



FINAL WATER REPORT

for

**BLACK ROCK COFFEE BAR
1520 AZ-89A
SEDONA, YAVAPAI COUNTY, AZ**

Prepared for

**BLACK ROCK DEVELOPMENT COMPANY, LLC
TONY PALLOTTA
9170 E BAHIA DR, SUITE 101
SCOTTSDALE, AZ 85260**

Prepared by



Atwell, LLC

**9001 AIRPORT FREEWAY, SUITE 660
NORTH RICHLAN HILLS, TX 76180
Project Number: 24004242**

Date: October 22, 2024

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ABBREVIATIONS

- ADD – Average Day Demand
- ADOT – Arizona department of Transportation
- AWC – Arizona Water Company
- DIP – Ductile Iron Pipe
- FF – Fire Flow
- GPD – Gallons Per Day
- GPM – Gallons Per Minute
- LLC – Limited Liability Company
- MDD – Maximum Day Demand
- PHD – Peak Hour Demand
- ROW – Right-of-way
- SF – Square Feet

INTRODUCTION

Development of a new Black Rock Coffee Bar (650 SF) that proposes a main line extension south along Posse Ground Rd, a domestic supply line, and a single fire hydrant. APN 408-25-038R, the property, is approximately 0.423 acres that is currently zoned as commercial. The Site is located at the intersection of W Arizona 89A and Posse Ground Rd. The Site address is 1520 W Arizona 89A and lies in a portion section 12, Township 17 North, Range 05 East of the Gila and Salt River Base and meridian, Yavapai county, Arizona (See Exhibit 1). The site location falls within Arizona Water Company's Sedona service area.

DEMAND CALCULATIONS

Average Day Unit demand:	1.3 gpd/sf
Total Average Daily Demand:	0.59 gpm
Total Maximum Daily Demand:	1.18 gpm
Total Peak Hour Demand:	1.77 gpm
Peaking Factors:	Max Day = 2x(Average Daily Demand) Peak Hour = 3x(Average Daily Demand)

Per Arizona Water Company water demand per land use.

FIRE FLOW REQUIREMENTS

Per IFC Table B105.1(2)

Building Size:	650 sf
Building Type:	V-B

Building Fire Flow Requirement: 1,500 gpm for 2 hours,

Per approved fire authority letter (see Appendix B).

EXISTING WATER

There is an existing 6-inch cement asbestos water main north of the site that crosses Posse Ground Rd. There are a couple of fire hydrant assembly's northeast of the site at the rear parking lots of adjacent businesses. There is also a 12-inch DIP waterline the dead ends a little west of the site that lies within the ADOT right-of-way (ROW) of W Arizona 89A. See Exhibit 2 for the quarter section map of the existing system.

PROPOSED WATER

A 12-inch DIP water line will be tapped into the existing main north of the site and extended south within Posse Ground Rd. The proposed building will have a 1-inch copper domestic water meter with a 1-inch Backflow preventer and 1-inch water service line. A new fire hydrant assembly will be built near the northwest corner of the property.

WATER MODEL

A WaterCAD model was prepared to show the resultant pressure in the system with the proposed demand. A fire hydrant flow test was conducted, and the resultant data was used to set up a pump curve in WaterCAD to represent the supply. The model was used to analyze the Average Day (ADD), Maximum Day (MDD), Peak Hour (PHD), and Max Day with Fire Flow (MDD+FF). A calibration scenario was setup to ensure the model has similar results to the fire flow test. The proposed 12-inch fire line is sufficient to provide adequate fire sprinkler coverage. See Exhibit 3 for a layout of the water system onsite. Results from the WaterCAD model are included in Appendix A.

CONCLUSION

The proposed water main extension and services are designed and in compliance with the guidelines requested and outlined by the Arizona Water Company in the Arizona Water Company Specifications, as well as the Water Report Checklist.



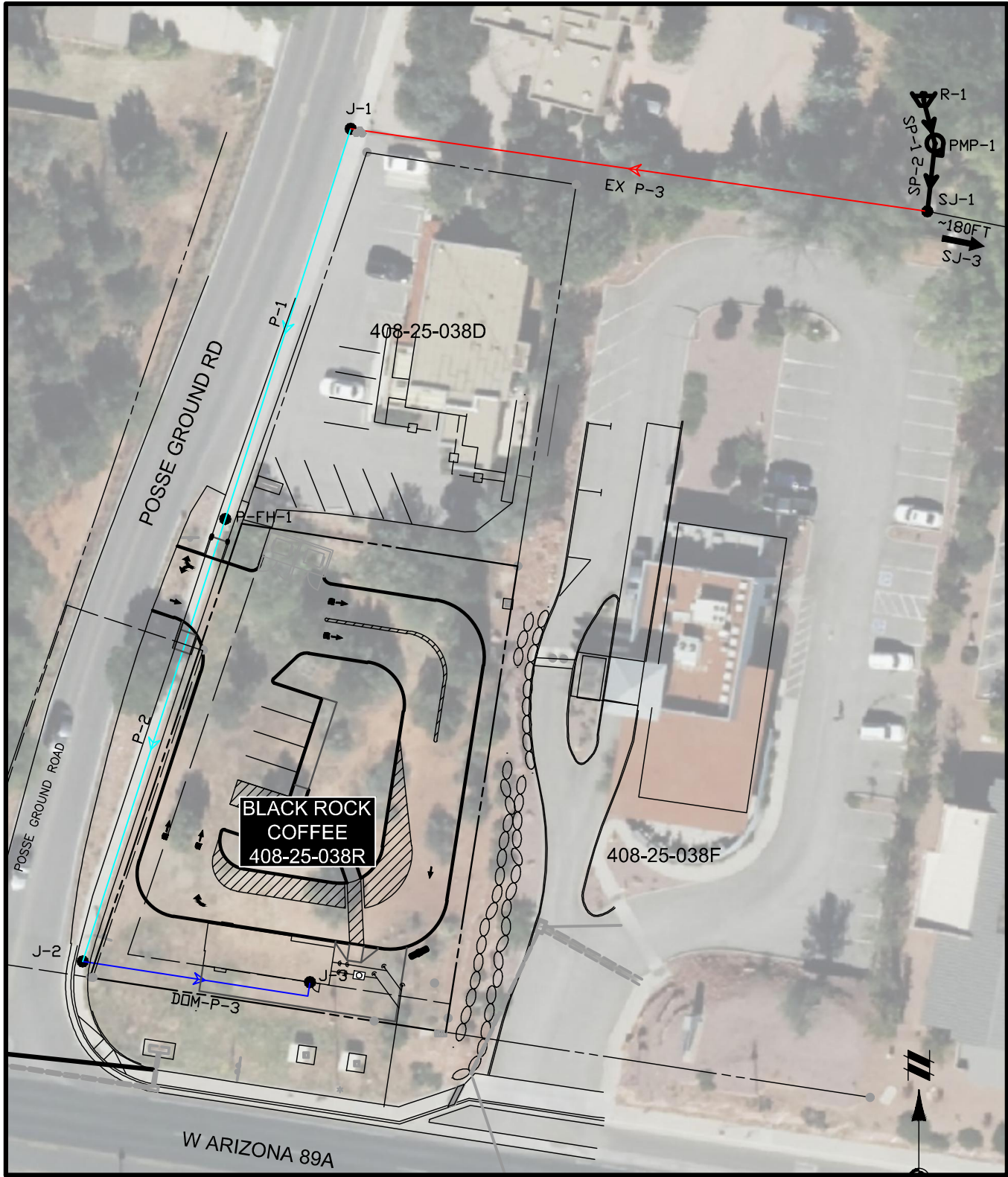
EXHIBIT 1 - VICINITY MAP
NOT TO SCALE




APPENDIX A

PROPOSED WATER DEMANDS WATER MODEL RESULTS

\\msk\proj\40000000 - hrs - on site & press ground - sedona az\project documents\water report\media\modelling\ScreenShot10/22/2004 1:01 PM PlotDate10/22/2004 1:04 PM



- EX 6" CEMENT ASBESTOS
- PROPOSED 12" DIP
- PROPOSED 1" COPPER SERVICE


 SCALE: 1" = 40'

WATER CAD MODEL LAYOUT

BLACK ROCK COFFEE
SEDONA, AZ



ATWELL

866.850.4200 www.atwell-group.com

FlexTable: Junction Table

Active Scenario: Static

Model.wtg

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Notes
SJ-1	0.00	4,442.00	4,658.92	94	Flow Hydrant
SJ-2	0.00	4,442.00	4,658.92	94	
SJ-3	0.00	4,442.00	4,658.92	94	Pressure Hydrant

FlexTable: Junction Table

Active Scenario: Tested

Model.wtg

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Notes
SJ-1	1,873.00	4,442.00	4,580.46	60	Flow Hydrant
SJ-2	0.00	4,442.00	4,580.46	60	
SJ-3	0.00	4,442.00	4,580.46	60	Pressure Hydrant

FlexTable: Junction Table

Active Scenario: Fire Flow

Model.wtg

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Notes
SJ-1	2,851.00	4,442.00	4,488.15	20	Flow Hydrant
SJ-2	0.00	4,442.00	4,488.15	20	
SJ-3	0.00	4,442.00	4,488.15	20	Pressure Hydrant

FlexTable: Junction Table

Active Scenario: ADD

Model.wtg

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Notes
J-1	0.00	4,442.00	4,658.92	94	
J-2	0.00	4,429.46	4,658.92	99	
J-3	0.59	4,427.76	4,658.88	100	
P-FH-1	0.00	4,432.70	4,658.92	98	
SJ-1	0.00	4,442.00	4,658.92	94	Flow Hydrant
SJ-2	0.00	4,442.00	4,658.92	94	
SJ-3	0.00	4,442.00	4,658.92	94	Pressure Hydrant

FlexTable: Pipe Table
Active Scenario: ADD
Model.wtg

Label	Dia (in)	Length (ft)	Start Node	Stop Node	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Headloss (ft)
DOM-P-3	1.0	85	J-2	J-3	Copper	135.0	0.59	0.24	0.444	0.04
EX P-1	6.0	137	SJ-1	SJ-2	CA	120.0	0.00	0.00	0.000	0.00
EX P-2	6.0	44	SJ-3	SJ-2	CA	120.0	0.00	0.00	0.000	0.00
EX P-3	6.0	204	SJ-1	J-1	CA	120.0	0.59	0.01	0.000	0.00
P-1	10.0	143	J-1	P-FH-1	Ductile Iron	120.0	0.59	0.00	0.000	0.00
P-2	12.0	163	P-FH-1	J-2	Ductile Iron	120.0	0.59	0.00	0.000	0.00
SP-1	42.0	19	R-1	PMP-1	Ductile Iron	130.0	0.59	0.00	0.000	0.00
SP-2	42.0	25	PMP-1	SJ-1	Ductile Iron	130.0	0.59	0.00	0.000	0.00

FlexTable: Pump Table

Active Scenario: ADD

Model.wtg

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	4,442.00	4,442.00	4,658.92	0.59	216.92

FlexTable: Junction Table

Active Scenario: MDD

Model.wtg

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Notes
J-1	0.00	4,442.00	4,658.92	94	
J-2	0.00	4,429.46	4,658.92	99	
J-3	1.17	4,427.76	4,658.78	100	
P-FH-1	0.00	4,432.70	4,658.92	98	
SJ-1	0.00	4,442.00	4,658.92	94	Flow Hydrant
SJ-2	0.00	4,442.00	4,658.92	94	
SJ-3	0.00	4,442.00	4,658.92	94	Pressure Hydrant

FlexTable: Pipe Table
Active Scenario: MDD
Model.wtg

Label	Dia (in)	Length (ft)	Start Node	Stop Node	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Headloss (ft)
DOM-P-3	1.0	85	J-2	J-3	Copper	135.0	1.17	0.48	1.598	0.14
EX P-1	6.0	137	SJ-1	SJ-2	CA	120.0	0.00	0.00	0.000	0.00
EX P-2	6.0	44	SJ-3	SJ-2	CA	120.0	0.00	0.00	0.000	0.00
EX P-3	6.0	204	SJ-1	J-1	CA	120.0	1.17	0.01	0.000	0.00
P-1	10.0	143	J-1	P-FH-1	Ductile Iron	120.0	1.17	0.00	0.000	0.00
P-2	12.0	163	P-FH-1	J-2	Ductile Iron	120.0	1.17	0.00	0.000	0.00
SP-1	42.0	19	R-1	PMP-1	Ductile Iron	130.0	1.17	0.00	0.000	0.00
SP-2	42.0	25	PMP-1	SJ-1	Ductile Iron	130.0	1.18	0.00	0.000	0.00

FlexTable: Pump Table

Active Scenario: MDD

Model.wtg

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	4,442.00	4,442.00	4,658.92	1.18	216.92

FlexTable: Junction Table

Active Scenario: PHD

Model.wtg

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Notes
J-1	0.00	4,442.00	4,658.92	94	
J-2	0.00	4,429.46	4,658.92	99	
J-3	1.76	4,427.76	4,658.63	100	
P-FH-1	0.00	4,432.70	4,658.92	98	
SJ-1	0.00	4,442.00	4,658.92	94	Flow Hydrant
SJ-2	0.00	4,442.00	4,658.92	94	
SJ-3	0.00	4,442.00	4,658.92	94	Pressure Hydrant

FlexTable: Pipe Table
Active Scenario: PHD
Model.wtg

Label	Dia (in)	Length (ft)	Start Node	Stop Node	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Headloss (ft)
DOM-P-3	1.0	85	J-2	J-3	Copper	135.0	1.76	0.72	3.381	0.29
EX P-1	6.0	137	SJ-1	SJ-2	CA	120.0	0.00	0.00	0.000	0.00
EX P-2	6.0	44	SJ-3	SJ-2	CA	120.0	0.00	0.00	0.000	0.00
EX P-3	6.0	204	SJ-1	J-1	CA	120.0	1.76	0.02	0.002	0.00
P-1	10.0	143	J-1	P-FH-1	Ductile Iron	120.0	1.76	0.01	0.000	0.00
P-2	12.0	163	P-FH-1	J-2	Ductile Iron	120.0	1.76	0.00	0.000	0.00
SP-1	42.0	19	R-1	PMP-1	Ductile Iron	130.0	1.77	0.00	0.000	0.00
SP-2	42.0	25	PMP-1	SJ-1	Ductile Iron	130.0	1.77	0.00	0.000	0.00

FlexTable: Pump Table

Active Scenario: PHD

Model.wtg

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	4,442.00	4,442.00	4,658.92	1.77	216.92

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: MDD+FF

Model.wtg

Label	Fire Flow (Needed) (gpm)	Flow (Total Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Available) (gpm)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (ft/s)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Junction w/ Minimum Pressure (Zone)	Satisfies Fire Flow?	Pressure (Calculated Residual) (psi)
P-FH-1	1,500.00	1,500.00	1,500.00	1,500.00	EX P-3	17.03	58	J-1	True	58

MAXIMUM VELOCITY OCCURS IN THE EXISTING 6-INCH WATER LINE.

FIRE FLOW VELOCITY IN PROPOSED PIPE

1,500gpm in a 12-inch water line

Flow Area: 0.785 sf

1,500gpm / 60min/second / 7.48gallons / CF = 3.34 cf/s

$Q=VA$; or $V=Q/A$

$V = 3.34 \text{ cf/s} / 0.785 \text{ sf} = 4.26 \text{ ft/s} < 8 \text{ ft/s (good)}$

APPENDIX B

FIRE FLOW TEST RESULTS
FIRE AUTHORITY LETTER

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name: Water Main Test
Project Address: West SR89A and Posse Ground Road, Sedona, Arizona 86336
Client Project No: Not Provided
Arizona Flow Testing Project No.: 24797
Date and Time flow test conducted: September 30, 2024 at 6:00 AM
Data is current and reliable until: March 30, 2025
Conducted by: Floyd Vaughan – Arizona Flow Testing (480-250-8154)
Witnessed by: David Lindner- Arizona Water Company (928-282-7092)

Raw Test Data

Static Pressure: **94.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **60.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **19.0 PSI**
(Measured in pounds per square inch)

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

Coefficient of Diffuser: 0.9

Flowing GPM: **1,873 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **2,851 GPM**

Data with 10 % Safety Factor

Static Pressure: **84.6 PSI**
(Measured in pounds per square inch)

Residual Pressure: **50.6 PSI**
(Measured in pounds per square inch)

Approx distance between hydrants: 160 Feet

Main size: Not Provided

Flowing GPM: **1,873 GPM**

GPM @ 20 PSI: **2,649 GPM**

Flow Test Location

