0.0033	**0.1904**	0.30	0.45	0.42	0.4486	0.35	2.0	0.8
SS#16	SSMH #10	1294.08	1283.38	10.0	SSMH #9	1294.56	1283.19	10.7	58	8	0.0033	**0.1455**	0.26	0.39	0.32	0.4486	0.35	2.0	0.6
SS#17	SSMH #11	1295.05	1283.75	10.6	SSMH #10	1294.08	1283.48	9.9	82	8	0.0033	**0.1455**	0.26	0.39	0.32	0.4486	0.35	2.0	0.6
SS#18	SSMH #31	1294.50	1284.81	9.0	SSMH #11	1295.05	1283.85	10.5	38	8	0.0253	**0.0660**	0.10	0.15	0.05	1.2422	0.35	5.5	0.3
SS#19	SSMH #51	1294.10	1287.82	5.6	SSMH #31	1294.50	1284.91	8.9	198	8	0.0147	**0.0660**	0.12	0.18	0.07	0.9469	0.35	4.2	0.3
SS#20	SSMH #12	1295.02	1284.14	10.2	SSMH #11	1295.05	1283.85	10.5	119	8	0.0024	**0.0796**	0.21	0.32	0.21	0.3826	0.35	1.7	0.4
SS#21	SSMH #48	1295.06	1286.04	8.4	SSMH #12	1295.02	1284.24	10.1	68	8	0.0265	**0.0211**	0.06	0.09	0.02	1.2713	0.35	5.6	0.1
SS#22	SSMH #49	1295.48	1288.23	6.6	SSMH #48	1295.06	1286.14	8.3	79	8	0.0265	**0.0211**	0.06	0.09	0.02	1.2713	0.35	5.6	0.1
SS#23	SSMH #13	1295.10	1284.39	10.0	SSMH #12	1295.02	1284.24	10.1	45	8	0.0033	**0.0585**	0.16	0.24	0.13	0.4486	0.35	2.0	0.3
SS#24	SSMH #32	1294.57	1289.31	4.6	SSMH #13	1295.10	1284.49	9.9	203	8	0.0237	**0.0095**	0.04	0.06	0.01	1.2023	0.35	5.3	0.0
SS#25	SSMH #33	1294.93	1284.85	9.4	SSMH #13	1295.10	1284.49	9.9	39	8	0.0092	**0.0490**	0.12	0.18	0.07	0.7491	0.35	3.3	0.2
SS#26	SSMH #34	1294.35	1285.67	8.0	SSMH #33	1294.93	1284.95	9.3	114	8	0.0063	**0.0490**	0.13	0.20	0.08	0.6199	0.35	2.7	0.2
SS#27	SSMH #40	1294.60	1288.47	5.5	SSMH #9	1294.56	1286.96	6.9	153	8	0.0099	**0.0449**	0.11	0.17	0.06	0.7771	0.35	3.4	0.2
SS#28	SSMH #41	1294.70	1289.09	4.9	SSMH #40	1294.60	1288.57	5.4	127	8	0.0041	**0.0367**	0.12	0.18	0.07	0.5001	0.35	2.2	0.2
SS#29	SSMH #42	1295.10	1289.66	4.8	SSMH #41	1294.70	1289.19	4.8	113	8	0.0042	**0.0286**	0.11	0.17	0.06	0.5061	0.35	2.2	0.1
SS#30	SSMH #14	1292.89	1280.41	11.8	SSMH #3	1292.40	1280.28	11.5	41	8	0.0032	**0.2074**	0.32	0.48	0.47	0.4418	0.35	2.0	0.9
SS#31	SSMH #15	1294.26	1280.71	12.9	SSMH #14	1292.89	1280.51	11.7	60	8	0.0033	**0.2074**	0.32	0.48	0.46	0.4486	0.35	2.0	0.9
SS#32	SSMH #16	1294.40	1281.25	12.5	SSMH #15	1294.26	1280.81	12.8	133	8	0.0033	**0.2074**	0.32	0.48	0.46	0.4486	0.35	2.0	0.9
SS#33	SSMH #17	1294.14	1281.74	11.7	SSMH #16	1294.40	1281.35	12.4	119	8	0.0033	**0.1843**	0.30	0.45	0.41	0.4486	0.35	2.0	0.8
SS#34	SSMH #18	1293.45	1283.51	9.3	SSMH #17	1294.14	1282.13	11.3	144	8	0.0096	**0.0476**	0.11	0.17	0.06	0.7652	0.35	3.4	0.2
SS#35	SSMH #19	1292.90	1287.14	5.1	SSMH #18	1293.45	1283.61	9.2	160	8	0.0221	**0.0476**	0.09	0.14	0.04	1.161	0.35	5.1	0.2
SS#36	SSMH #20	1294.20	1289.02	4.5	SSMH #19	1292.90	1287.24	5.0	278	8	0.0064	**0.0476**	0.12	0.18	0.08	0.6248	0.35	2.8	0.2
SS#37	SSMH #43	1294.20	1289.51	4.0	SSMH #20	1294.20	1289.12	4.4	118	8	0.0033	**0.0313**	0.12	0.18	0.07	0.4486	0.35	2.0	0.1
SS#38	SSMH #21	1295.06	1282.23	12.2	SSMH #17	1294.14	1281.84	11.6	115	8	0.0034	**0.1367**	0.25	0.38	0.30	0.4554	0.35	2.0	0.6
SS#39	SSMH #22	1293.72	1283.36	9.7	SSMH #21	1295.06	1282.33	12.1	313	8	0.0033	**0.1265**	0.24	0.36	0.28	0.4486	0.35	2.0	0.6
SS#40	SSMH #23	1293.22	1283.98	8.6	SSMH #22	1293.72	1283.46	9.6	157	8	0.0033	**0.1061**	0.22	0.33	0.24	0.4486	0.35	2.0	0.5
SS#41	SSMH #24	1292.52	1284.73	7.1	SSMH #23	1293.22	1284.08	8.5	198	8	0.0033	**0.1061**	0.22	0.33	0.24	0.4486	0.35	2.0	0.5
SS#42	SSMH #25	1291.25	1285.24	5.3	SSMH #24	1292.52	1284.83	7.0	123	8	0.0033	**0.0959**	0.21	0.32	0.21	0.4486	0.35	2.0	0.4
SS#43	SSMH #26	1290.46	1285.78	4.0	SSMH #25	1291.25	1285.34	5.2	133	8	0.0033	**0.0313**	0.12	0.18	0.07	0.4486	0.35	2.0	0.1
SS#44	SSMH #27	1290.08	1286.08	3.3	SSMH #26	1290.46	1285.88	3.9	61	8	0.0033	**0.0313**	0.12	0.18	0.07	0.4486	0.35	2.0	0.1
SS#45	SSMH #37	1292.11	1285.83	5.6	SSMH #25	1291.25	1285.34	5.2	106	8	0.0046	**0.0544**	0.14	0.21	0.10	0.5297	0.35	2.3	0.2
SS#46	SSMH #38	1292.61	1286.31	5.6	SSMH #37	1292.11	1285.93	5.5	83	8	0.0046	**0.0469**	0.14	0.21	0.09	0.5297	0.35	2.3	0.2
SS#47	*SSMH #39*	*1292.91*	*1286.90*	*5.3*	SSMH #38	1292.61	1286.41	5.5	106	8	0.0046	**0.0469**	0.14	0.21	0.09	*0.5297*	0.35	2.3	0.2

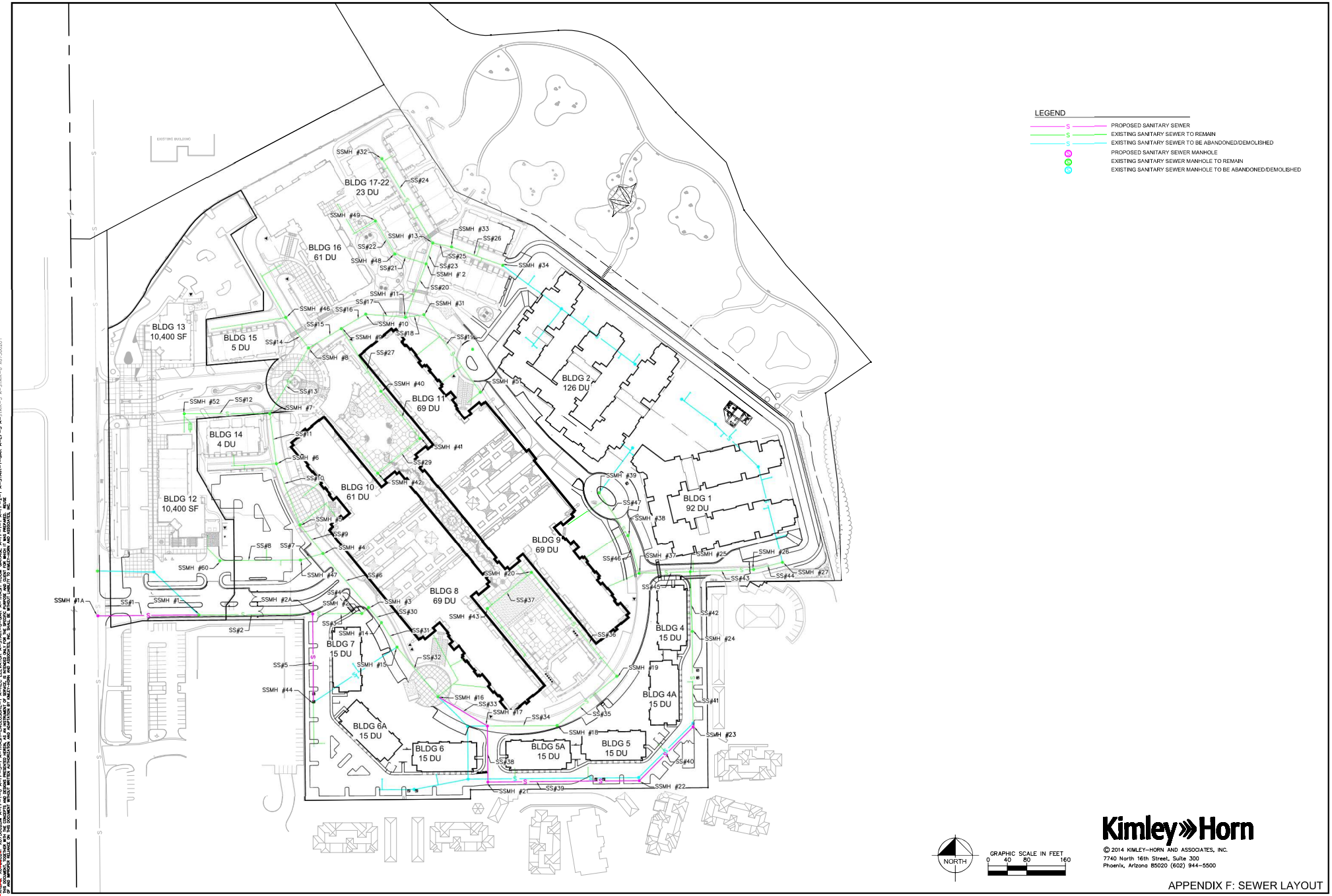
All lines have a peaking factor of 4

Pipes are sized to ensure a full flow velocity of at least 2.0 fps

Pipe Size (in)	8	10	12
Min. Slope	0.0033	0.0025	0.002

Max d/D = 0.65

Appendix F: Sewer Layout



Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

APPENDIX F: SEWER LAYOUT

9/12/2022

ISD-DR-2022

Appendix G: Water & Wastewater Basis of Design Report: Starpointe-Artesia

WR FILE

1098-06
QS 23-45
8-DR-2006

Water & Wastewater Basis of Design Report

STARPOINTE-ARTESIA

Located in Scottsdale, Arizona

Prepared for:
Starpointe Communities
7025 North Scottsdale Road-Suite 310
Scottsdale, AZ 85253

Accepted w/ Comments

Prepared by:
Kimley-Horn and Associates, Inc.
7878 N. 16th Street, Suite 300
Phoenix, Arizona 85020

CITY OF SCOTTSDALE
WATER RESOURCES DEPT
9388 E SAN SALVADOR DR.
SCOTTSDALE, AZ 85258

Doug Mann
8.29.06

091505005

August 2006

Kimley-Horn
and Associates, Inc.

City of Scottsdale
Water Resources Department

Basis of Design Review Comments

Project: Artesia Water & Wastewater Design Report

Engineer: Kimley Horn

Date: August 29, 2006

Action: Address comments on plans

Water Basis of Design

1. I recall 1500 gpm being acceptable to the Fire Department, but engineer is to confirm with a final site plan. Any larger required fire flow may dictate larger on-site water lines.
2. The private sanitary sewer can be on the edge of the 20-foot wide water line easement but cannot run within the water line easement.
3. All abandoned AC water line shall be removed from the ground and disposed of compliant with all applicable regulations of the EPA, State, County, etc.
4. The new water line needs to loop thru the site to the southeast connection with Traviata Condos. A second source of water into Traviata Condos is to be maintained at all times for fire protection.
5. On the site plan – do not extend water line between the two southern buildings. Extend it up the driveway, then east to the fire hydrant.
6. You have not identified any significant landscape irrigation needs in the report. Max day + fire flow requirements may reduce operating pressures if significant landscape irrigation is necessary.

Water & Wastewater Basis of Design Report

STARPOINTE-ARTESIA

Located in Scottsdale, Arizona

Prepared for:
Starpointe Communities
7025 North Scottsdale Road-Suite 310
Scottsdale, AZ 85253

Prepared by:
Kimley-Horn and Associates, Inc.
7878 N. 16th Street, Suite 300
Phoenix, Arizona 85020

091505005

August 2006

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1. INTRODUCTION

1.1 Project Name and Location

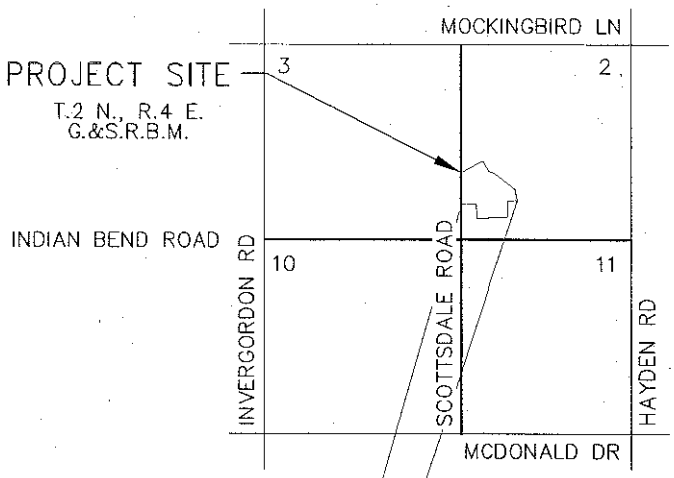
This Water and Wastewater Basis of Design Report has been prepared to support the development of "Starpointe-Artesia", a mixed use development consisting of single-family residences, town homes, and a commercial site located in the City of Scottsdale, Arizona. The site is positioned in the southwest quarter of Section 2, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. The site is currently occupied by the Radisson Resort Hotel. This parcel is bordered to the north by the Mummy Mountain Wash and to the south by existing condominiums. The site is further bound on the east by McCormick Ranch Golf Club and Indian Bend Wash. The eastern portion of the site is a backwater area for the Indian Bend Wash. It is bound on the west by Scottsdale Road. See Figure 1, Vicinity Map for the location of the site.

1.2 Project Size and Type of Report

The proposed project is a redevelopment of approximately 31.84 acres of the 44.27 acre property. The existing Hotel and Resort will be demolished and new facilities consisting of approximately 480 residential dwelling units (condos, brownstone units, and live/work units) and 20,800 square feet of retail area will be built. Parking for the project will be provided utilizing underground parking garages, surface parking for guests, brownstone garages, and surface parking for the retail areas.

This water basis of design report has been prepared as directed by stipulations from the City of Scottsdale in Case No. 2-ZN-2005.

VICINITY MAP FOR STARPOINTE–ARTESIA SCOTTSDALE, ARIZONA



N.T.S.

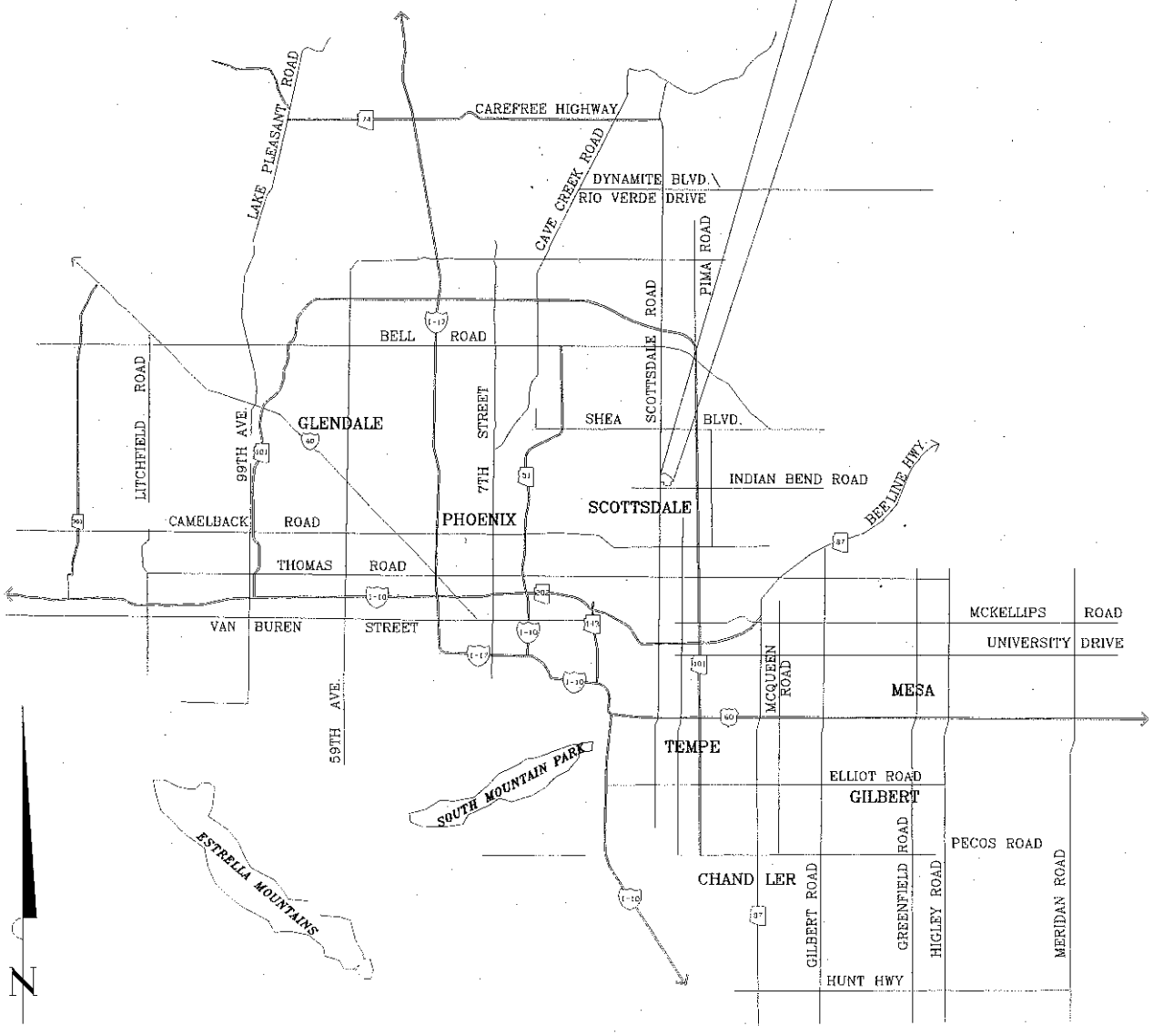


FIGURE 1

Kimley-Horn and Associates, Inc.

2034EX-VM.dwg

15-DR-2022
9/12/2022

2. EXISTING CONDITIONS

2.1 Zoning and Land Use

The project site currently contains two zoning districts. The majority of the site is zoned R-5 (PCD) – Multiple-Family Residential, Planned Community Development District. A small portion of the site, all of which fronts Scottsdale Road, is currently zoned C-1 (PCD) – Neighborhood Commercial, Planned Community Development District.

The existing hotel development consists of a 318 room resort hotel, banquet/meeting facilities, a health club/spa, a pool, and several tennis courts. The existing hotel will be demolished to make way for the proposed development.

2.2 Existing Topography

The majority of the site slopes generally to the outfall at the east end of the site. The north end of the site slopes to the Mummy Mountain Wash. Mature landscaping is present throughout the site. Most of this landscaping will have to be removed to accommodate the new development.

2.3 Existing Water Infrastructure

There is a ten (10) inch ACP water main located along Scottsdale Road adjacent to the project site. This water line is in the City's pressure zone 2A. An eight (8) inch water distribution main is currently located within the project site. This water main provides looped distribution throughout the site and connects to the ten (10) inch main in Scottsdale Road at two points.

A fire hydrant flow test was conducted by Alliance Fire Protection Co. on December 1, 2005 at the fire hydrant near the south entrance to the property with the flowing hydrant located at the north entrance to the property. The test yielded a static pressure of 84 pounds per square inch (psi) and a residual pressure of 60 psi with the hydrant flowing at 1278 gallons per minute (gpm). The estimated flow at 30 psi residual was approximately 1950 gpm. See Appendix A for the Fire Hydrant Flow Test Report from Alliance Fire Protection.

2.4 Existing Wastewater Infrastructure

There is a 36 inch sanitary sewer line located in Scottsdale Road adjacent to the project site. Currently, the site is served by an eight (8) inch sewer line which connects to the 36 inch line at the south entrance to the property. The existing eight (8) inch sewer was found to have an average slope of 0.33% according to the City of Scottsdale as-built plans. The existing system will be kept in place up to the first manhole (located on-site) off of Scottsdale Road to avoid a cut into Scottsdale Road.

3. PROPOSED CONDITIONS

3.1 Proposed Water Distribution System

The existing 8 inch water mains described above will have to be removed to accommodate the proposed development as they will interfere with multiple building foundations. A new 8 inch water distribution main will be installed to provide looped distribution to the project site. A total of two connections to the existing 10 inch main in Scottsdale Road are proposed as well as a third connection to the water line located at the southeast corner of the site. It is intended that these connections be at or near the locations where the existing 8 inch line connects to the 10 inch line with new tapping sleeve and valves. It is also intended that the existing connections be used for the new line. Water mains will lie in the streets which will serve as public water easements. Where it is not possible for the water line to be located in the streets a 20 foot wide public water easement will be dedicated. Water lines have been laid out to avoid parking stalls structures and walls. Refer to Appendix B: Water Demand Calculations and Appendix C: Water Layout for more information on the water distribution system.

Units will not be metered separately. A single meter will be in place on each building, i.e. each townhouse group (3-plex, 4-plex or 5-plex) will have one meter.

A separate fire loop is not required to serve the proposed development. Each building will have fire risers providing adequate sprinkler flows. Backflow prevention will be provided for each fire riser.

3.2 Domestic Water Demands

According to the guidelines provided in the City of Scottsdale's *Design Standards and Policies, Section 4,* the Starpointe-Artesia project will add the following demands to the City of Scottsdale's existing system:

Average Day Demand:

Residential: 185.3 GPD/unit = 0.129 GPM/unit (High Density Condominium)

Starpointe-Artesia: (0.129 GPM/unit) x (480 units) = 62 GPM

Commercial: 0.8 GPD/sq.ft. = 0.00056 GPM/sq.ft.

Starpointe-Artesia: (0.00056 GPM/sq.ft.) x (20,800 sq.ft.) = 12 GPM

Starpointe-Artesia Demands:

Average Day Demand = 62 GPM + 12 GPM = 74 GPM

Peak Hour Demand = (3.5) x (ADF) = 259 GPM

Maximum Day Demand = (2) x (ADF) = 148 GPM

It should be noted that the average day demand for the existing resort was calculated to be 112 GPM. Therefore the proposed development will not add demand to the existing system. Irrigation meters have not been included in the above demands. They will be added in the final report. Water needs report. But should be in here to verify the system. But I guess Fire Flow will rule!! So ok.

3.3 *Water Design Criteria*

Demands were based on the City of Scottsdale Design Standards. The average daily consumptive rates were assumed as follows: for residential sites, a demand of 185.3 gallons per day per unit was used. This is the design demand for high density condominiums. The maximum day demand and peak hour demand were calculated by multiplying the average day demands by peaking factors of 2 and 3.5 respectively.

The static pressure in the distribution system should not exceed 120 pounds per square inch (psi), and the system shall be designed to maintain a minimum residual pressure of 50 psi at the highest, finish floor level to be served by system pressure under normal daily operating conditions. The system will maintain 30 psi minimum pressure under design fire flow requirements.

3.4 *Fire Flow Requirements*

Per the City of Scottsdale Design Standards & Policies Manual water distribution facilities shall be sized to deliver a minimum fire flow of 1,500 gallons per minute (gpm) plus fire allowance for the fire sprinkler systems for commercial and multi-family residential properties. Fire hydrants are to be spaced no more than 700 feet apart and all sides of the buildings must be within 350 feet of a fire hydrant. All distances are to be measured along the street or roadway in which a fire hose would be laid.

Verify w/ FD. but I recall John Armstrong saying 1500# was OK.

3.5 *Network Analysis*

The network analysis for the distribution system was created using EPANET version 2.0 to demonstrate that the design standards outlined in section 2.1 will be met. Appendix B illustrates the proposed distribution network for the project site. The model analyzes average day, maximum day plus fire flow, and peak hour demand conditions. Water demands were broken into contribution areas and point loaded at nodes along the distribution mains. See Appendix D for detailed water network analysis.

3.6 *Proposed Wastewater Collection System*

The existing public wastewater collection system will have to be removed to accommodate the new development. It is proposed however that the new system connect to the 36 inch main line at the same point as the existing system. This will eliminate the need to construct a new manhole in Scottsdale Road.

The proposed wastewater collection system will consist of 8 inch and 12 inch pipes. This system will be private and will be designed with a minimum full flow velocity of 2.0 fps as per the 2003 Uniform Plumbing Code. The system will be constructed with a minimum cover of 4 feet as per the City of Scottsdale Design Standards. In most areas however the cover will be 7 feet or greater. A 9 foot minimum horizontal separation between the sewer and water lines will be maintained throughout the site.

Sewer Line can't be within 20' w/ a cast through -

For residential construction, 8 inch and 12 inch sanitary sewer lines will be designed using 100 gallons per capita per day (gpcd) and a peaking factor of 4, as per the City of Scottsdale's Design Standards & Policies Manual. For commercial construction the manual states that flows should be based upon known regional data. A value of 0.5 gallons per square foot per day (gpsfd) was used to calculate commercial flows as per the City of Phoenix Design Services Manual for Water and Wastewater Systems. Refer to Appendix E: Sewer Demand and Flow Calculations and Appendix F: Sewer Layout for more detailed information regarding the wastewater collection system.

3.7 Wastewater Hydraulic Design

The on-site sewer collection system is to be entirely private and will be designed in accordance with the Uniform Plumbing Code and Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control". All lines will be designed with a minimum mean full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013. The depth to diameter (d/D) ratio for all sanitary sewer pipes will be no greater than 0.65 in the ultimate peak flow condition. The criteria used in design (i.e. velocity and slope) do not meet City of Scottsdale requirements. All sanitary sewer lines will be privately maintained.

A drop of 0.1 feet will be present across the trough of each manhole. Manholes are required at every intersecting angle of sewer pipes other than 180 degrees and are to be spaced no greater than 500 feet apart. All sewer lines are to be installed with no less than 4 feet of cover over the top of the pipe.

Runs A, B, C, and D have been designed with 8 inch pipes with slopes of 0.33%. This slope generates a full flow velocity of 2.0 fps, based upon Manning's Formula, using an "n" value of 0.013. Similarly, run E is designed with 12 inch pipes and a slope of 0.2% to ensure a full flow velocity of 2.0 fps. See Appendix A for sewer plan and Appendix B for sewer demand and flow calculations.

4. SUMMARY

Note As disposed of in compliance w/ Applicable requirements of county, state, epa.

For the Starpointe-Artesia project all existing water and wastewater infrastructure within the project site will need to be removed.

The new water distribution system will tie into the existing ten (10) inch water line located in Scottsdale Road at two locations. The onsite water system will be looped and will provide sufficient pressure and fire flow to serve the proposed development and meet the City of Scottsdale requirements.

And the ex 8" system at the SE Corner of the Site.

The new wastewater collection system will tie into the existing 36 inch sanitary sewer line located in Scottsdale Road. The new system will be private and will adequately serve the sewer needs of the proposed development. The wastewater collection system has been designed to meet the requirements of the 2003 Uniform Plumbing Code.

8" that leads to the ex.

ex w/L loop cannot be taken or until A new w/L is constructed to provide A second source to Travista Condominiums.

5. REFERENCES

City of Phoenix, *City of Phoenix Design Services Manual for Water and Wastewater Systems.* City of Phoenix Water Services Department, 2004.

City of Scottsdale. *Design Standards & Policies Manual.* City of Scottsdale Planning, Building & Zoning, Arizona, 2004.

EPANET 2.0

Uniform Plumbing Code. 2003.

2005. FlowMaster v6.0 Haestad Methods, Inc.