

February 13, 2023

SMOKE TREE RESORT

Town of Paradise Valley, AZ

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Job #:1-01-03153-01



Preliminary Drainage Report
For
SMOKE TREE RESORT
Paradise Valley, Arizona

February 13, 2023

Prepared for:

Gentree, LLC

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**Preliminary Drainage Report for
Smoke Tree Resort**

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1.0 INTRODUCTION

1.1 SCOPE

Coe & Van Loo Consultants, Inc. (CVL) has been contracted by Gentree, LLC to provide engineering services in support of the proposed improvements to Smoke Tree Resort, herein referred to as the site. The purpose of this report is to provide on-site and off-site hydrologic and hydraulic analysis for the proposed development.

This report is focused on providing design information, evaluation, and analysis for statistical flood events up to and including the 100-year storm. The scope of this assessment does not include, neither did CVL's client request that, evaluation of storm-water runoff resulting from storm events exceeding the 100-year frequency event. Hence, it should be noted that a storm event exceeding the 100-year frequency may cause or create the risk of greater flood impact than is addressed and presented in this assessment.

The procedures used herein are derived from, and performed with, currently accepted engineering methodologies and practices.

1.2 REGULATORY JURISDICTION

The development is designed to meet the drainage requirements as stated in the Town of Paradise Valley's *Storm Drain Design Manual (2018)* [1] and Flood Control District of Maricopa County (FCDMC), *Drainage Design Manuals for Maricopa County, Arizona, Volume I, Hydrology* [2], *Volume II, Hydraulics* [3], and *Drainage Policies and Standards Manual for Maricopa County, Arizona* [4].

2.0 SITE CONDITIONS

2.1 LOCATION

The site is located within the Town of Paradise Valley, Maricopa County, Arizona. The site is bordered on the north by Lincoln Drive, on the east by commercial property, on the south by the Andaz Resort Hotel and on the west by Quail Run Road and custom residences. Furthermore, the site is located within Section 10, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Arizona.

2.2 EXISTING CONDITIONS

A field reconnaissance of the existing resort complex on approximately 4.61 acres of existing special use permit land and its surroundings was performed on February 5th, 2019. It was observed that the site and surrounding properties are flat and generally drain to east then to the north towards Lincoln Drive. The resort's landscaping is characterized by hedges around all but the north perimeter, mature trees throughout the site and open space consisting of lawn and dirt drive lanes and parking.

2.3 PROPOSED CONDITIONS

The resort was originally opened in 1966 and has yet to undergo any significant renovations beyond general maintenance measures. The resort is notably dated and in need of renovations and refurbishment of amenities. The vision for the transformation of the Smoke Tree Resort is to welcome guests to a four-star "local-centric" hospitality experience in both form and substance. This is to be achieved through active forward-facing components and lifestyle programmatic aspects. The existing resort often goes unnoticed in its unassuming character along Lincoln Drive, with only 23 of its 32 guest rooms currently in use. The revitalization of the site will retain its charming essence while providing the scale and quality of amenities sought by today's traveler; the specifics of which include 122 total keys, a restaurant, and a special events pavilion.

3.0 FLOOD ZONE INFORMATION

The Maricopa County, Arizona and Incorporated Areas Flood Insurance Rate Map (FIRM), panel numbers 04013C1770L, Map Revised October 16, 2013 [5], indicates the site falls within Zone D.

Zone D is defined by FEMA as:

"The Zone D designation is used for areas where there are possible but undetermined flood hazards, as no analysis of flood hazards has been conducted. The Zone D designation is also used when a community incorporates portions of another community's area where no map has been prepared."

Refer to **Figure 2** for a copy of the Flood Insurance Rate Map (FIRM).

4.0 OFFSITE AND ONSITE RUNOFF

4.1 OFFSITE RUNOFF MANAGEMENT PLAN

The offsite watershed affecting the site is urbanized by mainly low density custom residential lots to the west. These residential lots are flat with no concentrated flow paths. During the field reconnaissance, it was observed that some of the custom residences with perimeter block walls have weepholes that may keep flow moving through their sites while others residences do not allow flow to pass through. Based on the review of general topography, the upstream watershed and street slopes, it has been determined that there will be no significant off-site flow to the project site.

Quail Run Road slopes generally to the north and south from the project. The road will be improved with ribbon curb from Lincoln Drive to the south boundary of the site. Off-site flows will direct any minimal amount of flows from reaching Quail Run Road to the north and south similar to the existing condition, so that flows will not reach the project site. Additionally, in the case where some minor flows will reach the project site, a small sump condition is proposed for Quail Run Road to that will include a small storm drain inlet to convey flows into the onsite storage which will be oversized to accommodate extra volume of stored runoff.

4.2 ONSITE RUNOFF MANAGEMENT PLAN

The resort was developed in 1966 when drainage regulations were non-existent. The site has a single small drain located just south of the abandoned restaurant building for localized flow which is to be removed as part of this project. The remainder of the site is graded to drain to the east. The site currently provides no onsite retention. The proposed improvements to the resort will utilize parking and drive corridors as drainage pathways to drain flow to the east and north where runoff will be captured by grated catch basins. The flow from the catch basins will be retained by 10-ft diameter underground tanks. Stormwater runoff from rooftops will drain into roof drains then by a storm sewer system out falling to the underground storages. The site will be graded so that stormwater runoff that falls between buildings will drain towards the parking lots.

Underground storages will be designed to dispose of the storm water within 36 hours through drywells. During construction, percolation rate tests will be performed to verify the infiltration rate per drywell. Constant head percolation tests may be submitted to Town of Paradise Valley for consideration of the reduction in the number of required drywells based on the test results.

The rainfall data is based on NOAA Atlas 14 values with 2.19 inches of precipitation depth for the 100-year, 2-hour storm event (see **Appendix A**). The runoff coefficients used for this site is 0.95, as indicated on Table 3.2 of the *Drainage Design Manual for Maricopa County*. Retention and drywell calculations can be found in **Appendix B**. Refer to **Appendix B** for runoff coefficients.

5.0 STORM WATER POLLUTION PREVENTION PLAN

During final engineering design, the Storm Water Pollution Prevention Plan (SWPPP) will be prepared and submitted for approval.

6.0 SUMMARY AND CONCLUSIONS

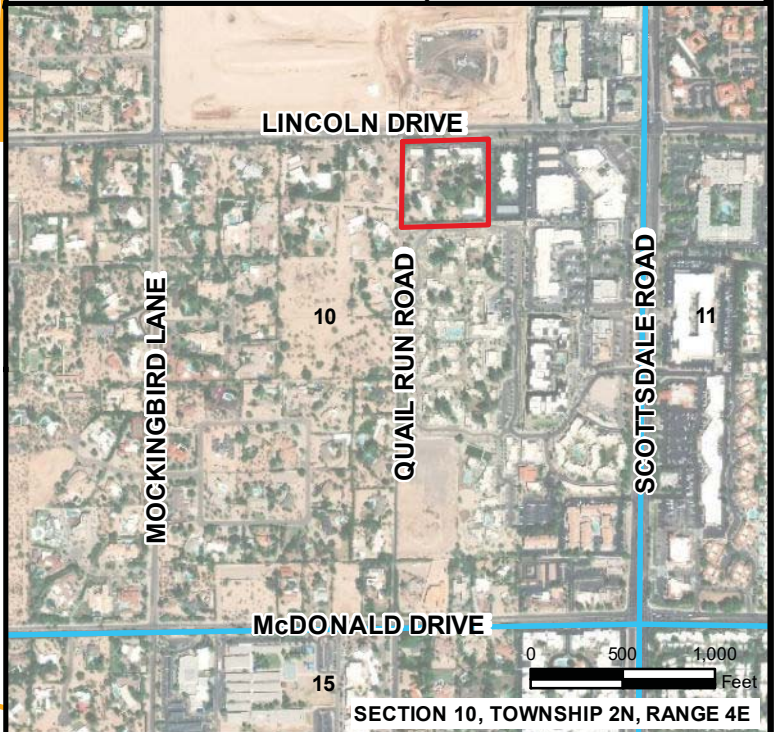
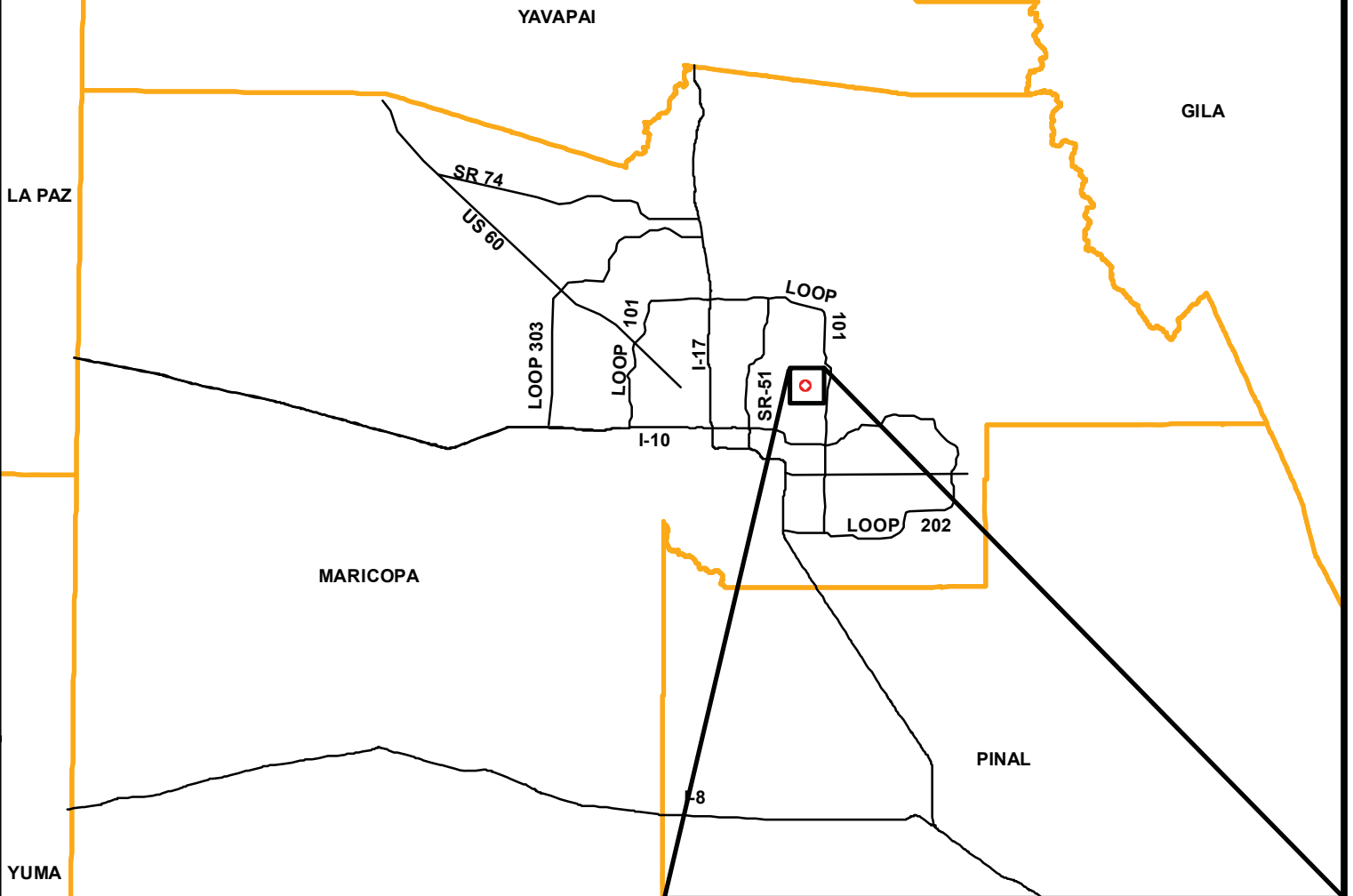
1. Underground storages are provided for the 100-year, 2-hour storm.
2. Underground storages are designed to drain within 36 hours.
3. According to the FIRM panel number 04013C1770L, Map Revised: October 16, 2013, the site is located in Zone D.
4. All finished floor elevations (FFE) will be at least 14 inches above the lowest drainage outfall for the site.

7.0 REFERENCES

- [1] Town of Paradise Valley, "Storm Drain Design Manual," June 2018.
- [2] Flood Control District of Maricopa County, "Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology," December 14, 2018.
- [3] Flood Control District of Maricopa County, Arizona, "Drainage Design Manual for Maricopa County, Volume II, Hydraulics," December 14, 2018.
- [4] Flood Control District of Maricopa County, "Drainage Policies and Standards," Revised August 22, 2018.
- [5] Federal Emergency Management Agency (FEMA), "National Flood Insurance Program, Flood Insurance Rate Map, Maricopa County, Arizona and Incorporated Areas, Panel Number 04013C1770L," Revised October 16, 2013.

FIGURES

CVL



Legend



SITE

— FREEWAY/MAJOR ROADS

— COUNTY BOUNDARY



SECTION ID



0 10 20
Miles



4550 NORTH 12TH STREET
PHOENIX, ARIZONA 85014
TELEPHONE (602) 264-6831

SMOKE TREE RESORT


VICINITY & LOCATION MAP

JOB NO.

01-03153-01

FIGURE 1

Legend

 SMOKE TREE RESORT

10

LINCOLN DRIVE

LINCOLN DR

24536-1

SCOTTS DALE ROAD

ROSE LN

ZONE D

TOWN OF PARADISE VALLEY
040049

24547-1

MCDONALD DRIVE

DU1341

PANEL 1770L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY,

ARIZONA

AND INCORPORATED AREAS

PANEL 1770 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	FLOOD	PANEL	SHEET
MARICOPA COUNTY	040049	1770	L
PARADISE VALLEY TOWN OF	040049	1770	L
250788A F.O.T.V. OF	040049	1770	L

Revised: Use the Map Number shown below should be used after 2013 1231 2013. The Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
04013C1770L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

SMOKE TREE RESORT

FLOOD INSURANCE RATE MAP

JOB NO.

1.01.03153.01

FIGURE 2



4550 NORTH 12TH STREET
PHOENIX, ARIZONA 85014
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APPENDICES

CVL

APPENDIX A

NOAA Atlas 14 Rainfall Data



NOAA Atlas 14, Volume 1, Version 5
Location name: Paradise Valley, Arizona, USA*
Latitude: 33.5306°, Longitude: -111.9293°
Elevation: 1310.38 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.186 (0.156-0.228)	0.243 (0.204-0.298)	0.331 (0.275-0.403)	0.397 (0.329-0.482)	0.487 (0.397-0.589)	0.556 (0.447-0.668)	0.627 (0.495-0.752)	0.700 (0.543-0.837)	0.796 (0.602-0.954)	0.870 (0.645-1.04)
10-min	0.284 (0.237-0.347)	0.371 (0.311-0.454)	0.503 (0.419-0.613)	0.605 (0.500-0.734)	0.742 (0.604-0.896)	0.847 (0.681-1.02)	0.955 (0.754-1.15)	1.07 (0.827-1.27)	1.21 (0.916-1.45)	1.32 (0.981-1.59)
15-min	0.352 (0.294-0.430)	0.459 (0.386-0.562)	0.624 (0.519-0.760)	0.750 (0.620-0.910)	0.919 (0.749-1.11)	1.05 (0.844-1.26)	1.18 (0.935-1.42)	1.32 (1.02-1.58)	1.50 (1.14-1.80)	1.64 (1.22-1.97)
30-min	0.473 (0.396-0.579)	0.619 (0.520-0.757)	0.840 (0.699-1.02)	1.01 (0.835-1.23)	1.24 (1.01-1.50)	1.41 (1.14-1.70)	1.60 (1.26-1.91)	1.78 (1.38-2.13)	2.02 (1.53-2.42)	2.21 (1.64-2.65)
60-min	0.586 (0.490-0.717)	0.766 (0.643-0.937)	1.04 (0.865-1.27)	1.25 (1.03-1.52)	1.53 (1.25-1.85)	1.75 (1.41-2.10)	1.97 (1.56-2.37)	2.20 (1.71-2.63)	2.50 (1.89-3.00)	2.74 (2.03-3.29)
2-hr	0.680 (0.577-0.814)	0.881 (0.748-1.06)	1.18 (0.995-1.41)	1.40 (1.17-1.67)	1.71 (1.42-2.03)	1.95 (1.59-2.30)	2.19 (1.76-2.59)	2.44 (1.92-2.88)	2.77 (2.13-3.27)	3.03 (2.28-3.60)
3-hr	0.748 (0.632-0.906)	0.959 (0.814-1.17)	1.26 (1.06-1.52)	1.49 (1.25-1.80)	1.83 (1.50-2.18)	2.09 (1.70-2.49)	2.37 (1.89-2.82)	2.65 (2.08-3.15)	3.05 (2.32-3.62)	3.37 (2.50-4.01)
6-hr	0.900 (0.777-1.07)	1.14 (0.985-1.35)	1.46 (1.25-1.72)	1.71 (1.46-2.01)	2.06 (1.73-2.40)	2.33 (1.93-2.71)	2.62 (2.13-3.04)	2.91 (2.33-3.38)	3.30 (2.58-3.84)	3.61 (2.75-4.21)
12-hr	1.00 (0.875-1.17)	1.27 (1.10-1.48)	1.61 (1.39-1.87)	1.87 (1.61-2.17)	2.23 (1.90-2.58)	2.50 (2.10-2.89)	2.78 (2.31-3.21)	3.07 (2.51-3.54)	3.45 (2.75-4.01)	3.75 (2.94-4.38)
24-hr	1.19 (1.05-1.38)	1.52 (1.33-1.75)	1.96 (1.72-2.27)	2.32 (2.02-2.68)	2.81 (2.44-3.24)	3.20 (2.75-3.68)	3.60 (3.08-4.15)	4.02 (3.41-4.63)	4.60 (3.85-5.30)	5.06 (4.20-5.84)
2-day	1.29 (1.13-1.48)	1.65 (1.45-1.90)	2.16 (1.90-2.49)	2.58 (2.25-2.96)	3.15 (2.74-3.62)	3.61 (3.11-4.14)	4.10 (3.51-4.70)	4.60 (3.91-5.28)	5.31 (4.46-6.10)	5.87 (4.88-6.77)
3-day	1.37 (1.20-1.57)	1.75 (1.54-2.01)	2.31 (2.02-2.65)	2.76 (2.40-3.16)	3.38 (2.94-3.87)	3.89 (3.35-4.45)	4.43 (3.79-5.07)	4.99 (4.24-5.72)	5.79 (4.86-6.63)	6.43 (5.34-7.39)
4-day	1.45 (1.27-1.66)	1.86 (1.63-2.13)	2.45 (2.15-2.80)	2.93 (2.56-3.35)	3.62 (3.14-4.13)	4.17 (3.59-4.76)	4.76 (4.07-5.43)	5.39 (4.57-6.16)	6.27 (5.26-7.16)	6.99 (5.80-8.01)
7-day	1.63 (1.43-1.87)	2.08 (1.82-2.39)	2.76 (2.40-3.17)	3.30 (2.87-3.79)	4.08 (3.52-4.67)	4.70 (4.04-5.37)	5.36 (4.57-6.14)	6.07 (5.13-6.96)	7.07 (5.90-8.10)	7.87 (6.51-9.04)
10-day	1.76 (1.54-2.02)	2.25 (1.98-2.58)	2.98 (2.60-3.40)	3.56 (3.10-4.07)	4.38 (3.80-4.99)	5.04 (4.34-5.72)	5.74 (4.91-6.53)	6.47 (5.50-7.37)	7.50 (6.29-8.54)	8.33 (6.92-9.50)
20-day	2.17 (1.91-2.47)	2.79 (2.46-3.18)	3.69 (3.25-4.20)	4.37 (3.83-4.96)	5.29 (4.62-6.00)	6.00 (5.21-6.80)	6.72 (5.81-7.63)	7.45 (6.41-8.47)	8.44 (7.20-9.61)	9.20 (7.79-10.5)
30-day	2.54 (2.23-2.89)	3.27 (2.87-3.72)	4.31 (3.78-4.90)	5.11 (4.47-5.79)	6.17 (5.37-7.00)	7.00 (6.07-7.92)	7.84 (6.77-8.87)	8.70 (7.47-9.83)	9.86 (8.40-11.2)	10.7 (9.10-12.2)
45-day	2.93 (2.59-3.32)	3.78 (3.33-4.28)	4.98 (4.39-5.64)	5.87 (5.17-6.64)	7.05 (6.18-7.97)	7.94 (6.93-8.98)	8.84 (7.68-10.00)	9.74 (8.43-11.0)	10.9 (9.39-12.4)	11.8 (10.1-13.5)
60-day	3.23 (2.86-3.64)	4.17 (3.70-4.71)	5.49 (4.86-6.19)	6.45 (5.70-7.28)	7.71 (6.79-8.68)	8.64 (7.57-9.73)	9.57 (8.36-10.8)	10.5 (9.12-11.8)	11.7 (10.1-13.2)	12.6 (10.8-14.3)

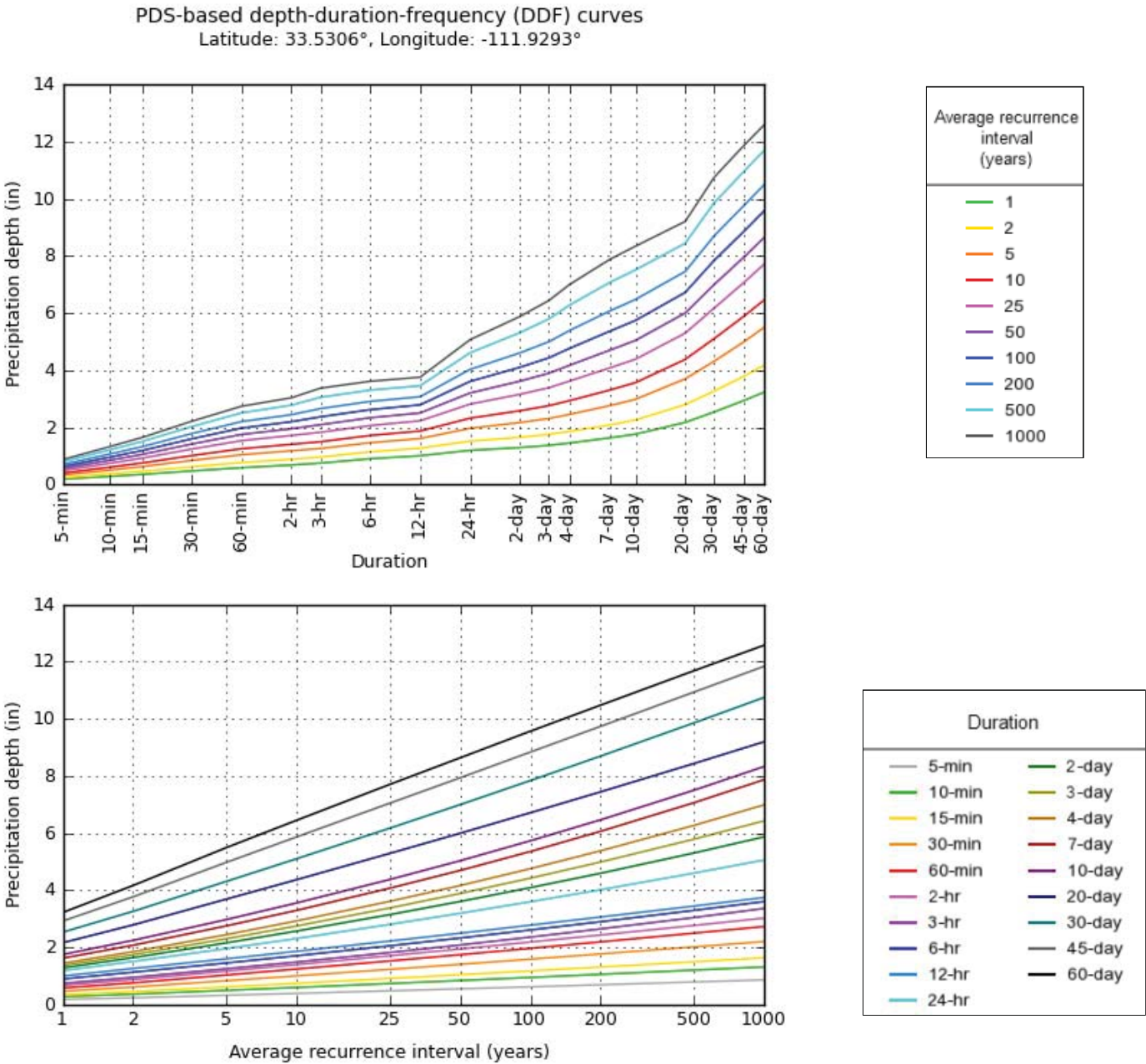
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

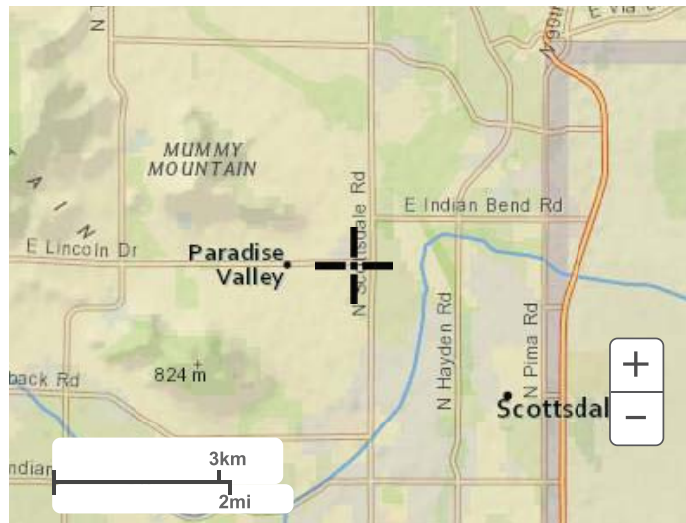
[Back to Top](#)

PF graphical



Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

APPENDIX B

Runoff Coefficients, Retention and Drywell Calculations, VortSentry(R) HS Stormwater Treatment Detail

Table 3.2
RUNOFF COEFFICIENTS FOR MARICOPA COUNTY

Land Use Code	Land Use Category	Runoff Coefficients by Storm Frequency ^{1, 2}							
		2-10 Year		25 Year		50 Year		100 Year	
		min	max	min	max	min	max	min	max
VLDR	Very Low Density Residential ^{3, 4}	0.33	0.42	0.36	0.50	0.40	0.60	0.45	0.65
LDR	Low Density Residential ^{3, 4}	0.42	0.48	0.46	0.55	0.50	0.64	0.53	0.70
MDR	Medium Density Residential ^{3, 4}	0.48	0.65	0.53	0.72	0.58	0.78	0.60	0.80
MFR	Multiple Family Residential ^{3, 4}	0.65	0.75	0.72	0.83	0.78	0.90	0.82	0.94
I1	Industrial 1 ³	0.60	0.70	0.66	0.77	0.72	0.84	0.75	0.88
I2	Industrial 2 ³	0.70	0.80	0.77	0.88	0.84	0.95	0.88	0.95
C1	Commercial 1 ³	0.55	0.65	0.61	0.72	0.66	0.78	0.69	0.81
C2	Commercial 2 ³	0.75	0.85	0.83	0.94	0.90	0.95	0.94	0.95
P	Pavement and Rooftops	0.75	0.85	0.83	0.94	0.90	0.95	0.94	0.95
GR	Gravel Roadways & Shoulders	0.60	0.70	0.66	0.77	0.72	0.84	0.75	0.88
AG	Agricultural	0.10	0.20	0.11	0.22	0.12	0.24	0.13	0.25
LPC	Lawns/Parks/Cemeteries	0.10	0.25	0.11	0.28	0.12	0.30	0.13	0.31
DL1	Desert Landscaping 1	0.55	0.85	0.61	0.94	0.66	0.95	0.69	0.95
DL2	Desert Landscaping 2	0.30	0.40	0.33	0.44	0.36	0.48	0.38	0.50
NDR	Undeveloped Desert Rangeland	0.30	0.40	0.33	0.44	0.36	0.48	0.38	0.50
NHS	Hillslopes, Sonoran Desert	0.40	0.55	0.45	0.60	0.48	0.66	0.50	0.70
NMT	Mountain Terrain	0.50	0.70	0.65	0.80	0.70	0.90	0.75	0.90

Notes:

- Runoff coefficients for 25-, 50- and 100-Year storm frequencies were derived using adjustment factors of 1.10, 1.20 and 1.25, respectively, applied to the 2-10 Year values with an upper limit of 0.95.
- The ranges of runoff coefficients shown for urban land uses were derived from lot coverage standards specified in the zoning ordinances for Maricopa County.
- Runoff coefficients for urban land uses are for lot coverage only and do not include the adjacent street and right-of-way, or alleys.
- Values are based on the NDR terrain class. Values should be increased for NHS and NMT terrain classes by the difference between NHS (or NMT) and the NDR C values, up to a maximum of 0.95. Engineering judgement should be used.
- Maricopa County has adopted specific values of C for each land use and storm frequency in the Drainage Policies and Standards for Maricopa County, Arizona (Maricopa County, 2007). These are the standard default values. The engineer/hydrologist may develop a computed composite value of C based on actual land uses, but must fully document the computations and assumptions and submit them to Maricopa County for approval. Many jurisdictions in Maricopa County may have adopted specific C coefficient values and procedures. The user should check with the appropriate agency before proceeding.

SMOKE TREE RESORT

Underground Storage Volume Calculations

Development Condition	Drainage ⁽¹⁾ Area A (acres)	Drainage ⁽¹⁾ Area A (feet ²)	Runoff ⁽²⁾ Coefficient C	Precipitation ⁽³⁾ Depth P (inches)	Volume ⁽⁴⁾ Required V _{req} (acre-ft)	Volume ⁽⁴⁾ Required V _{req} (cubic feet)	Retention Basin/Tank ID	Volume per lf of 10.00 ft dia pipe (ft ²)	Linear feet Provided 10.00 ft dia pipe	Volume ⁽⁵⁾ Provided V _{prov} (acre-ft)	Volume ⁽⁵⁾ Provided V _{prov} (cubic feet)
1	5.09	221567	0.95	2.19	0.88	38,414	UG1	78.54	85	0.15	6,676
							UG2	78.54	89	0.16	6,990
							UG3	78.54	59	0.11	4,634
							UG4	78.54	77	0.14	6,048
							UG5	78.54	244	0.44	19,164
							UG6	78.54	62	0.11	4,869
TOTAL	4.47				0.80	35,064			616	1.11	48,381

Reference: Drainage Design Manual for Maricopa County (2018)

Notes:

1. Drainage sub-basin delineated per Drainage Map (Plate 1).
2. Runoff coefficient values of 0.95 for resorts per Drainage Design Manual for Maricopa County (see Appendix B).
3. Precipitation depth per NOAA Atlas 14 rainfall data (see Appendix A).
4. $V_{req} = A \times C \times (P/12) = \text{Volume required}$
5. $V_{prov} = 10' \text{ Diameter Pipe LF} \times \pi (5')^2$

SMOKE TREE RESORT

Drywell Calculations

Underground Storage ID	Volume Required to Drain ⁽¹⁾ (ft ³)	Flowrate Required to Drain Within 36 hrs ⁽²⁾ (cfs)	Drywell Flow Rate ⁽³⁾ (cfs)	Number Of Drywells Required ⁽⁴⁾	Number Of Drywells Provided*
UG1	6,676	0.05	0.1	1	1
UG1	6,990	0.05	0.1	1	1
UG3	4,634	0.04	0.1	1	1
UG4	6,048	0.05	0.1	1	1
UG5	19,164	0.15	0.1	2	2
UG6	4,869	0.04	0.1	1	1
Total	48,381			7	7

Notes:

(1) Volume required to drain = Volume provided for retention basins.

(2) Flowrate Required to Drain Basin Within 36 hrs = (Volume Required to Drain)/(36 x 3600)

(3) Drywell flow rate assumed to be minimum required per DPSM Std 6.10.13. Field test should be performed to calculate actual dry well flow rate.

(4) (Number Of Dry Well(s) Required)=(Flowrate Required to Drain Basin Within 36 hrs)/(Dry Well Flowrate Capacity)

Note to contractor:

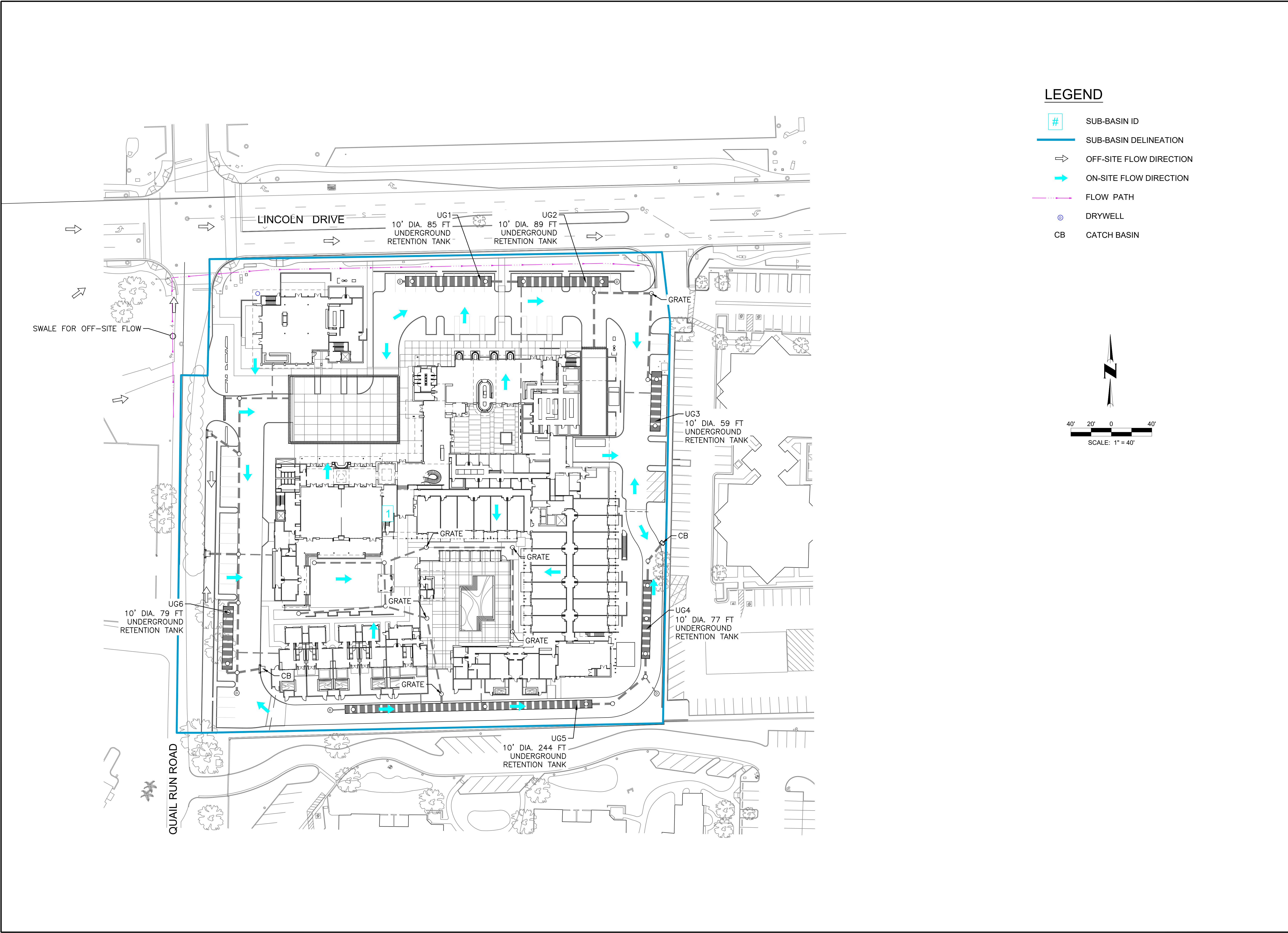
*Initially one drywell will be installed and field tests performed per the DPSM Standard 6.10.12 to check the actual flow rate of drywell.

Drywells will be provided and tested until the percolation requirement is achieved per DPSM Standard 6.10.12.

The amount of drywells needed shall be changed in accordance to the newly calculated flow rate.

PLATE

CVL



CVL CONSULTANTS 4550 North 12th Street Phoenix, Arizona 85014 602-264-6631 www.cvl.com	DATE	
	REVISION	
1 SHEET OF 1 CVL Contact: WILLIAM HAAS CVL Project #: SMOKE TREE © 2023 Coe & Van Loo Consultants, Inc. All rights reserved to reproduction in any format	NO.	
	PLATE 1	
DRAINAGE MAP		
SMOKE TREE RESORT TOWN OF PARADISE VALLEY, ARIZONA		
Coe & Van Loo Consultants, Inc.		

PROJECT NO. 10743153-01

February 10, 2023

Smoketree Resort

7101 East Lincoln Drive
Paradise Valley, Arizona 85253

Water Service Impact Study

Prepared for:

Walton Global Holdings

8800 N. Gainey Center Drive
Suite 345
Scottsdale, AZ 85258
Contact: Price Nosky



Prepared by:

Coe & Van Loo Consultants, Inc.

4550 N. 12th Street
Phoenix, AZ 85014
Contact: Cassandra Alejandro, P.E.
602.285.4763

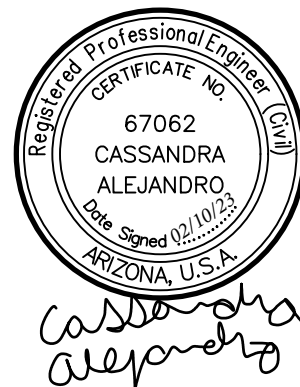
Job # 1.01.0315301



WATER SERVICE IMPACT STUDY

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EXECUTIVE SUMMARY

The proposed Smoketree Resort is the redevelopment of an existing resort complex. The proposed development will be constructed on approximately 5 acres of existing special use permit resort land on the southeast corner of Lincoln Drive and Quail Run Road. The property lies within the Town of Paradise Valley. Water service to the property is provided by EPCOR Water. EPCOR has stubbed out a 12-inch waterline in Quail Run Road from the existing 16-inch waterline on the north side of Lincoln Drive as part of the Town's Roadway and Utility Improvement Project No. 2016-1. Smoketree Resort will reimburse EPCOR the amount of \$58,397.23 for the 12-inch stub as part of the Lincoln Road Improvement Project No. 2016-14 installed by EPCOR. An 8-inch water loop within Smoketree Resort is proposed to serve the project. Connections to the 12-inch stub and existing 16-inch waterline are proposed.

Demand calculations were prepared based on the design requirements for the Town of Paradise Valley and EPCOR Water. Fire flow demands are per the 2018 International Fire Code with City of Phoenix Amendments. The calculated demands are as follow.

- Average Day Demand: 43,202 gpd (30 gpm)
- Maximum Day Demand: 77,764 gpd (54 gpm)
- Peak Hour Demand: 129,606 gpd (90 gpm)
- Maximum Day + Fire Flow Demand: 2,090 gpm

Modeling of the system was conducted utilizing WaterCAD software. Pressures in the proposed development were found to range between 92 and 95 psi for the ADD, MDD, and PHD scenarios. Velocities during Fire Flow for all fire flow scenarios were below 10 fps. The proposed water system is designed to meet the Town of Paradise Valley design standards and EPCOR Water's *Developer and Engineering Guide*, dated January 2015.

The September 26, 2019, updated "Will-Serve" letter from EPCOR Water is provided in Appendix A.

1.0 INTRODUCTION

1.1 General Description

Smoketree Resort is a proposed redevelopment of an existing resort complex on approximately 5 acres of existing special use permit resort land located in the Town of Paradise Valley, Arizona. A total of 82 rooms are proposed. The site will also include two restaurants, a pool, and a spa/fitness.

This study addresses the water service connections and fire protection requirements for the proposed development. EPCOR Water will provide water service to the development. EPCOR Water design standards in the *Developer and Engineering Guide*, Dated May 2020 will be used to determine domestic water demands. The Town of Paradise Valley will provide fire protection service to the site. Fire flow standards will be based on the Town of Paradise Valley design standards and EPCOR Water's *Developer and Engineering Guide*, dated May 2020. See Figure 1 for the Vicinity Map.

1.2 Project Location

Smoketree Resort is located in Section 10 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian. The development is bordered by Lincoln Drive to the north and Quail Run Road to the west. See Figure 2 for the Site Layout.



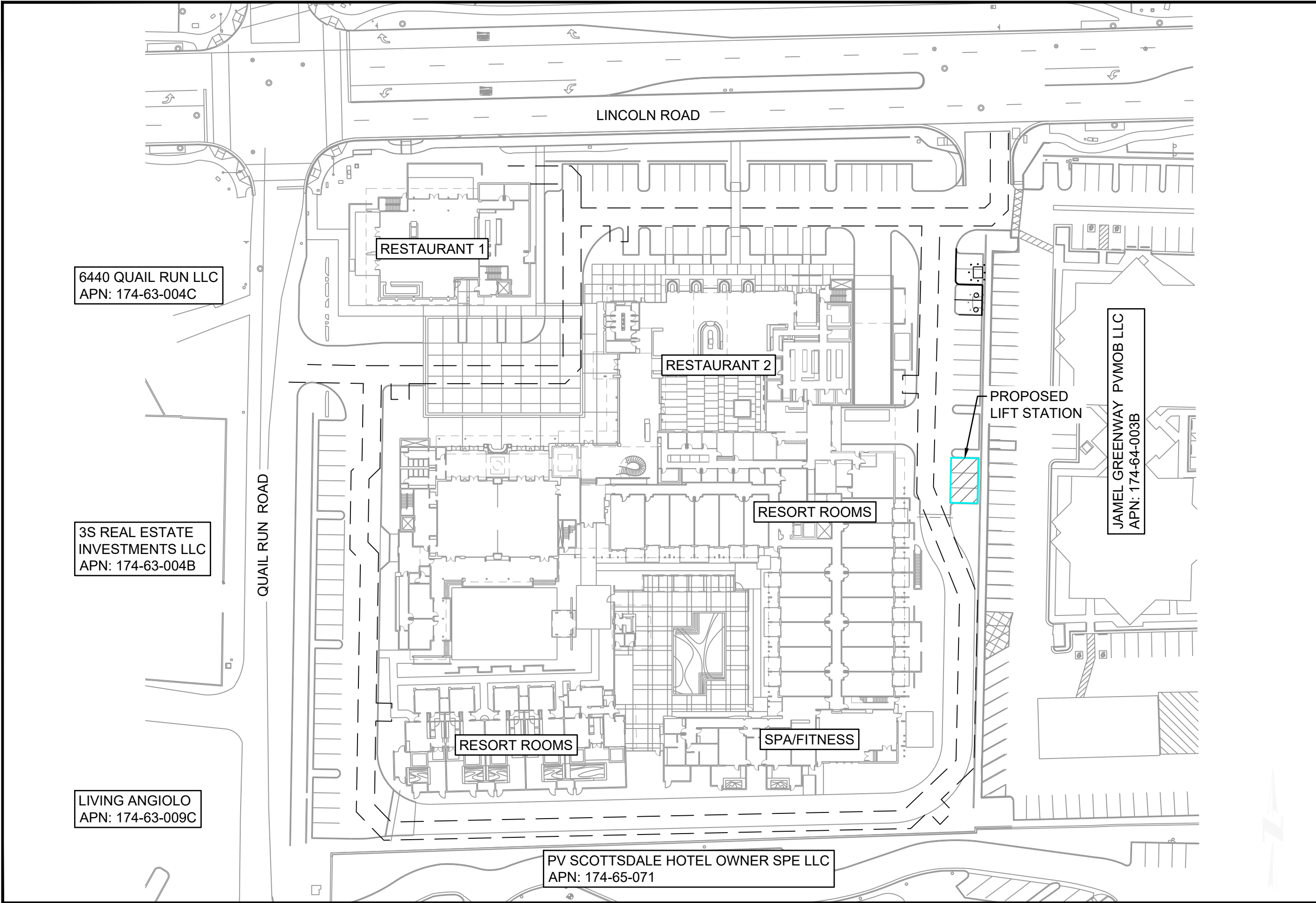
4550 North 12th Street
Phoenix, Arizona 85014
Phone 602-264-6831
<http://www.cvlci.com>

VICINITY MAP

SMOKE TREE RESORT



FIGURE 1



SCALE 1" = 60'

FIGURE 2

4550 North 12th Street
Phoenix, Arizona 85014
Phone 602-264-6831
<http://www.cvlci.com>

SMOKETREE RESORT

SITE LAYOUT



1.01.0387001

2.0 WATER SYSTEM DESIGN CRITERIA

The following criteria was be used in developing the water study.

2.1 Design Criteria

This water study is based on criteria from the Town of Paradise Valley and EPCOR Water's *Developer & Engineering Guide*, dated May 2020. The following criteria were used in developing this plan:

- Demand factors
 - Resort Average Day Demand = 446 gpd/room
 - Includes site amenities.
 - Commercial = 1,700 gpd/acre
 - Max day factor = 1.8 x Average Day Demand
 - Peak hour factor = 3.0 x Average Day Demand
- Pressure requirements
 - Minimum
 - 20 psi at the meter
 - Maximum = 120 psi
- Velocity
 - Maximum
 - 5 fps for maximum day demand
 - 7 fps for peak hour demand
 - 10 fps for maximum day demand plus fire flow
- Unit friction head loss
 - Maximum = 10ft/1,000 ft of distribution lines
- Hazen-Williams Coefficient = 130
- Fire Flows = 2,000 gpm

3.0 EXISTING INFRASTRUCTURE

3.1 Existing Waterlines

Existing adjacent waterlines to Smoketree Resort consist of a 16-inch waterline on the north side of Lincoln Drive. The nearest existing fire hydrants are located directly east on Lincoln Drive. See Appendix B for an EPCOR Water quarter section for this area.

3.2 Water Quality

Appendix F contains a copy of the 2018 Water Quality Report. No violations were reported.

4.0 PROPOSED INFRASTRUCTURE

4.1 Water Demands

The water demands for Smoketree Resort may be seen below in Table 1.

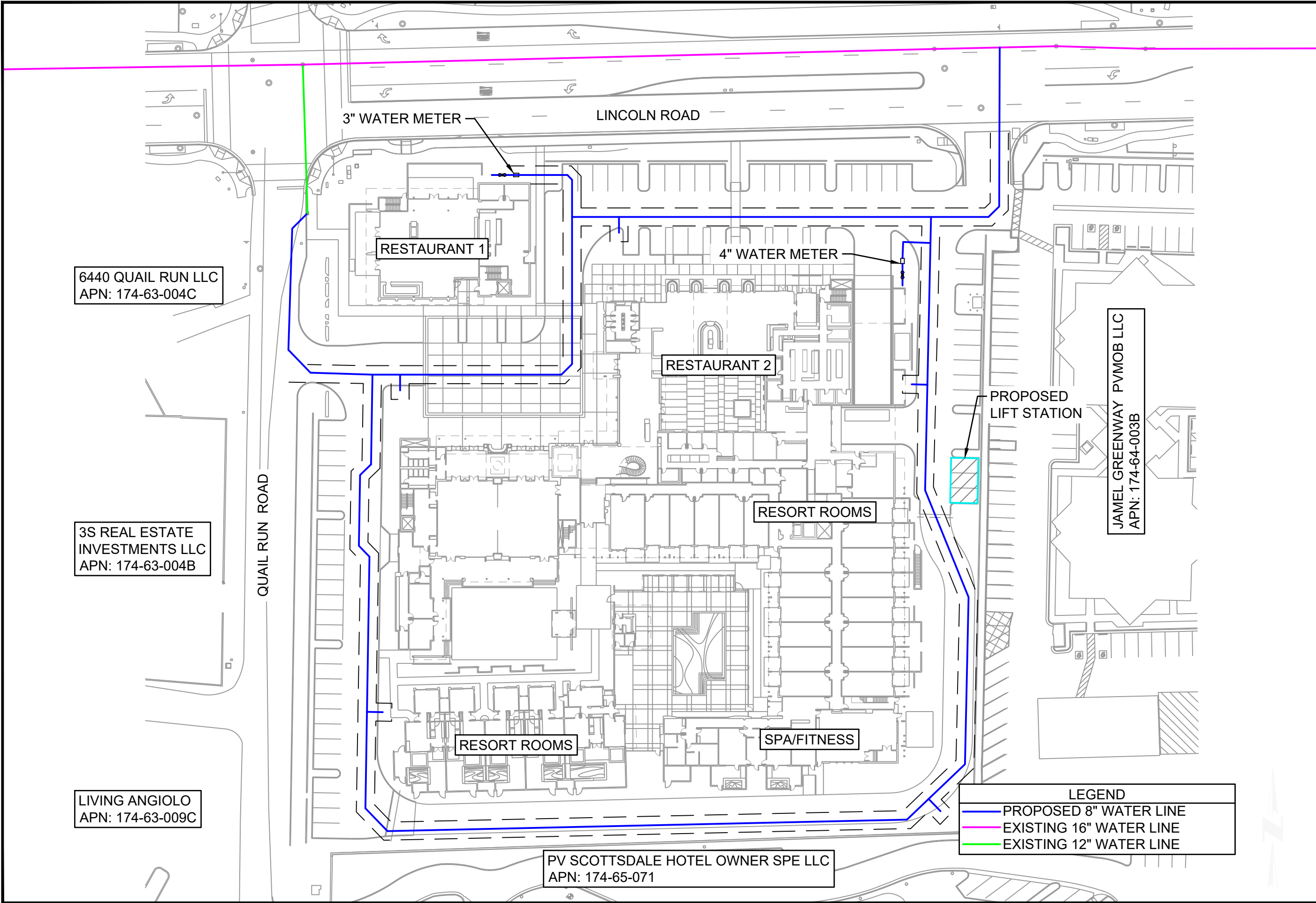
Table 1 – Smoketree Resort Water Demands

Description	Rooms	Gross Area (Square Feet)	Unit Factor	Unit	Average Day Demand (gpd)	Peak Hour Factor	Peak Hour Demand (gpd)
Resort Hotel Room	82	63,698	380	gpd/Room	31,160	4.5	140,220
Pool Backwash	---	---	60 (Peak Hour)	gpd/Pool	---	---	60
Spa/Fitness	---	2,950	0.5	gpd/sqft	1,475	3.0	4,425
Restaurant 1	---	6,860	1.2	gpd/sqft	8,232	6.0	49,392
Restaurant 2	---	7,620	1.2	gpd/sqft	9,144	6.0	54,864
Total	82	81,128	---	---	50,011	---	248,961

Fire flow demands of 2,000 gpm will be modeled.

4.2 Proposed On-Site Water Infrastructure

An public 8-inch water loop within an easement within Smoketree Resort is proposed to serve the project. Connections to the 12-inch stub and existing 16-inch waterline are proposed. A 3-inch domestic water meter is proposed for the restaurant and will be located on the north side of the building along Lincoln Road. A 4-inch domestic water meter is proposed for the hotel and will be located at the northeast corner of the building. See Appendix B: Paradise Valley Water Company Block Map PV – 407 for a detailed map of existing conditions for this connection.



SCALE 1" = 60'

FIGURE 3

4550 North 12th Street
Phoenix, Arizona 85014
Phone 602-264-6831
<http://www.cvlci.com>

SMOKETREE RESORT

WATER LAYOUT



1.01.0387001

5.0 WATER SYSTEM MODELING

5.1 Network Analysis Domestic Demands

The network analysis for the proposed development's distribution system was completed using WaterCAD. A model was created and modified as necessary to demonstrate that the existing and proposed water infrastructure meets the water system design criteria. All networks were analyzed for average day, maximum day, and peak hour demand conditions. The existing conditions were determined by a fire flow test completed on October 11, 2018. Results from this fire flow test may be seen in Appendix C.

The pipes were sized based on pressure requirements for average day, max day, and peak hour as described in Section 2.0.

Input parameters of the water distribution system modeling include:

- Pipe Diameters (inches)
- Elevations of Nodes/Junctions (feet)
- System Water Demands (gpm)
- Hazen-Williams, C=130

Output parameters include but are not limited to:

- Velocities (fps)
- Pressure (psi)
- Head Loss (feet)
- Flow Rates (gpm)

5.2 Modeling Results Domestic Demands

The detailed results of the WaterCAD analysis for the domestic demands are presented in Appendix D. Table 2 summarize the results.

Table 2 – Water Model Results Summary for Domestic Demands

Scenario	Flow (gpm)	Pressure (psi)				Maximum Velocity (fps)	Pipe ID
		Minimum	Node	Maximum	Node		
Average Day	30	91.91	J-41	94.94	J-9	0.10	P-72
Max Day	54	91.90	J-41	94.93	J-9	0.18	P-72
Peak Hour	114.09	91.87	J-41	94.90	J-9	0.30	P-72

5.3 Network Analysis Fire Flows

The network analysis was performed as described in subsection 5.1 above. The detailed results of the Water CAD analysis for the fire flow scenario are shown in Appendix E. Table 3 summarizes the results.

Table 3 – Water Model Results Summary for Fire Flow Demands

Maximum Day + Fire Flow Needed (gpm)	Pressure (psi)				Maximum Velocity (fps)	Pipe ID
	Minimum	Node	Maximum	Node		
2,090	73.60	J-37	79.81	J-9	8.05	P-72

6.0 SUMMARY

This Water Service Impact Study presents the proposed water system connections, and an overview of existing infrastructure surrounding the project site. The following summarizes CVL's findings of the proposed water system to serve Smoketree Resort.

- The water service connections will be made to the existing EPCOR Water system.
- Existing adjacent infrastructure to Smoketree Resort consist of a 16-inch waterline on the north side of Lincoln Drive.
- An 8-inch water loop within Smoketree Resort is proposed to serve the project. Connections to the 12-inch stub and existing 16-inch waterline are proposed.
- EPCOR has stubbed out the 12-inch waterline on Quail Run Road from the existing 16-inch waterline on the north side of Lincoln Drive as part of the Town's Roadway and Utility Improvement Project No. 2016-14.
- Smoketree Resort will reimburse EPCOR the amount of \$58,397.23 for the 12-inch stub as part of the Lincoln Road Improvement Project No. 2016-14 installed by EPCOR.
- Demands from the Smoketree Resort are:
 - Average Day Demand: 43,202 gpd (30 gpm)
 - Maximum Day Demand: 77,764 gpd (54 gpm)
 - Peak Hour Demand: 129,606 gpd (90 gpm)
 - Maximum Day + Fire Flow Demand: 2,090 gpm
- Pressures within the proposed development are approximately 92-95 psi for all domestic demand scenarios which is within the Town of Paradise Valley's pressure requirements. Individual PRVs are required after the meter where pressures are greater than 80 psi.
- The nearest fire hydrants to the proposed development are to the east of Smoketree Resort along Lincoln Drive.
- Velocities in the existing system are less than the 10 fps maximum requirement. The maximum velocity that occurs when a fire flow of 2,090 gpm is modeled at the site is 8.05 fps within P-72.

APPENDIX A

September 26, 2019, EPCOR Water “Will-Serve” Letter



2355 West Pinnacle Peak Road, Suite 300
Phoenix, AZ 85027 USA
epcor.com

September 26, 2019

Coe & Van Loo Consultants, Inc.
Attn: Fred Fleet, P.E.
4550 N. 12th Street
Phoenix, AZ 85014

Sent via e-mail to: fef_@cvlci.com

Re: Will-Serve Letter for Water Service
7101 E. Lincoln Drive, Paradise Valley
APN 174-64-003A

Dear Mr. Fleet;

This letter is in response to your request to EPCOR Water Arizona Inc. ("EPCOR") regarding EPCOR's willingness to provide water service to a proposed resort hotel to be located at 7101 E. Lincoln Drive in Paradise Valley (the "Development") as shown in **Exhibit A**. EPCOR provides the following information for your consideration:

1. EPCOR has confirmed that the Development is located within the area encompassed by EPCOR's Certificate of Convenience & Necessity ("CC&N") for water service as issued by the Arizona Corporation Commission.
2. Water service to the Development by EPCOR will be conditioned upon developer entering into a Main Extension Agreement (an "MXA") with EPCOR in a form acceptable to EPCOR, and upon EPCOR and developer fully performing its respective obligations under the MXA. The MXA will provide, among other things, that developer will be responsible for constructing at its cost all water main extensions necessary to distribute water from EPCOR's water system to the individual service line connections in the Development. The design and construction of all such main extensions will be subject to EPCOR's approval, and ownership of the main extensions, together with related real property easement rights, must be transferred to EPCOR prior to the initiation of water service in the Development.
3. Based on the water service currently provided by EPCOR in the CC&N, EPCOR will have adequate water capacity for normal use in the Development upon EPCOR's and developer's fulfillment of its respective obligations under the MXA. Please note that EPCOR does not guarantee the adequacy of its water capacity for fire protection.
4. Developer will also be required, as a condition to EPCOR providing water service to the Development, to pay all required fees pursuant to EPCOR's tariffs and as may be provided in the MXA.

This letter assumes that construction of the main extensions within the Development will begin within one (1) year after the date of this letter.

If developer begins construction of any water mains in the Development or any other water service infrastructure intended to serve the Development without, in each instance, the prior written approval of such construction by EPCOR, developer will be proceeding with such construction at its own risk.

This letter does not independently create any rights or obligations in either developer or EPCOR, and is provided for information only. Any agreement between developer and EPCOR for water service in the Development must be memorialized in a written agreement executed and delivered by their respective authorized representatives.

For additional information, please contact me at (623) 445-2402 or at bfinke@epcor.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Brad Finke".

Brad Finke, P.E.
Engineering Manager

Enclosure: Exhibit A – Location Description of Development

Location of Development



February 10, 2023

Smoketree Resort

7101 East Lincoln Drive
Paradise Valley, Arizona 85253

Wastewater Capacity Study



Cassandra Alejandro

Prepared for:

Gentree LLC

3620 East Campbell Avenue
Suite B
Phoenix, AZ 85018
Contact: Sam Robinson

Prepared by:

Coe & Van Loo Consultants, Inc.

4550 N. 12th Street
Phoenix, AZ 85014
Contact: Cassandra Alejandro, P.E.
602.285.4763

Job # 1.01.0315301



WASTEWATER CAPACITY STUDY

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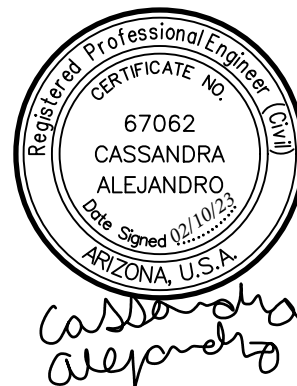
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Appendix A: City of Scottsdale “Will-Serve” Letter
Appendix B: Applicable Pages from the <i>Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)</i>
Appendix C: Sewer Quarter Section Maps
Appendix D: Sewer Analysis Results



1.0 INTRODUCTION

1.1 General Description

Smoketree Resort is a proposed redevelopment of an existing resort complex on approximately 5 acres of existing special use permit resort land located in the Town of Paradise Valley, Arizona. A total of 82 rooms are proposed. The site will also include two restaurants, a pool, and a spa/fitness.

This report addresses sewer capacity requirements for the proposed development. The sewer system will outfall to the City of Scottsdale Sewer System. The system's design will adhere to the *City of Scottsdale Design Standards and Policies Manual, January 2018* and the *International Plumbing Code*. See Figure 1 for the Vicinity Map.

1.2 Project Location

Smoketree Resort is located in Section 10 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian. The development is bordered by East Lincoln Drive to the north and Quail Run Road to the west. See Figure 2 for the Site Layout.

1.3 Topographic Conditions

Smoketree Resort ranges in elevation from approximately 1,318 feet above mean sea level (MSL) on the southwest corner of the property to approximately 1,313 feet MSL on the northeast corner of the property. Overall, the property generally slopes to the north northeast toward Lincoln Drive.

1.4 Existing Sewer Capacity

The Town of Paradise Valley has two wastewater providers, the City of Phoenix and the Town of Paradise Valley. The Town of Paradise Valley's wastewater system is operated, maintained, and treated by the City of Scottsdale through an intergovernmental agreement. Appendix A contains the City of Scottsdale "Will-Serve" letter. Smoketree Resort will be served by the City of Scottsdale per the *Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)*. Appendix B includes applicable Pages from the *Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)* depicting the direction of flow into the City of Scottsdale's wastewater system. Appendix C includes City of Scottsdale Wastewater Quarter Section Maps depicting the location and flow direction of the existing gravity sewer network servicing the Smoketree Resort.



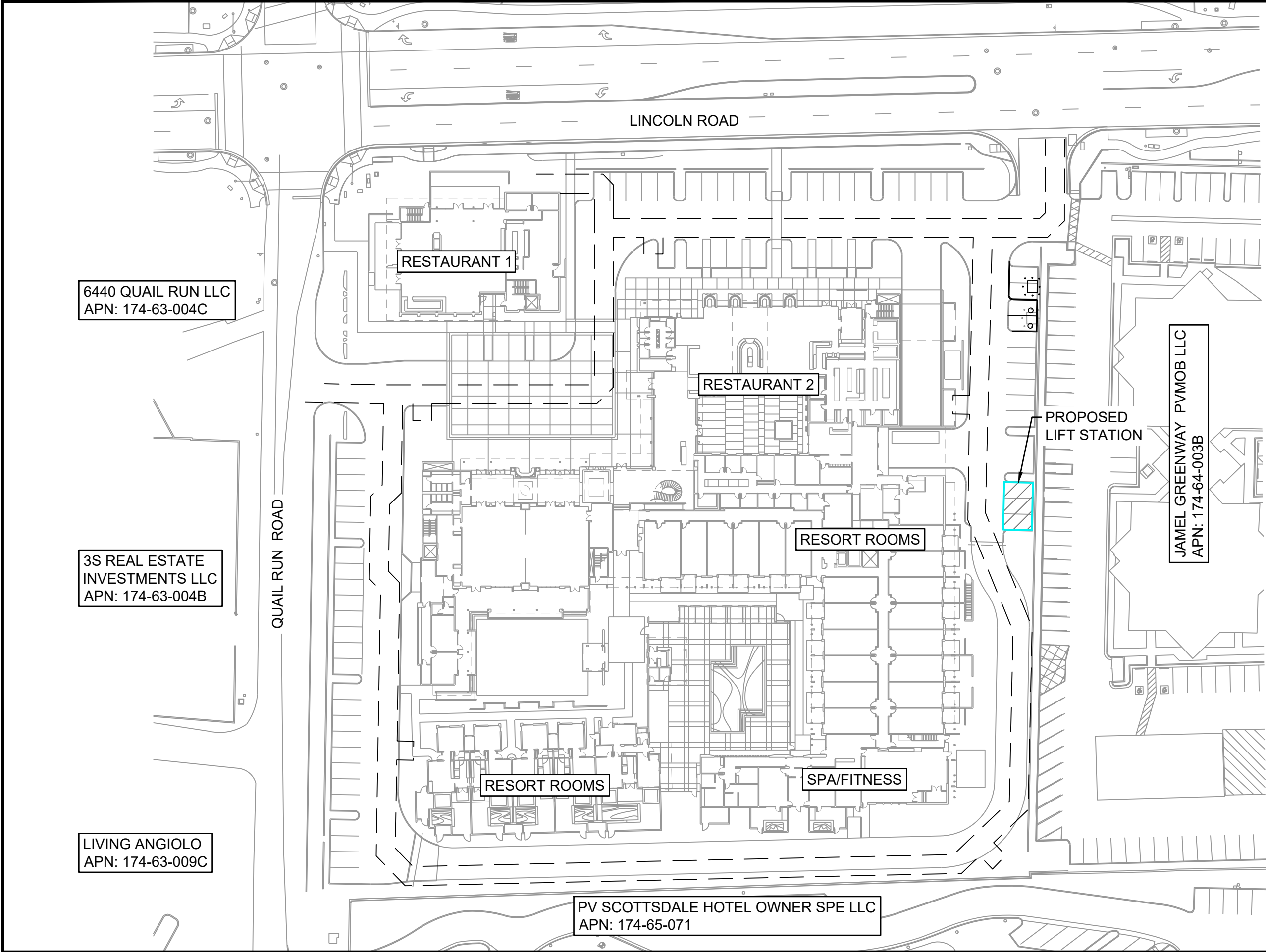
4550 North 12th Street
Phoenix, Arizona 85014
Phone 602-264-6831
<http://www.cvlci.com>

VICINITY MAP

SMOKE TREE RESORT



FIGURE 1



SCALE 1" = 60'

FIGURE 2

4550 North 12th Street
Phoenix, Arizona 85014
Phone 602-264-6831
<http://www.cvlci.com>

SMOKETREE RESORT

SITE LAYOUT



1.01.0387001

2.0 WASTEWATER SYSTEM DESIGN CRITERIA

The following criteria was be used in developing the sewer capacity study.

2.1 Design Criteria

This sewer study is based on criteria from the *City of Scottsdale Design Standards & Policies Manual, January 2018* and *Integrated Wastewater Master Plan, March 2008*. Design flow criteria are presented in Table 1 and hydraulic design criteria are presented in Table 2.

Table 1 - Design Flow Criteria

Description	Unit	Average Day Flow (gpd/unit)	Peak Day Flow (gpm/pool)	Peak Day Flow (gpd/unit)	Peaking Factor
Resort Hotel Room ¹	Room	380	-	1,710	4.5
Pool Backwash ²	Pool	N/A	60	-	-
Commercial/Retail	Square Foot	0.5	-	-	3.0
Restaurant	Square Foot	1.2	-	-	6.0

¹Includes site amenities

²Assumes backwash rate of 60 gpm/small pool for a 10 minute duration.

Table 2 – Hydraulic Design Criteria

Description	Criteria
Minimum Sewer Diameter	8-inch
Minimum Full Pipe Velocity	2.5 fps
Minimum Slope	
8-inch Sewer	0.0052 ft/ft
Manning's "n"	0.013
Maximum Pipe Velocity	10 fps
d/D (\leq 12-inch) at Peak Flow	0.65
d/D ($>$ 12-inch) at Peak Flow	0.70
Manhole Spacing (8 to 15-inch)	500 ft
Minimum Drop Across Manhole	0.1 ft
Change in Sewer Diameter	Top invert of upstream pipe \geq top invert of downstream
Minimum Depth of Cover	4 ft

2.2 Design Calculations

Table 3 contains the wastewater flow generation calculations for flows for the Smoketree Resort.

Table 3 – Wastewater Flow Generation

Description	Rooms	Gross Area (Square Feet)	Unit Factor	Unit	Average Day Demand (gpd)	Peak Hour Factor	Peak Hour Demand (gpd)
Resort Hotel Room	82	63,698	380	gpd/Room	31,160	4.50	140,220
Pool Backwash ¹	---	---	60 (Peak Hour)	gpd/Pool	---	---	60
Spa/Fitness	---	2,950	0.5	gpd/sqft	1,475	3.00	4,425
Restaurant 1	---	6,860	1.2	gpd/sqft	8,232	6.00	49,392
Restaurant 2	---	7,620	1.2	gpd/sqft	9,144	6.00	54,864
Total	82	81,128	---	---	50,011	---	248,961

¹Assumes backwash rate of 60 gpm/small pool for a 10 minute duration.

As shown, the peak flow calculations include peak flows calculated per the City of Scottsdale design criteria.

3.0 EXISTING AND PROPOSED INFRASTRUCTURE

3.1 Existing Sewer Lines

An existing 8-inch gravity sewer is adjacent to the site in Lincoln Drive and accepts flows from the existing 6-inch VCP gravity sewer serving the Smoketree Resort. Wastewater flows east within the existing 8-inch sewer line in Lincoln Drive to Scottsdale Road. From here the wastewater flows south along Scottsdale Road to McDonald Drive flowing east. (See Figure 3 and Appendix C for the Sewer Layout and the existing sewer layout.) Flow is ultimately treated at the 91st Avenue Regional Wastewater Treatment Plant in west Phoenix, which is owned and operated by the Sub-Regional Operating Group (SROG).

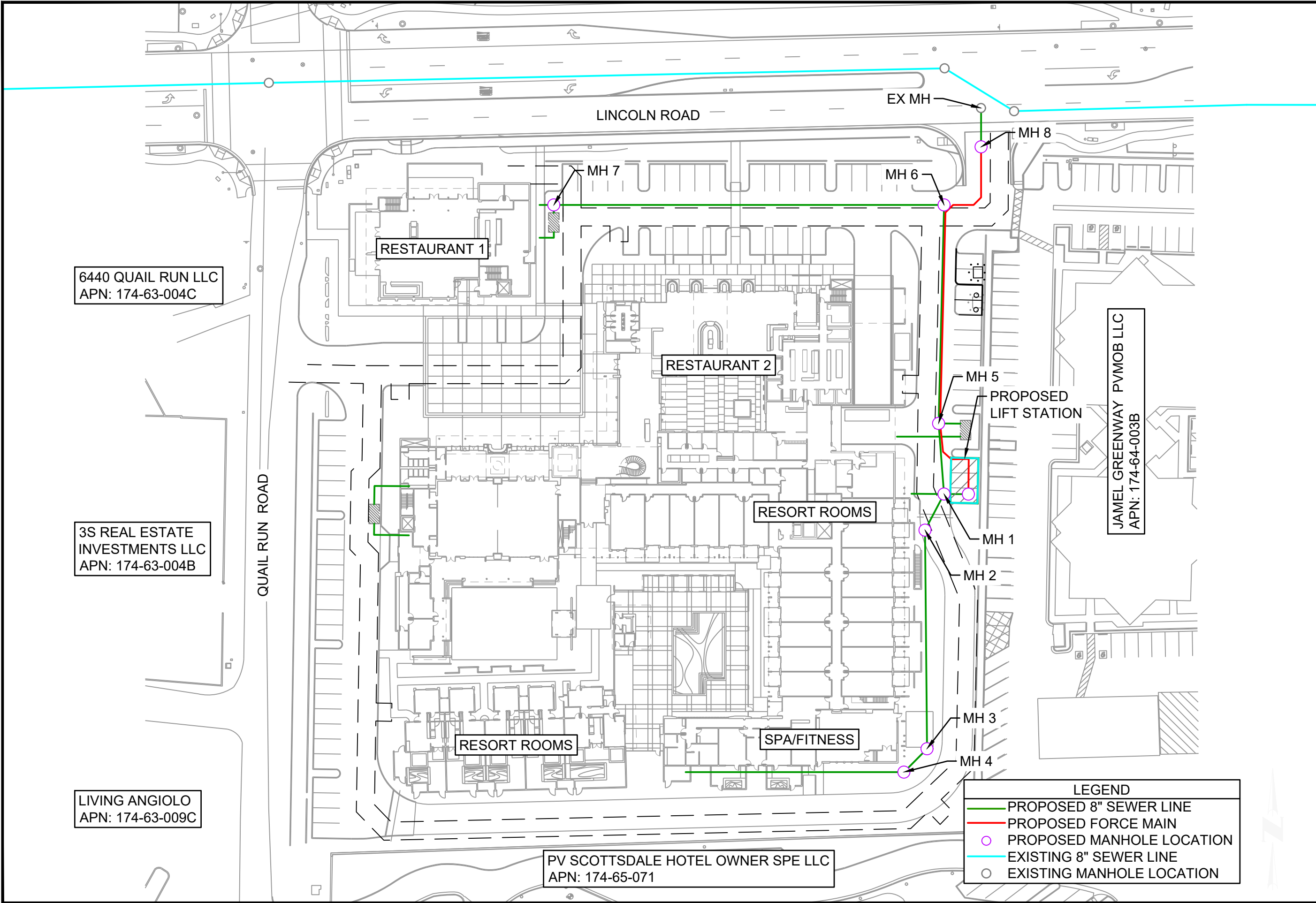
3.2 Proposed Infrastructure

The existing 6-inch VCP gravity sewer serving the Smoketree Resort will be replaced by 21.02-feet of 8-inch gravity sewer as designed by T.Y. Lin at a slope of 0.0052 ft/ft per the Town of Paradise Valley Arizona Roadway and Utility Improvements – Lincoln Drive Project No. 2016-14. Smoketree Resort will reimburse the Town of Paradise Valley for the replacement off the 6-inch VCP gravity sewer with the 8-inch gravity sewer and manhole as part of the Lincoln Road Improvement Project No. 2016-14.

The on-site collection system will consist of 8-inch sewer service lines and is designed to convey wastewater from the west to the east of the site where it will collect into a proposed private lift station. The sizing of the lift station will be completed during final design. The A force main will connect to the 8-inch gravity sewer service designed by T.Y. Lin and flow into the existing 8-inch gravity sewer line in Lincoln Drive.

All sewer lines will be located in major streets or in easements dedicated for that use. Project No. 2016-14 is going to stub out an 8-inch gravity sewer line in Quail Run Road which will not be utilized by the development of the Smoketree Resort.

A sewer capacity analysis was completed to design the wastewater line for Smoketree Resort. The analysis may be seen in Appendix D. The sewer mains will be sized according to the anticipated cumulative flows as the lines are routed to the existing 8-inch gravity sewer within Lincoln Drive. The pipe size and minimum and maximum slope required will be determined based on the criteria established in Section 2.1. Manholes within the development are assumed to have 6 feet of depth to verify cover depth and allow for slope design.



4.0 SUMMARY

This wastewater system analysis presents the collection system design criteria and proposed wastewater infrastructure for the Smoketree Resort. This wastewater system will be owned by the Town of Paradise Valley and operated by the City of Scottsdale. The sewer infrastructure conforms to the City of Scottsdale's minimum standards and is consistent with the City's current *Design Standards and Policies Manual, January 2018*.

The results of this analysis are summarized as follows:

- The proposed collection system is designed to meet the *City of Scottsdale Design Standards and Policies Manual, January 2018*.
- The proposed collection system will discharge to the proposed lift station. A force main will convey the wastewater to the 8-inch gravity sewer service designed by T.Y. Lin connecting the Smoketree Resort to the existing 8-inch gravity sewer line in Lincoln Drive.
- The sizing of the lift station will be completed during final design.
- Smoketree Resort will reimburse the Town of Paradise Valley for the replacement off the 6-inch VCP gravity sewer with the 8-inch gravity sewer and manhole as part of the Lincoln Road Improvement Project No. 2016-14.
- Minimum and maximum pipe velocities were met for all proposed sewer lines.
- The average day flow for Smoketree Resort is estimated at 50,011 gpd.
- The peak flow for Smoketree Resort including pool backwash is estimated at 248,961 gpd.

APPENDIX A

City of Scottsdale “Will-Serve” Letter



Water Resources

9379 E. San Salvador
Scottsdale, AZ 85258

PHONE 480-312-5685
FAX 480-312-5615
www.ScottsdaleAZ.gov

February 11, 2020

Maricopa County Environmental Services Department
1001 North Central Avenue, Suite 150
Phoenix, AZ 85004

**Re: Sanitary Sewer Connection
Smoke Tree Resort
Town of Paradise Valley**

Gentlemen:

This letter is provided to satisfy those submittal requirements under General Aquifer Protection Permit 4.01 for extension of a sanitary sewer collection system as indicated below:

The City of Scottsdale's sanitary sewer collection system has sufficient capacity to accept the flows generated from this project and convey those flows into the City of Scottsdale's sewer collection system.

The City of Scottsdale's sanitary sewer collection system which discharges to the Princess metering station has sufficient capacity to accept the residual waste stream resulting from the treatment of flows generated from this project. Downstream of the Princess metering station, these residual flows enter into the Sub-regional Operating Group (SROG) Salt River Outfall (SRO) trunk line.

The City of Scottsdale has established operational requirements and maintenance procedures to assure efficient conveyance of sanitary sewer flows throughout its collection system.

If you have any questions regarding this information, please contact our office at 480-312-5685.

Sincerely,

A handwritten signature in blue ink, which appears to read "Phil Sacks". The signature is fluid and cursive.

Richard Sacks, P.E.
Scottsdale Water

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 rsacks

DATE 1/29/2020

January 20, 2020

Smoke Tree Resort

7101 East Lincoln Drive
Paradise Valley, Arizona 85253

Wastewater Capacity Study

Prepared for:

Gentree LLC

3620 East Campbell Avenue
Suite B
Phoenix, AZ 85018
Contact: Sam Robinson

Prepared by:

Coe & Van Loo Consultants, Inc.

4550 N. 12th Street
Phoenix, AZ 85014
Contact: Cassandra Alejandro, P.E.
602.285.4763



Job # 1.01.0315301

WASTEWATER CAPACITY STUDY

APPENDIX B

***Applicable Pages from the Town of Paradise
Valley Wastewater Master Plan (Arcadis, May
2015)***



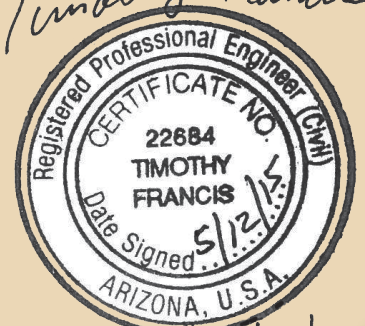
FINAL REPORT

WASTEWATER MASTER PLAN

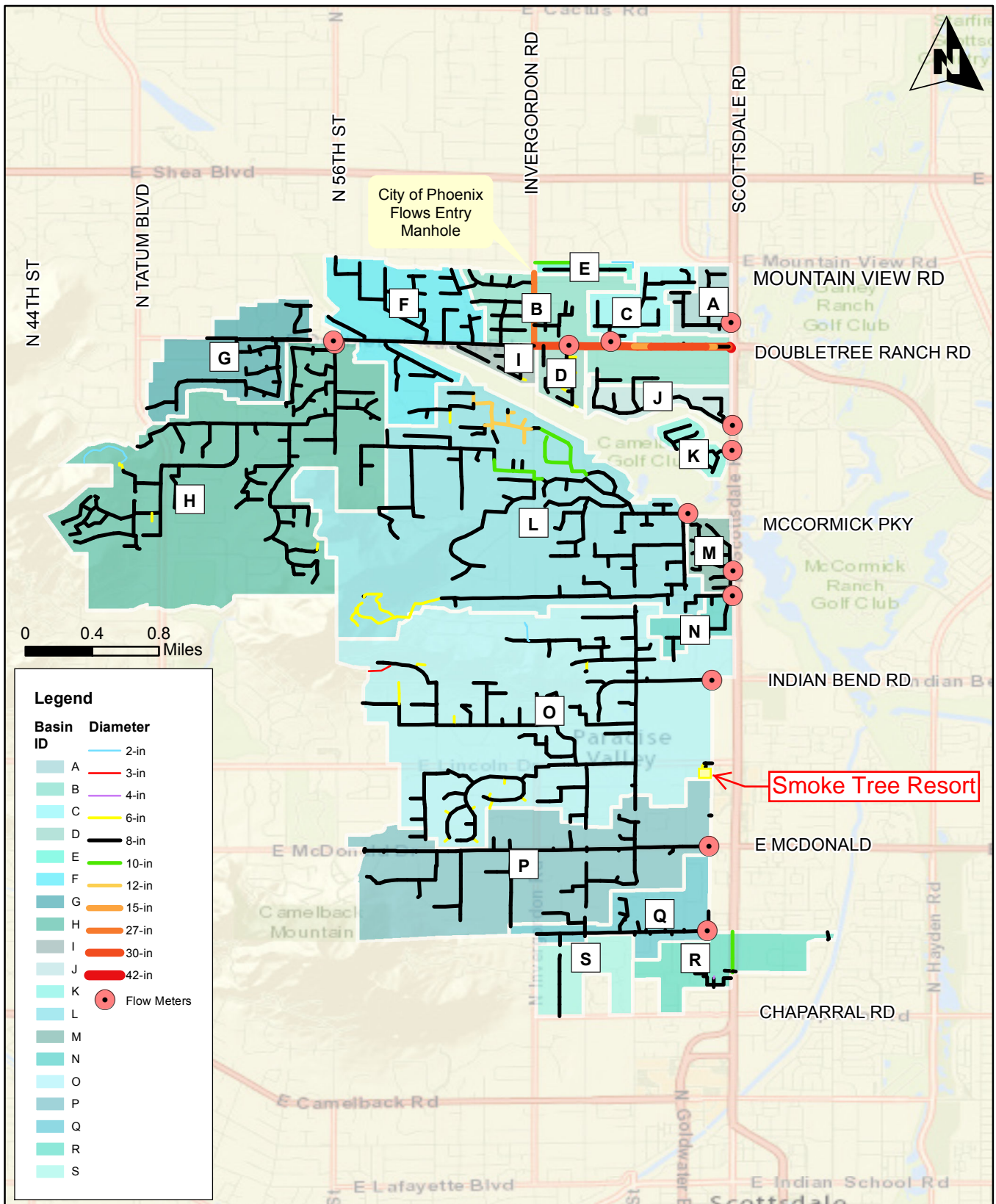
MAY 2015

Welcome
Town of
Paradise Valley

Timothy Francis



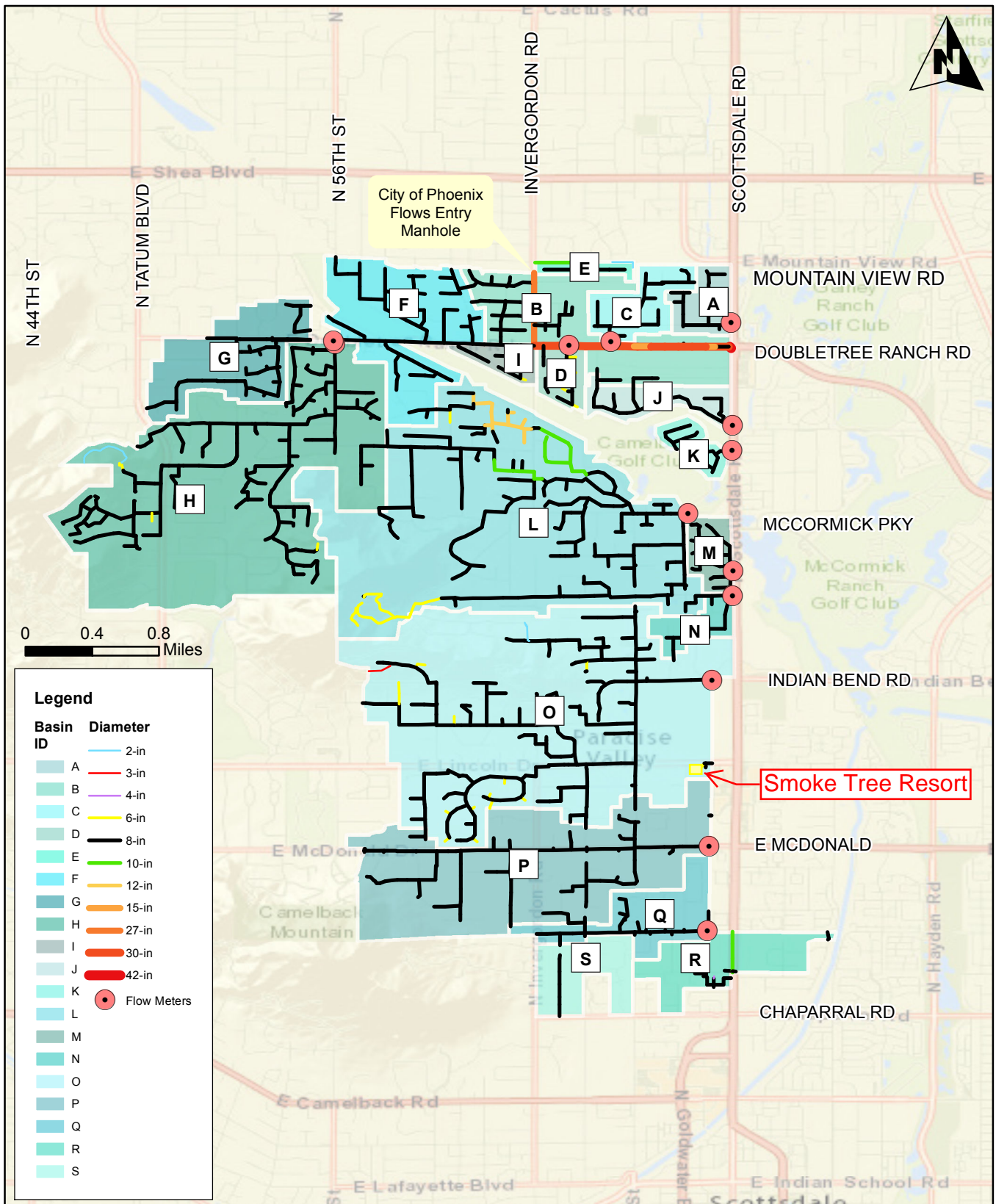
Expires 12/31/17



TOWN OF PARADISE VALLEY, ARIZONA
WASTEWATER MASTER PLAN
Existing Collection System



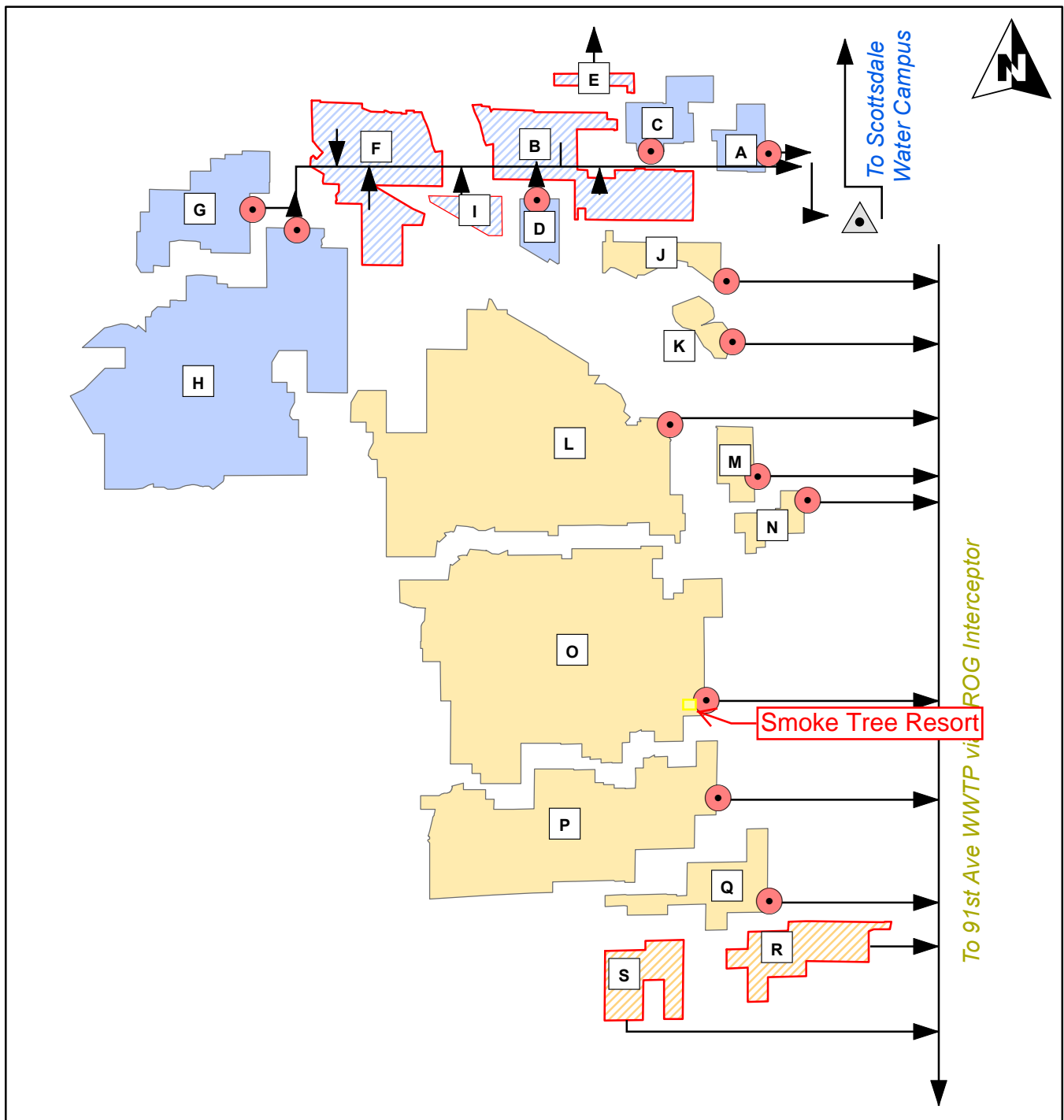
May 2015
 FIGURE 3-1



TOWN OF PARADISE VALLEY, ARIZONA
WASTEWATER MASTER PLAN
Existing Collection System



May 2015
 FIGURE 3-1



Legend

- | | | | | | | | | | | | |
|--|-------------------------|--|------------------------------|--|---|--|--|--|--|--|--|
| | Scottsdale Lift Station | | Schematic Basin Connectivity | | Flows to Scottsdale Water Campus, Metered | | Flow to Scottsdale Water Campus, Unmetered | | Flows to 91st Ave WWTB via SROG Interceptor, Metered | | Flows to 91st Ave WWTB via SROG Interceptor, Unmetered |
| | Flow Meters | | | | | | | | | | |



TOWN OF PARADISE VALLEY, ARIZONA WASTEWATER MASTER PLAN Schematic of Existing Basin Connectivity



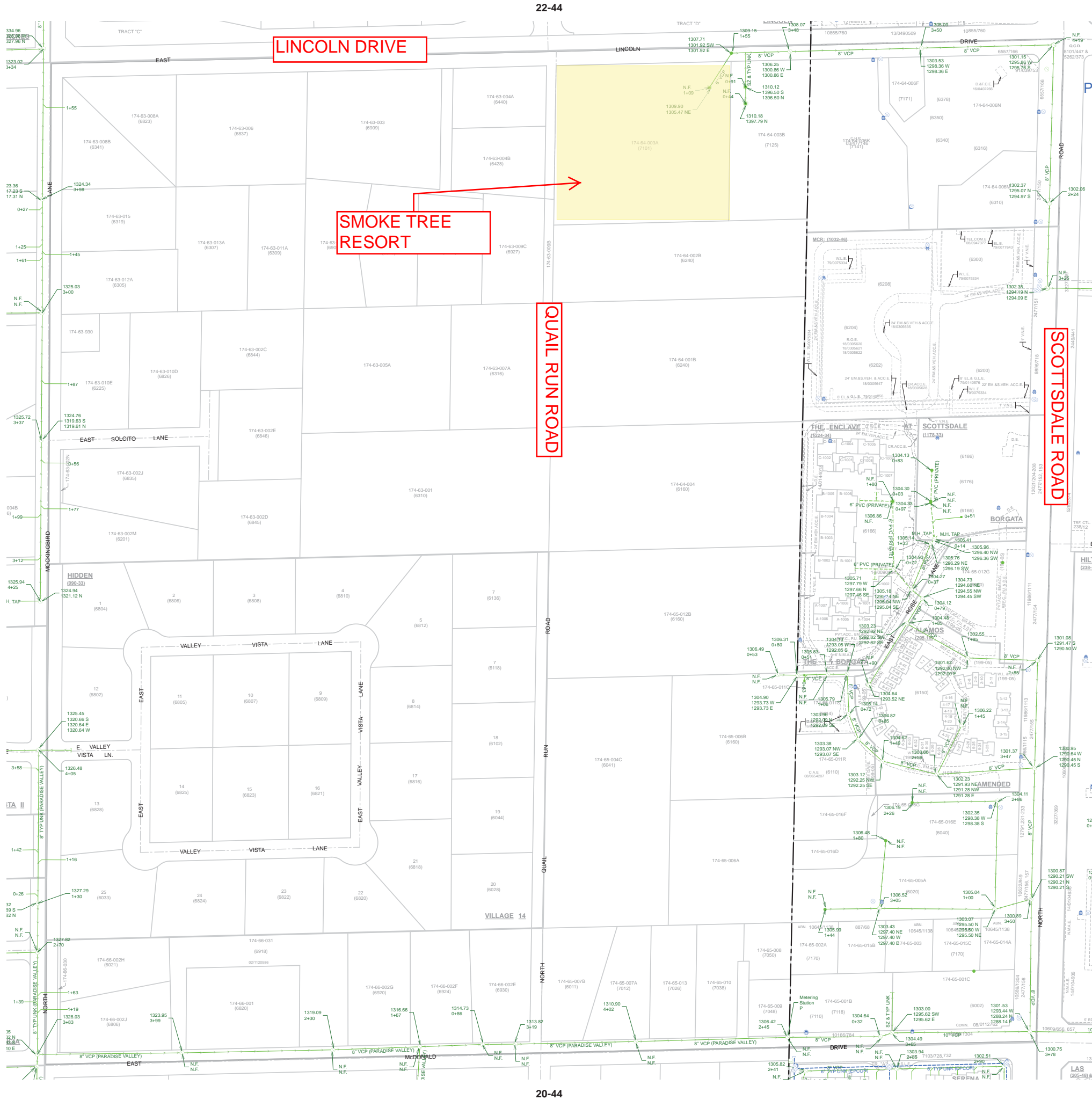
May 2015
FIGURE 3-2

APPENDIX C

Sewer Quarter Section Maps

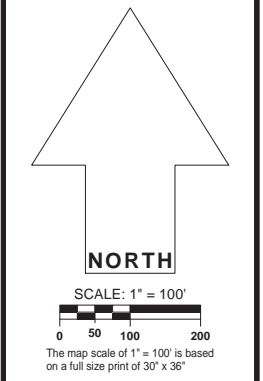
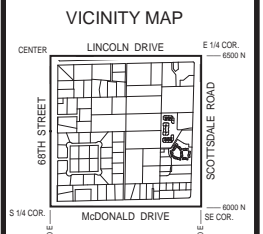
NOTICE
THIS DOCUMENT IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT ITS ACCURACY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.
THE CITY OF SCOTTSDALE

25-NOV-18



GENERAL NOTES:
• THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7782.
• THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS CALCULATED ON THE MAP.

- LEGEND:**
- Water Valve
 - Non-potable Water Valve
 - Fire Hydrant
 - Water Blowoff
 - Water Main Reducer
 - Water Sample Station
 - Water Air Release Valve
 - Non-potable Water Air Release Valve
 - Water Pressure Reducing Valve
 - Water Vault
 - Water Manhole
 - Non-Potable Water Manhole
 - Water Pump
 - Water Main
 - Non-Potable Water Main
 - Fire Line
 - Water Service
 - Non-Scottsdale Water Main
 - Sewer Manhole
 - Sewer Cleanout
 - Sewer Lift Station
 - Sewer Treatment Plant
 - Sewer Main - Gravity
 - Sewer Main - Force
 - Non-Scottsdale Sewer Main
 - Sewer Service



WATER & SEWER
QUARTER SECTION MAP
21-44
SE 1/4 SEC. 10 T2N R4E

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

APPENDIX D

Sewer Analysis Results

Table A-1: Smoketree Resort Sewer Calculations																						
Upstream MH	Downstream MH	Square Feet	Average Day Flow (gpd/sqft)	Average Day Flow (gpd)	Peaking Factor	Peak Flow Dry Weather (gpd)	Upstream Peak Flow (gpd)	Cumulative Peak Flow (gpd)	Total Estimated Peak Flow (gpd)	Estimated Ground Elevation' (feet)	Estimated Length (feet)	Line Diameter (inches)	Sewer Line Slope (ft/ft)	Estimated Upstream MH Depth (feet)	Estimated Upstream Invert Elevation (feet)	Drop Through Manhole (feet)	Estimated Downstream Invert Elevation (feet)	Sewer Line Capacity (gpd)	% Full (Q/Qf)	Velocity Flowing Full (fps)	Velocity at Peak Flow (fps)	d/D
Restaurant 1	7	6860	1.2	8,232	6.00	49,392	0	49,392	49,392.00	1312	10	8	0.0052	18.41	1292.53	0.10	1292.48	563,106	9%	2.5	1.54	0.20
7	6	0	1.2	0	6.00	0	49,392	49,392	49,392.00	1312	260	8	0.0052	18.55	1292.38	0.10	1291.03	563,106	9%	2.5	1.54	0.20
Pool	6	0	100	0	3.00	60	0	60	60.00	1311	146	8	0.0052	18.25	1291.78	0.10	1291.03	563,106	0%	2.5	0.20	0.01
6	5	0	100	0	3.00	0	49,452	49,452	49,452.00	1311	146	8	0.0052	19.11	1290.93	0.10	1290.17	563,106	9%	2.5	1.54	0.20
Restaurant 2	5	7620	1.2	9,144	6.00	54,864	0	54,864	54,864.00	1311	47	8	0.0052	19.82	1290.42	0.10	1290.17	563,106	10%	2.5	1.59	0.21
5	1	0	1.2	0	6.00	0	104,316	104,316	104,316.00	1311	47	8	0.0052	20.16	1290.07	0.10	1289.82	563,106	19%	2.5	1.91	0.29
Casitas (Resort Rooms)	4	5	380	1,900	4.50	8,550	0	8,550	8,550.00	1311	22	8	0.0052	19.08	1291.25	0.10	1291.14	563,106	2%	2.5	0.91	0.09
4	3	0	380	0	4.50	0	8,550	8,550	8,550.00	1311	22	8	0.0052	19.30	1291.04	0.10	1290.92	563,106	2%	2.5	0.91	0.09
Spa/Fitness	3	2950	0.5	1,475	3.00	4,425	0	4,425	4,425.00	1311	146	8	0.0052	18.55	1291.68	0.10	1290.92	563,106	1%	2.5	0.75	0.06
3	2	0	0.5	0	3.00	0	12,975	12,975	12,975.00	1311	146	8	0.0052	19.41	1290.82	0.10	1290.07	563,106	2%	2.5	1.03	0.10
2	1	0	380	0	4.50	0	12,975	12,975	12,975.00	1311	27	8	0.0052	19.97	1289.97	0.10	1289.82	563,106	2%	2.5	1.03	0.10
Resort Rooms	1	77	380	29,260	4.50	131,670	0	131,670	131,670.00	1311	22	8	0.0052	20.00	1289.94	0.10	1289.82	563,106	23%	2.5	2.04	0.33
1	Lift Station	0	100	0	3.00	0	248,961	248,961	248,961.00	1311	16	8	0.0052	20.51	1289.72		1289.64	563,106	44%	2.5	2.42	0.46
	Proposed lift station depth to achieve proposed gravity sewer connections to buildings.																					

August 28, 2019

Smoke Tree Resort

7101 East Lincoln Drive
Paradise Valley, Arizona 85253

Water Service Impact Study

EPCOR

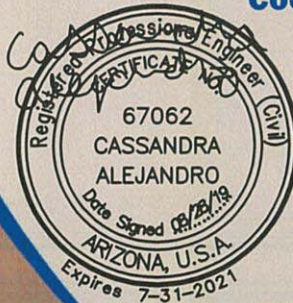
Accepted By: Brad Linke
Date: 9-26-2019

Prepared for:
Gentree LLC

3620 East Campbell Avenue
Suite B
Phoenix, AZ 85018
Contact: Sam Robinson

Prepared by:
Coe & Van Loo Consultants, Inc.

4550 N. 12th Street
Phoenix, AZ 85014
Contact: Cassandra Alejandro, P.E.
602.285.4763

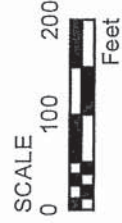
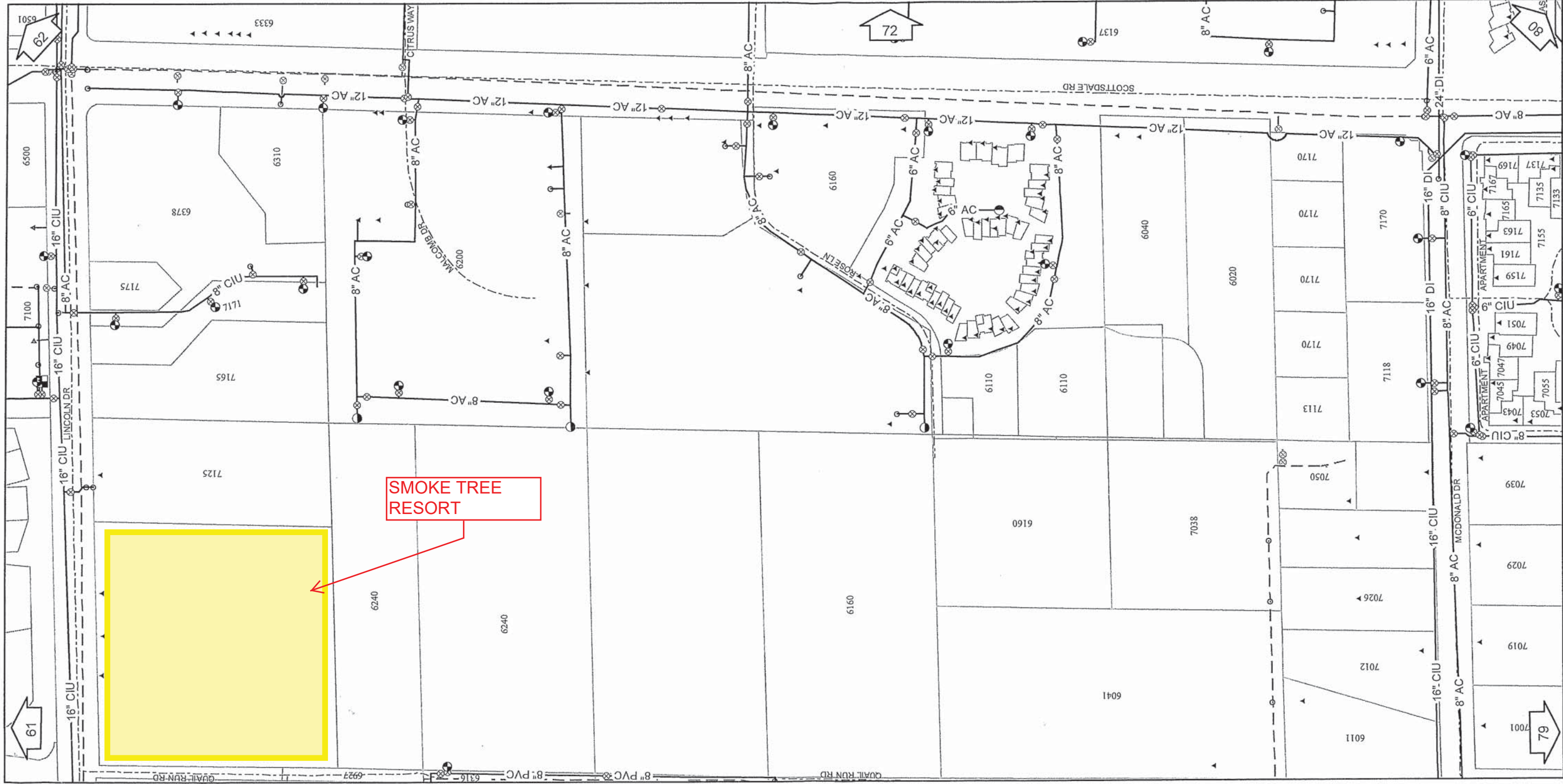


Job # 1.01.0315301

WATER SERVICE IMPACT STUDY

APPENDIX B

Water Quarter Section Map



WATER FEATURES

- Street Valves**
 - Air Release
 - Ball (Blow-off)
 - Double Check
 - Pressure Regulate
 - Gate, Butterfly Open
 - Gate, Butterfly Closed
- Other**
 - Customer Meter
 - Hydrant
 - Cap/Reducer
 - Pump Station
 - Tank
 - Well
 - Water Treatment Plant
 - System Interconnection

Lateral Service

All Types
(Domestic Not Shown For Map Clarity)

Mains

- Distribution
- Plant
- Transmission

Abandoned Features

- Mains/Laterals
- All Other Features Shown 50% Grey

Mapgrid: 21-44



EPCOR Water
EASTERN DIVISION

71
RIGHT

*Brad sent flow tests
Fred sent to me*

N



AREA
BOUNDARIES



Service Area

LAND
FEATURES

Street Centerline

Lotlines

TYPICAL LOT

ADDRESS
NUMBER

123

MAP PAGES

60	61	62
70	71	72
78	79	80

2N4E SE10

SE 1/4 SECTION 10

Mapgrid: 21-44

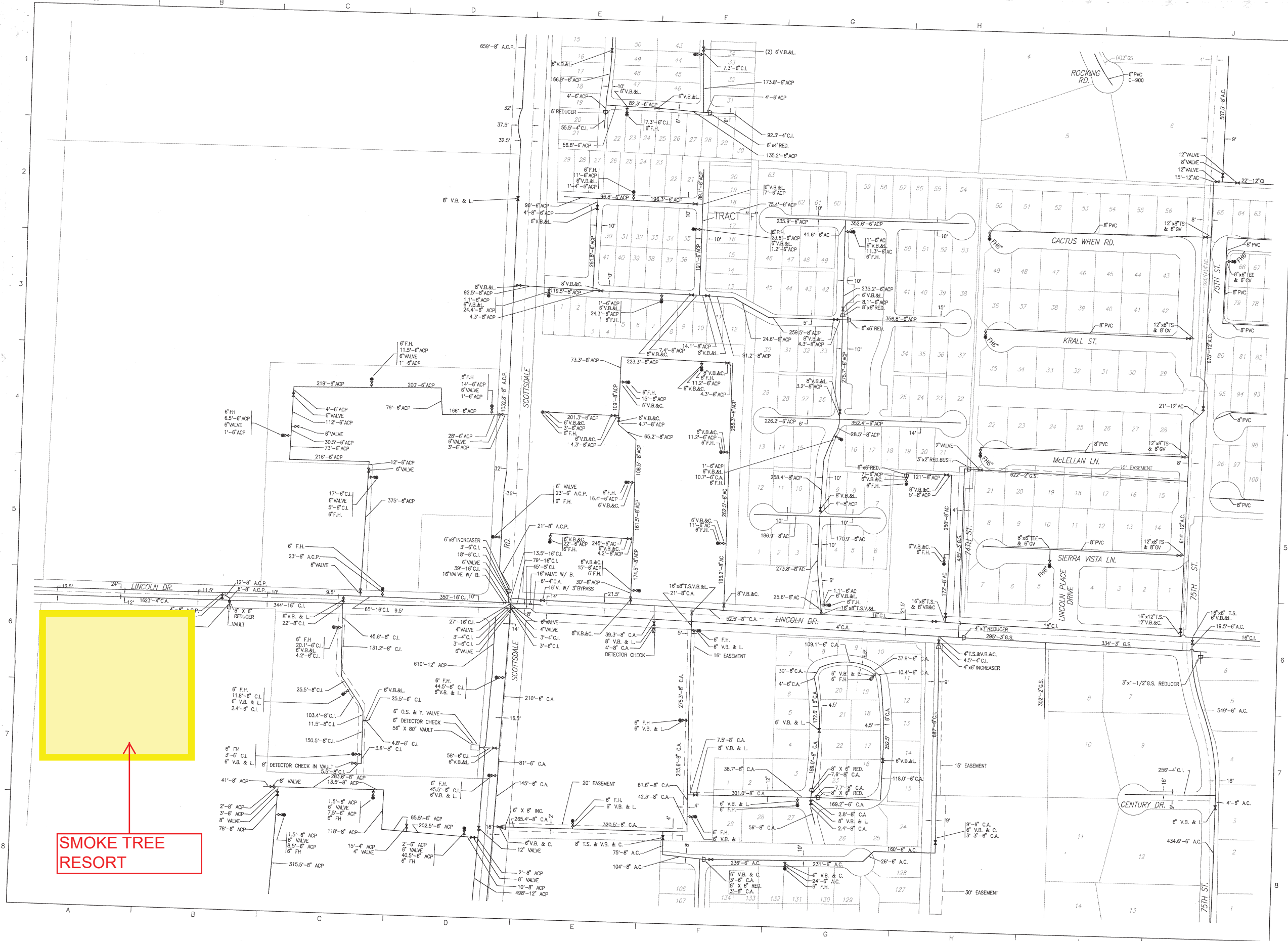


71 PARADISE VALLEY WATER

LEFT

REVISED: MAY 2014

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EPCOR MAKES NO CLAIMS CONCERNING THE ACCURACY
OF THIS MAP NOR ASSUMES ANY LIABILITY RESULTING
FROM THE USE OF THE INFORMATION HEREON.



Legend		
SYMBOL	ABBREV.	DESCRIPTION
	F.H.	COMPANY FIRE HYDRANT
	P.F.H.	PRIVATE FIRE HYDRANT
	REDU.	REDUCER
		WATER METER
		VALVE
		BLOW-OFF
	ARV-M	AIR RELEASE VALVE (MANUAL)
	ARV-A	AIR RELEASE VALVE (AUTOMATIC)
	(A)	ABANDONED
		WELL
	PSTA/P.S.	PUMP STATION
		TANK
	A.C.	ASBESTOS CEMENT
	BRS.	BRASS
	C.A.	CEMENT ASBESTOS
	C.I.	CAST IRON
	COP.	COPPER
	D.I.	DUCTILE IRON
	G.S.	GALVANIZED STEEL
	G.V.	GATE VALVE
	M.J.	MECHANICAL JOINT
	P.V.C.	POLYVINYL CHLORIDE
	R.W.	RAW WATER
	STL.	STEEL
	T.S.	TAPPING SLEEVE
	V.B. & C.	VALVE, BOX & COVER
	W.S.	WELDED STEEL
	V.	VALVE

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201	202
301	302
401	402
501	502
601	602
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901	902
1001	1002
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1201	1202
1301	1302
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1601	1602
1701	1702
1801	1802
1901	1902
2001	2002
2101	2102
2201	2202
2301	2302
2401	2402
2501	2502
2601	2602
2701	2702
2801	2802
2901	2902
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3101	3102
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3701	3702
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47901	47902
48001	48002</

APPENDIX C

Fire Flow Test Results



Flow Test Summary

Project Name: EJFT 23040 - Smoketree Resort
Project Address: 7125 E Lincoln Drive, Paradise Valley, Az 85253
Date of Flow Test: 2023-02-03
Time of Flow Test: 7:40 AM
Data Reliable Until: 2023-08-03
Conducted By: Steven Saethre & Sheila Schauble (EJ Flow Tests) 602.999.7637
Witnessed By: Mike Gomez (EPCOR Water) 480.450.4670
City Forces Contacted: EPCOR Water (480.450.4670)

Raw Flow Test Data

Static Pressure: 95.0 PSI
Residual Pressure: 75.0 PSI
Flowing GPM: 2,392
GPM @ 20 PSI: 4,885

Data with a 10 % Safety Factor

Static Pressure: 85.5 PSI
Residual Pressure: 65.5 PSI
Flowing GPM: 2,392
GPM @ 20 PSI: 4,540

Hydrant F₁

Pitot Pressure (1): 45 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 4 inches
Additional Coefficient 0.83 on orifice #1



Static-Residual
Hydrant

Flow Hydrant

Distance Between F₁ and R
252 ft (measured linearly)

Static-Residual Elevation
1304 ft (above sea level)

Flow Hydrant (F₁) Elevation
1306 ft (above sea level)

Elevation & distance values are
approximate

EJ Flow Tests, LLC

21505 North 78th Ave. | Suite 130 | Peoria, Arizona 85382 | (602) 999-7637 |

John L. Echeverri | NICET Level IV 78493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

www.flowtestsummary.com

Page 1

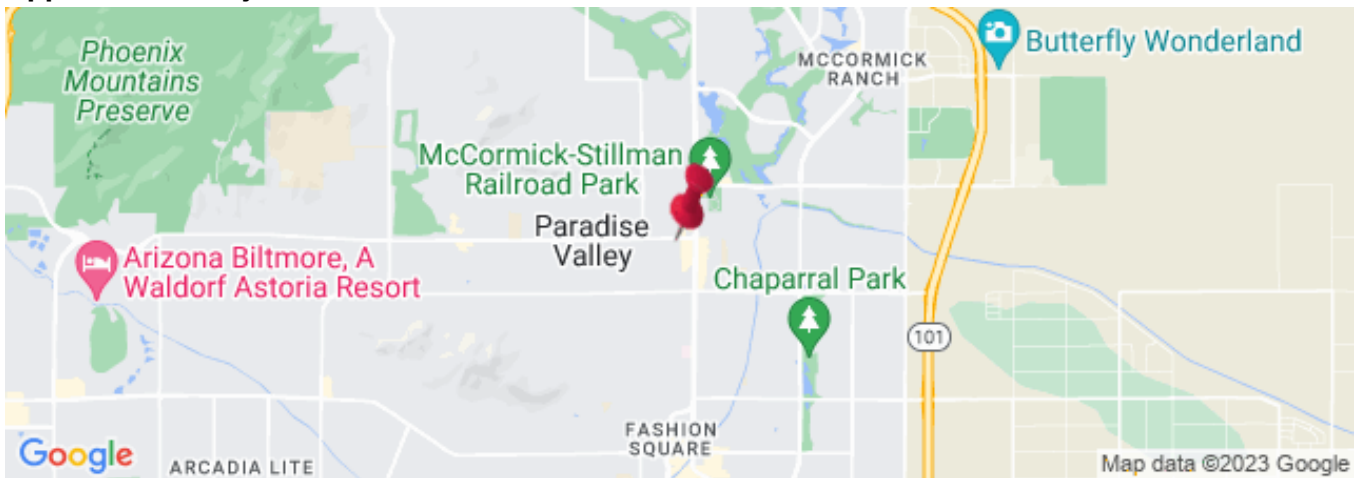
Static-Residual Hydrant



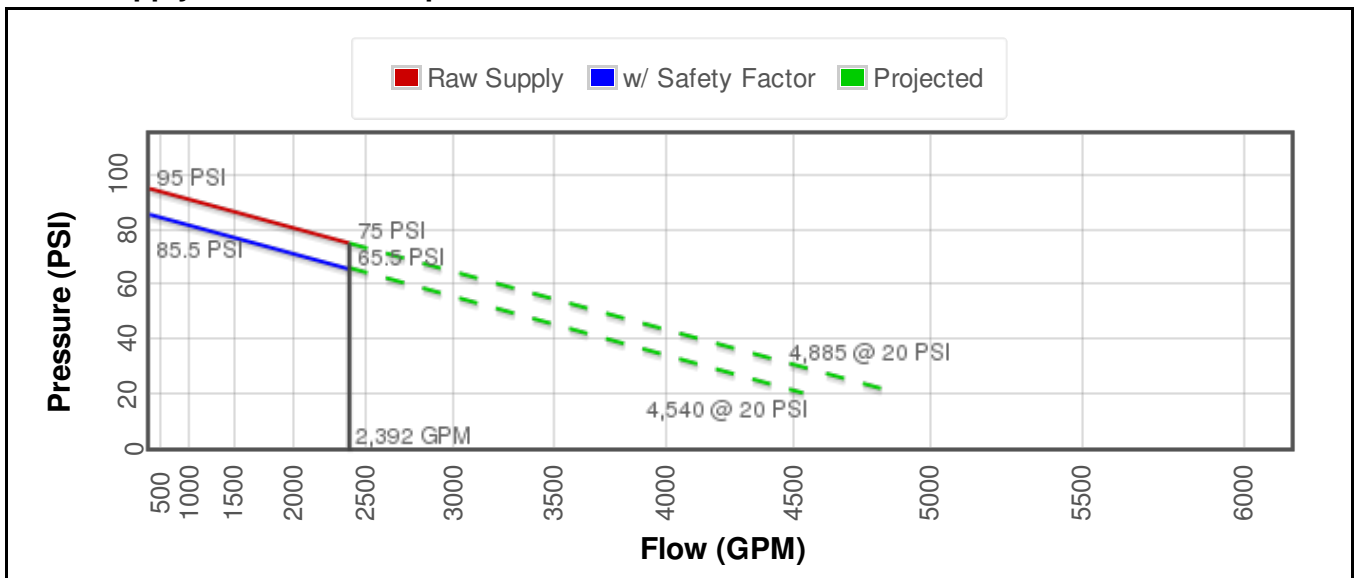
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve N^{1.85} Graph



APPENDIX D

WaterCAD Results (Domestic)

Color Coding Legend

Pipe: Diameter (in)

—	≤ 6.00
—	≤ 8.00
—	≤ 12.00
—	≤ 16.00
—	Other

Smoketree Resort
Active Scenario: Peak Hour
Average Day Demand
Pipe Table - Time: 0.00 hours

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen - Willia ms C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-8	32	R-1	PMP-1	16.00	Cast iron	130.0	30.00	0.05	0.0000
P-9	29	PMP-1	J-9	16.00	Cast iron	130.0	30.00	0.05	0.0000
P-19	260	J-9	J-7	16.00	Ductile Iron	130.0	30.00	0.05	0.0000
P-64	12	J-7	J-31	8.00	Copper	135.0	0.00	0.00	0.0000
P-68	37	J-7	J-33	16.00	Ductile Iron	130.0	30.00	0.05	0.0000
P-69	445	J-33	J-34	16.00	Ductile Iron	130.0	14.30	0.02	0.0000
P-70	16	J-34	J-35	16.00	Ductile Iron	130.0	14.30	0.02	0.0000
P-72	155	J-33	J-38	8.00	Ductile Iron	130.0	15.71	0.10	0.0000
P-73	33	J-35	J-36	12.00	Ductile Iron	130.0	14.30	0.04	0.0000
P-74	1,087	J-38	J-39	8.00	Ductile Iron	130.0	0.61	0.00	0.0000
P-75	233	J-39	J-37	8.00	Ductile Iron	130.0	4.91	0.03	0.0000
P-76	239	J-38	J-37	8.00	Ductile Iron	130.0	5.09	0.03	0.0000
P-78	158	J-41	J-39	8.00	Ductile Iron	130.0	14.30	0.09	0.0000
P-79	67	J-36	J-41	12.00	Ductile Iron	130.0	14.30	0.04	0.0000

Smoketree Resort
Active Scenario: Peak Hour
Average Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)
J-7	1,309.00	0.00	1,527.44	94.51	218.44
J-9	1,308.00	0.00	1,527.44	94.94	219.44
J-31	1,310.00	0.00	1,527.44	94.07	217.44
J-33	1,310.00	0.00	1,527.44	94.07	217.44
J-34	1,311.00	0.00	1,527.44	93.64	216.44
J-35	1,312.00	0.00	1,527.44	93.21	215.44
J-36	1,313.00	0.00	1,527.44	92.78	214.44
J-37	1,314.00	10.00	1,527.43	92.34	213.43
J-38	1,311.00	10.00	1,527.43	93.64	216.43
J-39	1,313.00	10.00	1,527.43	92.78	214.43
J-41	1,315.00	0.00	1,527.44	91.91	212.44

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
45	R-1	1,308.00	30.00	1,308.00

Pump Table - Time: 0.00 hours

Label	Elevation (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,307.00	1,527.44	30.00	219.44

Smoketree Resort
Active Scenario: Peak Hour
Maximum Day Demand
Pipe Table - Time: 0.00 hours

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen - Willia ms C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-8	32	R-1	PMP-1	16.00	Cast iron	130.0	54.00	0.09	0.0000
P-9	29	PMP-1	J-9	16.00	Cast iron	130.0	54.00	0.09	0.0000
P-19	260	J-9	J-7	16.00	Ductile Iron	130.0	54.00	0.09	0.0000
P-64	12	J-7	J-31	8.00	Copper	135.0	0.00	0.00	0.0000
P-68	37	J-7	J-33	16.00	Ductile Iron	130.0	54.00	0.09	0.0000
P-69	445	J-33	J-34	16.00	Ductile Iron	130.0	25.73	0.04	0.0000
P-70	16	J-34	J-35	16.00	Ductile Iron	130.0	25.73	0.04	0.0000
P-72	155	J-33	J-38	8.00	Ductile Iron	130.0	28.27	0.18	0.0000
P-73	33	J-35	J-36	12.00	Ductile Iron	130.0	25.73	0.07	0.0000
P-74	1,087	J-38	J-39	8.00	Ductile Iron	130.0	1.10	0.01	0.0000
P-75	233	J-39	J-37	8.00	Ductile Iron	130.0	8.83	0.06	0.0000
P-76	239	J-38	J-37	8.00	Ductile Iron	130.0	9.17	0.06	0.0000
P-78	158	J-41	J-39	8.00	Ductile Iron	130.0	25.73	0.16	0.0000
P-79	67	J-36	J-41	12.00	Ductile Iron	130.0	25.73	0.07	0.0000

Smoketree Resort
Active Scenario: Peak Hour
Maximum Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)
J-7	1,309.00	0.00	1,527.41	94.49	218.41
J-9	1,308.00	0.00	1,527.41	94.93	219.41
J-31	1,310.00	0.00	1,527.41	94.06	217.41
J-33	1,310.00	0.00	1,527.41	94.06	217.41
J-34	1,311.00	0.00	1,527.41	93.63	216.41
J-35	1,312.00	0.00	1,527.41	93.20	215.41
J-36	1,313.00	0.00	1,527.41	92.76	214.41
J-37	1,314.00	18.00	1,527.40	92.33	213.40
J-38	1,311.00	18.00	1,527.40	93.63	216.40
J-39	1,313.00	18.00	1,527.40	92.76	214.40
J-41	1,315.00	0.00	1,527.41	91.90	212.41

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
45	R-1	1,308.00	54.00	1,308.00

Pump Table - Time: 0.00 hours

Label	Elevation (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,307.00	1,527.41	54.00	219.41

Smoketree Resort
Active Scenario: Peak Hour
Peak Hour Demand
Pipe Table - Time: 0.00 hours

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen - Willia ms C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-8	32	R-1	PMP-1	16.00	Cast iron	130.0	90.00	0.14	0.0000
P-9	29	PMP-1	J-9	16.00	Cast iron	130.0	90.00	0.14	0.0000
P-19	260	J-9	J-7	16.00	Ductile Iron	130.0	90.00	0.14	0.0000
P-64	12	J-7	J-31	8.00	Copper	135.0	0.00	0.00	0.0000
P-68	37	J-7	J-33	16.00	Ductile Iron	130.0	90.00	0.14	0.0000
P-69	445	J-33	J-34	16.00	Ductile Iron	130.0	42.89	0.07	0.0000
P-70	16	J-34	J-35	16.00	Ductile Iron	130.0	42.89	0.07	0.0000
P-72	155	J-33	J-38	8.00	Ductile Iron	130.0	47.12	0.30	0.0001
P-73	33	J-35	J-36	12.00	Ductile Iron	130.0	42.89	0.12	0.0000
P-74	1,087	J-38	J-39	8.00	Ductile Iron	130.0	1.83	0.01	0.0000
P-75	233	J-39	J-37	8.00	Ductile Iron	130.0	14.72	0.09	0.0000
P-76	239	J-38	J-37	8.00	Ductile Iron	130.0	15.28	0.10	0.0000
P-78	158	J-41	J-39	8.00	Ductile Iron	130.0	42.89	0.27	0.0001
P-79	67	J-36	J-41	12.00	Ductile Iron	130.0	42.89	0.12	0.0000

Smoketree Resort
Active Scenario: Peak Hour
Peak Hour Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)
J-7	1,309.00	0.00	1,527.34	94.47	218.34
J-9	1,308.00	0.00	1,527.34	94.90	219.34
J-31	1,310.00	0.00	1,527.34	94.03	217.34
J-33	1,310.00	0.00	1,527.34	94.03	217.34
J-34	1,311.00	0.00	1,527.34	93.60	216.34
J-35	1,312.00	0.00	1,527.34	93.17	215.34
J-36	1,313.00	0.00	1,527.34	92.73	214.34
J-37	1,314.00	30.00	1,527.33	92.30	213.33
J-38	1,311.00	30.00	1,527.33	93.60	216.33
J-39	1,313.00	30.00	1,527.33	92.73	214.33
J-41	1,315.00	0.00	1,527.34	91.87	212.34

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
45	R-1	1,308.00	90.00	1,308.00

Pump Table - Time: 0.00 hours

Label	Elevation (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,307.00	1,527.34	90.00	219.34

APPENDIX E

WaterCAD Results (Fire Flow)

Fire Flow Node FlexTable: Fire Flow Results Table

Active Scenario: Residential Fire Flow

Label	Max Day Demand (gpm)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)	Flow (Total Needed) (gpm)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)	Pressure (Calculated Residual) (psi)	Pipe w/ Maximum Velocity	Maximum Velocity of Pipe (ft/s)	Satisfies Fire Flow Constraints?
J-33	0.00	2,000.00	2,001.00	2,000.00	78.64	J-41	78.62	P-19	3.28	True
J-35	0.00	2,000.00	2,001.00	2,000.00	77.42	J-41	77.40	P-19	3.28	True
J-36	0.00	2,000.00	2,001.00	2,000.00	76.90	J-41	76.88	P-73	4.90	True
J-38	18.00	2,000.00	2,019.00	2,018.00	76.32	J-37	76.31	P-72	8.05	True
J-41	0.00	2,000.00	2,001.00	2,000.00	75.87	J-37	75.86	P-73	4.73	True
J-39	18.00	2,000.00	2,019.00	2,018.00	75.31	J-37	75.29	P-78	7.57	True
J-37	18.00	2,000.00	2,019.00	2,018.00	73.60	J-39	73.58	P-72	6.86	True

APPENDIX F

Water Quality Report

PARADISE VALLEY

2020 WATER QUALITY REPORT





Safety. Quality. Community. You'll hear these words spoken often around EPCOR.

At EPCOR, we're committed to providing you safe, quality, reliable drinking water every day. It's our mission, and it's an honor. Water fuels our economy, quenches our thirst, and breathes life into our daily routines.

But we can't take it for granted. Our water system needs a steward, one who's there behind the scenes 24 hours a day, 7 days a week to manage, maintain and invest in it.

EPCOR takes this responsibility seriously. From daily water quality checks that ensure safety and quality to investing in your water system, we're ensuring that water will be available for years to come, whether your water source is deep underground or from rivers and lakes.

While the COVID-19 pandemic has created many uncertainties, we want to remind customers that your water is safe. The virus has not been detected in drinking water supplies, and there is no evidence to suggest that it survives the standard disinfection process.

In addition to monitoring the water that comes out of your tap, we're also maintaining and improving the miles of pipelines, water mains, wells and hydrants that make up your water system. We're ensuring that water isn't wasted, and that it's a resource that will be there for the long term.

Because every drop matters.



Sincerely,



Joe Gysel

President,
EPCOR USA, Inc.

YOU WANT TO KNOW WHAT'S IN THE WATER YOU'RE DRINKING

As your water service provider, we're committed to ensuring the quality and safety of that water. That's why you are receiving this annual water quality report from us. We hope it will help you understand your community's water a little better and what we're doing to protect it.

WHAT WILL I FIND IN THIS REPORT?

This report complies with state and U.S. Environmental Protection Agency (EPA) drinking water regulations.

In it you'll find information on:

- Where your water comes from
- Protecting your water
- What's in your water

Information in this report is compiled, in part, from analytical data generated by laboratories certified in drinking water analysis.

READ THIS REPORT – AND SHARE IT!

Reading this report and understanding your community's water is the first step. But it's also important to share this information with those who might not receive it directly. If you're a landlord, business, school or hospital, please share this report with water users in your community.



QUESTIONS?

EPCOR Customer Care: 1-800-383-0834 • mywater@epcor.com

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.

ABOUT YOUR WATER

PARADISE VALLEY

ABOUT YOUR DISTRICT

- EPCOR provides water service to approximately 4,900 service connections in the Paradise Valley district.

WHERE YOUR WATER COMES FROM

- Groundwater in the West Salt River Valley (WSRV) Sub-Basin, bordering the Phoenix Mountains

Additional information about the groundwater in your area

- The WSRV Sub-Basin is a broad, gently sloping alluvial plain, drained by the Gila and Salt Rivers.
- Sources of groundwater recharge include natural recharge from stream flows and along mountain fronts, incidental recharge from agricultural and urban uses, and intentional recharge at constructed recharge facilities.

How We Protect Groundwater Together

Both groundwater and the associated pumping and delivery facilities are part of a complex system that needs not just monitoring, but also maintenance. From pipelines to water mains, wells to hydrants, we're ensuring that the groundwater supply is protected and accessible.

How You Can Help

Properly dispose of hazardous household chemicals on hazardous material collection days and limit your pesticide and fertilizer use. For information on household hazardous material collection days in your area, contact the **Arizona Department of Environmental Quality** at **602-771-2300** or **Earth911.com**.



NOTICE OF SOURCE WATER ASSESSMENT

In 2004, the Arizona Department of Environmental Quality (ADEQ) completed a source water assessment for the seven wells used by EPCOR-Paradise Valley. The assessment reviewed the adjacent land uses that may pose a potential risk to the sources. These risks include, but are not limited to, gas stations, landfills, dry cleaners, agriculture fields, wastewater treatment plants, and mining activities. Once ADEQ identified the adjacent land uses, they were ranked as to their potential to affect the water sources. The results of the assessment were that two wells had no adjacent land uses, four wells had 10 adjacent land uses that posed a low risk to the source and each well also had one adjacent land use that posed a high risk, and one well had one adjacent land use that posed a high risk.

The complete assessment is available for inspection at the Arizona Department of Environmental Quality, 1110 W. Washington, Phoenix, AZ 85007, between the hours of 8 a.m. and 5 p.m. For more information please contact **ADEQ** at **602-771-2300**.

GETTING INVOLVED

Consulting with the community is important to us. If you have a question, concern or suggestion about your local water system, please contact our Customer Care team at **1-800-383-0834**.

WHAT YOU CAN EXPECT TO FIND IN YOUR WATER

SOURCES OF DRINKING WATER

The sources of drinking water—both tap water and bottled water—include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over land surfaces or through the ground, it can acquire naturally occurring minerals. In some cases it can also acquire radioactive material and substances resulting from the presence of animals or from human activity.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

More information about contaminants and potential health effects can be obtained by calling the **EPA's Safe Drinking Water Information Hotline** at **1-800-426-4791**.

DID YOU KNOW?

- ◆ **One-Part-Per-Million** (mg/L or ppm) is equivalent to one inch in 16 miles.
- ◆ **One-Part-Per-Billion** (ug/L or ppb) is equivalent to a single 4-inch hamburger in a chain of hamburgers long enough to circle the earth at the equator 2.5 times.
- ◆ **One-Part-Per-Trillion** (ng/L or ppt) is equal to a single drop of water being diluted into 20 Olympic-size swimming pools.



SUBSTANCES THAT MAY BE PRESENT IN SOURCE WATER

Microbial Contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations or wildlife.

Inorganic Contaminants, such as salts and metals, which can be naturally occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and Herbicides, may come from a variety of sources, such as agriculture, urban stormwater runoff and residential uses.

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and may also come from gas stations, urban stormwater runoff and septic systems.

Radioactive Contaminants, which can be naturally occurring or may be the result of oil and gas production and mining activities.



ENSURING YOUR WATER IS SAFE

To ensure that tap water is safe to drink, the EPA prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. To ensure bottled water is safe to drink, U.S. Food and Drug Administration regulations establish limits for contaminants in bottled water.

WHAT YOU CAN EXPECT TO FIND IN YOUR WATER

SPECIAL HEALTH INFORMATION

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants may be particularly at risk from infections. These people should seek advice about drinking water from their healthcare providers. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the **EPA's Safe Drinking Water Information Hotline** at **1-800-426-4791**.

Lead

EPCOR monitored the water for lead and copper in 2020 at 30 residences throughout the community and met the federal lead and copper standards. The 30 houses sampled were representative of the types of houses throughout the system. If your house was sampled you would have received the analysis results. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. EPCOR is responsible for providing highquality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the **Safe Drinking Water Information Hotline** or at **www.epa.gov/safewater/lead**.



DID YOU KNOW?

Tap water costs a lot less than what you pay for other beverages.

A gallon of water costs you about 1 penny.



Compare that to the cost of a gallon of these beverages*:

- o Milk = \$3.29/gallon
- o Orange Juice = \$2.55/gallon
- o Beer = \$15.00/gallon
- o Bottled Water = \$1.21/gallon
- o Wine = \$25/gallon

* Costs for milk, orange juice and bottled water obtained from Bureau of Labor Statistics and Beverage Marketing Association reports. Other costs determined by calculating average supermarket pricing for bottles of soda, wine and beer and converting to a gallon.

HOME WATER TREATMENT UNITS

Failure to perform maintenance on your home water treatment unit can result in poor water quality. If you installed a home water treatment system such as a water softener or reverse osmosis system, please remember to follow the manufacturer's instructions on operation and maintenance. For more information, contact the manufacturer of your treatment system for maintenance instructions or assistance. Additional information about home water treatment systems is available from the **Water Quality Association** at **630-505-0160** or by visiting **wqa.org**.

FREQUENTLY ASKED QUESTIONS

WHAT IS THE WHITE OR COLORED DEPOSIT ON MY DISHES OR FAUCETS?

In most cases, the deposits or sediments left behind after water evaporates are calcium carbonate. The amount of calcium in the water is referred to as hardness. Cleaning with white vinegar can help to dissolve and remove deposits. Using a commercial conditioner, liquid detergents or the “air-dry” option in dishwashers can help to decrease the calcium carbonate found on dishes.

ARE THE DEPOSITS OR HARD WATER HARMFUL?

Hardness and/or the deposits left by hard water don’t pose a health concern and may have health benefits. We don’t treat drinking water for water hardness that can result in hard water deposits.

WHAT IS THE LEVEL OF HARDNESS IN MY WATER?

The hardness in your water ranges from 12 to 20 grains per gallon (gpg).

Degree of water hardness range (gpg)

Soft	Less than 1
Slightly Hard	1 to 3.4
Moderately Hard	3.5 to 6.9
Hard	7 to 10.4
Very Hard	Greater than 10.5

WHY IS MY WATER CLOUDY OR MILKY IN APPEARANCE WHEN IT COMES OUT OF THE TAP?

Water that appears cloudy or milky is typically caused by trapped air (very small air bubbles) in the water. If this occurs, simply let the water stand for a few minutes—the air will dissipate leaving a clear glass of water.



The quality of your water depends on the source water itself as well as factors such as the geology and biology of the area where the water came from. For some elements that are known to have an effect on the aesthetics of the water quality parameters, the EPA has established guidance levels known as secondary maximum contaminant level standards (SMCLs). When levels of these contaminants are found to be above the SMCLs, they may impact the aesthetic quality of the water (e.g., color, taste and odor). Although aesthetic water qualities may vary, your water meets all state and federal regulatory standards and is safe to use for all drinking water purposes. Secondary contaminants include, but are not limited to, manganese, iron and total dissolved solids (TDS).

WHY IS CHLORINE ADDED TO MY DRINKING WATER?

Chlorine is added to your water for your protection and is used as a disinfectant to ensure that harmful organisms, such as bacteria and viruses, are destroyed in the treatment process.

ARE THERE OTHER WAYS TO REMOVE THE CHLORINE TASTE OR SMELL FROM MY WATER?

To remove the taste of chlorine from your water, try these tips:

- ▶ Place water in a glass container in the refrigerator overnight, uncovered. This will let the chlorine dissipate.
- ▶ Bring your water to a rolling boil for five minutes and let it stand to cool.
- ▶ Add a slice of lemon or a few drops of lemon juice to your glass of drinking water.



WILL MY HOME TREATMENT DEVICE REMOVE CHLORINE?

Some home treatment devices can remove chlorine. Once chlorine is removed, the water should be treated like any other beverage product and used as quickly as possible. We recommend that you follow the manufacturer’s instructions for maintaining the device to ensure water quality.

DEFINITION OF TERMS

AL (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

GPG (grains per gallon): Used to describe the dissolved hardness minerals contained in water and is a unit of weight that equals 1/7,000 of a pound.

HAA5 (Haloacetic Acids): Consist of Monochloroacetic Acid, Dichloroacetic Acid, Trichloroacetic Acid, Bromoacetic Acid and Dibromoacetic Acid.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MNR: Monitored, not regulated.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not Applicable.

ND: None Detected.

NTU: Nephelometric turbidity units.

ppb (Parts per Billion): One part substance per billion parts water (or micrograms per liter).

pCi/L (Picocuries per Liter): Measurement of the natural rate of disintegration of radioactive contaminants in water (also beta particles).



ppm (Parts per Million): One part substance per million parts water (or milligrams per liter).

ppt (Parts per Trillion): One part substance per trillion parts water (or nanograms per liter).

SMCL (Secondary Maximum Contaminant Level): Non-enforceable guidelines regulating contaminants that may cause cosmetic or aesthetic effects in drinking water.

Total Dissolved Solids: An overall indicator of the amount of minerals in water.

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

TTHM (Total Trihalomethanes): Consist of Chloroform, Bromoform, Bromodichloromethane and Dibromochloromethane.

UCMR (Unregulated Contaminant Monitoring Rule): Unregulated substances are measured, but maximum contaminant levels have not been established by the government.

WHAT'S IN YOUR WATER

HOW TO READ YOUR WATER QUALITY TABLE

Below, you'll see an analysis of your drinking water.

Here's an example of how to read these tables:



Start here and read across	2020 or year prior	The goal level for that substance	Highest level of substance allowed	Highest amount that was found	Highest and lowest amounts found	Yes means the amount found is below gov't requirements	Where substance usually originates
Substance (units)	Year Sampled	MCLG	MCL	Highest Amount Detected	Range of Detections	Compliance Achieved	Typical Sources

YOUR WATER QUALITY TABLE

The data shown in the tables below are results from commercial laboratories certified in drinking water analysis by the Arizona Department of Health Services.

The table shows what substances were detected in your drinking water during 2020 or the last required sampling period within the last five years.

Regulated Substances Measured in the Water Leaving the Treatment Facility

Substance (units)	Year Sampled	MCLG	MCL	Highest Amount Detected	Range of Detections	Compliance Achieved	Typical Sources
Arsenic (ppb)	2020	0	10	8.2 ¹	6.4 - 8.2	YES	Erosion of natural deposits
Barium (ppm)	2017	2	2	0.017	0.017	YES	Erosion of natural deposits
Chromium (ppb)	2017	100	100	25	25	YES	Erosion of natural deposits
Fluoride (ppm)	2017	4.0	4.0	0.37	0.37	YES	Erosion of natural deposits
Nitrate (ppm)	2020	10	10	4.34	4.34	YES	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits
Selenium (ppb)	2017	50	50	2.2	2.5	YES	Erosion of natural deposits
Sodium (ppb)	2017	NA	MNR	65	65	YES	Erosion of natural deposits
Gross Alpha excluding radon and uranium (pCi/L)	2014	0	15	4.8	4.8	YES	Erosion of natural deposits

WHAT'S IN YOUR WATER

Regulated Substances Measured in the Distribution System

Substance (units)	Year Sampled	MCLG/ MRDLG	MCL/ MRDL	Highest Running Annual Average	Range of Detections	Compliance Achieved	Typical Sources
TTHMs (ppb)	2020	NA ²	80	3.4	3.4	YES	By-product of drinking water disinfection
Chlorine Residual (ppm)	2020	4	4.0	0.86	0.7 - 0.86	YES	Water additive used to control microbes

Tap Water Samples: Lead and Copper Results

Substance (units)	Year Sampled	MCLG	Action Level	Number of Samples	90th Percentile	Number of Samples Above Action Level	Compliance Achieved	Typical Sources
Copper (ppm)	2020	1.3	1.3	30	0.14	0	YES	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb)	2020	0	15	30	ND	0	YES	Corrosion of household plumbing systems; erosion of natural deposits

Unregulated Substances Measured in the Water Leaving the Treatment Facility

Substance (units)	Year Sampled	Range of Detections	Typical Sources
Hardness (grains/gallon)	2017	11.7 - 19.8	Natural calcium and magnesium content
Total Dissolved Solids (ppm)	2017	470 - 640	Erosion of natural deposits

WHAT'S IN YOUR WATER

Unregulated Contaminant Monitoring Rule Substances Measured at the Treatment Facility and in the Distribution System

Substance (units)	Year Sampled	Range of Detections	Typical Sources
HAA6Br (ppb)	2018	0.7 - 1.98	By-product of drinking water disinfection
HAA9 (ppb)	2018	0.7 - 2.2	By-product of drinking water disinfection

¹Arsenic: EPCOR's groundwater arsenic removal facility continues to produce water with arsenic levels below the current federal and state standards. While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

²TTHM/HAA5: Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants: Trihalomethanes: bromodichloromethane (0.0 mg/L); bromoform (0.0 mg/L); chloroform (0.07 mg/L); dibromochloro-methane (0.06 mg/L). Haloacetic acids: dichloroacetic acid (0.0 mg/L); trichloroacetic acid (0.3 mg/L). Monochloroacetic acid, bromoacetic acid and dibromoacetic acid are regulated with this group but have no MCLGs.

ADDITIONAL MONITORING

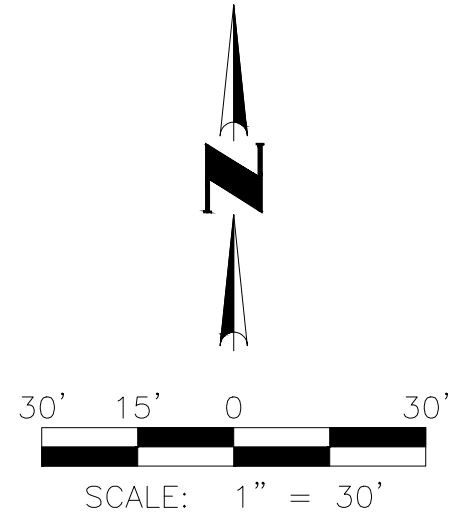
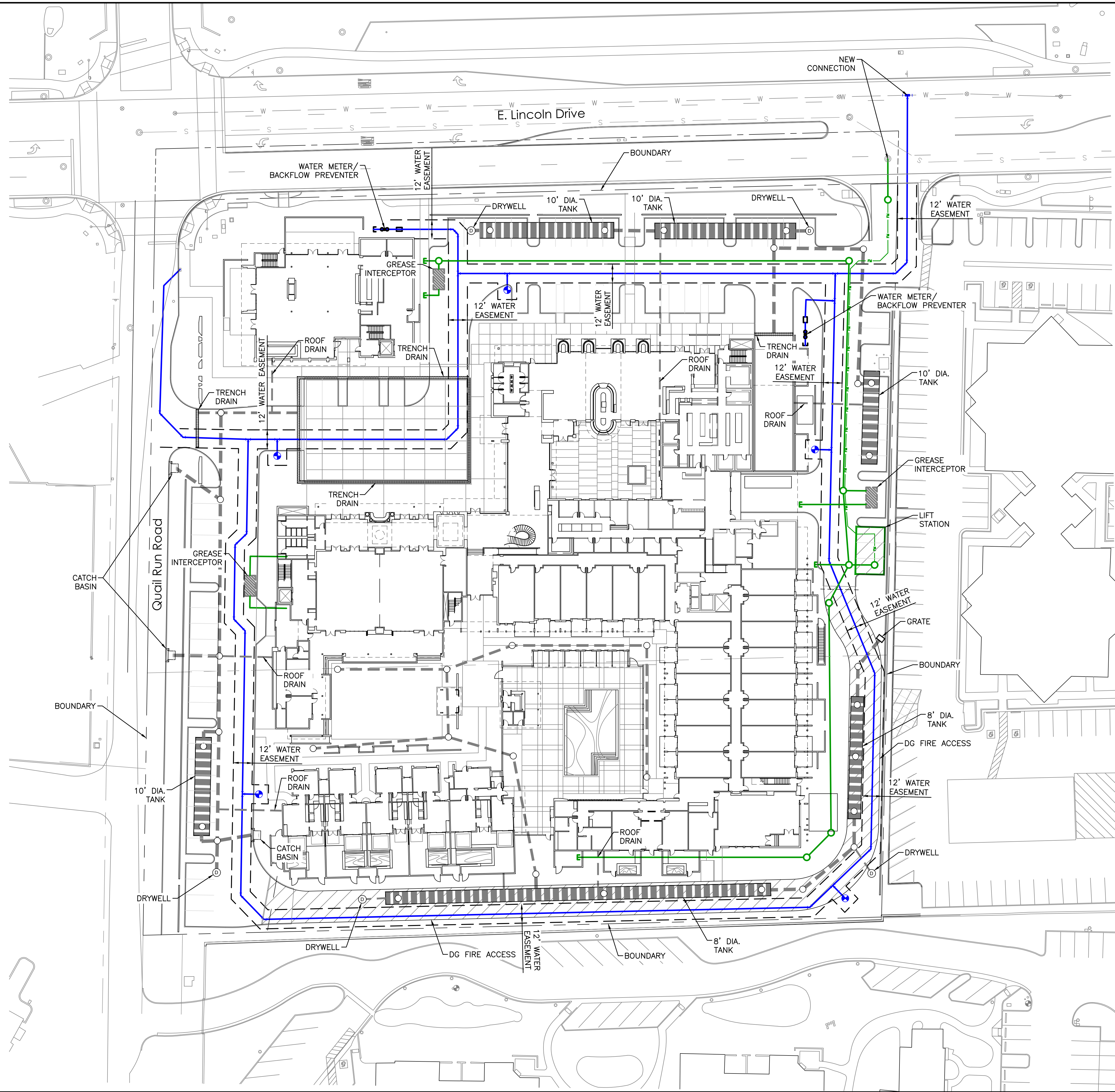
In addition to the parameters listed in this table, other parameters were monitored for, including regulated pesticides, herbicides, petroleum by-products and metals. None of those parameters were detected in the water. If you have any questions about this report or your drinking water, please call our **Customer Care** team at **1-800-383-0834**.

EPCOR encourages feedback related to the quality of water that is provided to you. Please feel free to submit comments to us directly at mywater@epcor.com. You may also provide feedback to the Arizona Corporation Commission (ACC).



Learn more about your
water at **epcor.com**.

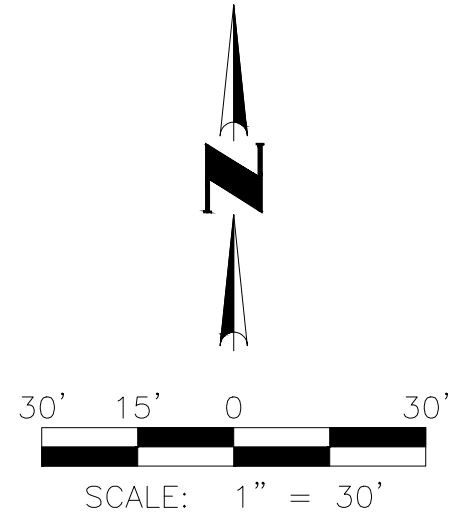
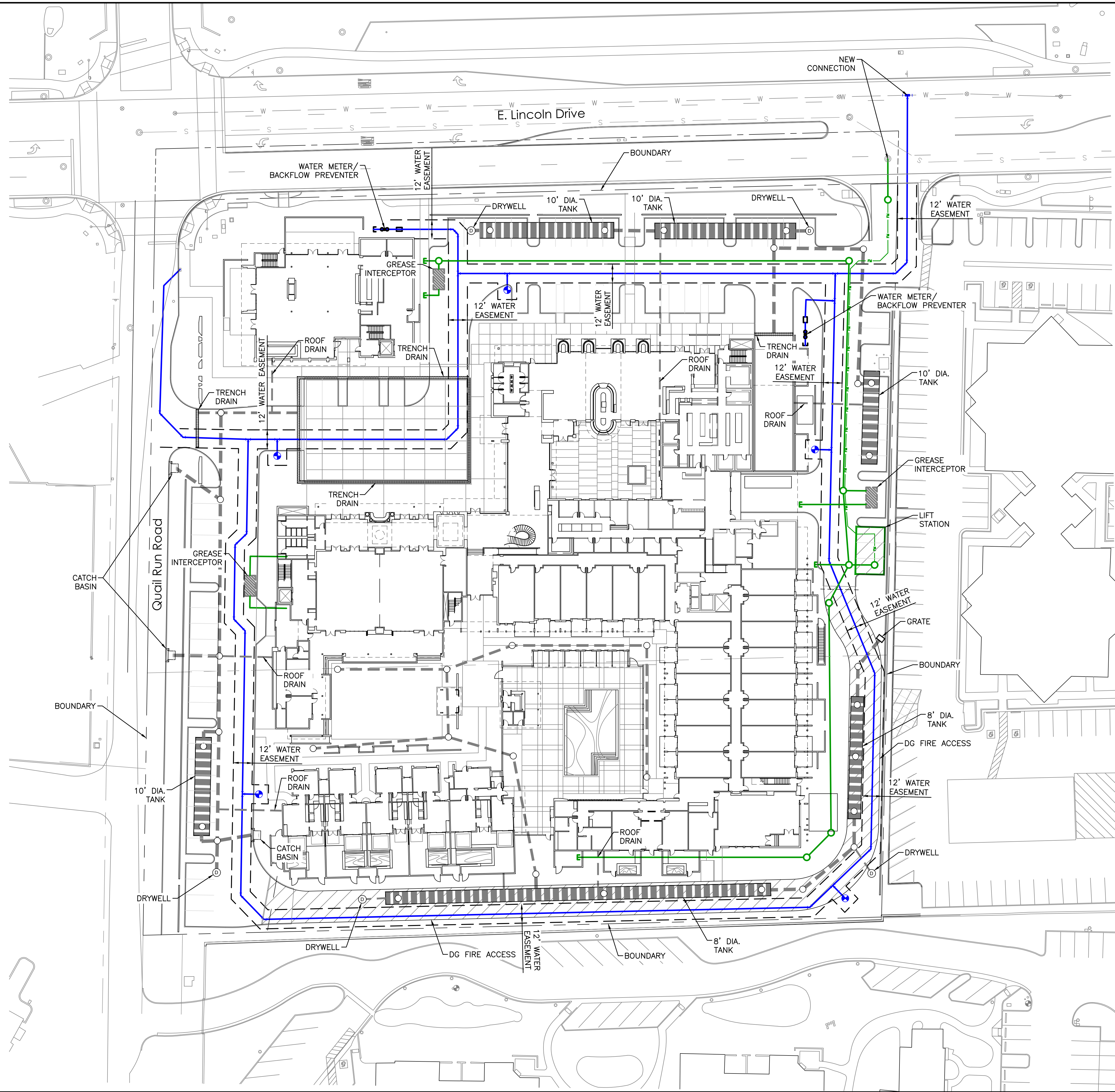
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CVL Contact: CONTACT
CVL Project #: 01-0315301
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