



FINAL Basis of Design Report

- ☐ APPROVED
- ☒ APPROVED AS NOTED
- ☐ REVISE AND RESUBMIT



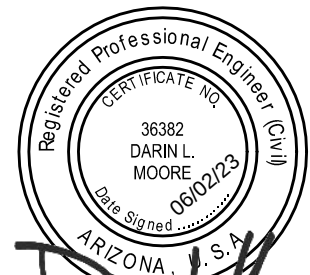
Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, 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 apritchard

DATE 7/16/2023

WATER DISTRIBUTION SYSTEM BASIS OF DESIGN REPORT FOR FAIRMONT SCOTTSDALE PRINCESS PARKING GARAGE

June 2, 2023
WP# 215319.40



EXPIRES 06-30-25

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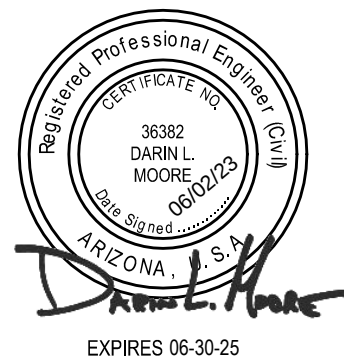
APPENDICES

APPENDIX A	Fire Hydrant Flow Test Results and Calculations
APPENDIX B	WaterCAD Modeling Results

EXHIBITS

EXHIBIT 1	Vicinity Map
EXHIBIT 2	Water Pipe Layout
EXHIBIT 3	WaterCAD Modeling Layout

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1.0 INTRODUCTION

The Fairmont Scottsdale Princess Parking Garage (Site) is a proposed multi-level parking structure on approximately 3.9 acres of the approximate 9.02-acre parcel of the FMT Scottsdale Owner LLC in the City of Scottsdale (APN#215-08-694). The project will include hardscape, landscape, and utility improvements to support the development. This Site is directly east of Princess Drive and Directly South of Princess Boulevard within Section 35, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to Exhibit 1 – *Vicinity Map* for the project location. The existing property, zoned C-2, is an existing parking lot with sidewalks and landscaping.

The design criteria used to estimate water demands and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (WOODPATEL's) understanding of the requirements listed in the *City of Scottsdale Design Standards and Policies Manual, 2018* Ref. 1).

The following is a summary of the primary design criteria utilized:

Fire Flow Demand:3,000 gpm (6,000 gpm * 50% reduction)

2.0 EXISTING WATER INFRASTRUCTURE

Existing water infrastructure adjacent to the Site includes existing 12-inch public water lines within Princess Drive and Princess Boulevard. The two (2) existing public 12-inch water mains connect at the intersection of the two roads. There is also an existing public 6-inch water main to the east which runs through the neighboring property. There are three (3) existing fire hydrants along Princess Drive and two (2) existing fire hydrants to the east in the neighboring property. Please refer to Exhibit 2 – *Water Pipe Layout* for a depiction of existing infrastructure.

3.0 PROPOSED WATER INFRASTRUCTURE

3.1 Onsite Water Infrastructure

A proposed 6-inch fire line will connect to the existing 12-inch water main within Princess Drive to serve the Site. The Site will not require a domestic service. Please refer to Exhibit 2 - *Water Pipe Layout* for representation of the proposed infrastructure.

3.2 Fire Demand Calculations

The fire flow calculations for the Site used the results from a fire hydrant flow test which shows a flow of 4350 gpm at 20 psi. The flow at 30 psi was calculated to be 3,876 gpm using the data from the flow test results. Refer to Appendix A – *Fire Hydrant Flow Test Results and Calculations*. With a building type of I-B and a total square footage of 320,700 square-feet, the fire flow requirement according to the International Fire Code (Ref. 2) is 6,000 gpm for the Site; 3,000 gpm with a 50% reduction for using a fire sprinkler system. Modeling results determined the Site achieves its fire flow requirement at or above the minimum pressure of 30 psi established by the City of Scottsdale. Refer to Appendix B – *WaterCAD Modeling Results*. Based on this information, there is sufficient supply to meet the demands for the Site.

4.0 CONCLUSIONS

Based on our analysis of the Site, the following conclusions can be made:

1. The design criteria used to estimate water demands and evaluate system hydraulics are based on the design criteria listed in the *City of Scottsdale Design Standards and Policies Manual, 2018*.
2. The proposed water infrastructure described is adequate to meet the fire flow requirements for the Site.

5.0 REFERENCES

1. *City of Scottsdale Design Standards and Policies Manual*, Scottsdale, AZ, 2018.
2. *International Fire Code Appendix B*, International Code Council, 2015.

APPENDIX A – FIRE HYDRANT FLOW TEST AND CALCULATIONS

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name: Fairmont Scottsdale Princess - Parking Structure
Project Address: 7575 East Princess Drive, Scottsdale, Arizona, 85255
Client Project No.: 215319.4
Arizona Flow Testing Project No.: 23093
Flow Test Permit No.: C71326
Date and time flow test conducted: February 6, 2023 at 6:20 AM
Data is current and reliable until: August 6, 2023
Conducted by: Floyd Vaughan-Az Flow Testing, LLC (480-250-8154)
Witnessed by: Sonny Schreiner – City of Scottsdale-Inspector (602-819-7718)

Raw Test Data

Static Pressure: **84.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **73.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **25.0 PSI**
(Measured in pounds per square inch)

+

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

Coefficient of Diffuser: 0.7875

Flowing GPM: **1,880 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **4,865 GPM**

Data with 12 PSI Safety Factor

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

Residual Pressure: **61.0 PSI**
(Measured in pounds per square inch)

Approx. distance between hydrants: 340 Feet

Main size: Not Provided

Flowing GPM: **1,880 GPM**

GPM @ 20 PSI: **4,349 GPM**

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

Flow Test Location

North ↑



EXISTING WATER SYSTEM PRESSURES

Project Fairmont Scottsdale Princess - Parking Structure
Location Scottsdale AZ
Project Number 215319.4
Project Engineer Darin Moore, P.E.

Flow Test Location

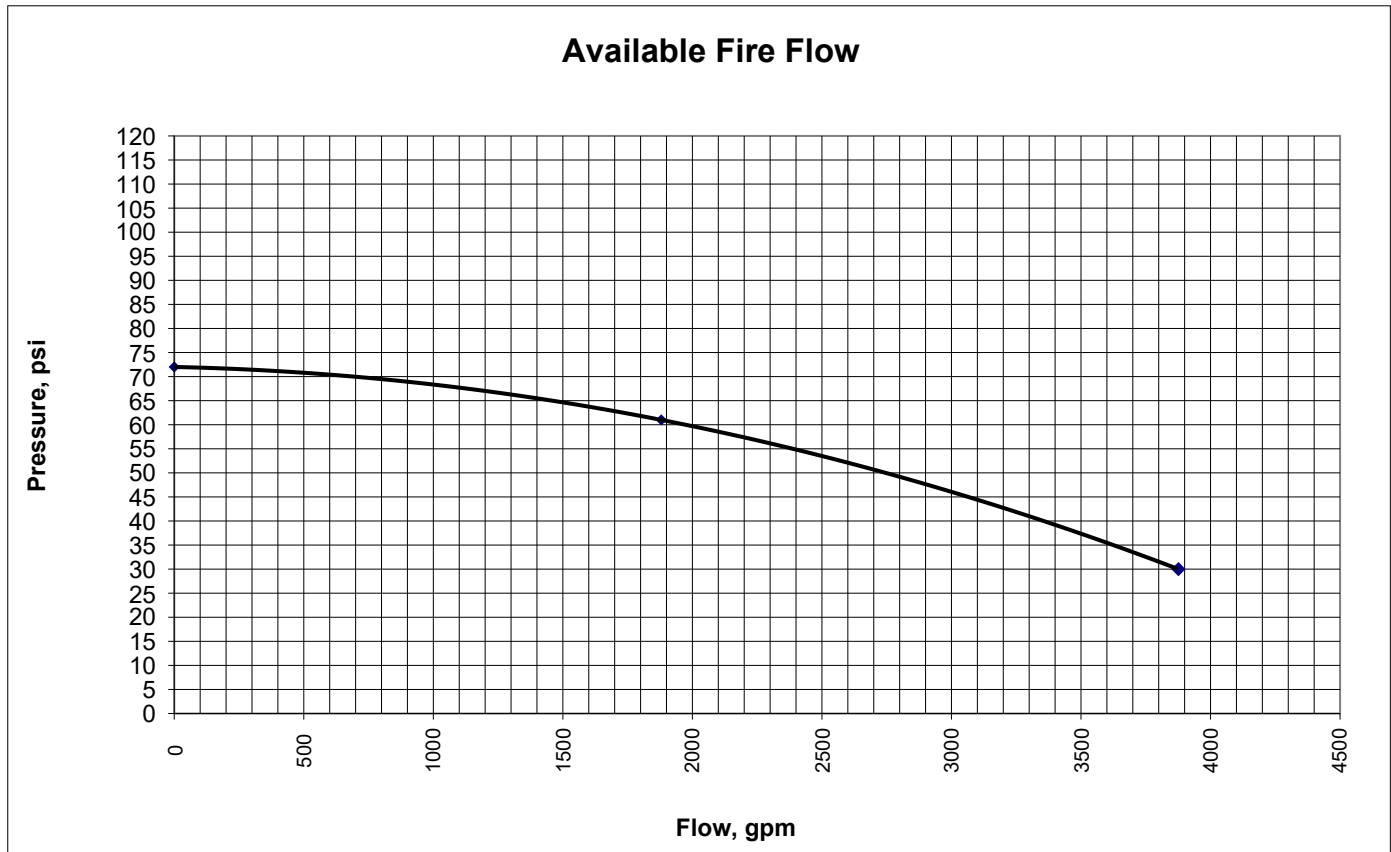
Date of Flow Test

Pressure Hydrant

Static Pressure (psi) 72.0
 Residual Pressure (psi) 61.0
 Calculated Flow at 30 psi 3876 gpm

Flow Hydrant

Flow (gpm) 1880
 Calculated Flow at 30 psi



Discharge (gpm)	Pressure (psi)	Head (ft)
0	72	166.2
1880	61	140.8
3876	30	69.3

Notes

- Values provided from a flow test by Arizona Flow Testing LLC

APPENDIX B – WATERCAD MODELING RESULTS

Fairmont Scottsdale Princess Water Master Plan - WaterCAD

FlexTable: Junction Table

Active Scenario: Calibration Static Model 2

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Pressure Head (ft)
Fire (Garage)	1,554.70	0	74	1,725.73	171.03
EX J-170	1,558.93	0	72	1,725.73	166.80
EX J-160	1,554.89	0	74	1,725.73	170.84
EX J-150	1,557.41	0	73	1,725.73	168.32
EX J-140	1,560.63	0	71	1,725.73	165.10
EX FH-11	1,557.90	0	73	1,725.73	167.83
EX FH-10	1,563.47	0	70	1,725.73	162.26
EX FH-7 (FLOW 2)	1,556.86	0	73	1,725.73	168.87
EX FH-6 (TEST 2)	1,559.33	0	72	1,725.73	166.40

Fairmont Scottsdale Princess Water Master Plan - WaterCAD

FlexTable: Junction Table

Active Scenario: Calibration Residual Model 2

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Pressure Head (ft)
Fire (Garage)	1,554.70	0	62	1,698.54	143.84
EX J-170	1,558.93	0	61	1,699.86	140.93
EX J-160	1,554.89	0	62	1,698.53	143.64
EX J-150	1,557.41	0	61	1,698.56	141.15
EX J-140	1,560.63	0	60	1,700.31	139.68
EX FH-11	1,557.90	0	61	1,698.56	140.66
EX FH-10	1,563.47	0	59	1,700.28	136.81
EX FH-7 (FLOW 2)	1,556.86	1,880	59	1,693.05	136.19
EX FH-6 (TEST 2)	1,559.33	0	61	1,700.33	141.00

Fairmont Scottsdale Princess Water Master Plan - WaterCAD

FlexTable: Junction Table

Active Scenario: Calibration Flow@20 Model 2

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Pressure Head (ft)
Fire (Garage)	1,554.70	0	18	1,597.33	42.63
EX J-170	1,558.93	0	19	1,603.56	44.63
EX J-160	1,554.89	0	18	1,597.27	42.38
EX J-150	1,557.41	0	17	1,597.43	40.02
EX J-140	1,560.63	0	20	1,605.70	45.07
EX FH-11	1,557.90	0	17	1,597.43	39.53
EX FH-10	1,563.47	0	18	1,605.56	42.09
EX FH-7 (FLOW 2)	1,556.86	4,349	6	1,571.36	14.50
EX FH-6 (TEST 2)	1,559.33	0	20	1,605.78	46.45

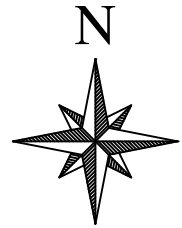
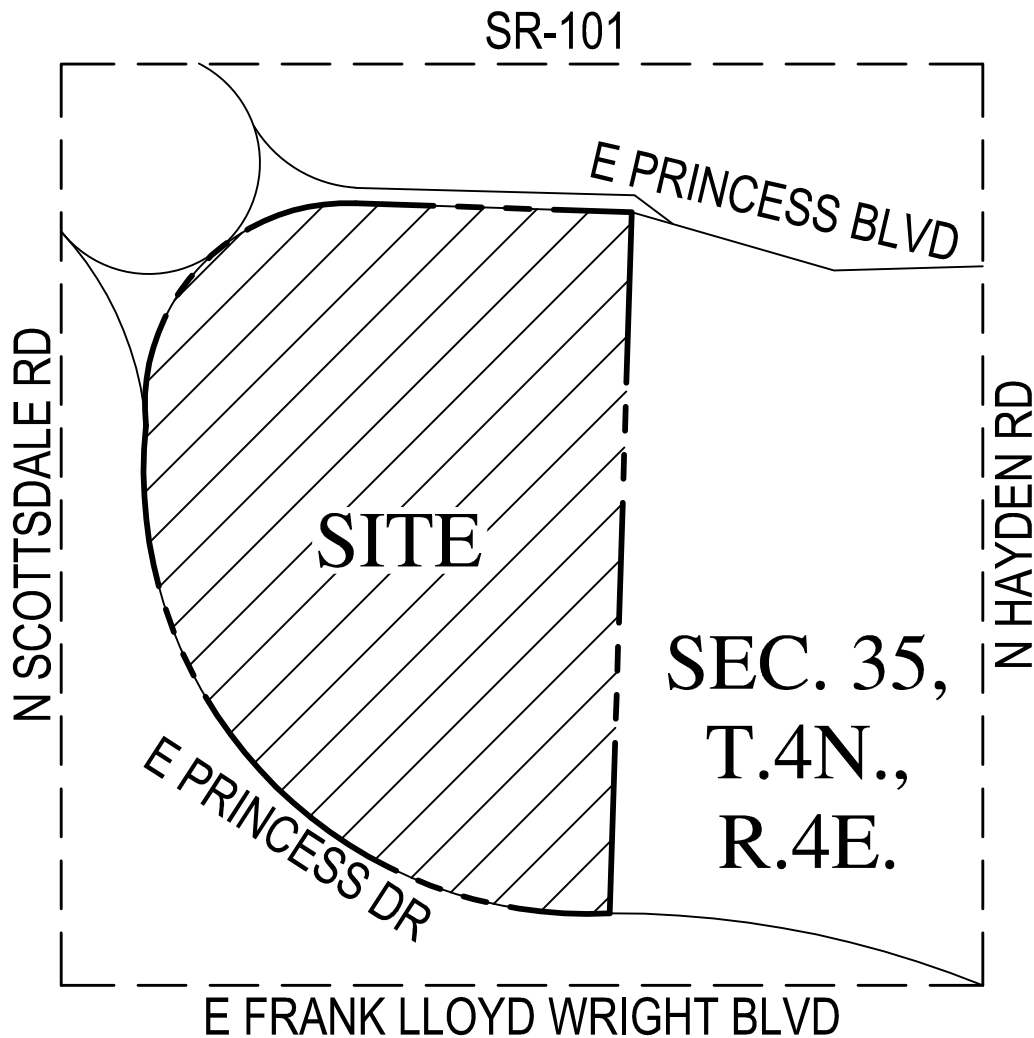
Fairmont Scottsdale Princess Water Master Plan - WaterCAD

Fire Flow Node FlexTable: Fire Flow Results Table

Active Scenario: Parking Structure (Model 2)

Label	Elevation (ft)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Hydraulic Grade (ft)
J-10	1,550.14	3,053	2,763	30	32	1,723.29
Fire (Villas and Bungalows)	1,553.13	3,000	2,664	30	31	1,723.30
Fire (Rooms Tower)	1,550.00	3,000	2,976	30	32	1,723.31
Fire (Roasterie)	1,559.64	3,000	2,350	30	30	1,723.30
Fire (Italian)	1,556.30	3,000	3,068	30	31	1,723.37
Fire (Garage)	1,554.70	3,000	3,257	30	31	1,723.58
Fire (Conf. Center)	1,556.46	3,000	2,869	30	30	1,723.35
FH-6	1,556.22	3,000	3,119	30	30	1,723.36
FH-5	1,556.39	3,000	2,879	30	30	1,723.35
FH-4	1,556.42	3,000	2,820	30	30	1,723.35
FH-3	1,556.46	3,000	2,875	30	30	1,723.35
FH-2	1,553.15	3,000	2,877	30	32	1,723.31
FH-1	1,552.65	3,000	2,875	30	30	1,723.31
EX J-194	1,556.60	3,000	3,128	30	30	1,723.37
EX J-190	1,556.35	3,191	3,315	30	30	1,723.36
EX J-170	1,558.93	3,000	3,294	30	31	1,723.62
EX J-160	1,554.89	3,000	3,286	30	32	1,723.58
EX J-150	1,557.41	3,000	3,171	30	30	1,723.58
EX J-140	1,560.63	3,000	3,218	30	31	1,723.59
EX J-130	1,558.03	3,000	3,155	30	30	1,723.47
EX J-120	1,556.34	3,000	3,086	30	31	1,723.39
EX J-110	1,556.50	3,000	3,053	30	31	1,723.35
EX J-100	1,550.00	3,000	2,983	30	33	1,723.31
EX J-90	1,547.00	3,000	2,961	30	32	1,723.31
EX J-80	1,542.85	3,000	2,947	30	32	1,723.31
EX J-70	1,542.85	3,000	2,807	30	30	1,723.31
EX J-54	1,555.20	3,000	2,632	30	31	1,723.30
EX J-50	1,552.03	3,000	2,866	30	30	1,723.31
EX J-40	1,552.55	3,000	2,891	30	31	1,723.31
EX J-34	1,553.36	3,000	2,883	30	32	1,723.31
EX J-30	1,553.00	3,000	2,920	30	32	1,723.31
EX J-20	1,553.00	3,000	2,946	30	32	1,723.31
EX J-10	1,552.00	3,192	3,184	30	33	1,723.31
EX FH-11	1,557.90	3,000	3,161	30	30	1,723.58
EX FH-10	1,563.47	3,000	3,081	30	30	1,723.59
EX FH-7 (FLOW 2)	1,556.86	3,000	3,185	30	30	1,723.46
EX FH-6 (TEST 2)	1,559.33	3,000	3,299	30	32	1,723.63
EX FH-5	1,558.03	3,000	3,154	30	30	1,723.47
EX FH-4	1,557.29	3,000	3,123	30	31	1,723.44
EX FH-3 (FLOW 1)	1,550.00	3,000	2,984	30	33	1,723.31
EX FH-2	1,542.85	3,000	2,728	30	30	1,723.31
EX FH-1 (TEST 1)	1,547.30	3,000	2,964	30	32	1,723.31
Domestic (Villas and Bungalows)	1,553.30	3,000	2,882	30	32	1,723.31
Domestic (Rooms Tower)	1,550.00	3,000	2,975	30	32	1,723.31
Domestic (Roasterie)	1,560.25	3,015	2,335	30	30	1,723.30
Domestic (Italian)	1,556.30	3,037	3,104	30	31	1,723.37
Domestic (Conf. Center)	1,556.46	3,000	2,880	30	30	1,723.35

EXHIBIT 1 – VICINITY MAP



VICINITY MAP

N.T.S.

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OR RECORDING**



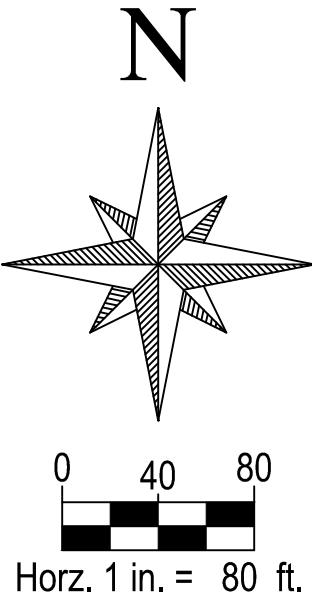
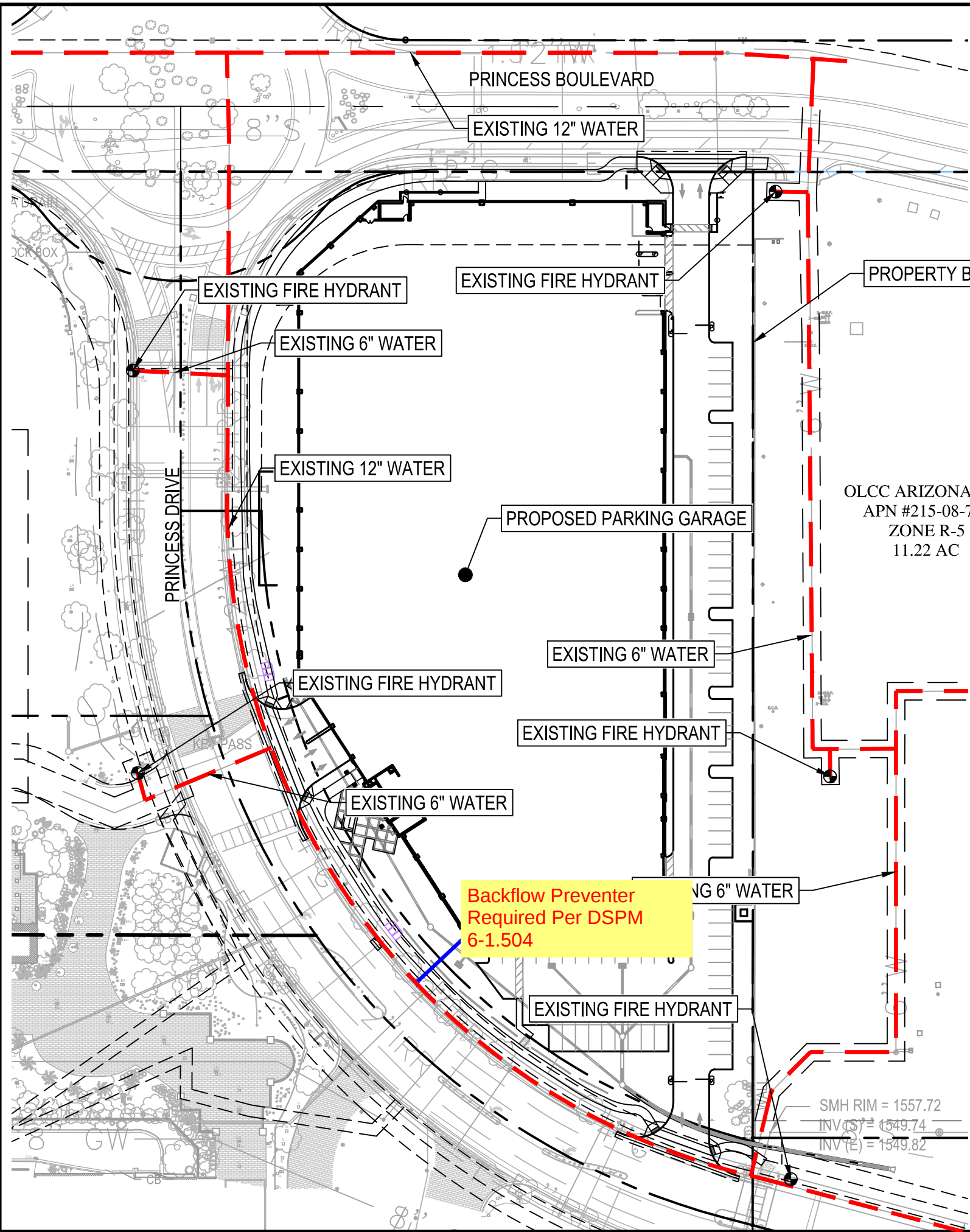
FAIRMONT SCOTTSDALE PRINCESS

PARKING GARAGE VICINITY MAP EXHIBIT

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		DRAWN	NTS	RFI #	

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EXHIBIT 2 – WATER PIPE LAYOUT



LEGEND

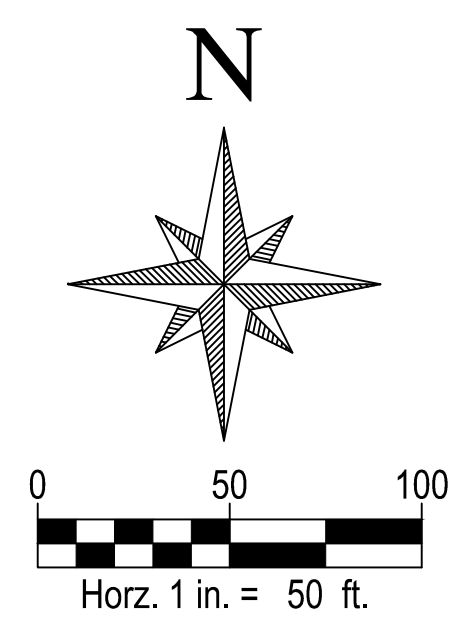
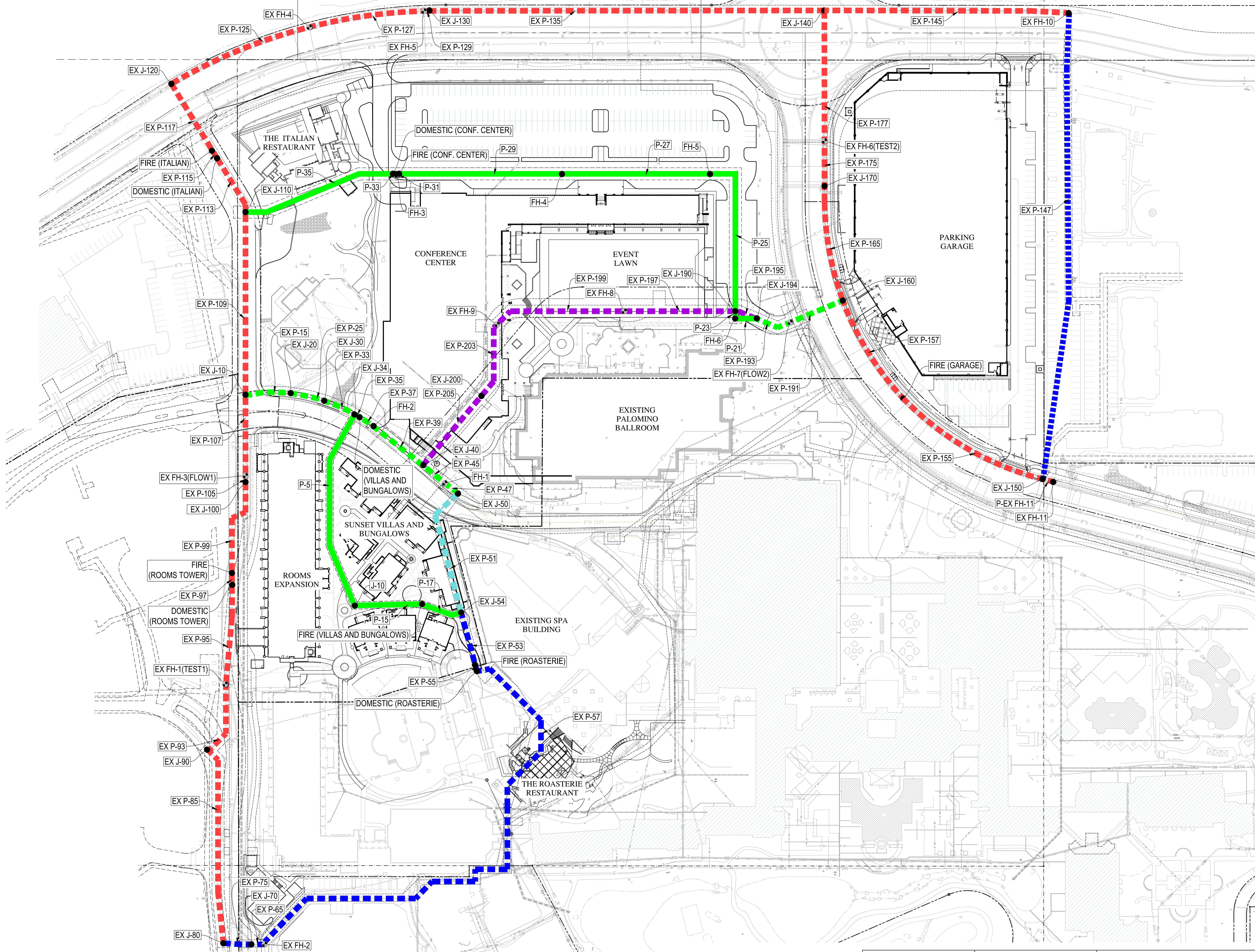
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- PROPOSED 6" FIRE LINE
- PROPERTY BOUNDARY

NOT
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CONSTRUCTION
OR RECORDING



FAIRMONT SCOTTSDALE PRINCESS			
EXHIBIT 2 – WATER PIPE LAYOUT			
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JOB NO.	215319.40	DESIGN	RS
SHEET	01 OF 01	DRAWN	AJS
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EXHIBIT 3 – WATERCAD MODELING LAYOUT



LEGEND

- PROPOSED 8" WATER PIPE
- EXISTING 8" WATER PIPE
- EXISTING 8" WATER PIPE
- EXISTING 12" WATER PIPE
- EXISTING 6" WATER PIPE TO BE REMOVED
- EXISTING 8" WATER PIPE TO BE REMOVED
- J-XX JUNCTION NODE AND LABEL
- P-XX PIPE LABEL
- FH-XX FIRE HYDRANT LABEL

NOT
FOR
CONSTRUCTION
OR RECORDING

WOOD
PATEL

FAIRMONT SCOTTSDALE PRINCESS

EXHIBIT 3 – WATERCAD MODELING LAYOUT

DATE	06/02/2023	SCALE	1" = 50'	SHEET	1 OF 1
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