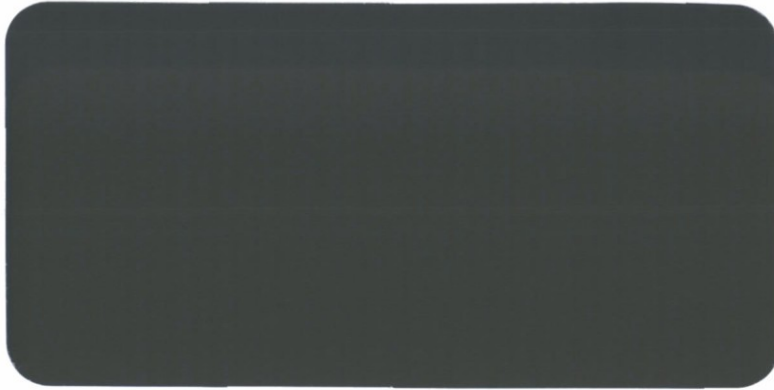


CITY FILE



Accepted For:
City of Scottsdale
Water Resources Department
9379 E. San Salvador
Scottsdale, Arizona

By: Doug Mann
Date: 8.3.16

34-DR-2016
07/27/16

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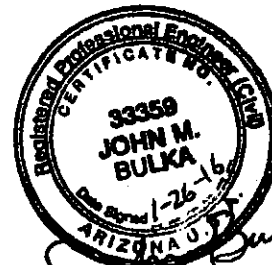
**MASTER WATER DISTRIBUTION
SYSTEM REPORT
FOR
SKYSONG NORTHWEST QUADRANT**

January 26, 2016
WP# 123808.50

Prepared For: **Plaza Companies, AMO®**
Mr. Jon Stelzer
9401 West Thunderbird Road
Suite 200
Peoria, Arizona 85381
Phone: (623) 344-4539

Submitted To: **City of Scottsdale**
Mr. Douglas L. Mann, P.E.
9388 East San Salvador Drive
Scottsdale, Arizona 85258
Phone: (480) 312-5636

Prepared By: **Wood, Patel & Associates, Inc.**
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Mesa, Arizona 85210
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January 26, 2016

Mr. Douglas L. Mann, P.E.
Water Resources Engineer
City of Scottsdale
9388 East San Salvador Drive
Scottsdale, AZ 85258

(480) 312- 5636
dmann@scottsdaleaz.gov

Re: **Skysong Northwest Quadrant**
Master Water Distribution System Report
WP# 123808.50

Dear Mr. Mann:

The proposed Skysong Northwest Quadrant (Skysong) development is a commercial development with three office buildings, a restaurant building, and a parking structure with associated landscaping and hardscape. The office buildings will have multiple stories (up to 6 stories), and range from 130,000 square feet (sf) to 200,000 sf, and the restaurant will be approximately 12,000 sf, according to information provided by the Architect, Butler Design Group. The proposed development is located east of Scottsdale Road and south of McDowell Road. More specifically, the site is located in the northwest quarter of Section 2, Township 1 North, Range 4 East of the Gila and Salt River Meridian. Refer to the *Vicinity Map* at the back of this report for project location. The existing Northwest Quadrant at Skysong is undeveloped with some desert landscaping.

The Skysong development has existing public 12-inch waterlines within Innovation Way and Skysong Boulevard that connect to existing 8-inch and 12-inch waterlines within Scottsdale Road and McDowell Road, respectively. This project will utilize these public waterlines to provide domestic water, fire protection, and landscape water to this site.

The design criteria used to estimate potable water demands and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (Wood/Patel) understanding of the requirements listed in the *City of Scottsdale Design Standards and Policies Manual, 2010*. The following is a summary of the primary design criteria utilized:

- Average-Day Water Demand, Office: 0.6 gpd/sf *
- Average-Day Water Demand, Restaurant: 1.3 gpd/sf *
- Average-Day Water Demand, Parking Garage: 100 gpd
- Fire Flow Requirements: 4,000 gpm**
- Maximum-Day Demand: 2.0 x ADD
- Peak-Hour Demand: 3.5 x ADD
- Minimum Residual Pressure, Peak-Hour: 50 psi
- Minimum Residual Pressure, Maximum-Day + Fire Flow: 30 psi
- Maximum System Pressure: 120 psi



January 26, 2016

- Maximum Pipe Head Loss, Maximum-Day Demand: 8 ft / 1,000 ft.
- Maximum Pipe Head Loss, Peak-Hour Demand: 10 ft / 1,000 ft.
- Minimum Pipe Diameter, Public Water Line: 8 inches

Abbreviations: gpd = gallons per day; SF = square feet; ADD = average day demand; psi = pounds per sq. inch

* Includes both inside and outside use per Figure 6.1-2, *COS Design Standards & Policies Manual*

** 4,000 gpm fire flow based on 50% reduction (refer to calculations in the Appendices)

Domestic and fire protection water demands for the proposed buildings will be served from a proposed 8-inch waterline loop connecting to the existing 12-inch public waterline in Innovation Way in two locations. Domestic water service will be provided to each building from this proposed 8-inch waterline.

Fire protection for the proposed buildings will be provided by a combination of four proposed fire hydrants connected to the proposed 8-inch waterline loop, and six existing fire hydrants; one along Scottsdale Road, one along McDowell Road, and two each along Innovation Way and Skysong Boulevard. The proposed hydrants have been strategically located to provide adequate coverage. In addition, each building shall have a fire suppression sprinkler system installed connected to a dedicated fire line, which is connected to the proposed public 8-inch waterline loop. A 20-foot wide public waterline easement, to be dedicated to the City of Scottsdale, will be created for all the new hydrants and the proposed 8-inch waterline loop (refer to the attached *Water Distribution System Exhibit*).

The average-day water demand for the proposed Skysong project is projected to be approximately 303,700 gallons per day (gpd), or 211 gallons per minute (gpm). Maximum-day demands and peak-hour demands are projected to be 422 gpm and 738 gpm, respectively (refer to attached calculations).

WaterCAD V8i, by Haestad Methods, was utilized to analyze the proposed water distribution system. Results from a fire hydrant flow test, conducted on November 25, 2015 by E J Flow Tests, LLC, was utilized to simulate the City of Scottsdale water supply for the project (refer to the attached modeling results).

The hydraulic modeling results indicate that the proposed system is capable of delivering peak-hour demands, totaling 738 gpm, to the proposed Skysong project, with pressures ranging from 91.0 to 96.0 pounds per square inch (psi). Fire flow results indicate that residual pressures exceed 30 psi within the project site, with 4,000 gpm fire hydrant flows during maximum-day demand. It is important to add that a 50-percent reduction was applied to the fire flow requirements, due to the proposed sprinkler system. Hydraulic modeling results, calculations, and exhibits involved in the water system analysis are attached.

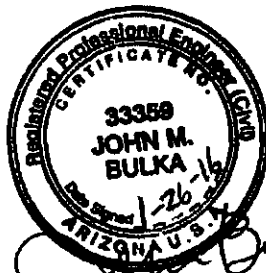
Thank you for your review of the Water Distribution System Report provided for Skysong Quadrant 4. Please feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

John M. Bulka, P.E.
Project Manager

JMB/km



Expires 3-31-17

CALCULATIONS AND HYDRAULIC MODELING RESULTS

Project: Skysong Quadrant 4
 Location: Scottsdale, AZ
 References: City of Scottsdale Design Standards and Policies Manual, Chapter 6, January 2010
 2012 International Fire Code

Proj. Number: 123808.50

Proj. Engineer: John M. Bulka, P.E.

WATER DEMAND CALCULATIONS

| Building ID | Applicable Unit | Water Demands | | Average Day Water Demand (GPD) | Average Day Water Demand (GPM) | Max Day Peaking Factor | Max Day Water Demand (GPM) | Peak Hour Peaking Factor | Peak Hour Water Demand (GPM) | Fire Flow (GPM) ¹ |
|----------------|-----------------|-----------------|-----------------------------|--------------------------------|--------------------------------|------------------------|----------------------------|--------------------------|------------------------------|------------------------------|
| | | Number of Units | ADF (GPD) / APPLICABLE UNIT | | | | | | | |
| Building 6 | square feet | 150,000.0 | 0.6 | 90,000 | 63 | 2.00 | 125 | 3.50 | 219 | 4,000 |
| Building 7 | square feet | 130,000.0 | 0.6 | 78,000 | 54 | 2.00 | 108 | 3.50 | 190 | 3,875 |
| Building 8 | square feet | 200,000.0 | 0.6 | 120,000 | 83 | 2.00 | 167 | 3.50 | 292 | 4,000 |
| Building 9 | square feet | 12,000.0 | 1.3 | 15,600 | 11 | 2.00 | 22 | 3.50 | 38 | 1,500 |
| Parking Garage | — | — | 100 | 100 | 0.07 | 2.00 | 0.14 | 3.50 | 0.24 | 3,000 |
| Total | | | | 303,700 | 211 | | 422 | | 738 | 4,000 |

1. Fire flow determined from the International Fire Code (IFC) 2012, Appendix B, Section 105, B105.2 Exception for a reduction of upto 75% (50% utilized).

Active Scenario: Calibration - Static

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----------------|-------------------|-----------------|-------------------------|-------------------|
| EX FH-1 (TEST) | 23.35 | 0 | 242.30 | 95 |
| EX FH-2 (FLOW) | 21.55 | 0 | 242.30 | 96 |
| EX J-10 | 22.75 | 0 | 242.30 | 95 |
| EX J-20 | 23.15 | 0 | 242.30 | 95 |
| EX J-30 | 24.06 | 0 | 242.30 | 94 |
| EX J-40 | 19.06 | 0 | 242.30 | 97 |
| EX J-50 | 17.39 | 0 | 242.30 | 97 |
| EX J-60 | 21.39 | 0 | 242.30 | 96 |
| EX J-70 | 21.05 | 0 | 242.30 | 96 |
| EX J-80 | 21.94 | 0 | 242.30 | 95 |
| EX J-90 | 22.00 | 0 | 242.30 | 95 |

Active Scenario: Calibration - Flow

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----------------|-------------------|-----------------|-------------------------|-------------------|
| EX FH-1 (TEST) | 23.35 | 0 | 219.20 | 85 |
| EX FH-2 (FLOW) | 21.55 | 2,600 | 213.01 | 83 |
| EX J-10 | 22.75 | 0 | 219.20 | 85 |
| EX J-20 | 23.15 | 0 | 219.09 | 85 |
| EX J-30 | 24.06 | 0 | 218.85 | 84 |
| EX J-40 | 19.06 | 0 | 218.16 | 86 |
| EX J-50 | 17.39 | 0 | 217.43 | 87 |
| EX J-60 | 21.39 | 0 | 216.74 | 85 |
| EX J-70 | 21.05 | 0 | 216.68 | 85 |
| EX J-80 | 21.94 | 0 | 217.99 | 85 |
| EX J-90 | 22.00 | 0 | 216.74 | 84 |

Active Scenario: Calibration - Flow@20

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----------------|-------------------|-----------------|-------------------------|-------------------|
| EX FH-1 (TEST) | 23.35 | 0 | 69.05 | 20 |
| EX FH-2 (FLOW) | 21.55 | 7,719 | 22.59 | 0 |
| EX J-10 | 22.75 | 0 | 69.05 | 20 |
| EX J-20 | 23.15 | 0 | 68.25 | 20 |
| EX J-30 | 24.06 | 0 | 66.46 | 18 |
| EX J-40 | 19.06 | 0 | 61.25 | 18 |
| EX J-50 | 17.39 | 0 | 55.79 | 17 |
| EX J-60 | 21.39 | 0 | 50.60 | 13 |
| EX J-70 | 21.05 | 0 | 50.13 | 13 |
| EX J-80 | 21.94 | 0 | 60.00 | 16 |
| EX J-90 | 22.00 | 0 | 50.60 | 12 |

Active Scenario: Average Day 1

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----------------|-------------------|-----------------|-------------------------|-------------------|
| EX FH-1 (TEST) | 23.35 | 0 | 242.08 | 95 |
| EX FH-2 (FLOW) | 21.55 | 0 | 242.07 | 95 |
| EX J-10 | 22.75 | 0 | 242.08 | 95 |
| EX J-20 | 23.15 | 0 | 242.08 | 95 |
| EX J-70 | 21.05 | 0 | 242.07 | 96 |
| EX J-80 | 21.94 | 0 | 242.07 | 95 |
| FH-1 | 22.50 | 0 | 242.03 | 95 |
| FH-2 | 26.21 | 0 | 241.96 | 93 |
| FH-3 | 27.20 | 0 | 241.96 | 93 |
| FH-4 | 18.80 | 0 | 242.03 | 97 |
| J-10 | 22.50 | 0 | 242.03 | 95 |
| J-20 | 26.21 | 83 | 241.96 | 93 |
| J-30 | 26.21 | 0 | 241.96 | 93 |
| J-40 | 26.46 | 54 | 241.96 | 93 |
| J-50 | 28.55 | 0 | 241.96 | 92 |
| J-60 | 27.20 | 0 | 241.96 | 93 |
| J-70 | 26.50 | 11 | 241.97 | 93 |
| J-80 | 25.00 | 63 | 241.97 | 94 |
| J-90 | 18.80 | 0 | 242.03 | 97 |

Active Scenario: Average Day 1

FlexTable: Pipe Table

| Label | Start Node | Stop Node | Hazen-Williams C | Diameter (in) | Length (ft) | Material | Flow (gpm) | Velocity (ft/s) | Headloss (ft) | Headloss Gradient (ft/ft) |
|-----------|----------------|----------------|---------------------|------------------|----------------|--------------|---------------|--------------------|------------------|---------------------------------|
| EX P-15 | EX J-10 | EX J-20 | 130.0 | 12.0 | 99 | Ductile Iron | 104 | 0.30 | 0.00 | 0.000 |
| EX P-75 | EX J-70 | EX J-80 | 130.0 | 12.0 | 148 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| EX P-85 | EX J-80 | EX J-10 | 130.0 | 12.0 | 136 | Ductile Iron | -107 | 0.30 | 0.01 | 0.000 |
| P-05 | EX J-20 | J-10 | 130.0 | 8.0 | 157 | Ductile Iron | 104 | 0.67 | 0.04 | 0.000 |
| P-15 | J-10 | J-20 | 130.0 | 8.0 | 259 | Ductile Iron | 104 | 0.67 | 0.07 | 0.000 |
| P-25 | J-20 | J-30 | 130.0 | 8.0 | 10 | Ductile Iron | 21 | 0.14 | 0.00 | 0.000 |
| P-35 | J-30 | J-40 | 130.0 | 8.0 | 29 | Ductile Iron | 21 | 0.14 | 0.00 | 0.000 |
| P-45 | J-40 | J-50 | 130.0 | 8.0 | 138 | Ductile Iron | -33 | 0.21 | 0.00 | 0.000 |
| P-55 | J-50 | J-60 | 130.0 | 8.0 | 49 | Ductile Iron | -33 | 0.21 | 0.00 | 0.000 |
| P-65 | J-60 | J-70 | 130.0 | 8.0 | 21 | Ductile Iron | -33 | 0.21 | 0.00 | 0.000 |
| P-75 | J-70 | J-80 | 130.0 | 8.0 | 68 | Ductile Iron | -44 | 0.28 | 0.00 | 0.000 |
| P-85 | J-80 | J-90 | 130.0 | 8.0 | 212 | Ductile Iron | -107 | 0.68 | 0.06 | 0.000 |
| P-95 | J-90 | EX J-80 | 130.0 | 8.0 | 149 | Ductile Iron | -107 | 0.68 | 0.04 | 0.000 |
| P-EX FH-1 | EX FH-1 (TEST) | EX J-10 | 130.0 | 6.0 | 18 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-EX FH-2 | EX J-70 | EX FH-2 (FLOW) | 130.0 | 6.0 | 8 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-1 | J-10 | FH-1 | 130.0 | 6.0 | 12 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-2 | J-30 | FH-2 | 130.0 | 6.0 | 17 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-3 | J-60 | FH-3 | 130.0 | 6.0 | 15 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-4 | J-90 | FH-4 | 130.0 | 6.0 | 14 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-PMP-1 | PMP-1 | EX J-10 | 130.0 | 48.0 | 1 | Ductile Iron | 211 | 0.04 | 0.00 | 0.000 |
| P-R-1 | R-1 | PMP-1 | 130.0 | 48.0 | 1 | Ductile Iron | 211 | 0.04 | 0.00 | 0.000 |

Active Scenario: Max Day 1

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----------------|-------------------|-----------------|-------------------------|-------------------|
| EX FH-1 (TEST) | 23.35 | 0 | 241.50 | 94 |
| EX FH-2 (FLOW) | 21.55 | 0 | 241.48 | 95 |
| EX J-10 | 22.75 | 0 | 241.50 | 95 |
| EX J-20 | 23.15 | 0 | 241.49 | 94 |
| EX J-70 | 21.05 | 0 | 241.48 | 95 |
| EX J-80 | 21.94 | 0 | 241.48 | 95 |
| FH-1 | 22.50 | 0 | 241.33 | 95 |
| FH-2 | 26.21 | 0 | 241.07 | 93 |
| FH-3 | 27.20 | 0 | 241.09 | 93 |
| FH-4 | 18.80 | 0 | 241.33 | 96 |
| J-10 | 22.50 | 0 | 241.33 | 95 |
| J-20 | 26.21 | 167 | 241.07 | 93 |
| J-30 | 26.21 | 0 | 241.07 | 93 |
| J-40 | 26.46 | 108 | 241.07 | 93 |
| J-50 | 28.55 | 0 | 241.08 | 92 |
| J-60 | 27.20 | 0 | 241.09 | 93 |
| J-70 | 26.50 | 22 | 241.09 | 93 |
| J-80 | 25.00 | 125 | 241.11 | 93 |
| J-90 | 18.80 | 0 | 241.33 | 96 |

Active Scenario: Max Day 1

FlexTable: Pipe Table

| Label | Start Node | Stop Node | Hazen-Williams C | Diameter (in) | Length (ft) | Material | Flow (gpm) | Velocity (ft/s) | Headloss (ft) | Headloss Gradient (ft/ft) |
|-----------|----------------|----------------|---------------------|------------------|----------------|--------------|---------------|--------------------|------------------|---------------------------------|
| EX P-15 | EX J-10 | EX J-20 | 130.0 | 12.0 | 99 | Ductile Iron | 209 | 0.59 | 0.01 | 0.000 |
| EX P-75 | EX J-70 | EX J-80 | 130.0 | 12.0 | 148 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| EX P-85 | EX J-80 | EX J-10 | 130.0 | 12.0 | 136 | Ductile Iron | -213 | 0.60 | 0.02 | 0.000 |
| P-05 | EX J-20 | J-10 | 130.0 | 8.0 | 157 | Ductile Iron | 209 | 1.33 | 0.16 | 0.001 |
| P-15 | J-10 | J-20 | 130.0 | 8.0 | 259 | Ductile Iron | 209 | 1.33 | 0.26 | 0.001 |
| P-25 | J-20 | J-30 | 130.0 | 8.0 | 10 | Ductile Iron | 42 | 0.27 | 0.00 | 0.000 |
| P-35 | J-30 | J-40 | 130.0 | 8.0 | 29 | Ductile Iron | 42 | 0.27 | 0.00 | 0.000 |
| P-45 | J-40 | J-50 | 130.0 | 8.0 | 138 | Ductile Iron | -66 | 0.42 | 0.02 | 0.000 |
| P-55 | J-50 | J-60 | 130.0 | 8.0 | 49 | Ductile Iron | -66 | 0.42 | 0.01 | 0.000 |
| P-65 | J-60 | J-70 | 130.0 | 8.0 | 21 | Ductile Iron | -66 | 0.42 | 0.00 | 0.000 |
| P-75 | J-70 | J-80 | 130.0 | 8.0 | 68 | Ductile Iron | -88 | 0.56 | 0.01 | 0.000 |
| P-85 | J-80 | J-90 | 130.0 | 8.0 | 212 | Ductile Iron | -213 | 1.36 | 0.22 | 0.001 |
| P-95 | J-90 | EX J-80 | 130.0 | 8.0 | 149 | Ductile Iron | -213 | 1.36 | 0.16 | 0.001 |
| P-EX FH-1 | EX FH-1 (TEST) | EX J-10 | 130.0 | 6.0 | 18 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-EX FH-2 | EX J-70 | EX FH-2 (FLOW) | 130.0 | 6.0 | 8 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-1 | J-10 | FH-1 | 130.0 | 6.0 | 12 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-2 | J-30 | FH-2 | 130.0 | 6.0 | 17 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-3 | J-60 | FH-3 | 130.0 | 6.0 | 15 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-4 | J-90 | FH-4 | 130.0 | 6.0 | 14 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-PMP-1 | PMP-1 | EX J-10 | 130.0 | 48.0 | 1 | Ductile Iron | 422 | 0.07 | 0.00 | 0.000 |
| P-R-1 | R-1 | PMP-1 | 130.0 | 48.0 | 1 | Ductile Iron | 422 | 0.07 | 0.00 | 0.000 |

Active Scenario: Peak Hour 1

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----------------|-------------------|-----------------|-------------------------|-------------------|
| EX FH-1 (TEST) | 23.35 | 0 | 240.05 | 94 |
| EX FH-2 (FLOW) | 21.55 | 0 | 239.99 | 95 |
| EX J-10 | 22.75 | 0 | 240.05 | 94 |
| EX J-20 | 23.15 | 0 | 240.01 | 94 |
| EX J-70 | 21.05 | 0 | 239.99 | 95 |
| EX J-80 | 21.94 | 0 | 239.99 | 94 |
| FH-1 | 22.50 | 0 | 239.56 | 94 |
| FH-2 | 26.21 | 0 | 238.83 | 92 |
| FH-3 | 27.20 | 0 | 238.89 | 92 |
| FH-4 | 18.80 | 0 | 239.56 | 96 |
| J-10 | 22.50 | 0 | 239.56 | 94 |
| J-20 | 26.21 | 292 | 238.83 | 92 |
| J-30 | 26.21 | 0 | 238.83 | 92 |
| J-40 | 26.46 | 190 | 238.82 | 92 |
| J-50 | 28.55 | 0 | 238.87 | 91 |
| J-60 | 27.20 | 0 | 238.89 | 92 |
| J-70 | 26.50 | 38 | 238.89 | 92 |
| J-80 | 25.00 | 219 | 238.93 | 93 |
| J-90 | 18.80 | 0 | 239.56 | 96 |

Active Scenario: Peak Hour 1

FlexTable: Pipe Table

| Label | Start Node | Stop Node | Hazen-Williams C | Diameter (in) | Length (ft) | Material | Flow (gpm) | Velocity (ft/s) | Headloss (ft) | Headloss Gradient (ft/ft) |
|-----------|----------------|----------------|---------------------|------------------|----------------|--------------|---------------|--------------------|------------------|---------------------------------|
| EX P-15 | EX J-10 | EX J-20 | 130.0 | 12.0 | 99 | Ductile Iron | 366 | 1.04 | 0.04 | 0.000 |
| EX P-75 | EX J-70 | EX J-80 | 130.0 | 12.0 | 148 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| EX P-85 | EX J-80 | EX J-10 | 130.0 | 12.0 | 136 | Ductile Iron | -373 | 1.06 | 0.06 | 0.000 |
| P-05 | EX J-20 | J-10 | 130.0 | 8.0 | 157 | Ductile Iron | 366 | 2.34 | 0.45 | 0.003 |
| P-15 | J-10 | J-20 | 130.0 | 8.0 | 259 | Ductile Iron | 366 | 2.34 | 0.74 | 0.003 |
| P-25 | J-20 | J-30 | 130.0 | 8.0 | 10 | Ductile Iron | 74 | 0.47 | 0.00 | 0.000 |
| P-35 | J-30 | J-40 | 130.0 | 8.0 | 29 | Ductile Iron | 74 | 0.47 | 0.00 | 0.000 |
| P-45 | J-40 | J-50 | 130.0 | 8.0 | 138 | Ductile Iron | -116 | 0.74 | 0.05 | 0.000 |
| P-55 | J-50 | J-60 | 130.0 | 8.0 | 49 | Ductile Iron | -116 | 0.74 | 0.02 | 0.000 |
| P-65 | J-60 | J-70 | 130.0 | 8.0 | 21 | Ductile Iron | -116 | 0.74 | 0.01 | 0.000 |
| P-75 | J-70 | J-80 | 130.0 | 8.0 | 68 | Ductile Iron | -154 | 0.98 | 0.04 | 0.001 |
| P-85 | J-80 | J-90 | 130.0 | 8.0 | 212 | Ductile Iron | -373 | 2.38 | 0.62 | 0.003 |
| P-95 | J-90 | EX J-80 | 130.0 | 8.0 | 149 | Ductile Iron | -373 | 2.38 | 0.44 | 0.003 |
| P-EX FH-1 | EX FH-1 (TEST) | EX J-10 | 130.0 | 6.0 | 18 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-EX FH-2 | EX J-70 | EX FH-2 (FLOW) | 130.0 | 6.0 | 8 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-1 | J-10 | FH-1 | 130.0 | 6.0 | 12 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-2 | J-30 | FH-2 | 130.0 | 6.0 | 17 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-3 | J-60 | FH-3 | 130.0 | 6.0 | 15 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-FH-4 | J-90 | FH-4 | 130.0 | 6.0 | 14 | Ductile Iron | 0 | 0.00 | 0.00 | 0.000 |
| P-PMP-1 | PMP-1 | EX J-10 | 130.0 | 48.0 | 1 | Ductile Iron | 739 | 0.13 | 0.00 | 0.000 |
| P-R-1 | R-1 | PMP-1 | 130.0 | 48.0 | 1 | Ductile Iron | 739 | 0.13 | 0.00 | 0.000 |

Active Scenario: Max Day + Fire 1

Fire Flow Node FlexTable: Fire Flow Report

| Label | Fire Flow (Needed) (gpm) | Fire Flow (Available) (gpm) | Pressure (Calculated Residual) (psi) | Junction w/ Minimum Pressure (Zone) | Hydraulic Grade (ft) | Elevation (ft) | Pressure Head (ft) |
|----------------|--------------------------------|-----------------------------------|---|---|-------------------------|-------------------|-----------------------|
| EX FH-1 (TEST) | 4,000 | 5,752 | 30 | J-50 | 241.50 | 23.35 | 218.15 |
| EX FH-2 (FLOW) | 4,000 | 5,830 | 30 | EX J-70 | 241.48 | 21.55 | 219.93 |
| EX J-10 | 4,000 | 6,563 | 33 | J-50 | 241.50 | 22.75 | 218.75 |
| EX J-20 | 4,000 | 6,440 | 31 | J-50 | 241.49 | 23.15 | 218.33 |
| EX J-70 | 4,000 | 6,226 | 30 | EX FH-2 (FLOW) | 241.48 | 21.05 | 220.43 |
| EX J-80 | 4,000 | 6,386 | 32 | J-50 | 241.48 | 21.94 | 219.55 |
| FH-1 | 4,000 | 5,123 | 30 | J-10 | 241.33 | 22.50 | 218.83 |
| FH-2 | 4,000 | 4,498 | 30 | J-30 | 241.07 | 26.21 | 214.86 |
| FH-3 | 4,000 | 4,521 | 30 | J-60 | 241.09 | 27.20 | 213.89 |
| FH-4 | 4,000 | 5,150 | 30 | J-80 | 241.33 | 18.80 | 222.53 |
| J-10 | 4,000 | 5,526 | 30 | FH-1 | 241.33 | 22.50 | 218.83 |
| J-20 | 4,000 | 4,918 | 30 | FH-2 | 241.07 | 26.21 | 214.86 |
| J-30 | 4,000 | 4,911 | 30 | FH-2 | 241.07 | 26.21 | 214.86 |
| J-40 | 4,000 | 4,888 | 30 | FH-2 | 241.07 | 26.46 | 214.61 |
| J-50 | 4,000 | 4,842 | 30 | FH-3 | 241.08 | 28.55 | 212.53 |
| J-60 | 4,000 | 4,889 | 30 | FH-3 | 241.09 | 27.20 | 213.89 |
| J-70 | 4,000 | 4,915 | 30 | FH-3 | 241.09 | 26.50 | 214.59 |
| J-80 | 4,000 | 5,006 | 30 | J-70 | 241.11 | 25.00 | 216.11 |
| J-90 | 4,000 | 5,619 | 30 | FH-4 | 241.33 | 18.80 | 222.53 |

FIRE HYDRANT FLOW TEST RESULTS



Flow Test Summary



Prior to conducting test you must contact Inspection Services at 480-312-5750 to activate permit and schedule test date and inspection.

Project Address: Skysong Boulevard & Innovation Place, Scottsdale, AZ 85257

Encroachment Permit No. C49140

Date of Test: 11/25/15

Time of Test: 8:20 AM

Flow test must be conducted during periods of high water use, such as 6:00 a.m. to 8:00 a.m.

Test requires using two (2) hydrants on the water system.

1. Attach water quarter section map identifying (#1) pressure and (#2) flow hydrant used to conduct the test OR
2. Show location of pressure hydrant and flow hydrant with cross streets and distance between hydrants and main size tested below.



See attached map.

Test Data

Static pressure: 95.0 (raw) psi

Residual pressure: 85.0 (raw) psi

Pitot reading: 60.0 (raw) psi

Flow GPM: 2,600 gpm

Hydrant orifice Diameter: 2.5" x 2

Coefficient of Discharge: 0.9

Contractor:

EJ Flow Tests

Test shall be certified by a NICET Level III or IV (Fire Sprinkler) OR a Civil/Fire Protection Engineer licensed within the State of Arizona.

Signatures of contractor's employees conducting test:

NICET Certification # or Engineers seal & signature: 078493

Planning & Development Services Department

7447 E Indian School Road, Suite 100, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7088



Flow Tests

FLOW TESTING SERVICES

Flow Test 1 Summary

EJ Flow Tests Project Name:

City of Scottsdale requires

Raw Test Data:

95.0 psi
(measured in pounds per square inch)

85.0 psi
(measured in pounds per square inch)

60.0 psi
(measured in pounds per square inch)

2
(measured in inches)

2.5 inches
(measured in inches)

0.9
(measured in gallons per minute)

2,600
(measured in gallons per minute)

Data with minimum safety factor of: 23 PSI :

72.0 psi
(measured in pounds per square inch)

62.0 psi
(measured in pounds per square inch)

(measured in inches)

285 ft
(measured in feet)

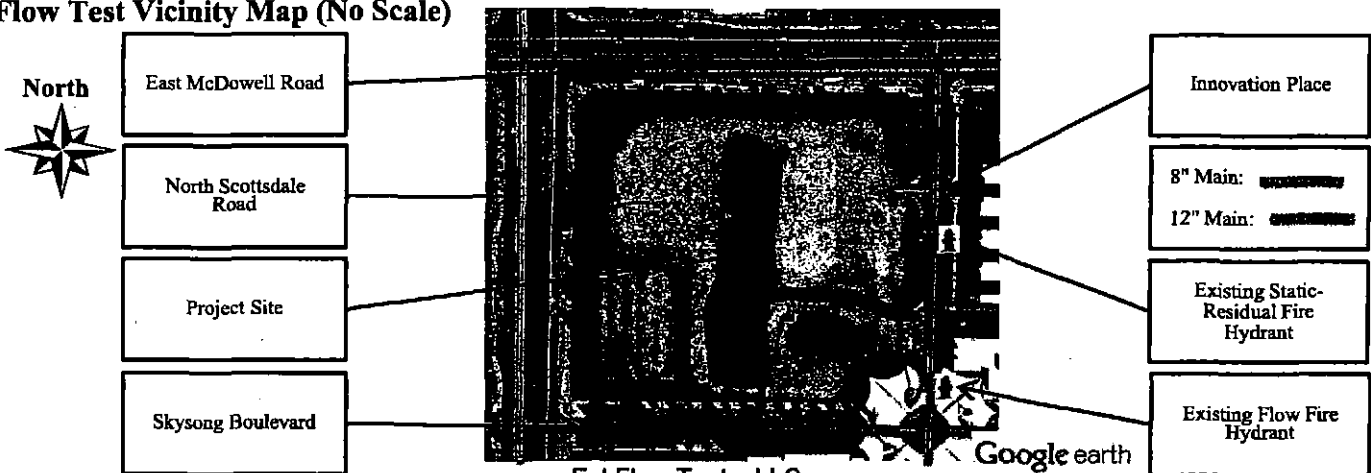
1,226 ft
(measured above sea level)

1,223 ft
(measured above sea level)

2,600
(measured in gallons per minute)

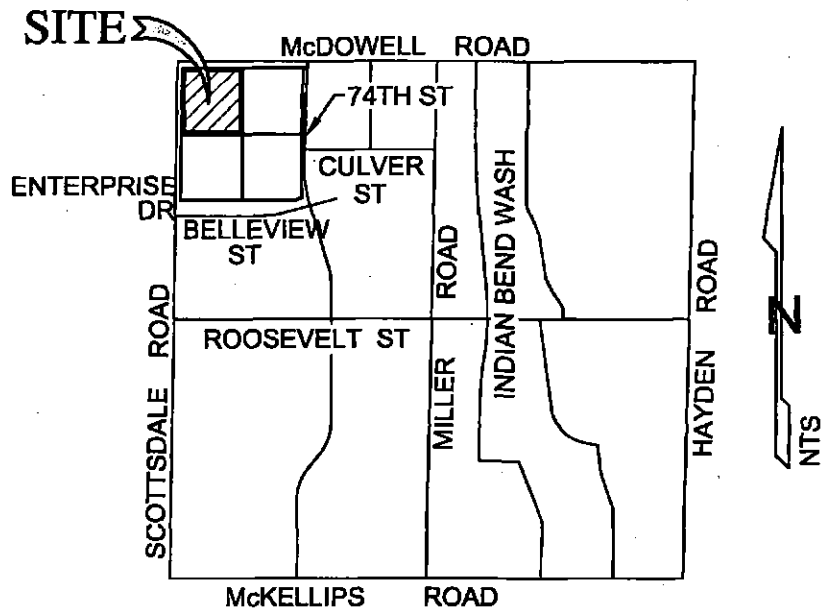
Conducted by/Witnessed by/City Forces Contacted:

Flow Test Vicinity Map (No Scale)



21505 North 78th Ave. • Suite 125 • Peoria, Arizona 85382 • 602.999.7637 • www.ejflowtests.com
 John L. Echeverri • NICET Level IV 078493 SME • C-16 FP Contractor ROC 271705 AZ • NFPA CFPS 1915
 Image Courtesy of Google Earth

VICINITY MAP



N:\2012\123808\Project Support\Reports\Water BOD\Skysong Q4\Exhibit\3808_50 Exhibit 1 - Vicinity Map.dwg

VICINITY MAP

SKYSONG NW QUADRANT

WOOD/PATEL
 MISSION: CLIENT SERVICE*
 (602) 335-8500
 WWW.WOODPATEL.COM

| | | |
|----------------------|-----------------------|-----------------|
| DATE 01-18-2016 | SCALE N.T.S. | SHEET 1 OF 1 |
| JOB NO. 123808.50 | DESIGN JB DRAWN JS | CHECK RS |

WATER DISTRIBUTION SYSTEM EXHIBIT

N. SCOTTSDALE RD.

E. McDOWELL RD.

PROPOSED BUILDING

PROPOSED BUILDING

PROPOSED PARKING GARAGE

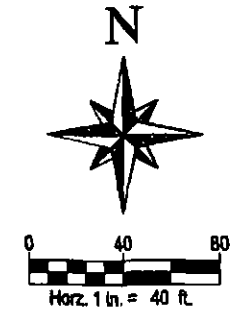
PROPOSED BUILDING

PROPOSED BUILDING

SKYSONG BLVD.

INNOVATION PL.

74TH ST.



LEGEND

- SITE BOUNDARY
- PROPOSED 6" WATERLINE
- PROPOSED 8" WATERLINE
- PROPOSED 12" WATERLINE
- EXISTING 6" WATERLINE
- EXISTING 8" WATERLINE
- EXISTING 12" WATERLINE
- FUTURE WATERLINE
- J-10 HYDRAULIC MODEL JUNCTION NODE AND LABEL
- P-10 HYDRAULIC MODEL PIPE LABEL
- PROPOSED FIRE HYDRANT
- EXISTING FIRE HYDRANT
- ◐ FUTURE FIRE HYDRANT

WOOD/PATEL
 MISSION: CLIENT SERVICE
 (602) 335-8500
 WWW.WOODPATEL.COM



SKYSONG

NW QUADRANT
 SCOTTSDALE, ARIZONA
 POTABLE WATER PLAN

| REV | DESCRIPTION | DATE |
|-----|-------------|------|
| | | |
| | | |

SCALE (HORIZONTAL) 1" = 40'
 SCALE (VERTICAL) N/A
 DATE 01/25/2018
 JOB NUMBER 123808.50
 SHEET 1 OF 1