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WATER STUDY

WASTERWATER STUDY

STORMWATER WAIVER APPLICATION

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WASTEWATER MASTER PLAN / BASIS OF DESIGN REPORT FOR DESERT MOUNTAIN PARCEL 19

June 15, 2016

Revised August 5, 2016

WP# 164434

Prepared for:

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Suite H100
Phoenix, Arizona 85018
Phone: (602) 386-1317

Submitted To:

City of Scottsdale
Water Resources Department
9388 East San Salvador Drive
Scottsdale, Arizona 85258
Phone: (480) 312-5636

Prepared By:

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EXPIRES 09-30-16

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EXPIRES 09-30-16

1.0 INTRODUCTION

1.1 General Background and Project Location

Desert Mountain Parcel 19 (Site) is an approximate 91-acre proposed residential/golf course development in the City of Scottsdale, located between Cave Creek Road and existing church development on the south, Pima Road on the west, and the existing fire station and booster pump site and Desert Mountain development to the east and north (refer to Exhibit 1 – *Vicinity Map*). The property is located within Section 31, Township 6 North, Range 5 East, of the Gila and Salt River Meridian.

The Site is planned to include an 18-hole, short-game golf course, clubhouse, and residential housing. This Wastewater Master Plan / Basis of Design Report (Wastewater Master Plan/BOD) for the Site utilizes a site plan prepared concurrently by Greey | Pickett, dated June 10, 2016.

This Wastewater Master Plan/BOD Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (Wood/Patel) understanding of the City of Scottsdale's technical requirements for wastewater collection systems, as applicable for the Site.

1.2 Scope of Wastewater Master Plan / Basis of Design Report

The purpose of this Wastewater Master Plan/BOD Report is to determine wastewater design flows, pipe sizes, and sewer line locations, as required to provide wastewater service to the proposed development. The required infrastructure identified includes wastewater collection system mains and outfall locations.

1.3 Full Build-Out Condition

The design criteria utilized to calculate wastewater design flows and determine required pipe sizes for the Site are based on projected full build-out conditions. The current zoning for the Site consists of I-1 ESL, C-0 ESL, C-2 ESL, R1-7 ESL, and R1-35. This report is based on the assumption that the rezoning case will change the zoning to Residential R-4 and OS ESL.

2.0 DESIGN DOCUMENTATION

2.1 Design Criteria

For the purpose of this Wastewater Master Plan/BOD Report, wastewater design flows and pipe-sizing criteria utilized are based on Wood/Patel's understanding of the following:

- Applicable wastewater system design criteria listed in the *City of Scottsdale Design Standards & Policies Manual*, dated January 2010; and
- Title 18, Chapter 9 of the *Arizona Administrative Code;*

Refer to Table 1 – *Wastewater Collection System Design Criteria* for detailed information regarding design criteria.

2.2 Wastewater Design Flows

Wastewater design flows for the Site were estimated using design criteria listed in Section 2.1 – *Design Criteria*. Wastewater design flows generated by the offsite and onsite areas are summarized as follows:

ANTICIPATED DESERT MOUNTAIN OFFSITE WASTEWATER FLOWS			
Type	**Adjacent Node**	**Average Daily Flow (gpd)**	**Peak Flow (gpd)**
Existing Fire Station	EX-MH-3	540	2,430
TOTAL		**540**	**2,430**

ANTICIPATED DESERT MOUNTAIN PARCEL 19 ONSITE WASTEWATER FLOWS TO PIMA ROAD			
Type	**Adjacent Nodes**	**Average Daily Flow (gpd)**	**Peak Flow (gpd)**
Proposed Single Family Residences	MH-1 to MH-27	47,500	190,000
Proposed Clubhouse	MH-8	20,000	90,000
TOTAL		**67,500**	**280,000**

Detailed design flow calculations are provided in Table 2 – *Offsite Wastewater Flows*, Table 3 – *Onsite Wastewater Design Flows,* and Table 4 – *Wastewater Model, Full Build-Out Condition*. Refer to Table 5 – *Calculated Pipe Capacities, Full Build-Out Condition* for pipe capacities. For the layout of the proposed wastewater collection system, refer to Exhibit 2 – *Wastewater Exhibit - Full Build-Out.*

3.0 EXISTING CONDITIONS

3.1 Topographic Conditions

The proposed project lies in the northern planning section of the City of Scottsdale. The Site generally slopes from east to west, at approximately 3 percent. Elevations range from 2,645 feet above mean sea level (MSL) in the east, to 2,585 feet MSL in the west. The Site is covered with typical Sonoran Desert vegetation including mesquite trees, saguaro cactus, creosote, etc. In addition, existing dirt roads to access the existing onsite wells are located throughout the Site.

3.2 Existing Offsite Wastewater Infrastructure

Relevant public wastewater collection systems near the Site include the following:

- An existing 18-inch gravity sewer located along Pima Road, from the north property boundary of the Site to Carefree Drive, connecting to an existing 21-inch gravity sewer from Carefree Drive to Cave Creek Drive.
- An existing 12-inch gravity sewer located northeast of the Site and connecting to the existing onsite 15-inch gravity sewer along the northern boundary of the Site.

According to the *2008 Integrated Wastewater Master Plan*, wastewater generated on the Site will be treated at the Water Campus Water Reclamation Plant (WCWRP) located near Pima Road and the AZ Loop 101. The WCWRP is the primary treatment facility for wastewater generated in the northern portions of the City of Scottsdale.

3.3 Existing Onsite Wastewater Infrastructure

A portion of the Site has access roads to a City of Scottsdale Potable Water Booster Pump Station and existing well sites. It is Wood/Patel's understanding that no existing onsite wastewater infrastructure exists along these access roads. However, two (2) existing gravity sewers located within the Site include:

- An existing 15-inch gravity sewer located along the northern property boundary and connecting to the existing gravity sewer located in Pima Road.
- An existing 8-inch gravity sewer located along the Twilight Drive alignment and extending to the adjacent Cave Creek Road alignment. This existing gravity sewer then extends west along the southern property boundary to connect to the existing gravity sewer within Pima Road. Development of Parcel 19 proposes to abandon this portion of sewer.

4.0 PROPOSED WASTEWATER COLLECTION SYSTEM

4.1 Sewer Pipe Sizing

Pipes for the Site were sized to accommodate peak wet-weather flow conditions at full build-out for the Site. Using the design criteria previously mentioned, the resulting sewer system consists of gravity-fed, 8-inch sewer pipes. Refer to Exhibit 2 for the proposed wastewater collection system configuration.

4.2 Sewer Layout

The sewer layout generally follows the natural topography of the Site, sloping in a southwesterly direction. The proposed wastewater collection system meets the minimum depth of cover requirements established by the City of Scottsdale (Ref. 1). The proposed wastewater collection system will outfall to the existing 21-inch sewer in two (2) locations. The first outfall location is near the intersection of Carefree Drive and Pima Road. The second outfall location is approximately 1,400 feet north of the intersection of Pima Road and Cave Creek Road.

5.0 CONCLUSIONS

This Wastewater Master Plan / Basis of Design Report, as presented, meets City of Scottsdale standards and requirements, and serves as a guide for construction documents associated with the proposed wastewater collection system. The following items highlight critical conclusions:

1. Wastewater design flows and proposed wastewater collection system for full build-out was analyzed.

2. The approximate average daily flow generated at full build-out by Desert Mountain Parcel 19 is 67,500 GPD, per section 2.2 of this report.

3. Wood/Patel's model of the proposed wastewater collection system provides system conveyance and capacity in conformance to City of Scottsdale's standards and Title 18, Chapter 9 of the *Arizona Administrative Code*.

4. Onsite wastewater flows will outfall to the existing 21-inch gravity sewer along Pima Road in 2 locations; the intersection of Carefree Drive and Pima Road, and approximately 1,400 feet north of the intersection of Pima Road and Cave Creek Road.

5. It is Wood/Patel's understanding that the proposed wastewater collection system conforms to the City of Scottsdale's adopted *Integrated Master Wastewater Plan*, dated March 2008.

6.0 REFERENCES

1. *Design Standards & Policies Manual*, City of Scottsdale, January 2010.
2. *Arizona Administrative Code, Title 18, Chapter 9,* Arizona Department of Environmental Quality, 2005.
3. *2008 Integrated Wastewater Master Plan,* City of Scottsdale, March 2008.

TABLE 1

WASTEWATER COLLECTION SYSTEM
DESIGN CRITERIA

WOOD/PATEL **TABLE 1 - WASTEWATER COLLECTION SYSTEM DESIGN CRITERIA**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Desert Mountain Proj. Number: 164434
Location: Scottsdale, AZ Proj. Engineer: Mike Young, P.E.
References: 2010 City of Scottsdale Design Standards & Policies Manual

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS

Description	Value	Units	Note(s)
General			
Minimum Full-Flow Velocity	2.5	ft/sec	1
Maximum Peak Flow Velocity	10	ft/sec	1
Minimum Cover on Sanitary Sewer Pipe	4	feet	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D) for Sewer Pipes 12 inches in Diameter or Less	0.65	-	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D) for Sewer Pipes Greater than 12 inches in Diameter	0.7		1
Minimum Pipe Diameter	8	in	1
Manning's "n" value	0.013	-	1
Peaking Factor (Single Family Residential for sanitary sewer lines 8 to 12 inches in diameter)	4.0		1
Peaking Factor (Resort Hotel)	4.5		1,2
Residential			
Average Day Wastewater Flow per Person (Pipes with 8 to 12 inch diameters)	100	GPD/person	1
Population Density	2.5	persons/du	1
Average Day Wastewater Flow per Dwelling Unit (Pipes with 8 to 12 inch diameters)	250	GPD/du	1
Average Day Wastewater Design Flows, Non-Residential			
Country Club Amenities (Resident Member)	100	GPD/Resident Member	3

Notes:

1. Per City of Scottsdale Design Standards & Policies Manual

2. This peaking factor was used for modeling the Clubhouse.

3. Per Table 1- *Unit Design Flows from the Arizona Administrative Code, Title 18, Chapter 9*

TABLE 2

OFFSITE WASTEWATER FLOWS

Project: Desert Mountain
Location: Scottsdale, Arizona

Proj. Number: 164434
Proj. Engineer: Mike Young, P.E.

OFFSITE LAND USE

Land Use	Non-Residential Acres	Population Density (employees/station)		Commercial/ Industrial/ Retail S.F.	Unit Daily Wastewater Flow (GPD/Employee)[1]		Total Avg Day (GPD)	Peaking Factor	Peak Wet Weather Flow (GPD)
Existing Fire Station	1	12	Employees	7,000	45	GPD/Employee	540	4.5	2,430
Offsite Totals							**540**		**2,430**

Notes:

1. Per Table 1- *Unit Design Flows from the Arizona Administrative Code, Title 18, Chapter 9*

TABLE 3

ONSITE WASTEWATER DESIGN FLOWS

Project: Desert Mountain
Location: Scottsdale, Arizona

Proj. Number: 164434
Proj. Engineer: Mike Young, P.E.

PROPOSED 8-INCH SEWER DESIGN FLOWS

Land Use	No. of Dus	Residential Acres	Non-Residential Acres	Population Density (patrons/day)		Commercial/ Retail S.F.	Unit Daily Wastewater Flow (GPD/DU, Person)		Total Avg Day (GPD)	Peaking Factor	Peak Wet Weather Flow (GPD)
Single Family Residential	190	36.0	-	-	-	-	250	GPD/DU	47,500	4.0	190,000
Clubhouse	-	-	2.0	200	Patrons/Day[1]	5,000	100	GPD/Person	20,000	4.5	90,000
Total Onsite Wastewater Flow to Pima Road (GPD)	**190**	**36.0**	**2.0**			**5,000**			**67,500**		**280,000**

1) The estimated number of patrons utilizing the clubhouse daily, assumes a group of 4 patrons having a golf tee time every 15 mintues. Assuming the clubhouse is open for 12 hours, the total number of patrons is equal to 16 patrons/hour*12 hours=192 patrons/day. Adding 8 employees results in approximately 200 Patrons/Day utilizing the clubhouse.

TABLE 4

WASTEWATER MODEL –
FULL BUILD-OUT CONDITION

Project: Desert Mountain
Location: Scottsdale, AZ
References: Arizona Administrative Code, Title 18, Chapter 9
City of Scottsdale 2009 Design Standards & Policies Manual, Chapter 7 Wastewater

Proj. Number: 164434
Proj. Engineer: Mike Young, P.E.

FROM NODE	TO NODE	SEWER AREA(S) SERVED/Number of Dus	PARCEL ADF (GPD)	TOTAL ADF (GPD)	PEAKING FACTOR	PEAK WET WEATHER FLOW (GPD)
OFFSITE WASTEWATER FLOWS						
EX-MH-5	MH-9	Fire Station	540	540	4.5	2,430
Total Offsite Flows			**540**	**540**		**2,430**
FULL BUILD OUT ONSITE WASTEWATER FLOWS						
MH-27	MH-26	13	3,250	3,250	4.0	13,000
MH-26	MH-25	14	3,500	6,750	4.0	27,000
MH-25	MH-24	5	1,250	8,000	4.0	32,000
MH-24	MH-23	7	1,750	9,750	4.0	39,000
MH-23	MH-22	7	1,750	11,500	4.0	46,000
MH-22	MH-21	4	1,000	12,500	4.0	50,000
MH-21	MH-20	4	1,000	13,500	4.0	54,000
MH-20	MH-19	4	1,000	14,500	4.0	58,000
MH-19	MH-18	7	1,750	16,250	4.0	65,000
MH-18	MH-10	5	1,250	17,500	4.0	70,000
MH-17	MH-13	7	1,750	1,750	4.0	7,000
MH-16	MH-15	5	1,250	1,250	4.0	5,000
MH-15	MH-14	7	1,750	3,000	4.0	12,000
MH-14	MH-13	4	1,000	4,000	4.0	16,000
MH-13	MH-12	10	2,500	8,250	4.0	33,000
MH-12	MH-11	10	2,500	10,750	4.0	43,000
MH-11	MH-10	9	2,250	13,000	4.0	52,000
MH-10	EX-MH-2	4	1,000	31,500	4.0	126,000
EX-MH-3	MH-9	Fire Station	540	540	4.5	2,430
MH-9	MH-8	-	-	540	-	2,430
MH-8	MH-7	Clubhouse	20,000	20,540	4.5	92,430
MH-7	MH-6	-	-	20,540	4.0	92,430
MH-6	MH-4	4	1,000	21,540	4.0	96,430
MH-5	MH-4	11	2,750	2,750	4.0	11,000
MH-4	MH-3	12	3,000	27,290	4.0	119,430
MH-3	MH-2	17	4,250	31,540	4.0	136,430
MH-2	MH-1	20	5,000	36,540	4.0	156,430
MH-1	EX-MH-1	0	0	36,540	4.0	156,430
Totals		**190**	**68,040**	**68,040**		**282,430**
Total Onsite Flow to Pima Road Gravity Sewer (Pima Road & Carefree Drive)			**-**	**31,500**		**126,000**
Total Onsite and Offsite Flow to Pima Road Gravity Sewer (500 feet South of Short Putt Place)			**-**	**36,540**		**156,430**
Total Onsite and Offsite Flow to Pima Road Gravity Sewer			**-**	**68,040**		**282,430**

TABLE 5

CALCULATED PIPE CAPACITIES – FULL BUILD-OUT CONDITION

TABLE 5 - CALCULATED PIPE CAPACITIES, FULL BUILD-OUT CONDITION

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS

Project: Desert Mountain
Location: Scottsdale, Arizona
References: Title 18, Chapter 9 of the Arizona Administrative Code
City of Scottsdale 2010 Design Standards & Policies Manual, Chapter 7 *Wastewater*

Proj. Number: 164434
Proj. Engineer: Mike Young, P.E.

FROM NODE	TO NODE	NOTES	PIPE DIA. (INCHES)	MODELED PIPE SLOPE (FT / FT)	PIPE CAPACITY		PEAK FLOW RESULTS					
					GPD	GPM	PEAK WET WEATHER FLOW (GPD)	PEAK WET WEATHER FLOW (GPM)	d/D (WET WEATHER)	FLOW VELOCITY (FT/S) AT d/D=0.65	SURPLUS CAPACITY (WET WEATHER) (GPD)	PERCENT OF CAPACITY (WET WEATHER)
Offsite Pipe Sizes												
EX-MH-5	MH-9	Proposed	8	0.0095	767,080	533	2,430	2	0.04	3.7	764,650	0.3%
Full Build-Out Onsite Pipe Sizes												
MH-27	MH-26	Proposed	8	0.0245	1,218,304	846	13,000	9	0.07	5.9	1,205,304	1.1%
MH-26	MH-25	Proposed	8	0.0143	925,008	642	27,000	19	0.12	4.5	898,008	2.9%
MH-25	MH-24	Proposed	8	0.0099	789,641	548	32,000	22	0.14	3.8	757,641	4.1%
MH-24	MH-23	Proposed	8	0.0196	1,105,498	768	39,000	27	0.13	5.4	1,066,498	3.5%
MH-23	MH-22	Proposed	8	0.0248	1,240,865	862	46,000	32	0.13	6.0	1,194,865	3.7%
MH-22	MH-21	Proposed	8	0.0458	1,669,527	1159	50,000	35	0.12	8.1	1,619,527	3.0%
MH-21	MH-20	Proposed	8	0.0154	970,131	674	54,000	38	0.16	4.7	916,131	5.6%
MH-20	MH-19	Proposed	8	0.0098	767,080	533	58,000	40	0.19	3.7	709,080	7.6%
MH-19	MH-18	Proposed	8	0.0106	812,202	564	65,000	45	0.19	4.0	747,202	8.0%
MH-18	MH-10	Proposed	8	0.0295	1,353,671	940	70,000	49	0.16	6.6	1,283,671	5.2%
MH-17	MH-13	Proposed	8	0.0219	1,150,620	799	7,000	5	0.06	5.6	1,143,620	0.6%
MH-16	MH-15	Proposed	8	0.0087	721,958	501	5,000	3	0.06	3.5	716,958	0.7%
MH-15	MH-14	Proposed	8	0.0098	767,080	533	12,000	8	0.09	3.7	755,080	1.6%
MH-14	MH-13	Proposed	8	0.0097	767,080	533	16,000	11	0.10	3.7	751,080	2.1%
MH-13	MH-12	Proposed	8	0.0097	767,080	533	33,000	23	0.14	3.7	734,080	4.3%
MH-12	MH-11	Proposed	8	0.0093	744,519	517	43,000	30	0.16	3.6	701,519	5.8%
MH-11	MH-10	Proposed	8	0.0351	1,466,476	1018	52,000	36	0.13	7.1	1,414,476	3.5%
MH-10	EX-MH-2	Proposed	8	0.0521	1,782,333	1238	126,000	88	0.18	8.7	1,656,333	7.1%
EX-MH-3	MH-9	Proposed	8	0.0095	767,080	533	2,430	2	0.04	3.7	764,650	0.3%
MH-9	MH-8	Proposed	8	0.0109	812,202	564	2,430	2	0.04	4.0	809,772	0.3%
MH-8	MH-7	Proposed	8	0.0498	1,737,211	1206	92,430	64	0.16	8.5	1,644,781	5.3%
MH-7	MH-6	Proposed	8	0.0084	721,958	501	92,430	64	0.24	3.5	629,528	12.8%
MH-6	MH-4	Proposed	8	0.0078	699,396	486	96,430	67	0.25	3.4	602,966	13.8%
MH-5	MH-4	Proposed	8	0.0149	947,569	658	11,000	8	0.08	4.6	936,569	1.2%
MH-4	MH-3	Proposed	8	0.0104	789,641	548	119,430	83	0.26	3.8	670,211	15.1%
MH-3	MH-2	Proposed	8	0.0252	1,240,865	862	136,430	95	0.23	6.0	1,104,435	11.0%
MH-2	MH-1	Proposed	8	0.0217	1,150,620	799	156,430	109	0.25	5.6	994,190	13.6%
MH-1	EX-MH-1	Proposed	8	0.0612	1,940,261	1347	156,430	109	0.19	9.4	1,783,831	8.1%

EXHIBIT 1

VICINITY MAP

0 500 1000

Horz. 1 in. = 500 ft.

DESERT MOUNTAIN

EXHIBIT 1
VICINITY MAP

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

DATE: 6-13-2016	SCALE: 1" = 500'	SHEET 1 OF 1
JOB NO.: 164434	DESIGN: SM	
	DRAWN: SM	

EXHIBIT 2

WASTEWATER EXHIBIT – FULL BUILD-OUT

EXISTING 15" SEWER TO REMAIN

EX. 8"

EX. 15"

EX. 12"

EX. 18"

EX. 21"

MH-23

MH-22

MH-21

MH-20

MH-19

MH-17

MH-24

MH-25

MH-18

MH-13

MH-12

MH-11

MH-26

EX MH-2

MH-10

MH-14

MH-27

MH-15

MH-16

PROPOSED CONNECTION TO EXISTING 21" GRAVITY SEWER

PROPOSED CLUBHOUSE

MH-9

MH-8

MH-7

MH-6

EX-MH-3

EXISTING FIRE STATION

MH-1

MH-3

MH-2

MH-4

MH-5

EX MH-1

PROPOSED CONNECTION TO EXISTING 21" GRAVITY SEWER

EXISTING 8" SEWER TO BE ABANDONED

EX. 8"

PIMA ROAD

CAVE CREEEK ROAD

DESERT MOUNTAIN PARCEL 19 BOUNDARY

Floodplain

25.5 Ac.

10.7 Ac.

Gate

LEGEND

8"	PLANNED SEWER
8"	EXISTING SEWER
12"	EXISTING SEWER
15"	EXISTING SEWER
18"	EXISTING SEWER
21"	EXISTING SEWER

N

0 300 600

Horz. 1 in. = 300 ft.

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(602) 335-8500
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DESERT MOUNTAIN P19

EXHIBIT 2- WASTEWATER EXHIBIT

DATE	SCALE	SHEET
06-10-16	1" = 300'	1 OF 1
JOB NO. 164434	DESIGN SM	CHECK DC
	DRAWN SM	

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Wood, Patel & Associates, Inc.

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17-ZN-2016
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WATER MASTER PLAN /
BASIS OF DESIGN REPORT
FOR
DESERT MOUNTAIN PARCEL 19

June 15, 2016
Revised August 5, 2016
WP# 164434

Prepared for:

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Phone: (602)386-1317

Submitted To:

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1.0 INTRODUCTION

1.1 General Background and Project Location

Desert Mountain Parcel 19 (Site) is an approximate 91-acre proposed residential/golf course development in the City of Scottsdale, located between Cave Creek Road and existing church development on the south, Pima Road on the west, and the existing fire station and booster pump site and Desert Mountain development to the east and north (refer to Exhibit 1 – *Vicinity Map*). The property is located within Section 31, Township 6 North, Range 5 East, of the Gila and Salt River Meridian.

The Site is planned to include an 18-hole, short-game golf course, clubhouse, and residential housing. This Water Master Plan / Basis of Design Report (Water Master Plan/BOD) Report for the Site utilizes a site plan prepared concurrently by Greey | Pickett, dated June 10, 2016.

This Water Master Plan/BOD Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (Wood/Patel) understanding of the City of Scottsdale's technical requirements for water distribution systems, as applicable for the Site.

1.2 Scope of Water Master Plan / Basis of Design Report

The purpose of this Water Master Plan/BOD Report is to determine water design flows, pipe sizes, and waterline locations, as required to provide water service to the proposed development. The required infrastructure identified includes water distribution system mains and connection points.

1.3 Full Build-Out Condition

The design criteria utilized to determine water demands and pipe sizes for the Site are based on projected full build-out conditions. The current zoning for the Site consists of I-1 ESL, C-0 ESL, C-2 ESL, R1-7 ESL, and R1-35. This report is based on the assumption that the rezoning case will change the zoning to Residential R-4 and OS ESL. Additionally, it is our understanding the golf course will be irrigated by the existing Irrigation Water Distribution System (IWDS) non-potable waterlines.

2.0 DESIGN DOCUMENTATION

2.1 Design Criteria

For the purpose of this Water Master Plan/BOD Report, water demand design flows and pipe-sizing criteria utilized are based on Wood/Patel's understanding of the applicable water system design criteria listed in the *City of Scottsdale Design Standards & Policies Manual*, dated January 2010. Refer to Table 1 – *Water Distribution System Design Criteria* for detailed information regarding design criteria.

2.2 Water Demand Design Flows

Water demand design flows for Desert Mountain Parcel 19 were calculated using design criteria listed in Section 2.1 – *Design Criteria* and are summarized below. For detailed calculations, refer to Table 2 – *Offsite Water Demands - Existing Condition,* Table 3 – *Offsite Water Demands - Full Build-Out Condition,* and Table 4 – *Onsite Water Demands - Full Build-Out Condition.*

EXISTING OFFSITE WATER DEMANDS (ZONE 12)			
Type	**Average Daily Demand (gpm)**	**Maximum Daily Demand (gpm)**	**Peak Hour Demand (gpm)**
Existing Single-Family Residential	44.2	88.4	155.1
Existing Fire Station	0.5	1.0	1.8
TOTAL	**44.7**	**89.4**	**156.9**

FULL BUILD-OUT OFFSITE WATER DEMANDS (ZONE 12)			
Type	**Average Daily Demand (gpm)**	**Maximum Daily Demand (gpm)**	**Peak Hour Demand (gpm)**
Existing Single-Family Residential	76.3	152.6	267.3
Existing Fire Station	0.5	1.0	1.8
TOTAL	**76.8**	**153.6**	**269.1**

FULL BUILD-OUT DESERT MOUNTAIN PARCEL 19 WATER DEMANDS (ZONE 12)			
Type	**Average Daily Demand (gpm)**	**Maximum Daily Demand (gpm)**	**Peak Hour Demand (gpm)**
Existing Single-Family Residential	32.6	65.2	114.3
Clubhouse	17.4	34.8	60.9
TOTAL	**50.0**	**100.0**	**175.2**

FULL BUILD-OUT DESERT MOUNTAIN PARCEL 19 AND OFFSITE WATER DEMANDS (ZONE 12)			
Type	**Average Daily Demand (gpm)**	**Maximum Daily Demand (gpm)**	**Peak Hour Demand (gpm)**
Offsite	76.8	153.6	269.1
Desert Mountain Parcel 19	50.0	100	175.2
TOTAL	**126.8**	**253.6**	**444.3**

3.0 EXISTING CONDITIONS

3.1 Topographic Conditions

The proposed project lies in the Desert Mountain planning region of the City of Scottsdale. The Site generally slopes from east to west, at approximately 3 percent. Elevations range from 2,645 feet above mean sea level (MSL) in the east, to 2,585 feet MSL in the west. The Site is covered with typical Sonoran Desert vegetation including mesquite trees, saguaro cactus, creosote, etc. In addition, existing dirt roads to access the existing onsite wells and booster pump station are located throughout the Site.

3.2 Existing Offsite Water Storage

According to the *2015 Master Water plan Update,* water is provided to the Site by Well Site #86, which is located southeasterly of the Site. Additionally, the well site has a 0.5-million gallon (MG) storage tank. Booster Pump Station #92B conveys water from Well Site 86 and Booster Pump Station #102 to Storage Facility T-90 and Zone 12. Storage facility locations are summarized below.

- Storage Facility located at Booster Pump Station #92B, with a storage capacity of 0.5 MG.
- Storage Facility T-90 located Zone 12, with a storage capacity of 0.8 MG.

3.3 Existing Pressure Zone Sources and Hydraulic Grade Lines

The Site elevations fall within City of Scottsdale Water Pressure Zone 12B, which has ground elevations ranging from 2,570 feet to 2,700 feet. Booster Pump Station #92, elevation equal to 2,645 feet, supplies water to Tank 90 at an elevation of 3,116 feet. According to the City of Scottsdale, the suction pressure at BPS-92 is approximately 40 psi, and the pressure feeding Tank 90 is approximately 205 psi. The hydraulic grade line (HGL) for pressure zones served directly by Tank 90 is approximately 3,116 feet. Since the HGL needed to serve Zone 12B is much lower than the HGL from Tank 90, several pressure reducing valves (PRVs) exist throughout Desert Mountain in order to provide pressures within the approved 50-120 psi. In order to serve Desert Mountain Parcel 19, an HGL of 2,790 feet was utilized to serve the Site.

3.4 Existing Offsite Water Infrastructure

Relevant existing water infrastructure adjacent to the Site includes the following:

Zone 11:

- 16-inch waterline along Cave Creek Road, from Pima Road to the existing Booster Pump Station (BPS) access road.
- 24-inch waterline along Cave Creek Road, from Pima Road to the existing BPS access road, and along the access road to the BPS.
- 12-inch waterline along the BPS access road, from Cave Creek Road to the 24-inch waterline extending to the BPS.

Zone 12 and Higher Zones:

- 8-inch waterline along Covey Trail
- 6-inch waterline along Happy Hollow Drive/Andora Hills Drive, between Bajada Drive and 93rd Street
- Two (2) 16-inch waterlines along Cave Creek Road, from Desert Mountain Parkway to the existing BPS access road. One (1) 16-inch waterline connects to a 12-inch waterline extending to a 24-inch waterline connected to the BPS. The second 16-inch waterline extends along the access road to the 24-inch waterline, which connects to the BPS.
- 12-inch waterline stub southeast of Happy Hollow Drive within Desert Mountain Phase 1 Unit 1. (Existing valve near Happy Hollow Drive exists, but unable to currently identify that waterline stub exists)

3.5 Existing Onsite Water Infrastructure

The Site currently has five (5) City of Scottsdale groundwater wells on site. Refer to Exhibit 2 – *Existing Groundwater Well Locations*. According to the *2015 Water Master Plan Update*, City of Scottsdale Well #85 is no longer in use due to high levels of arsenic. City of Scottsdale Wells 152, 153, 155, and 156 were drilled as part of the recharge and recovery project by Desert Mountain. Currently, Well #152 is a recovery-only well, with the capacity to recover approximately 700 gallons per minute (gpm).

Well #153 has a wall around the well site and installed electrical; however, this well is not operating, as it is not fully equipped. Well #155 has the capacity to recover 800 gpm and recharge 60 gpm. Well #156 has the capacity to recover 875 gpm and recharge 160 gpm.

It is Wood/Patel's understanding an existing 16-inch waterline from the BPS extends to Well Sites 155 and 156. Additionally, this 16-inch waterline connects to an existing 12-inch waterline that connects Well Sites 155 to 152. Furthermore, the existing onsite 16-inch waterline connects to the IWDS Pump Station #150 located near the southeastern corner of the Site. Additionally, seven (7) onsite vadose wells, which have the capacity to recharge approximately 500 gpm, are connected to the non-potable waterlines along the access road.

Additional waterline stubs and non-potable waterlines exist near the southeast corner of the Site, and along the access road to the well sites. As final design and construction documents are completed, an analysis will be completed to determine which waterlines can be utilized within final design. Additionally, utility location services will be utilized to accurately locate existing waterlines within the Site.

The following notes were provided by Maurice Tatlow (dated 7/6/2016):
There are only (4) groundwater wells on Parcel 19. Well 156 is not located on the parcel. The recovery rates listed are approximate since the wells have never been operated for extended periods of time before they were equipped.

There are also two (2) drain wells located on Parcel 19. They are located between vadose wells VZ-3 and VZ-4 (drain well 1) and VZ-7 and VD-7 (Drain Well 2). (See Exhibit 2).

City of Scottsdale Well #85 is used as a groundwater quality sampling well for the City's recharge permit.

4.0 HYDRAULIC MODEL

4.1 Methodology

WaterCAD Version 8.0, a potable water transmission and distribution system numerical modeling program by Haestad Methods, was utilized to analyze the proposed potable water system. The Site lies within the Zone 12 pressure zone in the City of Scottsdale water system.

The water system serving Zone 12 from BPS #92 has a static HGL of approximately 3,118 feet. Several PRVs exist within the Desert Mountain. Refer to Exhibit 3 – *Master Water Exhibit - Full Build-Out* for waterline locations. The exact locations of these PRVs is shown schematically. Within the water model, valves were modeled along 94th Street in order to calibrate the model to the flow tests completed on June 9, 2016. Water Valve 12A was modeled to reduce the static HGL at flow test #2 (J-12EX) to 2,879 feet. Water Valve 12B was modeled to reduce the static HGL at flow test #1 (J-16EX) to 2811 feet. Refer to hydraulic modeling results within Appendix B – *Hydraulic Modeling Results – Existing Condition*.

Water demands and peaking factors, described in *2010 City of Scottsdale Design Standards & Policies – Chapter 6*, were applied to the hydraulic model. Pipes were sized to accommodate modeled conditions of flow.

The following primary modeling scenarios were selected to demonstrate compliance with City of Scottsdale requirements and to analyze the proposed water system:

- Average Daily Demand
- Peak Hour Demand
- Maximum Daily Demand plus Fire Flow

The hydraulic model utilizes the Hazen-Williams equation to calculate the head losses throughout the system during the modeled scenarios. Fire flow demands were analyzed with an automatic sprinkler system would installed in the proposed Clubhouse. Refer to Table 1 – *Water Distribution System Design Criteria* for additional information regarding hydraulic modeling parameters and specific fire flow demands for specific buildings.

4.2 Piping Layout

Potable water service and fire protection will be provided through planned ductile iron pipe public waterlines. Proposed onsite waterlines will consist of a Zone 12 looped waterline connecting the existing 8-inch waterline in Covey Trail to the high-pressure waterline leaving BPS #92. A PRV will be installed at the BPS to lower the HGL to 2,790 feet, which results in a pressure of approximately 65 psi at the downstream side of the PRV. A reduction of such pressure may require PRV's in series according to City of Scottsdale. Additionally, individual Pressure Regulators will be installed at the residences and the clubhouse to account for any pressure fluctuations within the waterline connection to Covey Trail. Additional 8-inch waterlines will be located within the proposed roadways with dead-end lines meeting the City of Scottsdale water standards. Refer to Exhibit 3 – *Master Water Exhibit - Full Build-Out* for waterline locations.

4.3 Hydraulic Modeling Results

The hydraulic-modeling results indicate that the onsite system is capable of delivering Average Day, Maximum Day, and Peak Hour demands with the following pressure ranges.

Scenario	Full Build-Out Pressure (psi)	
	Low	High
Average Day Demand	70.8	94.2
Max Day Demand	70.3	93.7
Peak Hour Demand	69.0	92.6
Extreme Node	J-DM-13	J-DM-5

Fire-flow results from the model indicate that available fire hydrant flows exceed the required fire flows at individual modeling nodes during Max Day Demand, while maintaining residual pressures greater than 30 psi throughout the Site at full build-out. Results from these scenarios indicate that minimum and maximum residual pressures and head losses meet the design criteria presented herein. Hydraulic-modeling results, calculations, and exhibits are provided in the attached appendices and exhibits.

5.0 CONCLUSIONS

This Desert Mountain Water Master Plan / Basis of Design Report, as presented, meets City of Scottsdale standards and requirements, and serves as a guide for construction documents associated with the planned potable-water distribution system. No critical issues were identified that would preclude the anticipated development as presented in this Master Plan report. The following highlights primary conclusions:

1. Desert Mountain Parcel 19 will be served by Pressure Zone 12B with 1 connection to the existing system at Covey Trail and a second connection to the Booster Pump Station.

2. The planned potable-water system is capable of being designed in accordance with the City of Scottsdale's current water-system design criteria.

3. The hydraulic modeling results presented indicate that flow velocities, head losses, and system pressures are within the allowable range of design criteria utilized for this Water Master Plan / Basis of Design Report.

4. The *Desert Mountain Parcel 19 Water Master Plan / Basis of Design* demonstrates the sufficiency of the proposed water distribution system to serve the proposed Site in accordance with City of Scottsdale Water Standards.

5. The proposed golf course will be supplied by a non-potable water system through a separate agreement. No potable water will be used for the golf course irrigation.

6. The *Desert Mountain Parcel 19 Water Master Plan / Basis of Design* demonstrates compliance with the City of Scottsdale's *2015 Master Water plan Update.*

6.0 REFERENCES

1. *Design Standards & Policies Manual*. City of Scottsdale, January 2010.
2. *City of Scottsdale 2015 Master Water plan Update*
3. *Bentley WaterCAD Version 8.0,* Bentley Systems Inc., December 2015.

TABLE 1

WATER DISTRIBUTION SYSTEM DESIGN CRITERIA

Project: Desert Mountain Parcel 19 **Project Number:** 164334
Location: Scottsdale, AZ **Project Engineer:** Mike Young, P.E.
References: 2010 City of Scottsdale Design Standards & Policies Manual

UNIT DAILY RESIDENTIAL WATER DEMANDS

LAND USE	AVERAGE DAY WATER DEMANDS			NOTES
	Inside Use	Outside Use	Total Use	
<2 DU/AC	208.9	276.7	485.6	
2-2.9 DU/AC	193.7	276.7	470.4	
3-7.9 DU/AC	175.9	72.3	248.2	
8-11 DU/AC	155.3	72.3	227.6	
12-22 DU/AC	155.3	72.3	227.6	

UNIT DAILY NON-RESIDENTIAL WATER DEMANDS

LAND USE	AVERAGE DAY WATER DEMANDS		NOTES
	VALUE	UNITS	
Developed Open Space -Golf Course	4285	GPD/ACRE	Demand will be supplied with a separate non-potable system.
Clubhouse	125	GPD/Person	This demand was assumed to be 25% greater than the wastewater demand.
Fire Station	60	GPD/Employee	This demand was assumed to be 25% greater than the wastewater demand.

HYDRAULIC MODELING CRITERIA

DESCRIPTION	VALUE	UNITS	NOTES
PEAKING FACTORS			
Maximum Day Demand (MDD)	2.00	x ADD	1
Peak Hour Demand (PHD)	3.50	x ADD	1
MODELED FIRE HYDRANT FLOW (MINIMUMS)			
Residential (Less than 3,600 Square Feet)	1,000	gpm	1, 2
Clubhouse	2,000	gpm	2,3
HYDRAULICS (ON SITE)			
Minimum Residual Pressure	50	psi	1
Maximum Residual Pressure	120	psi	1
Minimum Residual Pressure, Max Day Demand + Fire Flow	30	psi	1
Maximum Pipe Headloss (Distribution Lines)	10 ft/1000 ft	-	1
Maximum Pipe Headloss (Transmission Lines)	8 ft/1000 ft	-	1
Minimum Pipe Diameter (within City of Scottsdale's county service area)	8	in	1
Maximum Dead End Length (Pipes with 8 to 12 inch diameters)	1200	ft	1
Hazen-Williams C-value	130	-	

Notes:

1. City of Scottsdale Design Standards and Policy Manual
2. 2012 International Fire Code, *Minimum Required Fire Flow and Flow Duration for Buildings*
3. The most conservative building type, Type V-B, was utilized for the fire flow requirement for the Clubhouse. As final design is completed, the fire flow requirement for the Clubhouse may need to be reevaluated.

TABLE 2

OFFSITE WATER DEMANDS,
EXISTING CONDITION

Project: Desert Mountain Parcel 19
Location: Scottsdale, Arizona

Proj. Number: 164334
Proj. Engineer: Mike Young, P.E.

EXISTING LAND USE AND DWELLING UNIT BREAKDOWN

Land Use	No. of Dus	Residential Acres	Non-Residential Acres	Population Density (employees/day)		Commercial/ Retail S.F.	Unit Daily Water Demand (GPD/DU, GPD/Person)		Total Avg Day (GPD)
Existing Single Family Residential	131	290	-	-	-	-	485.6	GPD/DU	63,620
Existing Fire Station	-	-	1	12	Employees	7,000	60.0	GPD/Person	720
Onsite Totals									**64,340**

Notes: 1) For this report only a portion of the existing water demands north and east of Desert Mountain Parcel 19 were included. Calculated water demands from the existing subdivisions Desert Mountain Phase 1 Unit 1, Gambel Quail Preserve 2, and a portion of Desert Mountain Phase 1 Unit 4 were included within this report in order to calibrate the existing water model.

TABLE 3

OFFSITE WATER DEMANDS,
FULL BUILD-OUT CONDITION

WOOD/PATEL **TABLE 3 - OFFSITE WATER DEMANDS, FULL BUILD-OUT CONDITION**

Project: Desert Mountain Parcel 19
Location: Scottsdale, Arizona

Proj. Number: 164334
Proj. Engineer: Mike Young, P.E.

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN

Land Use	No. of Dus	Residential Acres	Non-Residential Acres	Population Density (Employees/day)		Commercial/ Retail S.F.	Unit Daily Water Demand (GPD/DU, GPD/Person)		Total Avg Day (GPD)
Single Family Residential	227	290	-	-	-	-	485.6	GPD/DU	110,240
Existing Fire Station	-	-	1	12	Employees	7,000	60.0	GPD/Person	720
Onsite Totals									**110,960**

Notes: 1) For this report only a portion of the water demands north and east of Desert Mountain Parcel 19 were included. Calculated water demands for the full buildout of the following subdivisions were included: Desert Mountain Phase 1 Unit 1, Gambel Quail Preserve 2, and a portion of Desert Mountain Phase 1 Unit 4.

TABLE 4

ONSITE WATER DEMANDS,
FULL BUILD-OUT CONDITION

WOOD/PATEL **TABLE 4 - ONSITE WATER DEMANDS, FULL BUILD-OUT CONDITION**

Project: Desert Mountain Parcel 19
Location: Scottsdale, Arizona

Proj. Number: 164334
Proj. Engineer: Mike Young, P.E.

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN

Land Use	No. of Dus	Residential Acres	Non-Residential Acres	Population Density (patrons/day)		Commercial/ Retail S.F.	Unit Daily Water Demand (GPD/DU, GPD/Person)		Total Avg Day (GPD)
Single Family Residential	190	36.0	-	-	-	-	248.2	GPD/DU	47,160
Clubhouse	-	-	2.0	200	Patrons/Day	5,000	125.0	GPD/Person	25,000
Onsite Totals									**72,160**

Notes: 1) The water demand needed for the golf course will be served by a non-potable system. A future basis of design report will need to be completed to determine the available capacity of the non-potable system in comparison with the water demands from the proposed golf courses.

TABLE 5

WATER DEMAND DESIGN FLOWS BY JUNCTION NODE
EXISTING CONDITION

WOOD/PATEL **TABLE 5- WATER DEMAND DESIGN FLOWS BY JUNCTION NODE, EXISTING CONDITION**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Desert Mountain Parcel 19
Location: Scottsdale, AZ
References: 2010 City of Scottsdale Design Standards & Policies Manual

Project Number: 164434
Project Engineer: Mike Young, P.E.

Existing Adjacent Desert Mountain Potable Water Demands

HYDRAULIC MODEL NODE	Water Demand Type	Zone	Existing Units	Unit Flow (GPD/Unit)	ADD (GPD)	ADD (GPM)	MDD (GPM)	PHD (GPM)	Note
Zone 12 (Existing Offsite Potable Water Demands)									
J-2EX	Residential	Zone - 12	10	485.6	4856	3.4	6.8	11.9	
J-3EX	Residential	Zone - 12	5	485.6	2428	1.7	3.4	6.0	
J-4EX	Residential	Zone - 12	15	485.6	7284	5.1	10.2	17.9	
J-5EX	Residential	Zone - 12	8	485.6	3884.8	2.7	5.4	9.5	
J-6EX	Residential	Zone - 12	3	485.6	1456.8	1.0	2.0	3.5	
J-7EX	Residential	Zone - 12	9	485.6	4370.4	3.0	6.0	10.5	
J-8EX	None	Zone - 12	-	-	0	0.0	0.0	0.0	
J-9EX	Residential	Zone - 12	18	485.6	8740.8	6.1	12.2	21.4	
J-10EX	None	Zone - 12	-	-	0	0.0	0.0	0.0	
J-11EX	None	Zone - 12	-	-	0	0.0	0.0	0.0	1
J-12EX	Residential	Zone - 12	8	485.6	3884.8	2.7	5.4	9.5	
J-13EX	Residential	Zone - 12	17	485.6	8255.2	5.7	11.4	20.0	
J-14EX	Residential	Zone - 13	6	485.6	2913.6	2.0	4.0	7.0	
J-15EX	Residential	Zone - 12	7	485.6	3399.2	2.4	4.8	8.4	
J-16EX	Residential	Zone - 12	5	485.6	2428	1.7	3.4	6.0	
J-17EX	Residential	Zone - 12	3	485.6	1456.8	1.0	2.0	3.5	
J-18EX	Residential	Zone - 12	8	485.6	3884.8	2.7	5.4	9.5	
J-19EX	Residential	Zone - 12	9	485.6	4370.4	3.0	6.0	10.5	
J-20EX	Existing Fire Station	Zone - 12	-	-	720	0.5	1.0	1.8	
Existing Zone 12 Offsite Totals			**131**		**64,334**	**44.7**	**89.4**	**156.9**	

NOTES:

1) For this report only a portion of the existing water demands north and east of Desert Mountain Parcel 19 were included. Calculated water demands from the existing subdivisions Desert Mountain Phase 1 Unit 1, Gambel Quail Preserve 2, and a portion of Desert Mountain Phase 1 Unit 4 were included within this report in order to calibrate the existing water model.

TABLE 6

WATER DEMAND DESIGN FLOWS BY JUNCTION NODE
FULL BUILD-OUT CONDITION

WOOD/PATEL **TABLE 6- WATER DEMAND DESIGN FLOWS BY JUNCTION NODE, FULL BUILD-OUT CONDITION**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Desert Mountain Parcel 19
Location: Scottsdale, AZ
References: 2010 City of Scottsdale Design Standards & Policies Manual

Project Number: 164434
Project Engineer: Mike Young, P.E.

Desert Mountain

HYDRAULIC MODEL NODE	Water Demand Type	Zone	Units	Unit Flow (GPD/Unit)	ADD (GPD)	ADD (GPM)	MDD (GPM)	PHD (GPM)	Fire Flow (GPM)	Note
Zone 12 (Offsite Water Demands)										
J-2EX	Residential	Zone - 12	16	485.6	7770	5.4	10.8	18.9	1000	
J-3EX	Residential	Zone - 12	8	485.6	3885	2.7	5.4	9.5	1000	
J-4EX	Residential	Zone - 12	30	485.6	14,568	10.1	20.2	35.4	1000	
J-5EX	Residential	Zone - 12	11	485.6	5,342	3.7	7.4	13.0	1000	
J-6EX	Residential	Zone - 12	12	485.6	5,827	4.0	8.0	14.0	1000	
J-7EX	Residential	Zone - 12	12	485.6	5,827	4.0	8.0	14.0	1,000	
J-8EX	None	Zone - 12	-	-	0	0.0	0.0	0.0	1,000	
J-9EX	Residential	Zone - 12	32	485.6	15,539	10.8	21.6	37.8	1,000	
J-10EX	None	Zone - 12	-	-	0	0.0	0.0	0.0	1,000	
J-11EX	None	Zone - 12	-	-	0	0.0	0.0	0.0	1,000	1
J-12EX	Residential	Zone - 12	12	485.6	5,827	4.0	8.0	14.0	1,000	
J-13EX	Residential	Zone - 12	35	485.6	16,996	11.8	23.6	41.3	1,000	
J-14EX	Residential	Zone - 13	6	485.6	2,914	2.0	4.0	7.0	1,000	
J-15EX	Residential	Zone - 12	19	485.6	9,226	6.4	12.8	22.4	1,000	
J-16EX	Residential	Zone - 12	5	485.6	2,428	1.7	3.4	6.0	1,000	
J-17EX	Residential	Zone - 12	3	485.6	1,457	1.0	2.0	3.5	1,000	
J-18EX	Residential	Zone - 12	12	485.6	5,827	4.0	8.0	14.0	1,000	
J-19EX	Residential	Zone - 12	14	485.6	6,798	4.7	9.4	16.5	1,000	
J-20EX	Existing Fire Station	Zone - 12	-	-	720	0.5	1.0	1.8	1,500	
Zone 12 Offsite Water Demand Totals			**227**		**110,951**	**76.8**	**153.6**	**269.1**		
Zone 12 (Onsite Water Demands)										
J-DM-1	Residential	Zone - 12	13	248.2	3,227	2.2	4.4	7.7	1,000	
J-DM-2	Residential	Zone - 12	14	248.2	3,475	2.4	4.8	8.4	1,000	
J-DM-3	Residential	Zone - 12	15	248.2	3,723	2.6	5.2	9.1	1,000	
J-DM-4	Residential	Zone - 12	19	248.2	4,716	3.3	6.6	11.6	1,000	
J-DM-5	Residential	Zone - 12	20	248.2	4,964	3.4	6.8	11.9	1,000	
J-DM-6	Residential	Zone - 12	25	248.2	6,205	4.3	8.6	15.1	1,000	
J-DM-7	Residential	Zone - 12	16	248.2	3,971	2.8	5.6	9.8	1,000	
J-DM-8	Residential	Zone - 12	20	248.2	4,964	3.4	6.8	11.9	1,000	
J-DM-9	Residential	Zone - 12	20	248.2	4,964	3.4	6.8	11.9	1,000	
J-DM-10	Residential	Zone - 12	17	248.2	4,219	2.9	5.8	10.2	1,000	
J-DM-11	Residential	Zone - 12	11	248.2	2,730	1.9	3.8	6.7	1,000	
J-DM-12	Clubhouse	Zone - 12	-	-	25,000	17.4	34.8	60.9	2,000	
J-DM-13	None	Zone - 12	-	-	0	0.0	0.0	0.0	-	
Zone 12 Onsite Water Demand Totals			**190**		**72,160**	**50.0**	**100.0**	**175.2**		
Zone 12 Offsite and Onsite Totals					**183,111**	**126.8**	**253.6**	**444.3**		

NOTES:

1) The number of dwelling units assumes that the subdivisions Desert Mountain Phase 1 Unit 1, Gambel Quail Preserve 2, and a portion of Desert Mountain Phase 1 Unit 4 are at full build-out.

TABLE 7

EXISTING WATER SYSTEM PRESSURES
(8949 E. COVEY TRAIL)

WOOD/PATEL **TABLE 7 - EXISTING WATER SYSTEM PRESSURES (8949 E Covey Trail)**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Desert Mountain Parcel 19 **Proj. Number:** 164334

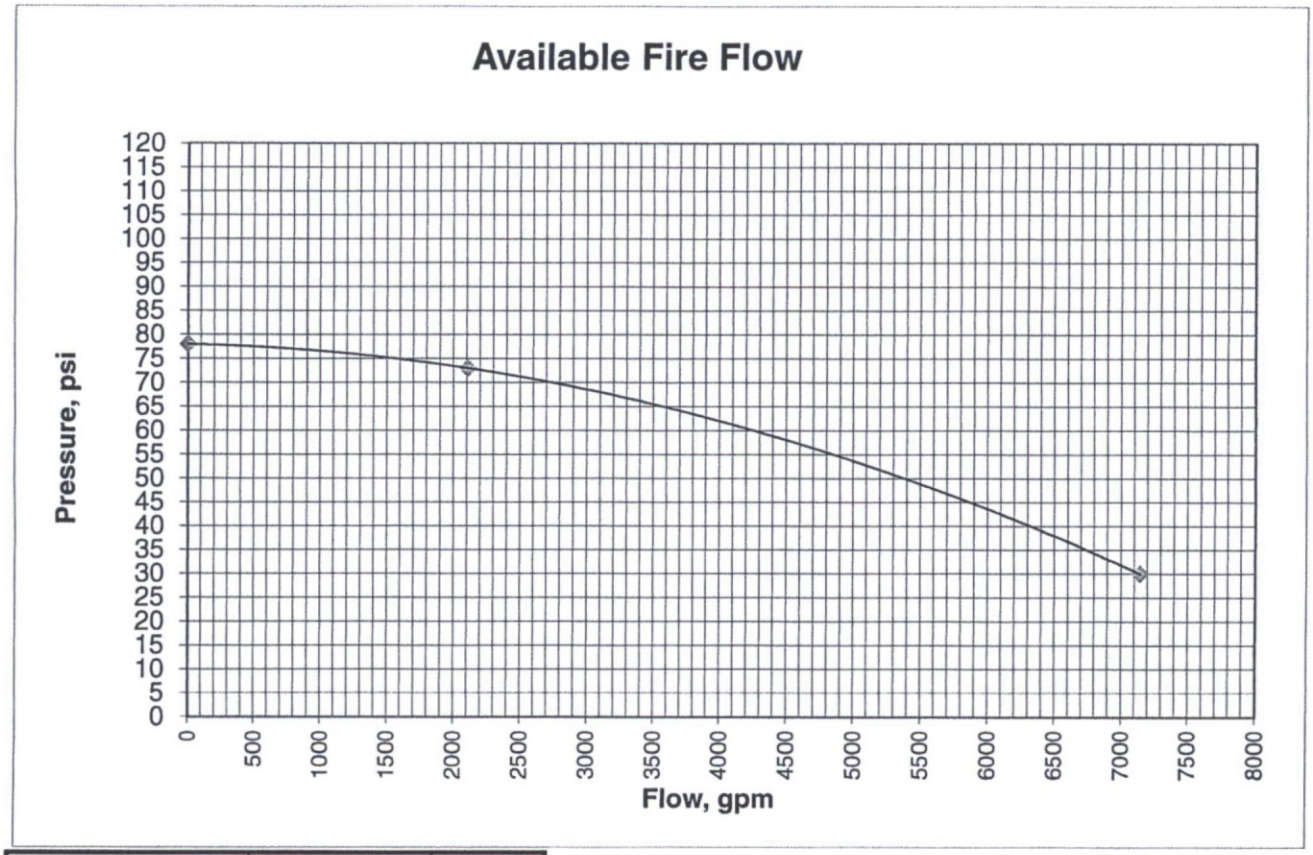
Location: 8949 East Covey Trail **Proj. Engineer:** Mike Young, P.E.

Date: June 9, 2016

Pressure Zone: Zone 12

Residual Hydrant		**Flow Hydrant**	
Static Pressure (psi)	78.0		
Residual Pressure (psi)	73.0 *(See Note 1)*	Flow (gpm)	2106
Calculated Flow at 30 psi	**7143 gpm**	**Calculated Flow at**	30

Sketch of Flow and Residual Hydrant:



Discharge (gpm)	psi	head (ft)
0	78	180.1
2106	73	168.6
7143	30	69.3

Note 1)Before and after the flow test, the static pressure in the system changed significantly. Additionally, during the flow test, obtaining a reasonable pressure drop was difficult. The operation of the waterline and pressure reducing valves in this area by the City of Scottsdale is unknown at this time, therefore, only the static pressure from this flow test was used in the calibration of the model.

TABLE 8

EXISTING WATER SYSTEM PRESSURES
(9199 E. HAPPY HOLLOW DRIVE)

WOOD/PATEL **TABLE 8 - EXISTING WATER SYSTEM PRESSURES (9199 E Happy Hollow Drive)**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Desert Mountain Parcel 19 **Proj. Number:** 164434
Location: 9199 East Happy Hollow Drive **Proj. Engineer:** Mike Young, P.E.
Date: June 9, 2016
Pressure Zone: Zone 12

Residual Hydrant		**Flow Hydrant**	
Static Pressure (psi)	92.0		
Residual Pressure (psi)	74.0	Flow (gpm)	1062
Calculated Flow at 30 psi	**2071 gpm**	**Calculated Flow at**	30

Sketch of Flow and Residual Hydrant:

Discharge (gpm)	Pressure (psi)	head (ft)
0	92	212.4
1062	74	170.9
2071	30	69.3

APPENDIX A

HYDRANT FLOW TEST RESULTS

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT 1

Project Name:	Desert Mountain
Project Address:	North Cave Creek Road, Scottsdale, Arizona, 85251
Arizona Flow Testing Project No.:	16083
Client Project No.:	164434
Flow Test Permit No.:	C50737
Date and time flow test conducted:	June 9, 2016 at 8:30 AM
Data is current and reliable until:	December 9, 2016
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Jimmy Demarbiex –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **78.0 PSI**
(Measured in pounds per square inch)

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

Pitot Pressure: **11.0 PSI (2½ inch)**
13.0 PSI (4 inch)
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One (2½ inch)
(Measured in inches) One (4 inch)

Coefficient of Diffuser: .9

Flowing GPM: **2,106 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **7,911 GPM**

Data with 10 % Safety Factor

Static Pressure: **70.2 PSI**
(Measured in pounds per square inch)

Residual Pressure: **65.2 PSI**
(Measured in pounds per square inch)

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

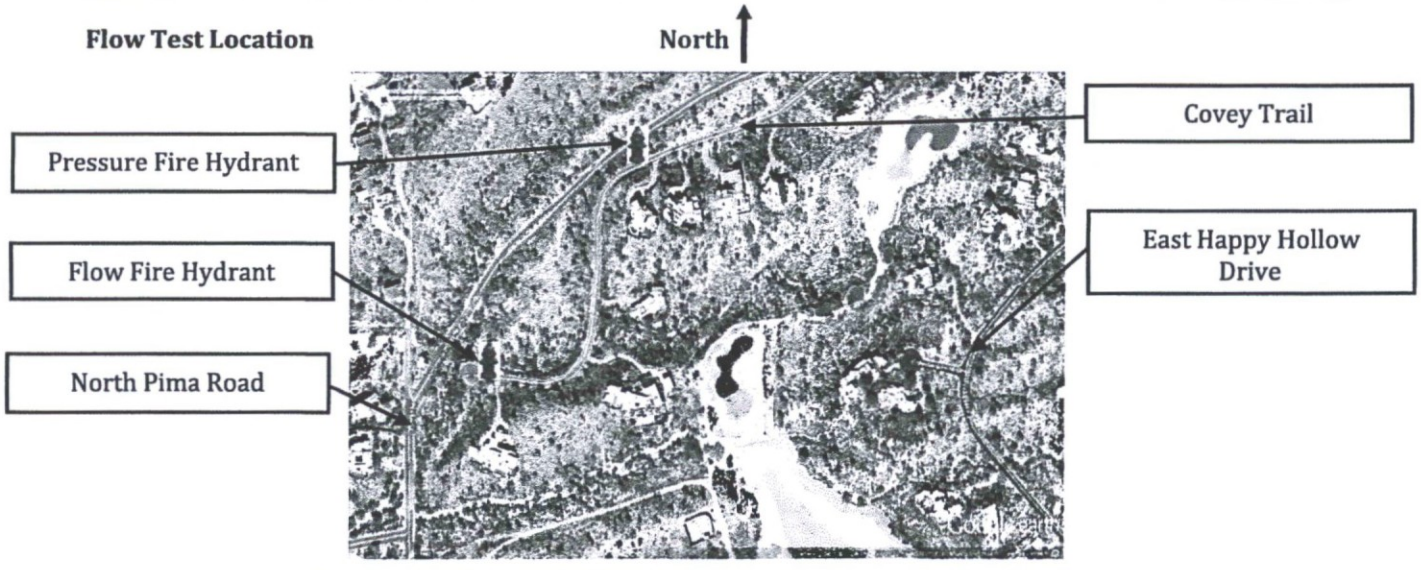
Distance between hydrants: Approx. 1,100 Feet

Main size: 8 Inch

Flowing GPM: **2,106 GPM**

GPM @ 20 PSI: **7,318 GPM**

Flow Test Location



Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT 2

Project Name:	Desert Mountain
Project Address:	North Cave Creek Road, Scottsdale, Arizona, 85251
Arizona Flow Testing Project No.:	16083
Client Project No.:	164434
Flow Test Permit No.:	C50737
Date and time flow test conducted:	June 9, 2016 at 9:00 AM
Data is current and reliable until:	December 9, 2016
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Jimmy Demarbiex –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **92.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **74.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **40.0 PSI**
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One (2½ inch)
(Measured in inches)

Coefficient of Diffuser: .9

Flowing GPM: **1,062 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **2,244 GPM**

Data with 20 PSI Safety Factor

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

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

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

Distance between hydrants: Approx. 1,200 Feet

Main size: 8 Inch

Flowing GPM: **1,062 GPM**

GPM @ 20 PSI: **1,883 GPM**

Flow Test Location

North

APPENDIX B

HYDRAULIC MODELING RESULTS – EXISTING CONDITION

FlexTable: Reservoir Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (Existing Condition)

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
BPS-92	3,118	44.7	3,118

Bentley Systems, Inc. Haestad Methods Solution Center
27 Siemon Company Drive Suite 200 W
Watertown, CT 06795 USA +1-203-755-1666

FlexTable: Junction Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (Existing Condition)

Label	Elevation (ft)	Zone	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	
J-2EX	2,697	Zone 12	3.4	78.7	2,879	
J-3EX	2,713	Zone 12	1.7	71.8	2,879	
J-4EX	2,666	Zone 12	5.1	92.1	2,879	
J-5EX	2,682	Zone 12	2.7	85.2	2,879	
J-6EX	2,720	Zone 12	1.0	68.8	2,879	
J-7EX	2,752	Zone 12	3.0	54.9	2,879	
J-8EX	2,767	Zone 12	0.0	151.9	3,118	
J-9EX	2,709	Zone 12	6.1	73.5	2,879	
J-10EX	2,712	Zone 12	0.0	175.7	3,118	
J-11EX	2,666	Zone 12	0.0	195.6	3,118	FLOW TEST #2
J-12EX	2,667	Zone 12	2.7	91.7	2,879	← STATIC HGL
J-13EX	2,760	Zone 12	5.7	51.5	2,879	
J-14EX	2,696	Zone 12	2.0	79.2	2,879	
J-15EX	2,698	Zone 12	2.4	78.3	2,879	
J-16EX	2,633	Zone 12	1.7	77.0	2,811	← FLOW TEST #1
J-17EX	2,604	Zone 12	1.0	89.6	2,811	STATIC HGL
J-18EX	2,756	Zone 12	2.7	53.3	2,879	
J-19EX	2,701	Zone 12	3.0	76.8	2,879	
J-20EX	2,655	Zone 12	0.5	200.3	3,118	
J-39EX	2,663	Zone 12	0.0	196.9	3,118	

FlexTable: Pipe Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (Existing Condition)

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Zone	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-1EX	6.0	1,156	130.0	Zone 12	-1.0	0.01	0.000
P-3EX	6.0	944	130.0	Zone 12	-4.9	0.06	0.004
P-5EX	12.0	317	130.0	Zone 12	-12.0	0.03	0.001
P-6EX	6.0	611	130.0	Zone 12	-2.7	0.03	0.001
P-8EX	12.0	1,062	130.0	Zone 12	-14.4	0.04	0.001
P-9EX	12.0	1,245	130.0	Zone 12	-23.4	0.07	0.003
P-12EX	6.0	2,038	130.0	Zone 12	3.8	0.04	0.002
P-13EX	6.0	1,219	130.0	Zone 12	-8.3	0.09	0.011
P-14EX	12.0	2,591	130.0	Zone 12	-44.2	0.13	0.008
P-15EX	16.0	1,773	130.0	Zone 12	-25.4	0.04	0.001
P-17EX	6.0	921	130.0	Zone 12	4.4	0.05	0.003
P-18EX	6.0	1,195	130.0	Zone 12	1.7	0.02	0.001
P-20EX	6.0	2,345	130.0	Zone 12	1.1	0.01	0.000
P-21EX	6.0	685	130.0	Zone 12	7.1	0.08	0.007
P-24EX	8.0	1,155	130.0	Zone 12	1.0	0.01	0.000
P-25EX	6.0	472	130.0	Zone 12	9.5	0.11	0.013
P-26EX	6.0	814	130.0	Zone 12	6.8	0.08	0.007
P-27EX	6.0	776	130.0	Zone 12	5.3	0.06	0.004
P-28EX	6.0	1,474	130.0	Zone 12	2.3	0.03	0.001
P-53EX	16.0	457	130.0	Zone 12	-25.4	0.04	0.001
P-56EX	16.0	1,859	130.0	Zone 12	18.9	0.03	0.000
P-57EX	12.0	493	130.0	Zone 12	18.9	0.05	0.002
P-58EX	12.0	186	130.0	Zone 12	-44.2	0.13	0.008
P-59EX	12.0	222	130.0	Zone 12	-44.2	0.13	0.008
P-63EX	8.0	827	130.0	Zone 12	-5.1	0.03	0.001
P-64EX	8.0	310	130.0	Zone 12	2.7	0.02	0.000
P-65EX	8.0	3,132	130.0	Zone 12	2.7	0.02	0.000
P-69EX	24.0	409	130.0	Zone 12	-44.7	0.03	0.000

FlexTable: GPV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (Existing Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12A	2,763	12.0	0.390	44.2	3,118	2,879	239.00

FlexTable: PRV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (Existing Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12B	2,690	8.0	0.390	2,811	52.4	2.7	2,879	2,811	67.91

FlexTable: Reservoir Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 Residual Flow

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
BPS-92	3,118	1,106.7	3,118

FlexTable: Junction Table
DESERT MOUNTAIN PARCEL 19
Active Scenario: Avg Day Demand (Existing Condition) + FT #2 Residual Flow

Label	Elevation (ft)	Zone	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-2EX	2,697	Zone 12	3.4	72.8	2,865
J-3EX	2,713	Zone 12	1.7	66.2	2,866
J-4EX	2,666	Zone 12	5.1	84.8	2,862
J-5EX	2,682	Zone 12	2.7	79.0	2,865
J-6EX	2,720	Zone 12	1.0	63.4	2,867
J-7EX	2,752	Zone 12	3.0	50.7	2,869
J-8EX	2,767	Zone 12	0.0	148.2	3,109
J-9EX	2,709	Zone 12	6.1	68.6	2,867
J-10EX	2,712	Zone 12	0.0	175.4	3,117
J-11EX	2,666	Zone 12	0.0	195.5	3,118
J-12EX	2,667	Zone 12	1,064.7	74.6	2,839
J-13EX	2,760	Zone 12	5.7	46.9	2,869
J-14EX	2,696	Zone 12	2.0	74.2	2,867
J-15EX	2,698	Zone 12	2.4	73.3	2,867
J-16EX	2,633	Zone 12	1.7	77.0	2,811
J-17EX	2,604	Zone 12	1.0	89.6	2,811
J-18EX	2,756	Zone 12	2.7	49.0	2,869
J-19EX	2,701	Zone 12	3.0	70.8	2,865
J-20EX	2,655	Zone 12	0.5	200.3	3,118
J-39EX	2,663	Zone 12	0.0	196.7	3,118

← Flow test #2 Residual Pressure = 74.0 psi

FlexTable: Pipe Table
DESERT MOUNTAIN PARCEL 19
Active Scenario: Avg Day Demand (Existing Condition) + FT #2 Residual Flow

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Zone	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-1EX	6.0	1,156	130.0	Zone 12	-83.2	0.94	0.742
P-3EX	6.0	944	130.0	Zone 12	-174.1	1.98	2.913
P-5EX	12.0	317	130.0	Zone 12	-762.9	2.16	1.535
P-6EX	6.0	611	130.0	Zone 12	-84.9	0.96	0.771
P-8EX	12.0	1,062	130.0	Zone 12	-683.1	1.94	1.251
P-9EX	12.0	1,245	130.0	Zone 12	-914.2	2.59	2.147
P-12EX	6.0	2,038	130.0	Zone 12	-167.4	1.90	2.707
P-13EX	6.0	1,219	130.0	Zone 12	-117.7	1.34	1.411
P-14EX	12.0	2,591	130.0	Zone 12	-1,106.2	3.14	3.056
P-15EX	16.0	1,773	130.0	Zone 12	-634.5	1.01	0.269
P-17EX	6.0	921	130.0	Zone 12	586.1	6.65	27.575
P-18EX	6.0	1,195	130.0	Zone 12	-478.6	5.43	18.946
P-20EX	6.0	2,345	130.0	Zone 12	62.9	0.71	0.441
P-21EX	6.0	685	130.0	Zone 12	7.1	0.08	0.008
P-24EX	8.0	1,155	130.0	Zone 12	1.0	0.01	0.000
P-25EX	6.0	472	130.0	Zone 12	71.3	0.81	0.557
P-26EX	6.0	814	130.0	Zone 12	68.6	0.78	0.518
P-27EX	6.0	776	130.0	Zone 12	145.2	1.65	2.080
P-28EX	6.0	1,474	130.0	Zone 12	142.2	1.61	2.001
P-53EX	16.0	457	130.0	Zone 12	-634.5	1.01	0.269
P-56EX	16.0	1,859	130.0	Zone 12	471.7	0.75	0.155
P-57EX	12.0	493	130.0	Zone 12	471.7	1.34	0.631
P-58EX	12.0	186	130.0	Zone 12	-1,106.2	3.14	3.055
P-59EX	12.0	222	130.0	Zone 12	-1,106.2	3.14	3.055
P-63EX	8.0	827	130.0	Zone 12	-5.1	0.03	0.001
P-64EX	8.0	310	130.0	Zone 12	2.7	0.02	0.000
P-65EX	8.0	3,132	130.0	Zone 12	2.7	0.02	0.000
P-69EX	24.0	409	130.0	Zone 12	-1,106.7	0.78	0.104

FlexTable: GPV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 Residual Flow

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12A	2,763	12.0	0.390	1,106.2	3,109	2,870	239.00

FlexTable: PRV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 Residual Flow

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12B	2,690	8.0	0.390	2,811	52.4	2.7	2,867	2,811	56.43

FlexTable: Reservoir Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 @ 2,071 GPM

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
BPS-92	3,118	2,115.7	3,118

FlexTable: Junction Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 @ 2,071 GPM

Label	Elevation (ft)	Zone	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-2EX	2,697	Zone 12	3.4	58.8	2,833
J-3EX	2,713	Zone 12	1.7	53.1	2,836
J-4EX	2,666	Zone 12	5.1	67.5	2,822
J-5EX	2,682	Zone 12	2.7	64.6	2,831
J-6EX	2,720	Zone 12	1.0	50.8	2,837
J-7EX	2,752	Zone 12	3.0	40.9	2,846
J-8EX	2,767	Zone 12	0.0	139.6	3,090
J-9EX	2,709	Zone 12	6.1	57.1	2,841
J-10EX	2,712	Zone 12	0.0	174.7	3,116
J-11EX	2,666	Zone 12	0.0	195.3	3,117
J-12EX	2,667	Zone 12	2,073.7	33.3	2,744
J-13EX	2,760	Zone 12	5.7	36.5	2,844
J-14EX	2,696	Zone 12	2.0	62.7	2,841
J-15EX	2,698	Zone 12	2.4	61.8	2,841
J-16EX	2,633	Zone 12	1.7	77.0	2,811
J-17EX	2,604	Zone 12	1.0	89.6	2,811
J-18EX	2,756	Zone 12	2.7	38.9	2,846
J-19EX	2,701	Zone 12	3.0	56.5	2,832
J-20EX	2,655	Zone 12	0.5	200.3	3,118
J-39EX	2,663	Zone 12	0.0	196.3	3,117

← Flow Test #2 Pressure ≈ 30 psi

FlexTable: Pipe Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 @ 2,071 GPM

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Zone	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-1EX	6.0	1,156	130.0	Zone 12	-161.5	1.83	2.535
P-3EX	6.0	944	130.0	Zone 12	-335.9	3.81	9.832
P-5EX	12.0	317	130.0	Zone 12	-1,479.5	4.20	5.235
P-6EX	6.0	611	130.0	Zone 12	-163.2	1.85	2.584
P-8EX	12.0	1,062	130.0	Zone 12	-1,321.4	3.75	4.247
P-9EX	12.0	1,245	130.0	Zone 12	-1,764.2	5.00	7.253
P-12EX	6.0	2,038	130.0	Zone 12	-326.4	3.70	9.325
P-13EX	6.0	1,219	130.0	Zone 12	-220.0	2.50	4.491
P-14EX	12.0	2,591	130.0	Zone 12	-2,115.2	6.00	10.150
P-15EX	16.0	1,773	130.0	Zone 12	-1,213.2	1.94	0.893
P-17EX	6.0	921	130.0	Zone 12	1,141.0	12.95	94.688
P-18EX	6.0	1,195	130.0	Zone 12	-932.7	10.58	65.194
P-20EX	6.0	2,345	130.0	Zone 12	119.6	1.36	1.453
P-21EX	6.0	685	130.0	Zone 12	7.1	0.08	0.008
P-24EX	8.0	1,155	130.0	Zone 12	1.0	0.01	0.000
P-25EX	6.0	472	130.0	Zone 12	128.0	1.45	1.647
P-26EX	6.0	814	130.0	Zone 12	125.3	1.42	1.584
P-27EX	6.0	776	130.0	Zone 12	278.6	3.16	6.955
P-28EX	6.0	1,474	130.0	Zone 12	275.6	3.13	6.817
P-53EX	16.0	457	130.0	Zone 12	-1,213.2	1.94	0.893
P-56EX	16.0	1,859	130.0	Zone 12	902.0	1.44	0.516
P-57EX	12.0	493	130.0	Zone 12	902.0	2.56	2.094
P-58EX	12.0	186	130.0	Zone 12	-2,115.2	6.00	10.149
P-59EX	12.0	222	130.0	Zone 12	-2,115.2	6.00	10.150
P-63EX	8.0	827	130.0	Zone 12	-5.1	0.03	0.001
P-64EX	8.0	310	130.0	Zone 12	2.7	0.02	0.000
P-65EX	8.0	3,132	130.0	Zone 12	2.7	0.02	0.000
P-69EX	24.0	409	130.0	Zone 12	-2,115.7	1.50	0.347

FlexTable: GPV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 @ 2,071 GPM

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12A	2,763	12.0	0.390	2,115.2	3,087	2,848	239.00

FlexTable: PRV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Avg Day Demand (Existing Condition) + FT #2 @ 2,071 GPM

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12B	2,690	8.0	0.390	2,811	52.4	2.7	2,841	2,811	29.91

APPENDIX C

HYDRAULIC MODELING RESULTS – FULL BUILD-OUT

FlexTable: Reservoir Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (FBO Condition)

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
BPS-92	3,118	126.8	3,118

FlexTable: Junction Table
DESERT MOUNTAIN PARCEL 19
Active Scenario: Average Day Demand (FBO Condition)

Label	Elevation (ft)	Zone	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-2EX	2,697	Zone 12	5.4	78.7	2,879
J-3EX	2,713	Zone 12	2.7	71.7	2,879
J-4EX	2,666	Zone 12	10.1	92.1	2,879
J-5EX	2,682	Zone 12	3.7	85.1	2,879
J-6EX	2,720	Zone 12	4.0	68.7	2,879
J-7EX	2,752	Zone 12	4.0	54.9	2,879
J-8EX	2,767	Zone 12	0.0	151.8	3,118
J-9EX	2,709	Zone 12	10.8	73.4	2,879
J-10EX	2,712	Zone 12	0.0	175.7	3,118
J-11EX	2,666	Zone 12	0.0	195.6	3,118
J-12EX	2,667	Zone 12	4.0	91.6	2,879
J-13EX	2,760	Zone 12	11.8	51.4	2,879
J-14EX	2,696	Zone 12	2.0	78.9	2,878
J-15EX	2,698	Zone 12	6.4	78.0	2,878
J-16EX	2,633	Zone 12	1.7	76.9	2,811
J-17EX	2,604	Zone 12	1.0	89.4	2,811
J-18EX	2,756	Zone 12	4.0	53.3	2,879
J-19EX	2,701	Zone 12	4.7	76.8	2,879
J-20EX	2,655	Zone 12	0.5	200.3	3,118
J-39EX	2,663	Zone 12	0.0	196.9	3,118
J-DM-1	2,640	Zone 12	2.2	73.8	2,811
J-DM-2	2,629	Zone 12	2.4	78.5	2,811
J-DM-3	2,628	Zone 12	2.6	78.9	2,811
J-DM-4	2,600	Zone 12	3.3	91.1	2,811
J-DM-5	2,593	Zone 12	3.4	94.2	2,811
J-DM-6	2,617	Zone 12	4.3	83.8	2,811
J-DM-7	2,621	Zone 12	2.8	82.0	2,811
J-DM-8	2,613	Zone 12	3.4	85.5	2,811
J-DM-9	2,599	Zone 12	3.4	91.5	2,811
J-DM-10	2,622	Zone 12	2.9	81.8	2,811
J-DM-11	2,625	Zone 12	1.9	80.2	2,811
J-DM-12	2,640	Zone 12	17.4	73.8	2,811
J-DM-13	2,647	Zone 12	0.0	70.8	2,811

FlexTable: Pipe Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (FBO Condition)

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Zone	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-1EX	6.0	1,156	130.0	Zone 12	-3.0	0.03	0.002
P-3EX	6.0	944	130.0	Zone 12	-15.5	0.18	0.033
P-5EX	12.0	317	130.0	Zone 12	-31.3	0.09	0.004
P-6EX	6.0	611	130.0	Zone 12	-5.7	0.06	0.005
P-8EX	12.0	1,062	130.0	Zone 12	-33.7	0.10	0.005
P-9EX	12.0	1,245	130.0	Zone 12	-57.0	0.16	0.013
P-12EX	6.0	2,038	130.0	Zone 12	22.4	0.25	0.065
P-13EX	6.0	1,219	130.0	Zone 12	-35.5	0.40	0.153
P-14EX	12.0	2,591	130.0	Zone 12	-126.3	0.36	0.055
P-15EX	16.0	1,773	130.0	Zone 12	-72.4	0.12	0.005
P-17EX	6.0	921	130.0	Zone 12	12.1	0.14	0.021
P-18EX	6.0	1,195	130.0	Zone 12	8.1	0.09	0.010
P-20EX	6.0	2,345	130.0	Zone 12	14.0	0.16	0.028
P-21EX	6.0	685	130.0	Zone 12	61.1	0.69	0.418
P-24EX	8.0	1,155	130.0	Zone 12	51.0	0.33	0.074
P-25EX	6.0	472	130.0	Zone 12	29.8	0.34	0.111
P-26EX	6.0	814	130.0	Zone 12	25.8	0.29	0.085
P-27EX	6.0	776	130.0	Zone 12	13.6	0.15	0.026
P-28EX	6.0	1,474	130.0	Zone 12	8.9	0.10	0.012
P-53EX	16.0	457	130.0	Zone 12	-72.4	0.12	0.005
P-56EX	16.0	1,859	130.0	Zone 12	53.9	0.09	0.003
P-57EX	12.0	493	130.0	Zone 12	53.9	0.15	0.011
P-58EX	12.0	186	130.0	Zone 12	-126.3	0.36	0.055
P-59EX	12.0	222	130.0	Zone 12	-126.3	0.36	0.055
P-63EX	8.0	827	130.0	Zone 12	-59.1	0.38	0.097
P-64EX	8.0	310	130.0	Zone 12	52.7	0.34	0.078
P-65EX	8.0	3,132	130.0	Zone 12	52.7	0.34	0.078
P-69EX	24.0	409	130.0	Zone 12	-126.8	0.09	0.002
P-DM-10	8.0	102	130.0	Zone 12	0.0	0.00	0.000
P-DM-20	8.0	103	130.0	Zone 12	0.0	0.00	0.000
P-DM-30	8.0	510	130.0	Zone 12	-17.0	0.11	0.010
P-DM-35	8.0	587	130.0	Zone 12	-19.4	0.12	0.012
P-DM-40	8.0	965	130.0	Zone 12	-43.3	0.28	0.054
P-DM-45	8.0	840	130.0	Zone 12	50.0	0.32	0.071
P-DM-50	8.0	436	130.0	Zone 12	21.3	0.14	0.015
P-DM-50	8.0	567	130.0	Zone 12	3.4	0.02	0.000
P-DM-55	8.0	574	130.0	Zone 12	17.0	0.11	0.009
P-DM-60	8.0	553	130.0	Zone 12	14.2	0.09	0.007
P-DM-65	8.0	651	130.0	Zone 12	3.4	0.02	0.000
P-DM-70	8.0	434	130.0	Zone 12	-7.4	0.05	0.002
P-DM-75	8.0	180	130.0	Zone 12	-1.9	0.01	0.000
P-DM-80	8.0	400	130.0	Zone 12	-2.6	0.02	0.000
P-DM-85	8.0	272	130.0	Zone 12	14.8	0.09	0.007
P-DM-90	8.0	357	130.0	Zone 12	14.8	0.09	0.008

FlexTable: GPV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (FBO Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12A	2,763	12.0	0.390	126.3	3,118	2,879	239.00

FlexTable: PRV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Average Day Demand (FBO Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12B	2,690	8.0	0.390	2,811	52.4	52.7	2,878	2,811	67.20
PRV-DM19	2,640	8.0	0.390	2,790	64.9	0.0	3,118	2,811	0.00

FlexTable: Reservoir Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day Demand (FBO Condition)

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
BPS-92	3,118	253.6	3,118

FlexTable: Junction Table
DESERT MOUNTAIN PARCEL 19
Active Scenario: Max Day Demand (FBO Condition)

Label	Elevation (ft)	Zone	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-2EX	2,697	Zone 12	10.8	78.4	2,878
J-3EX	2,713	Zone 12	5.4	71.5	2,878
J-4EX	2,666	Zone 12	20.2	91.8	2,878
J-5EX	2,682	Zone 12	7.4	84.9	2,878
J-6EX	2,720	Zone 12	8.0	68.5	2,878
J-7EX	2,752	Zone 12	8.0	54.7	2,878
J-8EX	2,767	Zone 12	0.0	151.6	3,117
J-9EX	2,709	Zone 12	21.6	73.0	2,878
J-10EX	2,712	Zone 12	0.0	175.6	3,118
J-11EX	2,666	Zone 12	0.0	195.6	3,118
J-12EX	2,667	Zone 12	8.0	91.4	2,878
J-13EX	2,760	Zone 12	23.6	51.0	2,878
J-14EX	2,696	Zone 12	4.0	78.2	2,877
J-15EX	2,698	Zone 12	12.8	77.2	2,876
J-16EX	2,633	Zone 12	3.4	76.6	2,810
J-17EX	2,604	Zone 12	2.0	89.1	2,810
J-18EX	2,756	Zone 12	8.0	53.0	2,878
J-19EX	2,701	Zone 12	9.4	76.5	2,878
J-20EX	2,655	Zone 12	1.0	200.3	3,118
J-39EX	2,663	Zone 12	0.0	196.8	3,118
J-DM-1	2,640	Zone 12	4.4	73.3	2,809
J-DM-2	2,629	Zone 12	4.8	78.0	2,809
J-DM-3	2,628	Zone 12	5.2	78.4	2,809
J-DM-4	2,600	Zone 12	6.6	90.7	2,810
J-DM-5	2,593	Zone 12	6.8	93.7	2,810
J-DM-6	2,617	Zone 12	8.6	83.3	2,809
J-DM-7	2,621	Zone 12	5.6	81.5	2,809
J-DM-8	2,613	Zone 12	6.8	85.0	2,809
J-DM-9	2,599	Zone 12	6.8	91.0	2,809
J-DM-10	2,622	Zone 12	5.8	81.2	2,809
J-DM-11	2,625	Zone 12	3.8	79.7	2,809
J-DM-12	2,640	Zone 12	34.8	73.3	2,809
J-DM-13	2,647	Zone 12	0.0	70.3	2,809

FlexTable: Pipe Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day Demand (FBO Condition)

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Zone	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-1EX	6.0	1,156	130.0	Zone 12	-6.1	0.07	0.006
P-3EX	6.0	944	130.0	Zone 12	-31.0	0.35	0.119
P-5EX	12.0	317	130.0	Zone 12	-62.6	0.18	0.015
P-6EX	6.0	611	130.0	Zone 12	-11.5	0.13	0.019
P-8EX	12.0	1,062	130.0	Zone 12	-67.4	0.19	0.017
P-9EX	12.0	1,245	130.0	Zone 12	-114.0	0.32	0.045
P-12EX	6.0	2,038	130.0	Zone 12	44.8	0.51	0.236
P-13EX	6.0	1,219	130.0	Zone 12	-70.9	0.80	0.552
P-14EX	12.0	2,591	130.0	Zone 12	-252.6	0.72	0.198
P-15EX	16.0	1,773	130.0	Zone 12	-144.9	0.23	0.017
P-17EX	6.0	921	130.0	Zone 12	24.2	0.27	0.076
P-18EX	6.0	1,195	130.0	Zone 12	16.2	0.18	0.036
P-20EX	6.0	2,345	130.0	Zone 12	28.1	0.32	0.099
P-21EX	6.0	685	130.0	Zone 12	122.2	1.39	1.512
P-24EX	8.0	1,155	130.0	Zone 12	102.0	0.65	0.266
P-25EX	6.0	472	130.0	Zone 12	59.7	0.68	0.401
P-26EX	6.0	814	130.0	Zone 12	51.7	0.59	0.307
P-27EX	6.0	776	130.0	Zone 12	27.2	0.31	0.094
P-28EX	6.0	1,474	130.0	Zone 12	17.8	0.20	0.043
P-53EX	16.0	457	130.0	Zone 12	-144.9	0.23	0.018
P-56EX	16.0	1,859	130.0	Zone 12	107.7	0.17	0.010
P-57EX	12.0	493	130.0	Zone 12	107.7	0.31	0.041
P-58EX	12.0	186	130.0	Zone 12	-252.6	0.72	0.198
P-59EX	12.0	222	130.0	Zone 12	-252.6	0.72	0.199
P-63EX	8.0	827	130.0	Zone 12	-118.2	0.75	0.350
P-64EX	8.0	310	130.0	Zone 12	105.4	0.67	0.283
P-65EX	8.0	3,132	130.0	Zone 12	105.4	0.67	0.283
P-69EX	24.0	409	130.0	Zone 12	-253.6	0.18	0.007
P-DM-10	8.0	102	130.0	Zone 12	0.0	0.00	0.000
P-DM-20	8.0	103	130.0	Zone 12	0.0	0.00	0.000
P-DM-30	8.0	510	130.0	Zone 12	-34.0	0.22	0.034
P-DM-35	8.0	587	130.0	Zone 12	-38.8	0.25	0.044
P-DM-40	8.0	965	130.0	Zone 12	-86.6	0.55	0.197
P-DM-45	8.0	840	130.0	Zone 12	100.0	0.64	0.257
P-DM-50	8.0	436	130.0	Zone 12	42.6	0.27	0.053
P-DM-50	8.0	567	130.0	Zone 12	6.8	0.04	0.002
P-DM-55	8.0	574	130.0	Zone 12	34.0	0.22	0.035
P-DM-60	8.0	553	130.0	Zone 12	28.4	0.18	0.025
P-DM-65	8.0	651	130.0	Zone 12	6.8	0.04	0.001
P-DM-70	8.0	434	130.0	Zone 12	-14.8	0.09	0.007
P-DM-75	8.0	180	130.0	Zone 12	-3.8	0.02	0.000
P-DM-80	8.0	400	130.0	Zone 12	-5.2	0.03	0.001
P-DM-85	8.0	272	130.0	Zone 12	29.6	0.19	0.027
P-DM-90	8.0	357	130.0	Zone 12	29.6	0.19	0.027

FlexTable: GPV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day Demand (FBO Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12A	2,763	12.0	0.390	252.6	3,117	2,878	239.00

FlexTable: PRV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day Demand (FBO Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12B	2,690	8.0	0.390	2,811	52.4	105.4	2,876	2,811	65.23
PRV-DM19	2,640	8.0	0.390	2,790	64.9	0.0	3,118	2,809	0.00

Fire Flow Node FlexTable: Fire Flow Report
DESERT MOUNTAIN PARCEL 19
Active Scenario: Max Day + FF (FBO Condition)

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Press. (Calc Rsdl) (psi)	Press (Calc Zn Lwr Limit) (psi)	Junction w/ Min Press (Zone)
J-2EX	2,697	True	1,010.8	2,326.4	49.5	30.0	J-13EX
J-3EX	2,713	True	1,005.4	1,878.9	30.0	36.4	J-13EX
J-4EX	2,666	True	1,020.2	2,217.7	49.6	30.0	J-13EX
J-5EX	2,682	True	1,007.4	2,318.1	55.1	30.0	J-13EX
J-6EX	2,720	True	1,008.0	2,337.4	42.5	30.0	J-13EX
J-7EX	2,752	True	1,008.0	2,398.9	33.7	30.0	J-13EX
J-8EX	2,767	True	1,000.0	2,589.8	130.6	30.0	J-13EX
J-9EX	2,709	True	1,021.6	1,696.2	36.0	30.0	J-13EX
J-10EX	2,712	True	1,000.0	3,000.0	173.6	49.0	J-13EX
J-11EX	2,666	True	1,000.0	3,000.0	194.7	50.3	J-13EX
J-12EX	2,667	True	1,008.0	2,075.7	30.0	33.0	J-13EX
J-13EX	2,760	False	1,023.6	979.9	30.0	42.2	J-18EX
J-14EX	2,696	True	1,004.0	1,170.2	30.9	30.0	J-15EX
J-15EX	2,698	True	1,012.8	1,074.5	30.0	38.4	J-14EX
J-16EX	2,633	True	1,003.4	2,209.2	30.0	31.5	J-15EX
J-17EX	2,604	True	1,002.0	2,675.5	32.7	30.0	J-16EX
J-18EX	2,756	True	1,008.0	1,306.1	30.0	30.9	J-13EX
J-19EX	2,701	True	1,009.4	1,825.5	30.0	36.7	J-13EX
J-20EX	2,655	True	1,501.0	3,001.0	200.2	50.9	J-13EX
J-39EX	2,663	True	1,000.0	3,000.0	195.0	49.8	J-13EX
J-DM-1	2,640	True	1,004.4	3,004.4	60.2	48.7	J-13EX
J-DM-2	2,629	True	1,004.8	3,004.8	52.2	47.4	J-13EX
J-DM-3	2,628	True	1,005.2	3,005.2	49.0	45.9	J-13EX
J-DM-4	2,600	True	1,006.6	3,006.6	36.3	35.9	J-15EX
J-DM-5	2,593	True	1,006.8	2,504.9	30.0	43.4	J-15EX
J-DM-6	2,617	True	1,008.6	3,008.6	46.3	46.6	J-13EX
J-DM-7	2,621	True	1,005.6	3,005.6	39.8	47.2	J-13EX
J-DM-8	2,613	True	1,006.8	3,006.8	43.2	46.3	J-DM-11
J-DM-9	2,599	True	1,006.8	2,526.1	30.0	48.1	J-13EX
J-DM-10	2,622	True	1,005.8	3,005.8	42.7	41.2	J-DM-11
J-DM-11	2,625	True	1,003.8	3,003.8	30.3	42.7	J-DM-10
J-DM-12	2,640	True	2,034.8	3,034.8	40.7	46.2	J-DM-13
J-DM-13	2,647	True	1,000.0	3,000.0	44.0	48.1	J-DM-12

FIRE FLOW AT CLUBHOUSE
(SHOWS PROPOSED PRV OPERATING)

FlexTable: Reservoir Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day + FF (J-DM-12) FBO Condition

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
BPS-92	3,118	2,253.6	3,118

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FlexTable: Junction Table
DESERT MOUNTAIN PARCEL 19
Active Scenario: Max Day + FF (J-DM-12) FBO Condition

Label	Elevation (ft)	Zone	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-2EX	2,697	Zone 12	10.8	77.2	2,875
J-3EX	2,713	Zone 12	5.4	70.3	2,875
J-4EX	2,666	Zone 12	20.2	90.3	2,875
J-5EX	2,682	Zone 12	7.4	83.7	2,875
J-6EX	2,720	Zone 12	8.0	67.3	2,875
J-7EX	2,752	Zone 12	8.0	53.5	2,876
J-8EX	2,767	Zone 12	0.0	150.6	3,115
J-9EX	2,709	Zone 12	21.6	69.5	2,870
J-10EX	2,712	Zone 12	0.0	175.6	3,118
J-11EX	2,666	Zone 12	0.0	195.5	3,118
J-12EX	2,667	Zone 12	8.0	90.0	2,875
J-13EX	2,760	Zone 12	23.6	48.9	2,873
J-14EX	2,696	Zone 12	4.0	69.4	2,856
J-15EX	2,698	Zone 12	12.8	66.8	2,852
J-16EX	2,633	Zone 12	3.4	70.9	2,797
J-17EX	2,604	Zone 12	2.0	81.3	2,792
J-18EX	2,756	Zone 12	8.0	51.5	2,875
J-19EX	2,701	Zone 12	9.4	75.2	2,875
J-20EX	2,655	Zone 12	1.0	200.3	3,118
J-39EX	2,663	Zone 12	0.0	196.8	3,118
J-DM-1	2,640	Zone 12	4.4	62.9	2,785
J-DM-2	2,629	Zone 12	4.8	67.3	2,785
J-DM-3	2,628	Zone 12	5.2	67.4	2,784
J-DM-4	2,600	Zone 12	6.6	81.4	2,788
J-DM-5	2,593	Zone 12	6.8	84.4	2,788
J-DM-6	2,617	Zone 12	8.6	70.6	2,780
J-DM-7	2,621	Zone 12	5.6	66.8	2,775
J-DM-8	2,613	Zone 12	6.8	68.2	2,771
J-DM-9	2,599	Zone 12	6.8	74.3	2,771
J-DM-10	2,622	Zone 12	5.8	63.0	2,767
J-DM-11	2,625	Zone 12	3.8	61.4	2,767
J-DM-12	2,640	Zone 12	2,034.8	53.6	2,764
J-DM-13	2,647	Zone 12	0.0	54.6	2,773

FlexTable: Pipe Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day + FF (J-DM-12) FBO Condition

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Zone	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-1EX	6.0	1,156	130.0	Zone 12	-15.2	0.17	0.031
P-3EX	6.0	944	130.0	Zone 12	-80.4	0.91	0.696
P-5EX	12.0	317	130.0	Zone 12	-144.2	0.41	0.071
P-6EX	6.0	611	130.0	Zone 12	-20.6	0.23	0.056
P-8EX	12.0	1,062	130.0	Zone 12	-139.8	0.40	0.066
P-9EX	12.0	1,245	130.0	Zone 12	-228.4	0.65	0.165
P-12EX	6.0	2,038	130.0	Zone 12	159.2	1.81	2.466
P-13EX	6.0	1,219	130.0	Zone 12	-230.8	2.62	4.908
P-14EX	12.0	2,591	130.0	Zone 12	-616.8	1.75	1.036
P-15EX	16.0	1,773	130.0	Zone 12	-353.8	0.56	0.091
P-17EX	6.0	921	130.0	Zone 12	56.4	0.64	0.360
P-18EX	6.0	1,195	130.0	Zone 12	48.4	0.55	0.272
P-20EX	6.0	2,345	130.0	Zone 12	118.0	1.34	1.418
P-21EX	6.0	685	130.0	Zone 12	486.4	5.52	19.522
P-24EX	8.0	1,155	130.0	Zone 12	466.2	2.98	4.445
P-25EX	6.0	472	130.0	Zone 12	149.6	1.70	2.200
P-26EX	6.0	814	130.0	Zone 12	141.6	1.61	1.987
P-27EX	6.0	776	130.0	Zone 12	60.0	0.68	0.405
P-28EX	6.0	1,474	130.0	Zone 12	50.6	0.57	0.295
P-53EX	16.0	457	130.0	Zone 12	-353.8	0.56	0.091
P-56EX	16.0	1,859	130.0	Zone 12	263.0	0.42	0.053
P-57EX	12.0	493	130.0	Zone 12	263.0	0.75	0.214
P-58EX	12.0	186	130.0	Zone 12	-616.8	1.75	1.035
P-59EX	12.0	222	130.0	Zone 12	-616.8	1.75	1.035
P-63EX	8.0	827	130.0	Zone 12	-482.4	3.08	4.735
P-64EX	8.0	310	130.0	Zone 12	469.6	3.00	4.505
P-65EX	8.0	3,132	130.0	Zone 12	469.6	3.00	4.505
P-69EX	24.0	409	130.0	Zone 12	-617.8	0.44	0.035
P-DM-10	8.0	102	130.0	Zone 12	1,635.8	10.44	45.443
P-DM-20	8.0	103	130.0	Zone 12	1,635.8	10.44	45.444
P-DM-30	8.0	510	130.0	Zone 12	232.4	1.48	1.224
P-DM-35	8.0	587	130.0	Zone 12	227.6	1.45	1.178
P-DM-40	8.0	965	130.0	Zone 12	-450.8	2.88	4.177
P-DM-45	8.0	840	130.0	Zone 12	464.2	2.96	4.409
P-DM-50	8.0	436	130.0	Zone 12	673.2	4.30	8.776
P-DM-50	8.0	567	130.0	Zone 12	6.8	0.04	0.002
P-DM-55	8.0	574	130.0	Zone 12	664.6	4.24	8.570
P-DM-60	8.0	553	130.0	Zone 12	659.0	4.21	8.437
P-DM-65	8.0	651	130.0	Zone 12	6.8	0.04	0.001
P-DM-70	8.0	434	130.0	Zone 12	-645.4	4.12	8.117
P-DM-75	8.0	180	130.0	Zone 12	-3.8	0.02	0.000
P-DM-80	8.0	400	130.0	Zone 12	-635.8	4.06	7.895
P-DM-85	8.0	272	130.0	Zone 12	1,399.0	8.93	34.020
P-DM-90	8.0	357	130.0	Zone 12	1,399.0	8.93	34.019

FlexTable: GPV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day + FF (J-DM-12) FBO Condition

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12A	2,763	12.0	0.390	616.8	3,115	2,876	239.00

FlexTable: PRV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Max Day + FF (J-DM-12) FBO Condition

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12B	2,690	8.0	0.390	2,811	52.4	469.6	2,851	2,811	39.96
PRV-DM19	2,640	8.0	0.390	2,790	64.9	1,635.8	3,113	2,790	323.32

FlexTable: Reservoir Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Peak Hour Demand (FBO Condition)

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
BPS-92	3,118	443.8	3,118

FlexTable: Junction Table
DESERT MOUNTAIN PARCEL 19
Active Scenario: Peak Hour Demand (FBO Condition)

Label	Elevation (ft)	Zone	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-2EX	2,697	Zone 12	18.9	77.9	2,877
J-3EX	2,713	Zone 12	9.4	71.0	2,877
J-4EX	2,666	Zone 12	35.4	91.1	2,877
J-5EX	2,682	Zone 12	12.9	84.4	2,877
J-6EX	2,720	Zone 12	14.0	67.9	2,877
J-7EX	2,752	Zone 12	14.0	54.2	2,877
J-8EX	2,767	Zone 12	0.0	151.2	3,116
J-9EX	2,709	Zone 12	37.8	72.0	2,875
J-10EX	2,712	Zone 12	0.0	175.6	3,118
J-11EX	2,666	Zone 12	0.0	195.5	3,118
J-12EX	2,667	Zone 12	14.0	90.8	2,877
J-13EX	2,760	Zone 12	41.3	50.2	2,876
J-14EX	2,696	Zone 12	7.0	76.3	2,872
J-15EX	2,698	Zone 12	22.4	75.1	2,872
J-16EX	2,633	Zone 12	5.9	75.9	2,809
J-17EX	2,604	Zone 12	3.5	88.1	2,808
J-18EX	2,756	Zone 12	14.0	52.4	2,877
J-19EX	2,701	Zone 12	16.5	75.9	2,877
J-20EX	2,655	Zone 12	1.8	200.3	3,118
J-39EX	2,663	Zone 12	0.0	196.8	3,118
J-DM-1	2,640	Zone 12	7.7	72.0	2,806
J-DM-2	2,629	Zone 12	8.4	76.7	2,806
J-DM-3	2,628	Zone 12	9.1	77.1	2,807
J-DM-4	2,600	Zone 12	11.6	89.6	2,807
J-DM-5	2,593	Zone 12	11.9	92.6	2,807
J-DM-6	2,617	Zone 12	15.0	82.0	2,806
J-DM-7	2,621	Zone 12	9.8	80.2	2,806
J-DM-8	2,613	Zone 12	11.9	83.7	2,806
J-DM-9	2,599	Zone 12	11.9	89.7	2,806
J-DM-10	2,622	Zone 12	10.2	79.9	2,806
J-DM-11	2,625	Zone 12	6.7	78.4	2,806
J-DM-12	2,640	Zone 12	60.9	72.0	2,806
J-DM-13	2,647	Zone 12	0.0	69.0	2,806

FlexTable: Pipe Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Peak Hour Demand (FBO Condition)

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Zone	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-1EX	6.0	1,156	130.0	Zone 12	-10.6	0.12	0.016
P-3EX	6.0	944	130.0	Zone 12	-54.2	0.62	0.336
P-5EX	12.0	317	130.0	Zone 12	-109.6	0.31	0.042
P-6EX	6.0	611	130.0	Zone 12	-20.1	0.23	0.053
P-8EX	12.0	1,062	130.0	Zone 12	-117.9	0.33	0.048
P-9EX	12.0	1,245	130.0	Zone 12	-199.5	0.57	0.128
P-12EX	6.0	2,038	130.0	Zone 12	78.4	0.89	0.664
P-13EX	6.0	1,219	130.0	Zone 12	-124.1	1.41	1.555
P-14EX	12.0	2,591	130.0	Zone 12	-442.0	1.25	0.559
P-15EX	16.0	1,773	130.0	Zone 12	-253.5	0.40	0.049
P-17EX	6.0	921	130.0	Zone 12	42.4	0.48	0.213
P-18EX	6.0	1,195	130.0	Zone 12	28.4	0.32	0.101
P-20EX	6.0	2,345	130.0	Zone 12	49.2	0.56	0.280
P-21EX	6.0	685	130.0	Zone 12	213.8	2.43	4.262
P-24EX	8.0	1,155	130.0	Zone 12	178.5	1.14	0.751
P-25EX	6.0	472	130.0	Zone 12	104.5	1.19	1.130
P-26EX	6.0	814	130.0	Zone 12	90.5	1.03	0.866
P-27EX	6.0	776	130.0	Zone 12	47.6	0.54	0.264
P-28EX	6.0	1,474	130.0	Zone 12	31.1	0.35	0.120
P-53EX	16.0	457	130.0	Zone 12	-253.5	0.40	0.049
P-56EX	16.0	1,859	130.0	Zone 12	188.5	0.30	0.028
P-57EX	12.0	493	130.0	Zone 12	188.5	0.53	0.115
P-58EX	12.0	186	130.0	Zone 12	-442.0	1.25	0.558
P-59EX	12.0	222	130.0	Zone 12	-442.0	1.25	0.560
P-63EX	8.0	827	130.0	Zone 12	-206.8	1.32	0.987
P-64EX	8.0	310	130.0	Zone 12	184.4	1.18	0.798
P-65EX	8.0	3,132	130.0	Zone 12	184.4	1.18	0.798
P-69EX	24.0	409	130.0	Zone 12	-443.8	0.31	0.019
P-DM-10	8.0	102	130.0	Zone 12	0.0	0.00	0.000
P-DM-20	8.0	103	130.0	Zone 12	0.0	0.00	0.000
P-DM-30	8.0	510	130.0	Zone 12	-59.4	0.38	0.098
P-DM-35	8.0	587	130.0	Zone 12	-67.8	0.43	0.125
P-DM-40	8.0	965	130.0	Zone 12	-151.5	0.97	0.555
P-DM-45	8.0	840	130.0	Zone 12	175.0	1.12	0.724
P-DM-50	8.0	436	130.0	Zone 12	74.6	0.48	0.149
P-DM-50	8.0	567	130.0	Zone 12	11.9	0.08	0.005
P-DM-55	8.0	574	130.0	Zone 12	59.6	0.38	0.098
P-DM-60	8.0	553	130.0	Zone 12	49.8	0.32	0.071
P-DM-65	8.0	651	130.0	Zone 12	11.9	0.08	0.005
P-DM-70	8.0	434	130.0	Zone 12	-26.0	0.17	0.021
P-DM-75	8.0	180	130.0	Zone 12	-6.7	0.04	0.001
P-DM-80	8.0	400	130.0	Zone 12	-9.2	0.06	0.003
P-DM-85	8.0	272	130.0	Zone 12	51.7	0.33	0.076
P-DM-90	8.0	357	130.0	Zone 12	51.7	0.33	0.076

FlexTable: GPV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Peak Hour Demand (FBO Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12A	2,763	12.0	0.390	442.1	3,116	2,877	239.00

FlexTable: PRV Table

DESERT MOUNTAIN PARCEL 19

Active Scenario: Peak Hour Demand (FBO Condition)

Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	Hydraulic Grade Setting (Initial) (ft)	Pressure Setting (Initial) (psi)	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
VALVE-12B	2,690	8.0	0.390	2,811	52.4	184.4	2,871	2,811	60.28
PRV-DM19	2,640	8.0	0.390	2,790	64.9	0.0	3,118	2,806	0.00

EXHIBIT 1

VICINITY MAP

0 500 1000

Horz. 1 in. = 500 ft.

N

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WWW.WOODPATEL.COM

DESERT MOUNTAIN		
EXHIBIT 1 VICINITY MAP		
DATE: 6-15-2016	SCALE: 1" = 500'	SHEET 1 OF 1
JOB NO.: 164434	DESIGN: SM DRAWN: SM	

EXHIBIT 2

EXISTING GROUNDWATER WELL LOCATIONS

N

0 300 600

Horz. 1 in. = 300 ft.

NOT
FOR CONSTRUCTION OR RECORDING

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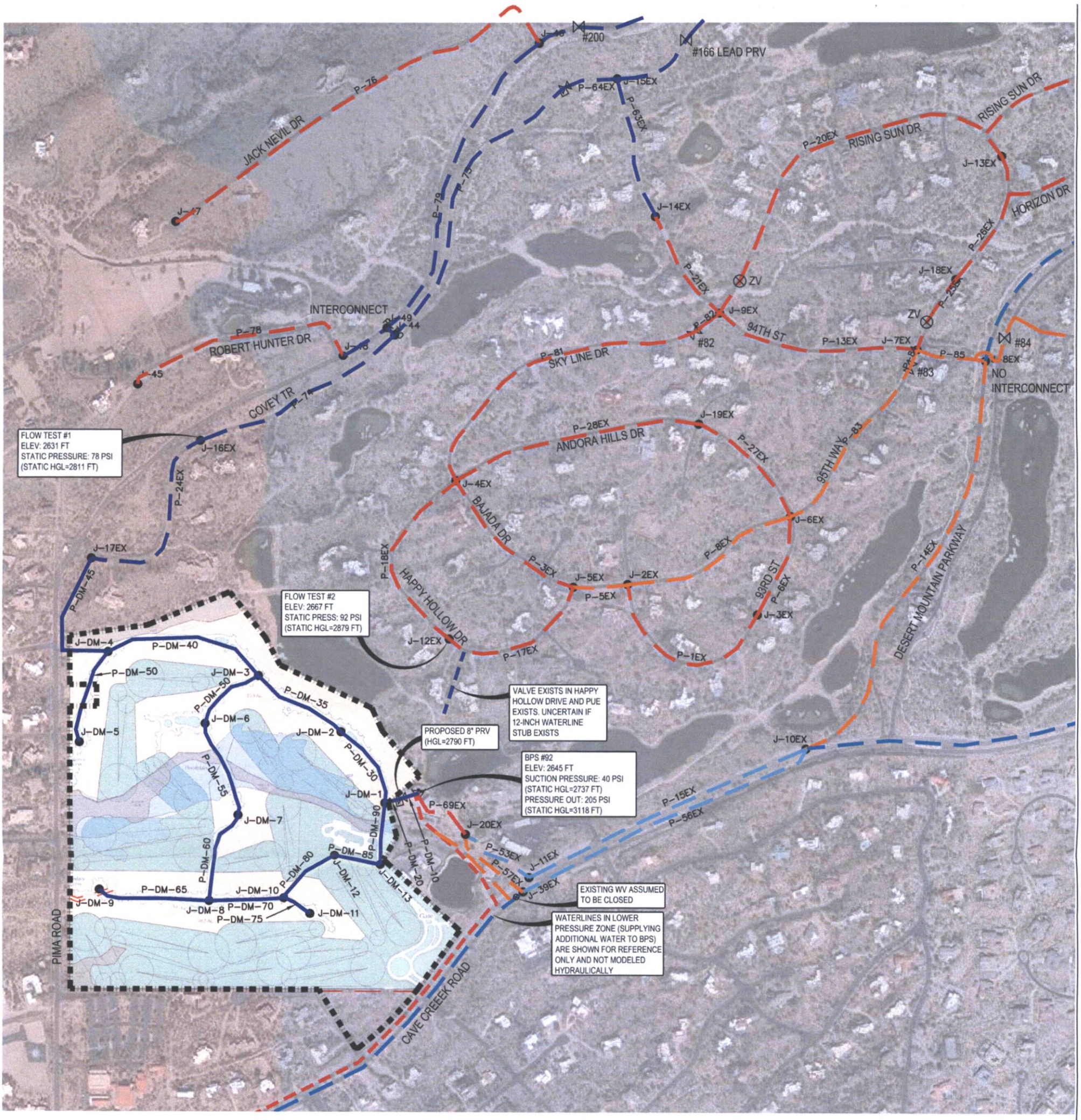
DESERT MOUNTAIN P19

EXHIBIT 2- EXISTING GROUNDWATER WELL LOCATIONS

	SCALE: 1" = 300'	SHEET 1 OF 1
JOB NO.: 164434	DESIGN: SM	
	DRAWN: SM	

EXHIBIT 3

MASTER WATER EXHIBIT – FULL BUILD-OUT



LEGEND

- J1 — HYDRAULIC MODEL JUNCTION NODE
- P1 — HYDRAULIC MODEL PIPE
- PROPERTY BOUNDARY

PIPE DIAMETER	EXISTING	PROPOSED
6-INCHES		
8-INCHES		
12-INCHES		
16-INCHES		
24-INCHES		

N

0 600 1200

Horz. 1 in. = 600 ft.

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DESERT MOUNTAIN P19

EXHIBIT 3- MASTER WATER EXHIBIT-FULL BUILD-OUT

	SCALE: 1" = 600'	SHEET 1 OF 1
JOB NO.: 164434	DESIGN: SM	
	DRAWN: SM	

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Wood, Patel & Associates, Inc.

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