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 apritchard DATE 7/25/2022

GOLD DUST APARTMENTS

Preliminary Water Basis of Design Report

1122028

Prepared For: ESG Architecture & Design

June 17, 2022

DIBBLE

4-ZN-2022
7/6/2022

GOLD DUST APARTMENTS

Preliminary Water Basis of Design Report

10050 N Scottsdale Road, Paradise Valley, AZ

1122028

Prepared For: ESG Architecture & Design
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June 17, 2022

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1. INTRODUCTION

This report presents a preliminary water plan for the City of Scottsdale as a part of the Gold Dust Apartments project. The purpose of this report is to provide analysis and results for the existing and proposed water distribution system at the site. The Gold Dust Apartments site is approximately 4.8 acres and fully developed site with a one-story commercial development that will be demolished. The Gold Dust Apartments project includes the design of a new mixed-use building, associated utilities, and hardscape improvements. This report provides the on-site water and fire line analysis and results for the project.

The project is located at the intersection of Gold Dust Ave. and Scottsdale Road, in the northeast quadrant of Township 3 North, Range 4 East, Section 27. This site is bounded by two existing buildings to the east, residential apartments to the west, Acacia Dr to the south, and Gold Dust Ave to the north. This site has an Assessor's Parcel Number (APN) of 175-56-002H. See **Figure 1** for a location map.

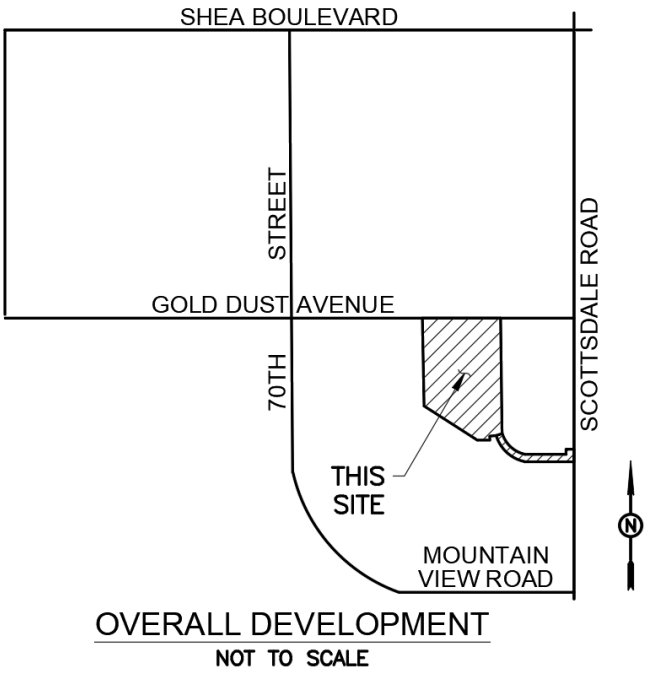

Figure 1 – VICINITY MAP

2. EXISTING CONDITIONS

There is a 12-inch ACP water main that runs in N. Scottsdale Road and a 12-inch ACP water main that runs under the sidewalk just south of E. Gold Dust Avenue. There is an 8-inch public main that routes around the entire existing building and through the east side parking lot. This water line is tied into the existing 12-inch ACP water lines that run through N. Scottsdale Road and the 12-inch ACP water main that runs through the sidewalk just south of Gold Dust Avenue. The adjacent roadways are fully developed on site that are not expected to have improvements. There are 2 existing fire hydrants on the site, one existing on the north end of the site along Gold Dust Ave and the second one is on the south side of the existing building.

3. DESIGN CRITERIA

All public water main extensions will be submitted to the City of Scottsdale and Maricopa County Environmental Service Division for review. New water mains and services at the site will be designed to meet Maricopa Association of Governments (MAG) standards and details and the *2015 International Fire Code (IFC)*. Additionally, the following criteria per the City of Scottsdale *(DS&PM)* will be met:

- Water distribution lines shall be between 6 and 12-inches in diameter.
- Pipe material shall be ductile iron pipe (DIP) with a minimum pressure class of 350.
- Fire line services 4-inches and larger shall be constructed of DIP class 350.
- All DIP water lines are to be specified with polyethylene wrapping.
- To provide appropriate water pressure, water mains must be designed in a looped configuration.
- All water mains must maintain 3-feet horizontal clearance to dry utilities.
- The water main and sewer main will run parallel to each other with 9-feet of separation to pipes centerlines and maintain 6-feet of clearance at outside of water main to outside of manhole barrel.
- Static pressure in the distribution system shall not exceed 120 pounds per square-inch (psi).
- The system shall be designed to maintain a minimum residual pressure of 50 psi at the highest floor level to be served by system pressure under normal daily operating conditions.
- A minimum of 30 pounds per square inch (psi) must be maintained at the worst-case hydrant supply line tee/tap under this condition with a simultaneous minimum of 15 psi maintained at all domestic demand nodes.
- All distribution water mains, appurtenances and service lines will be designed for a minimum normal internal working pressure of 150 psi plus allowance for water hammer.
- A minimum cover of 36-inches shall be maintained over lines smaller than 12-inches in diameter, 48-inches shall be maintained over 12-inch lines, and 60-inches shall be maintained over lines larger than 12-inches in diameter.

4. DESIGN METHODOLOGY

4.1 WATER DESIGN

The City of Scottsdale *(DS&PM)* specifies the design demand for high density condominium inside use as .27 gallons per minute (GPM) per unit. A high-density condominium demand is being used as they do not have a specific unit for apartments. The building will also have a co-working space which requires a demand of commercial office space to be used for (7,500 sq ft). The Cowork and yoga space will use a demand of .000834 (GPM). A maximum day peaking factor of 2.0 and a peak hour peaking factor of 3.5 is used for analysis of the water system per chapter 6-1.404 of the City of Scottsdale *Design Standards and Policies Manual (2018)*.

The Average Day Flow for the facility was calculated with **Equation 1 below.**

Equation 1 – AVERAGE DAILY DEMAND

$$Q_{Avg} = \frac{\#\ units\ or\ SF}{1} * \frac{\#\ gal}{unit}$$

The Maximum Day Flow was calculated with **Equation 2** below.

Equation 2 – MAXIMUM DAILY DEMAND

$$Q_{max} = Q_{Avg} * (PHF) = Q_{Avg} * 2.0$$

The Peak Day Flow was calculated with **Equation 3** below.

Equation 3 – PEAK HOUR DEMAND

$$Q_{peak} = Q_{Avg} * (PHF) = Q_{Avg} * 3.5$$

Refer to **Table 1** for potable water demand calculations.

Table 1- DEMAND ALLOCATION SUMMARY

Facility	Number of Units or SF	GPM	Average Day Demand	Maximum Day Demand	Peak Hour Demand
			GPM	*GPM*	*GPM*
Apartments	254	0.27	68.58	137.16	240.03
Cowork and Yoga	7,500	0.000834	6.26	12.51	21.88

4.2 FIRE DESIGN

Required fire flow was determined by using Table B105.1(2) and Table B105.2 of Appendix B of the 2015 *International Fire Code (IFC)*. The new building is 93,569 SF and of Type V-A wood frame construction over Type 1A parking. Per IFC 2015, The required fire flow for the site is 5,500 GPM, which can be reduced by 75% due to the building being sprinkled to no less than 1,500 GPM. There the building fire flow requirement is reduce to 1,500 GPM. Excerpts of the 2015 (*IFC)* can be found in **Appendix A**.

5. PROPOSED CONDITIONS

As part of the proposed site improvements, the existing 8-inch water service line that routes around the entirety of the existing building will have most of the line removed. Parts of the 8-inch water main that runs through the east side parking lot will remain to tie into the new proposed 8-inch water main. See Attached **Appendix B** utility exhibit labeled, “new 8” water main” for reference. This new 8-inch DIP water main will run from the 12-inch ACP public water main in Gold Dust Avenue to the existing 8” DIP main that runs between the CVS and California Kitchen. A new fire hydrant will be provided on the east side of the building of the site to provide building fire protection. The finished floor of the new proposed building is found to be 1344.50 feet. The tallest residential floor was found to be 32 feet 8 inches tall. With the tallest residential floor, the highest finished floor is at an elevation of 1377.17 feet.

6. CONCLUSIONS

The fire flow test shows that the existing infrastructure with the proposed water developments will be able to support the flow and pressure demands of the proposed Gold Dust apartment building while meeting City of Scottsdale and Fire Code requirements. The fire flow test accounted for 6,239 gallons per minute of water at 20 psi where our sites fire flow demand is only 1,500 gallons per minute. The fire flow test can be found in A**ppendix C**. The hydrants serviced the existing development, so there are no expected issues with flows or pressures within the area. A final model will be provided in the final report.

7. REFERENCES

City of Scottsdale, *Design Standards and Policies Manual*. 2018.

International Code Council. *International Fire Code*. 2015.

Maricopa Association of Governments. *Uniform Standard Details for Public Works Construction*. 2021.

Appendix A - 2015 IFC TABLE B105.1(2)

TABLE B105.1(2)
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.
b. Measured at 20 psi residual pressure.

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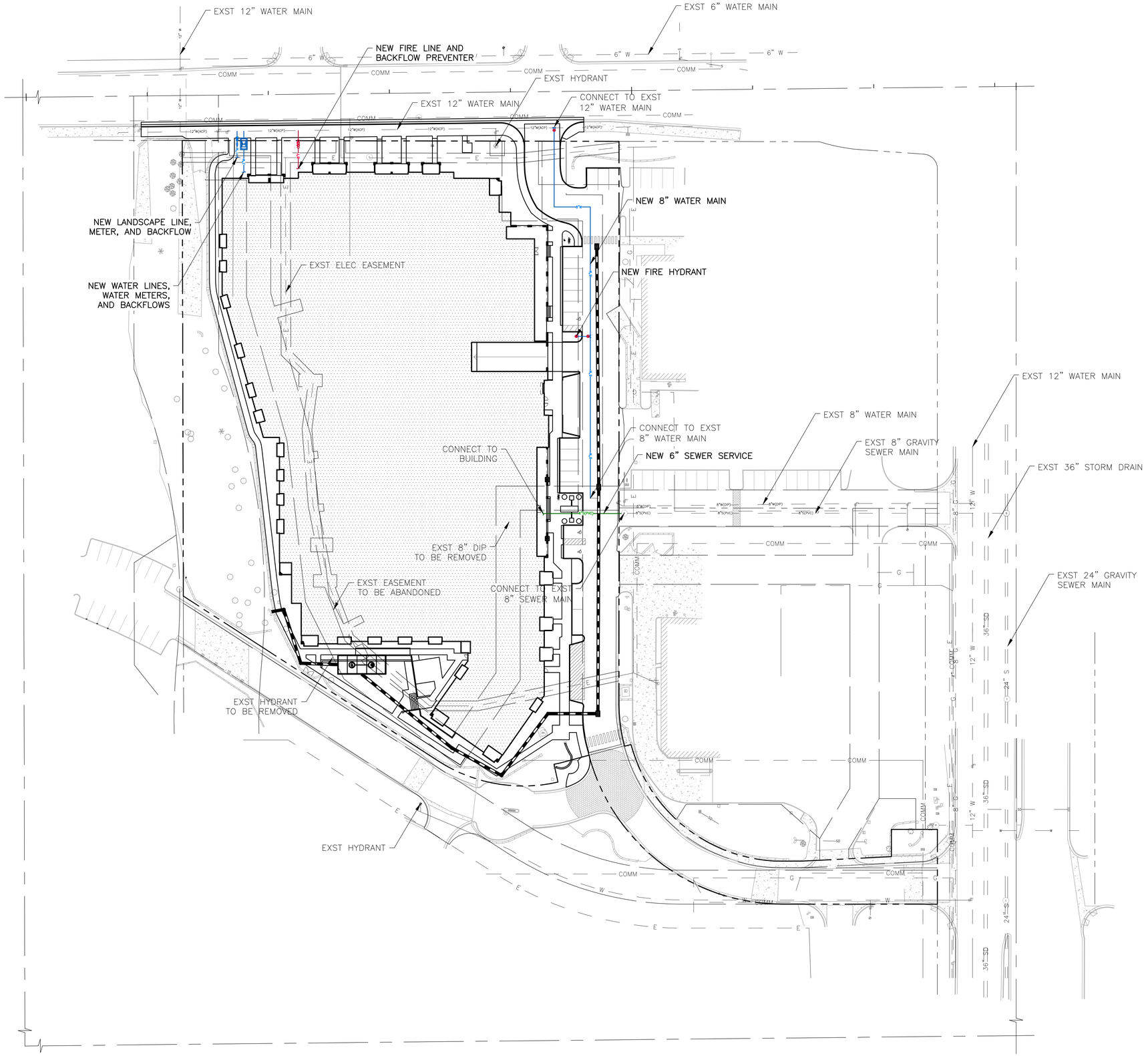
Appendix B – UTILITY EXHIBIT



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Gold Dust Ave &
Scottsdale Rd
Scottsdale, AZ

HIGHSTREET RESIDENTIAL

DIBBLE

esg
ARCHITECTURE & DESIGN

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Minneapolis, MN 55415
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www.esgarch.com

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed architect under the laws of the State of Arizona

Signature

Typed or Printed Name

License # Date

Registered professional engineer
CERTIFICATE NO.
43320
CHRISTINA SHANNON MAUCK
ARIZONA U.S.A.
Date signed 1/11/2022

REZONING & GPA SUBMITTAL
3/29/2022

ORIGINAL ISSUE:

REVISIONS

No.	Description	Date

221564
PROJECT NUMBER

DRAWN BY CHECKED BY

KEY PLAN

Gold Dust Ave &
Scottsdale Rd

Utility Exhibit

1.0

4-ZN-2022
7/6/2022

Appendix C – FIRE FLOW TEST RESULTS

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Gold Dust and Scottsdale
Project Address:	10060 North Scottsdale Road, Scottsdale, Arizona, 85253
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	22177
Flow Test Permit No.:	C68299
Date and time flow test conducted:	March 29, 2022 at 6:50 AM
Data is current and reliable until:	September 29, 2022
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Vince Cusumano – City of Scottsdale-Inspector (602-828-0847)

Raw Test Data

Static Pressure: **100.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **54.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **27.0 PSI Hyd A**
31.0 PSI Hyd B
(Measured in pounds per square inch)

Diffuser Orifice Diameter: Two 4-inch Pollard Diffuser
(Measured in inches)

Coefficient of Diffuser: 0.9

Flowing GPM: **4,625 GPM**
(Measured in gallons per minute)
2,233 GPM + 2,392 GPM = 4,625 GPM

GPM @ 20 PSI: **6,239 GPM**

Data with 28 PSI Safety Factor

Scottsdale requires a maximum Static Pressure of 72 PSI for AFES Design.

Static Pressure: **72.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **26.0 PSI**
(Measured in pounds per square inch)

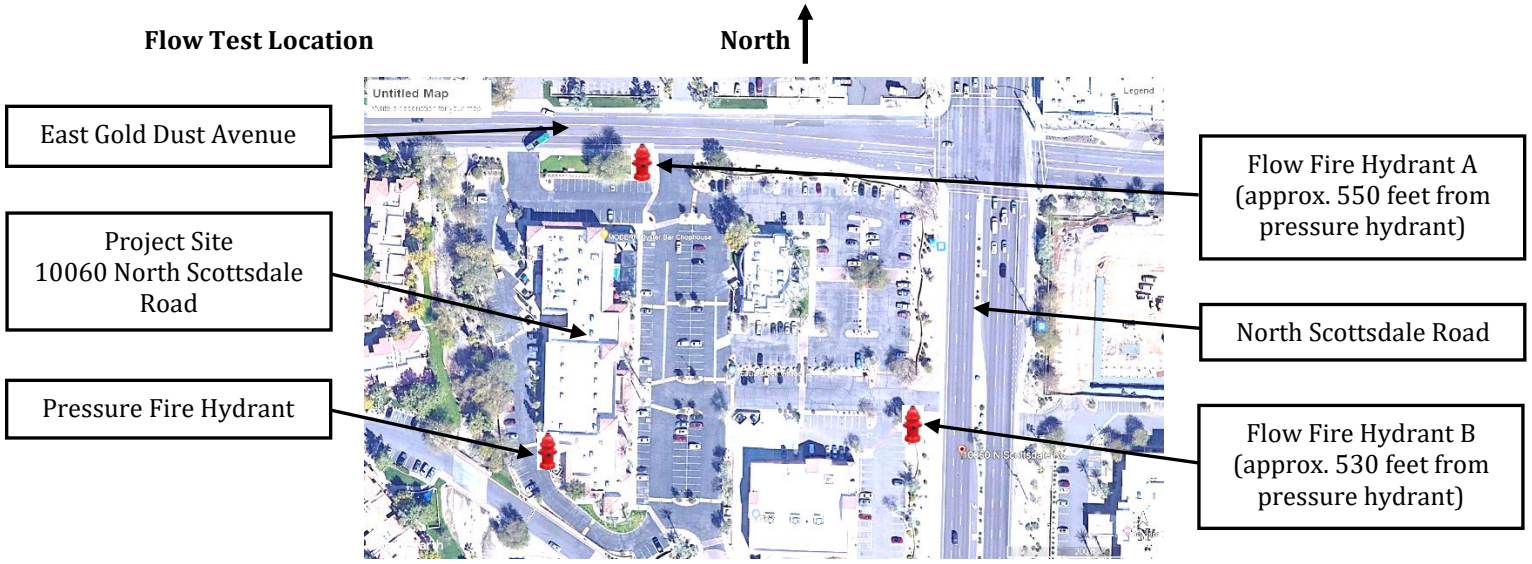
Distance between hydrants: See Below

Main size: Not Provided

Flowing GPM: **4,625 GPM**

GPM @ 20 PSI**:** **4,942 GPM**

Flow Test Location **North**



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