DRAINAGE REPORTS

ABBREVEATED WATER & SEWER NEED REPORTS

WATER STUDY

WASTERWATER STUDY

STORMWATER WAIVER APPLICATION

6-UP-2016
6/17/16

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

June 15, 2016

WP# 164434

Prepared for:

DM19, LLC
4222 East Camelback Road
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:

Wood, Patel & Associates, Inc.
2051 West Northern Avenue
Suite 100
Phoenix, Arizona 85021
Phone: (602) 335-8500

WOOD/PATEL
MISSION: CLIENT SERVICE®

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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 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

WOOD/PATEL **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"

MH-23

MH-22

MH-21

MH-20

MH-19

MH-24

MH-17

MH-25

MH-18

MH-13

EX. 18"

MH-12

MH-11

MH-26

EX MH-2

MH-10

PROPOSED CONNECTION TO EXISTING 21" GRAVITY SEWER

MH-14

MH-27

MH-15

MH-16

PROPOSED CLUBHOUSE

MH-9

MH-8

MH-7

EX. 21"

MH-6

EX-MH-3

EXISTING FIRE STATION

MH-1

MH-3

MH-2

MH-4

EX MH-1

MH-5

PROPOSED CONNECTION TO EXISTING 21" GRAVITY SEWER

EXISTING 8" SEWER TO BE ABANDONED

EX. 8"

PIMA ROAD

DESERT MOUNTAIN PARCEL 19 BOUNDARY

CAVE CREEEK ROAD

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.

NOT FOR CONSTRUCTION OR RECORDING

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DESERT MOUNTAIN P1

EXHIBIT 2- WASTEWATER EXHIBIT

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

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

June 15, 2016
WP# 164434

Prepared for:

DM19, LLC
4222 East Camelback Road
Suite H100
Phoenix, Arizona
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:

Wood, Patel & Associates, Inc.
2051 West Northern Avenue
Suite 100
Phoenix, Arizona 85021
Phone: (602) 335-8500

WOOD/PATEL
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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 *2008 City of Scottsdale Integrated Water Master Plan,* 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 #92 conveys water from Well Site 86 and Zone 11 to Storage Facility T-90 and Zone 12. Storage facility locations are summarized below.

- Storage Facility located at Well Site #86, 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 12, which has ground elevations ranging from 2,570 feet to 2,700 feet. Within Zone 12, 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 12 is much lower than the HGL from Tank 90, several pressure reducing valves (PRVs) exist throughout Zone 12 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 *2008 Integrated Master Water Plan*, 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.

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. Throughout Zone 12, several PRVs exist within the water system. The exact locations of these PRVs is unknown at this time, but 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
- Maximum 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 the assumption that 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. Additionally, individual PRVs 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 12 with 2 connections to the existing system at Covey Trail and 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 adopted *Integrated Master Water Plan*, dated March 2008.

6.0 REFERENCES

1. *Design Standards & Policies Manual*. City of Scottsdale, January 2010.
2. *Integrated Water Master Plan*. City of Scottsdale, March 2008.
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

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

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

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

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

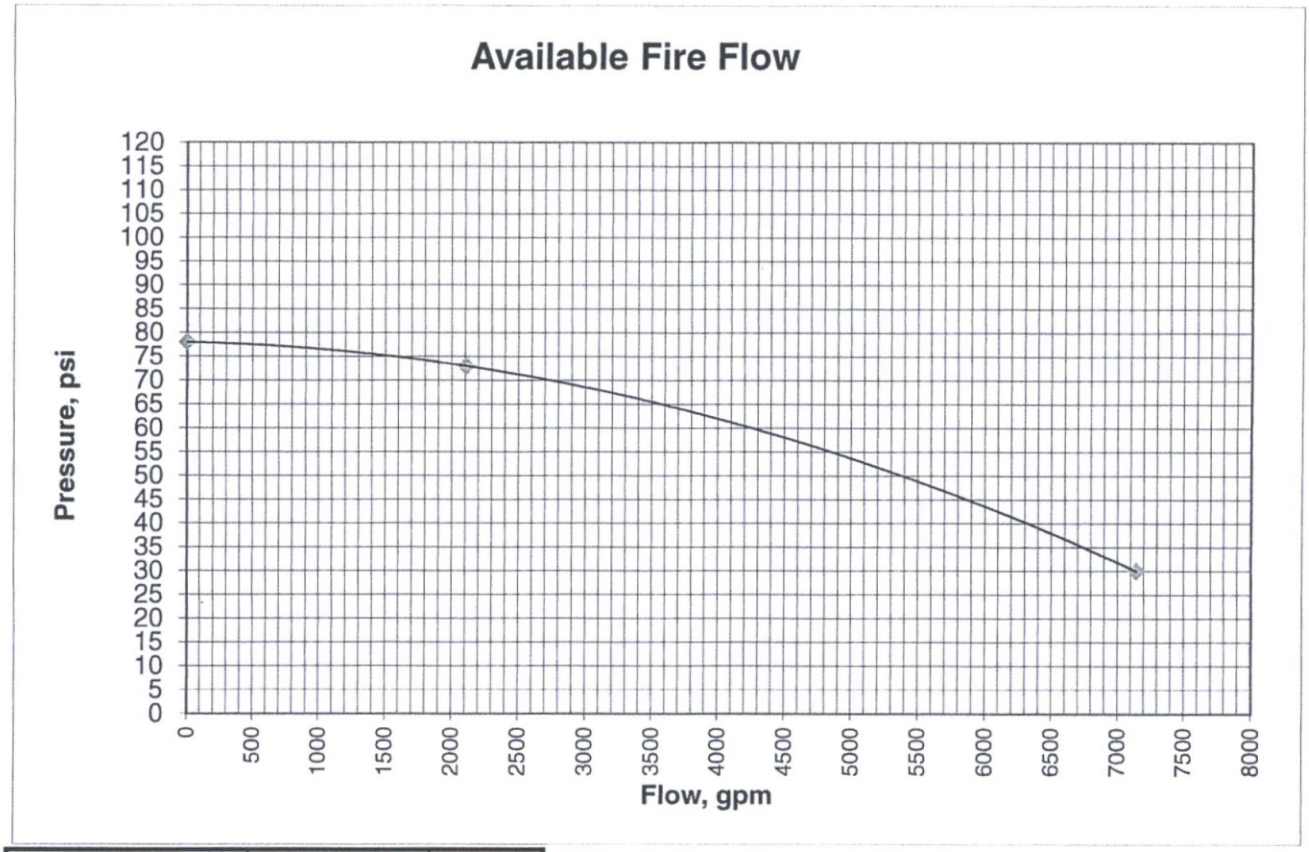
Location: 8949 East Covey Trail **Proj. Engineer:** Mike Young, P.E.

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)

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

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

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

North

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

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

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

DESERT MOUNTAIN

EXHIBIT 1
VICINITY MAP

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

DATE:	SCALE:	
6-15-2016	1" = 500'	SHEET 1 OF 1
JOB NO.:	DESIGN: SM	
164434	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	

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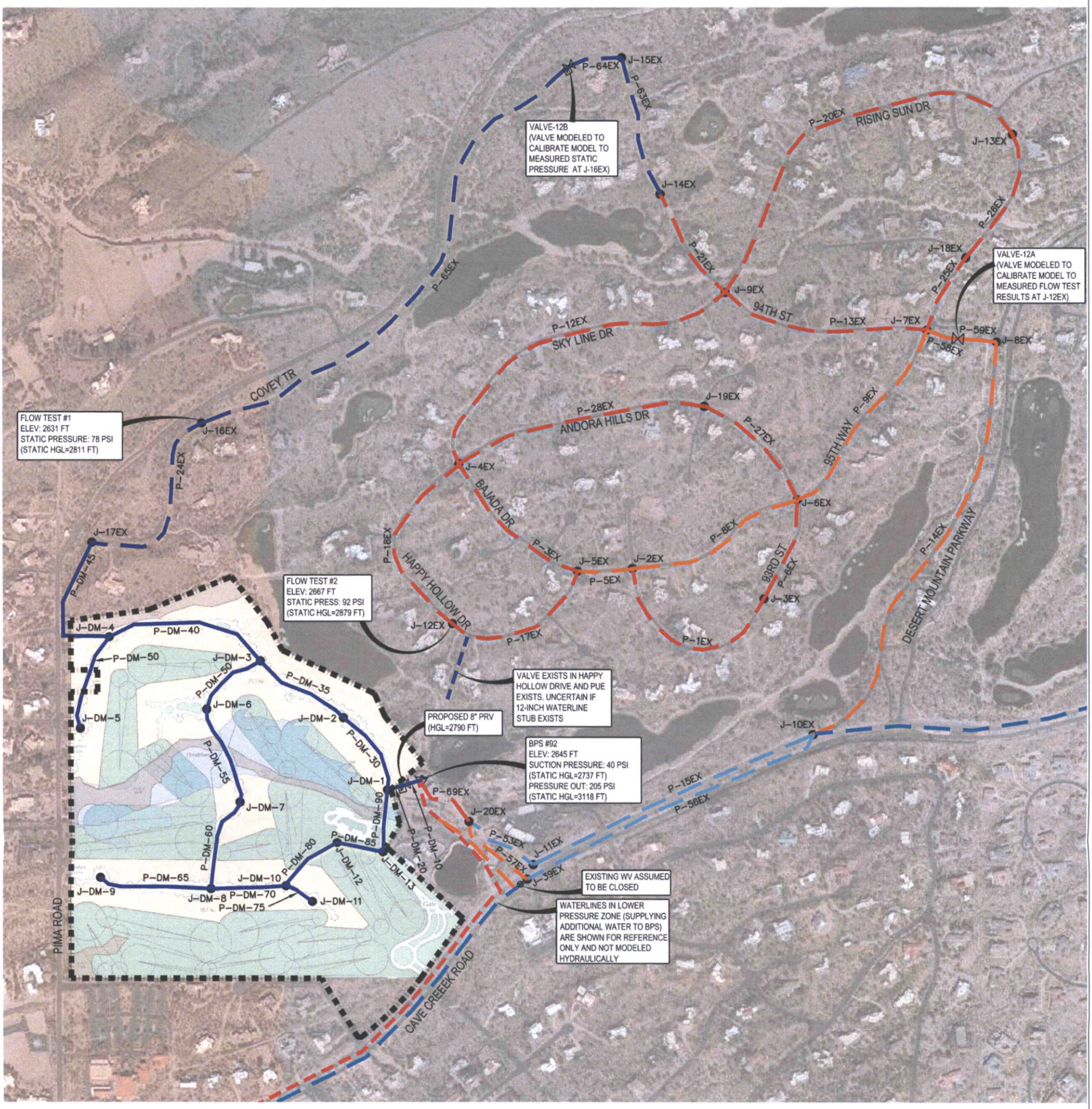
EXHIBIT 3

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	

Wood, Patel & Associates, Inc.

PHOENIX • MESA • TUCSON

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Desert Mountain Parcel 19
Scottsdale, Arizona

Traffic Impact Mitigation Analysis

June 15, 2016

Expires 3-31-2017

Prepared by:
Stanley Consultants, Inc.

Stanley Consultants

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APPENDICES

1. INTRODUCTION AND EXECUTIVE SUMMARY

Stanley Consultants, Inc. was retained by DM 19, LLC to complete a Traffic Impact Mitigation Analysis (TIMA) for the proposed Desert Mountain Parcel 19 (DM 19), located in the northeast quadrant of the Cave Creek Road/Pima Road intersection in Scottsdale, Arizona. The site is currently vacant and is located approximately three miles northeast of the Carefree Highway and Scottsdale Road intersection. The project site location is shown in Figure 1.

The purpose of this study is to complete a traffic impact analysis of the proposed rezoning of the DM 19 and quantify the potential traffic impacts of the proposed development to the existing traffic operations.

Executive Summary

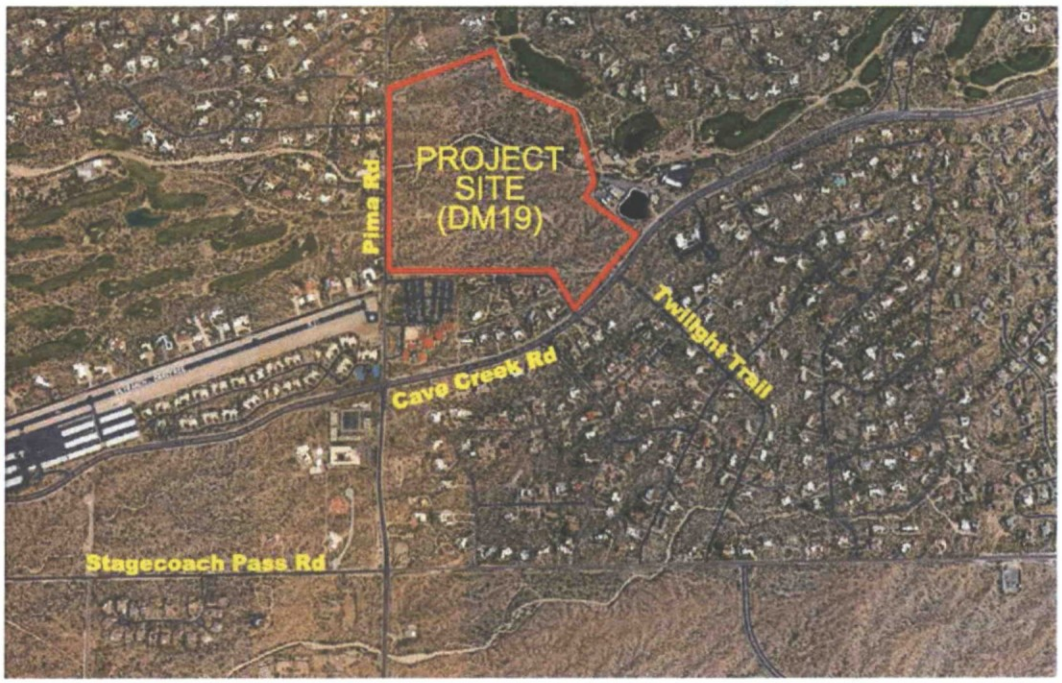
The proposed Desert Mountain development would rezone the site from commercial and industrial to R4 residential and will include an 18 hole par 3 golf course. The primary access to the site will be via Cave Creek Road (Access 1) and a secondary access for residents only will be via Pima Road (Access 2). The conceptual site plan is shown in Figure 2. The proposed development is anticipated to generate an average of 1273 daily trips including 71 trips during the AM peak hour and 103 trips during the PM peak hour. The proposed development is anticipated to generate substantially fewer vehicular trips as compared to the currently approved plan.

The study area included the following three intersections:

1. Cave Creek Road/Pima Road
2. Cave Creek Road/Twilight Trail-Access 1
3. Pima Road/Access 2

All the study intersections are expected to operate at an overall LOS B or better during both peak hours without and with the addition of project generated traffic. An eastbound left-turn lane and westbound right-turn lane on Cave Creek Road at project Access 1 is recommended.

The proposed development will not disrupt or disturb the residential street operations on the south side of Cave Creek Road.



DESERT MOUNTAIN PARCEL 19 (DM19)
TRAFFIC IMPACT MITIGATION ANALYSIS

Stanley Consultants INC.

FIGURE 1

PROJECT SITE LOCATION

5/26/2016 20747...\CAD\Exhibits\Figure 1.dgn

Figure 1 – Project Site Location

DESERT MOUNTAIN PARCEL 19 (DM19) TRAFFIC IMPACT MITIGATION ANALYSIS Stanley Consultants INC.	FIGURE 2 CONCEPTUAL SITE PLAN

5/26/2016 20747...\CAD\Exhibits\Figure 2.dgn

Figure 2 – Conceptual Site Plan

2. PROPOSED DEVELOPMENT

The proposed DM 19 site is located on the northeast corner of the Cave Creek Road/Pima Road intersection in Scottsdale, Arizona. It is bounded by residential development to the north, golf course/Scottsdale fire station to the east, residential development/Cave Creek Road to the south and Pima Road to the west. The site is currently vacant and zoned commercial and industrial. The proposed Desert Mountain development would rezone the site to R4 residential and includes 190 residential units and an 18 hole par 3 golf course. The proposed development is anticipated to be constructed and open by 2019. The site is proposed to be accessed via Cave Creek Road (Access 1) and Pima Road (Access 2).

The proposed Access 1 on Cave Creek Road would be aligned opposite Twilight Trail that is located approximately one half mile east of Pima Road. Access 1 will be the primary entry/exit and will provide full access to/from the site for both residential and golf-related trips.

The proposed Access 2 on Pima Road would be located approximately one half mile north of Cave Creek Road. This access will be gated and will only be operated by residents.

3. STUDY AREA

The study area is located in the northeast corner of the Cave Creek Road/Pima Road intersection in Scottsdale, Arizona, approximately three miles northeast of the Carefree Highway/Scottsdale Road intersection. The study area roadway segments include Cave Creek Road, Pima Road, and Twilight Trail. The study intersections include the following two existing intersections and one proposed intersection.

1. Cave Creek Road/Pima Road
2. Cave Creek Road/Twilight Trail (Access 1)
3. Cave Creek Road/Access 2 (future intersection)

Existing Roadway System

Cave Creek Road is a Town of Carefree facility adjacent to the project site. It runs east-west with two lanes in each direction and separated by a landscaped median. It is classified as an arterial street according to the Town of Carefree Transportation Plan, June 2008. The posted speed limit on Cave Creek Road east of Pima Road is 40 miles per hour and west of Pima Road is 35 miles per hour.

Pima Road is a north-south street with one lane in each direction of travel. According to the Town of Carefree Transportation Plan, June 2008, Pima Road is classified as a minor collector north of Cave Creek Road and as an arterial south of Cave Creek Road. Pima

Road, south of Stagecoach Pass Road, is classified as a minor rural arterial by City of Scottsdale Transportation Master Plan, January 2008. The posted speed limit on Pima Road south of Cave Creek Road is 35 miles per hour and north of Cave Creek Road is 25 miles per hour.

Twilight Trail is a north-south residential street and has one lane in each direction. It extends from Cave Creek Road on the north to Stagecoach Pass Road on the south.

Existing Intersections

Cave Creek Road/Pima Road has stop signs on all approaches and is called an all-way stop-controlled intersection. The Cave Creek Road eastbound and westbound approaches each include one left-turn lane, one through lane and one shared through/right-turn lane. The eastbound approach has a short (two-car) right-turn-only lane. The northbound and southbound Pima Road approaches each have one shared left-turn/through lane and one right-turn lane.

Cave Creek Road/Twilight Trail is an unsignalized, tee intersection. The eastbound and westbound Cave Creek Road approaches are free-flow and include one through lane and one shared through/right-turn lane. The northbound Twilight Trail approach is stop controlled and includes one shared left/right-turn lane. It should be noted that with the proposed development, project Access 1 will be aligned opposite to Twilight tail and will become the north leg of this intersection.

Existing lane configurations and traffic control are shown in Figure 3.

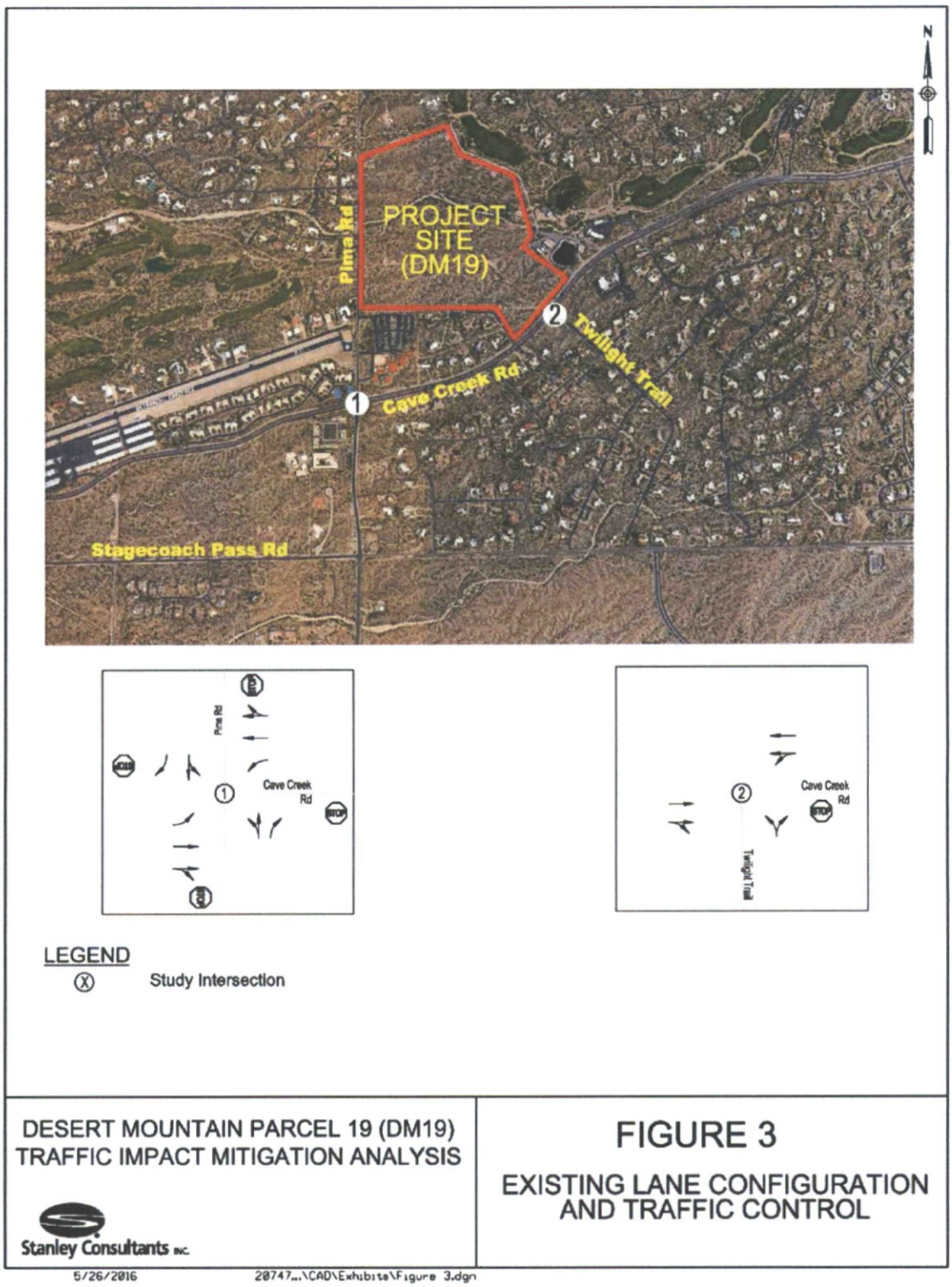


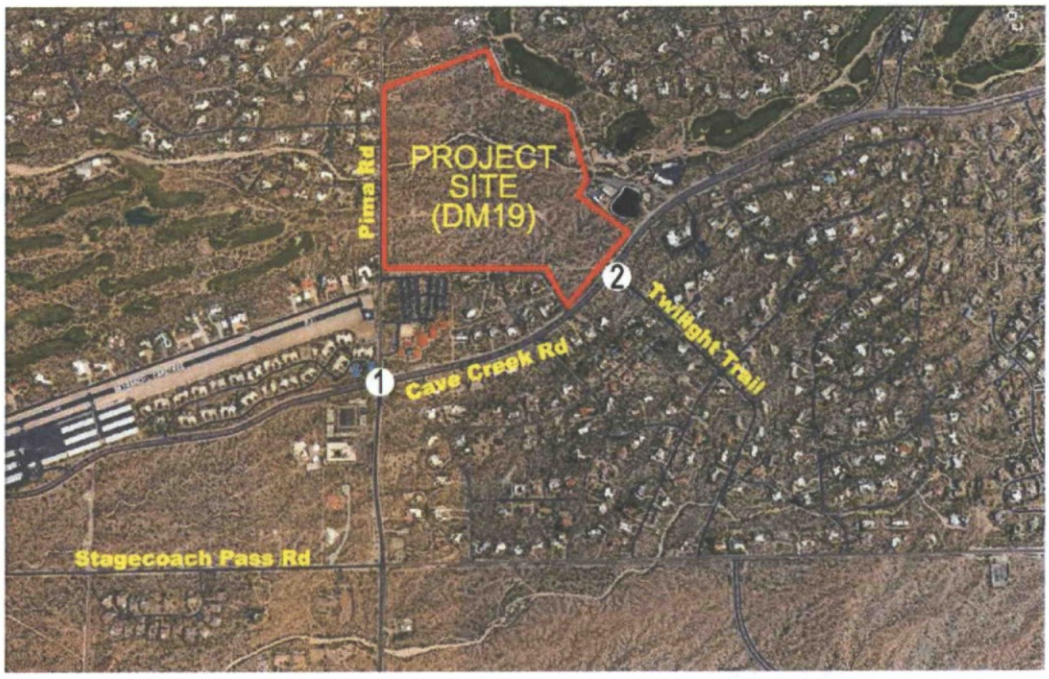
Figure 3 – Existing Lane Configuration and Traffic Control

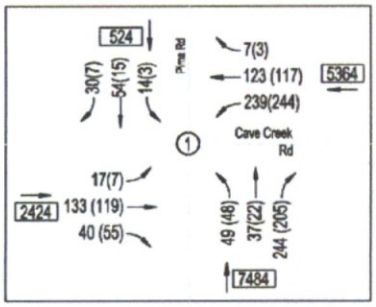
4. EXISTING CONDITIONS TRAFFIC ANALYSIS

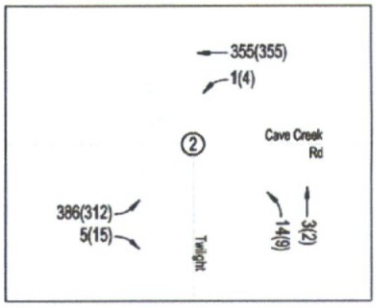
Traffic Volumes

Cave Creek Road/Pima Road: Traffic counts for a 24-hour period on each approach of the Cave Creek Road/Pima Road intersection were collected by Traffic Research and Analysis (TRA), Inc., on Thursday, May 3, 2016. The AM and PM peak hour turning-movement counts at this intersection and 24-hour counts on each approach are shown in Figure 4.

Cave Creek Road/Twilight Trail: At this intersection, existing turning movement counts were not collected. The AM and PM peak hour turning movement volumes to/from Twilight Trail was estimated. The existing land use on the east and west side of Twilight Trail between Cave Creek Road and Stagecoach Pass includes single family residential homes. For a worst case analysis, it was assumed that 30 single family residential homes will be using Twilight Trail to access Cave Creek Road. AM and PM peak hour trips generated by 30 homes were estimated by using the standard rates published by the Institute of Transportation Engineers (ITE) in the Trip Generation Manual, 9th Edition, 2012 for a Single Family Residential (ITE code 210) land use. Based on the above information, 23 AM peak hour trips (6 in/17 out) and 30 PM peak hour trips (19 in/11 out) will be generated. These trips were distributed at the intersection by assuming that 20 percent of the trips will travel to/from east on Cave Creek Road and the remaining 80 percent of the trips will travel to/from west on Cave Creek Road. Additionally, the westbound approach volume on Cave Creek Road at Pima Road was carried backwards to the intersection of Cave Creek Road/Twilight Trail. Also, the eastbound volumes on Cave Creek Road just east of Pima Road were carried forward to the Cave Creek Road/Twilight Trail intersection. The through volumes on Cave Creek Road were balanced between Twilight Trail and Pima Road. The resulting AM and PM peak hour turning movement volumes at this intersection are shown in Figure 4.







LEGEND

Ⓧ	Study Intersection
XX(XX)	AM (PM) Peak Hour Volumes
[XX]	Average Daily Traffic (One Direction)

DESERT MOUNTAIN PARCEL 19 (DM19) TRAFFIC IMPACT MITIGATION ANALYSIS Stanley Consultants INC.	FIGURE 4 EXISTING 2016 TRAFFIC VOLUMES

5/26/2016 20747...\CAD\Exhibits\Figure 4.dgn

Figure 4 – Existing 2016 Traffic Volumes

Crash Data

The City of Scottsdale provided crash data for the intersection of Pima Road and Stagecoach Pass Road for 2011 to 2015. The Crash Experience Warrant for a traffic signal is not satisfied at Pima Road and Stagecoach Pass Road. The Town of Carefree provided Crash Location Summaries for 2012 through 5-31-2016 for the intersection of Cave Creek Road/Pima Road. The Town of Carefree did not have any reported crashes at Cave Creek Road/Twilight Trail. The crash data by intersection by year are summarized in Table 1 below and the crash data is presented in Appendix B.

Table 1 – Crash Data on Pima Road

Intersection	Number of Crashes by Year				
	2012	2013	2014	2015	2016 thru 5-31
Cave Creek Road/Pima Road	5	4	8	3	3
Stagecoach Pass Road/Pima Road	2	0	3	1	NA

Note: NA = Not Available

Level of Service Methodology

Level of Service (LOS) is a qualitative description of roadway operations based on a quantitative analysis. It is used to rank, describe and label traffic operations on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, LOS A represents free flow conditions with little or no delay and LOS F represents overloaded and severely congested conditions.

The study intersections were analyzed using methodologies published in the Highway Capacity Manual (HCM), Transportation Research Board, 2010. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The LOS for the Cave Creek Road/Twilight Trail intersection where the Twilight Trail approach is stop-controlled was analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a LOS for each minor-street movement (or shared movement), as well as major-street left turns by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements. LOS is not defined for the intersection as a whole or for the major-street approaches. The weighted overall average delay for the 2-way stop sign intersection is provided for information in the LOS tables.

The study intersection of Cave Creek Road/Pima Road with stop signs on all approaches was analyzed using the "All-Way Stop-Controlled" Intersection methodology from the HCM. This methodology evaluates delay for each approach based on turning movements,

opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection as a whole, and is then related to a LOS.

The ranges of delay associated with the various levels of service are indicated in Table 2.

Table 2 – Intersection Level of Service Criteria

Level of Service (LOS)	Two-Way Stop-Controlled Control Delay (sec/vehicle)	All-Way Stop-controlled Control Delay (sec/vehicle)
A	0 to10	0 to10
B	>10 to 15	>10 to 15
C	> 15 to 25	> 15 to 25
D	> 25 to 35	> 25 to 35
E	> 35 to 50	> 35 to 50
F	> 50	> 50

Source: Highway Capacity Manual, Transportation Research Board 2010, Exhibit 19-1 and 20-2

City of Scottsdale LOS Guidance

According to the City of Scottsdale Transportation Master Plan, January 2008, vehicular LOS D or better should be maintained at all signalized intersections with the exception of those intersections located within a designated core, a roadway with an urban character designation, or mixed-use area where lower levels of service are acceptable if other factors such as walkability, transit access, and aesthetic or right-of-way (ROW) considerations are overriding. At non-signalized intersections with moderate traffic volumes, levels of service below D may be appropriate. Where low volume locations intersect with high volume locations, LOS F is not unusual, but should be considered for mitigation if alternative access is not available.

Existing Conditions Capacity Analysis

Under Existing Conditions, all the study intersections operate at an overall LOS B or better during both peak hours. All the stop-controlled approaches operate at LOS C or better. A summary of the levels of service calculations are shown in Table 3 and the Capacity Analysis summary sheets are provided in Appendix C.

Table 3 – Existing Conditions Intersection Levels of Service

No.	Intersection Name	Control Type	Peak Hour	Overall Delay – LOS	Approach – Delay/LOS
1	Cave Creek Road/Pima Road	All-way Stop	AM	13.4 – B	EB – 11.4/B
					WB – 15.1/C
					NB – 13.3/B
					SB – 11.2/B
			PM	12.6 – B	EB – 10.6/B
					WB – 14.4/B
					NB – 11.8/B
					SB – 10.1/B
2	Cave Creek Road/Twilight Trail	Stop (NB)	AM	0.3	NB – 13.2/B
			PM	0.2	NB – 12.3/B

Notes: Delay is measured in average seconds per vehicle in Synchro; LOS = Level of Service

5. PROJECTED TRAFFIC

Trip Generation (Proposed Development)

The project site is currently vacant and zoned commercial. The proposed DM 19 development would rezone the site to R4 residential and includes 190 residential units and an 18 hole par 3 golf course. The anticipated trip generation for the proposed development was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in the Trip Generation Manual, 9th Edition, 2012. The ITE rates are based on studies that measured the trips for various land uses. The rates are expressed in terms of trips per unit of land use. The trip rates and number of trips generated are presented for an average weekday and the AM and PM peak hour of the adjacent street traffic. The ITE trip rates used for the updated site plan include the following:

- ITE Code 251 – Senior Adult Housing-Detached
- ITE Code 260 – Recreational Homes
- ITE Code 430 – Golf Course

For trip generation analysis, it was assumed that 70 percent of the total residential units would be recreational homes (133 units), while the remaining 30 percent would be senior adult housing detached units (57 units). The proposed development would include a short golf course. However, to provide a conservative analysis, a full size 18-hole golf course was used for trip generation.

The proposed development is anticipated to generate an average of 1,273 daily trips including 71 trips during the AM peak hour and 103 trips during the PM peak hour.

Internal Trips Reduction

The ITE Trip Generation Manual includes data and methodologies that can be applied to determine the proportion of internal trips that may occur within a development area that includes a variety of land uses. For the proposed development, internal trips would consist of residents patronizing on-site golf course. Although some of these internal trips will be made by walking and golf carts, it was assumed they would all be made by automobile. For internal reduction, it was assumed that 30 percent of the short golf course traffic would come from the on-site residents and the remaining 70 percent would come off-site. None of the internal trips will leave the site.

Net-New Trips (External Trips)

After subtracting the internal trips from total trip generation, the proposed development would generate an average of 887 weekday daily trips including 49 trips during the AM peak hour and 71 trips during the PM peak hour.

A summary of the trip generation analysis is provided in Table 4.

Table 4 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Proposed											
Senior Adult Housing Detached	57 du	3.68	210	0.22	13	4	9	0.27	15	9	6
Recreational Homes	133 du	3.16	420	0.16	21	14	7	0.26	35	14	21
Golf Course	18 holes	35.74	643	2.06	37	29	8	2.92	53	27	26
Total Trips (External +Internal)		**1273**			**71**	**47**	**24**		**103**	**50**	**53**
Internal Trip Reduction		*-30%*		*-30%*				*-30%*			
From Golf to Residential			*-193*		*-11*	-9	*-2*		*-16*	-8	*-8*
From Residential to Golf			*-193*		*-11*	-2	*-9*		*-19*	-8	*-8*
Net-New Residential Trips (External)			437		23	16	7		34	15	19
Net-New Golf Trips (External)			450		26	20	6		37	19	18
Total External Trips			**887**		**49**	**36**	**13**		**71**	**34**	**37**

Note: du = dwelling unit

Trip Generation Comparison

The project site is vacant and zoned commercial and industrial. The currently approved development plan includes a mixed-use development including residential units, light industrial, and commercial office/retail land use. A summary of the trip generation for the currently approved plan is provided in Appendix D. The proposed Desert Mountain development would rezone the site to include residential units and a golf course. A comparison of trips generated by the currently approved plan and the proposed development is provided in Table 5.

Table 5 – Trip Generation Comparison

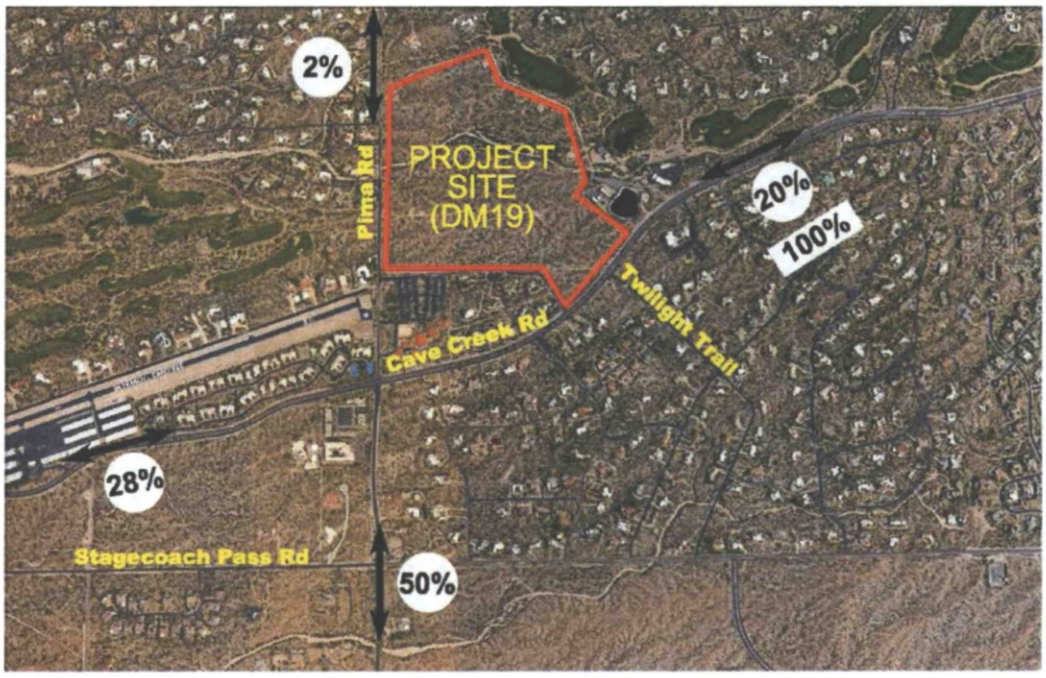
Trips	Currently Approved Plan			Proposed Development		
	Total	**AM**	**PM**	**Total**	**AM**	**PM**
External + Internal	9,969	859	1,126	1,273	71	103
External	8,367	784	971	887	49	71

As shown in Table 5, the proposed development is anticipated to generate approximately 11% of the number of vehicular trips of the currently approved commercial development plan.

Trip Distribution/Assignment

Access to the project site will be provided via Cave Creek Road (Access 1) and Pima Road (Access 2). Access 1 off of Cave Creek Road would be the primary access point and used by residents and golf traffic. Access 2 would be restricted to residents only. For the proposed project, two trip distribution patterns were developed: one for residents only and the other for golf traffic. The resident's only trip distribution pattern was developed based on the existing traffic volumes near the study area, proximity of other Desert Mountain communities located east of the project site and general knowledge of the area. The trip distribution pattern for residential traffic is shown in Figure 5. The golf course will not be open for public play. The residents residing in other Desert Mountain communities located on the east side of the project site will have access to the proposed DM 19 golf course. It was therefore assumed that all the external golf-related traffic would access the site to/from the east on Cave Creek Road via Access 1. The golf-related trip distribution of 100% to the east is also shown in Figure 5.

Based on the trip distribution pattern shown in Figure 5, the trips were assigned to the study intersections. For residential trips, it was assumed that nearly 75 percent of the trips would use Access 1 off of Cave Creek Road, while the remaining 25 percent would use Access 2 off on Pima Road. The assigned trips are shown in Figure 6.



LEGEND

(XX%) Residential Development Trip Distribution

[XX%] Golf Related Trip Distribution

DESERT MOUNTAIN PARCEL 19 (DM19) TRAFFIC IMPACT MITIGATION ANALYSIS	FIGURE 5 TRIP DISTRIBUTION

Stanley Consultants INC.

5/26/2016 20747...\CAD\Exhibits\Figure 5.dgn

Figure 5 – Trip Distribution

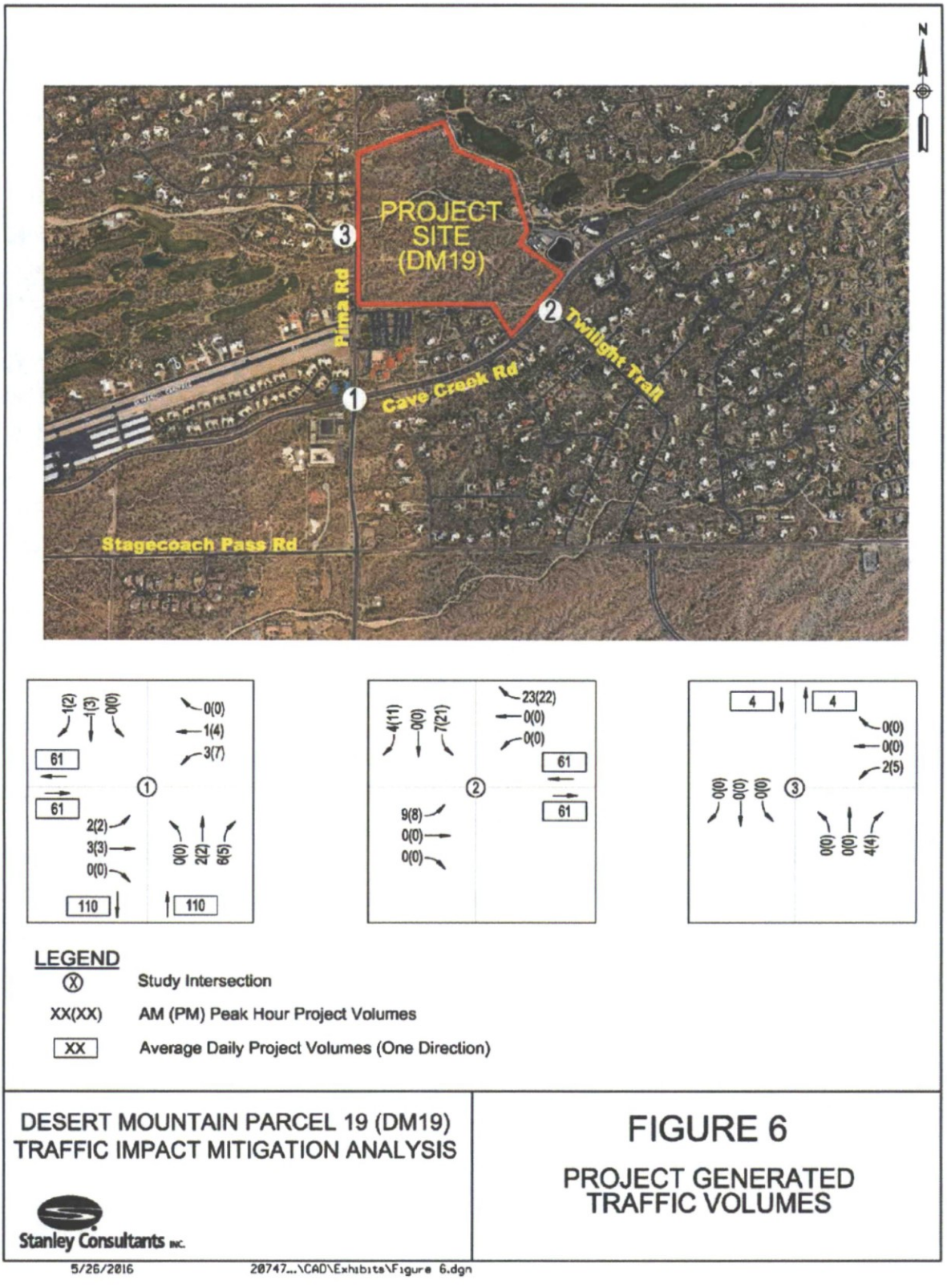


Figure 6 – Project Generated Traffic Volumes

6. EXISTING PLUS PROJECT TRAFFIC ANALYSIS

The project trips were added to the existing traffic volumes to estimate existing plus project conditions and are shown in Figure 7. The existing lane configurations and traffic control at the Cave Creek Road/Pima Road were used for this analysis. However, the lane configurations at the remaining two access driveway intersections were modified as follows:

Cave Creek Road/Twilight Trail-Access 1: At this intersection the southbound project Access 1 approach was modeled as stop-controlled and included one shared left/through/right-turn lane. The eastbound Cave Creek Road approach included one left-turn lane, one through lane, and one shared through/right-turn lane. The westbound Cave Creek Road approach included one shared left/through lane, one through lane, and one right-turn lane. The northbound Twilight Trail approach was stop-controlled and included one shared left/through/right-turn lane.

Pima Road/Access 2: At this intersection the northbound and southbound Pima Road approaches were modeled as free flow and the westbound project Access 2 approach was modeled as stop-controlled. The northbound Pima Road approach included one shared through/right-turn lane. The southbound Pima Road approach included one shared left/through lane. The westbound project Access 2 approach included one shared left/right-turn lane.

With the addition of project traffic to existing volumes and utilizing the lane configurations discussed above, all the intersections are anticipated to operate at an overall LOS B or better during both peak hours. All the stop-controlled approaches are also expected to operate at LOS C or better during both peak hours. A summary of the levels of service calculations are shown in Table 6 and the detail LOS summary sheets are provided in Appendix C.

Table 6 – Existing Plus Project Conditions Intersection Levels of Service

No.	Intersection Name	Control Type	Peak Hour	Overall Delay – LOS	Approach – Delay/LOS
1	Cave Creek Road/Pima Road	All-way Stop	AM	13.6 – B	EB – 11.5/B
					WB – 15.4/C
					NB – 13.5/B
					SB – 11.3/B
			PM	13.0 – B	EB – 10.8/B
					WB – 15.0/B
					NB – 12.1/B
					SB – 10.3/B
2	Cave Creek Road/Twilight Trail-Access 1	Stop (NB & SB)	AM	0.6	NB – 14.6/B
					SB – 13.0/B
			PM	0.9	NB – 13.4/B
					SB – 13.1/B
3	Pima Road/Access 2	Stop (WB)	AM	0.1	WB – 9.4/A
			PM	0.7	WB – 8.8/A

Notes: Delay is measured in average seconds per vehicle in Synchro; LOS = Level of Service

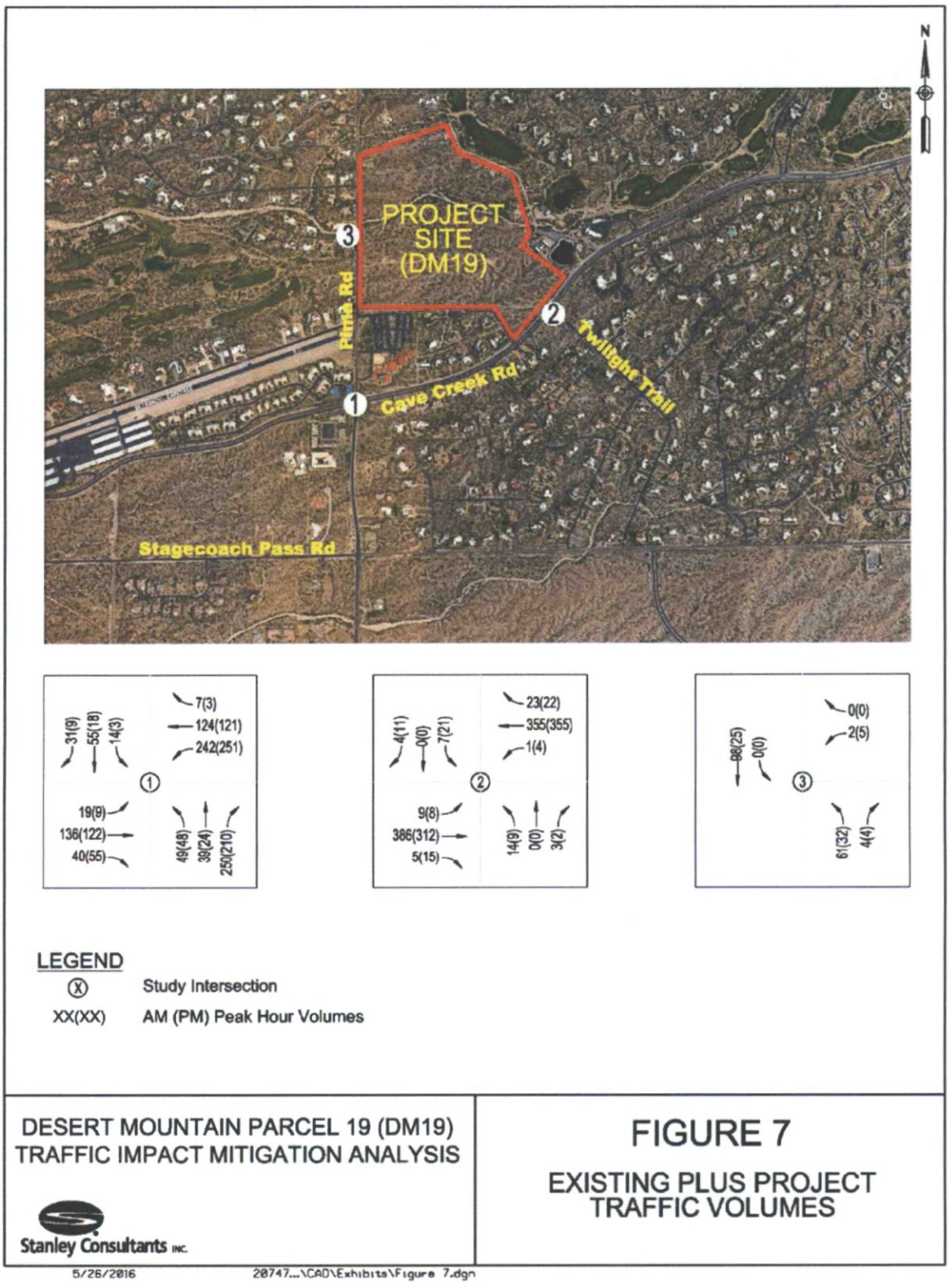


Figure 7 – Existing Plus Project Traffic Volumes

Turn Lanes at Access 1

At the intersection of Cave Creek Road/Twilight Trail-Access 1, several turn lanes at the site main entrance are highly recommended for traffic safety and traffic operational benefits. Even though the proposed site will have relatively low traffic volumes, it is recommended that the Access 1 include an eastbound left-turn lane, a westbound left-turn lane, a westbound right-turn lane and a separate southbound right-turn lane. Left-turn lanes allow improved visibility of opposing traffic and also improve safety by moving the left-turn vehicles out of the through lanes. The southbound right-turn lane will improve traffic operations by keeping the southbound through and left-turning vehicles from blocking and delaying the easy southbound right turn movement. The westbound right-turn lane will help traffic exiting the site be clear that the approaching westbound vehicle is either turning into the site or continuing through to the west. All turn lanes should provide a minimum of 100 feet of storage.

7. PIMA ROAD/STAGECOACH PASS ROAD INTESECTION DISCUSSION/TRAFFIC CONCERNS

Intersection and Roadway Characteristics

The intersection of Pima Road/Stagecoach Pass Road is located approximately 1,600 feet south of Cave Creek Road/Pima Road intersection. Pima Road/Stagecoach Pass is a four-legged, unsignalized intersection. The northbound and southbound Pima Road approaches are free flow and each consist of one left-turn lane and one shared through/right-turn lane. The eastbound and westbound Stagecoach Pass Road approaches are stop-controlled and each consist of one shared left/through/right-turn lane. Stagecoach Pass Road is a border between the City of Scottsdale to the south and the Town of Carefree to the north. As a result, this intersection is jointly controlled by the two jurisdictions.

Pima Road is a north-south roadway with one lane in each direction of travel. It is classified as an arterial by the Town of Carefree, north of Stagecoach Pass and is classified as a rural minor arterial by the City of Scottsdale south of Stagecoach Pass Road. The posted speed limit on Pima Road is 35 miles per hour north of Stagecoach Pass Road and 45 miles per hour south of Stagecoach Pass Road.

Stagecoach Pass Road is an east-west roadway with one lane in each direction of travel. It is classified as a rural minor-collector street in the vicinity of Pima Road. The posted speed limit on Stagecoach Pass Road is 25 miles per hour east of Pima Road and 35 miles per hour west of Pima Road.

Town of Carefree Traffic Concerns

Stagecoach Pass Road east of Pima Road is the border between Carefree and Scottsdale. Homes on the north side of Stagecoach Pass Road and east of Pima Road are in the Town of Carefree. Some individuals from the Town of Carefree and the Velvet Shadows subdivision located south of Cave Creek Road across from the DM 19 site have expressed concerns that traffic generated from the proposed DM 19 development would leave the site and proceed straight south across Cave Creek Road onto the residential street Twilight Trail while on their way to get onto southbound Pima Road. The proposed DM 19 access off of Cave Creek Road is proposed to be aligned opposite Twilight Trail. Based on the concerns raised by the Town and by the residents, the alternative routes using the major streets and using the residential streets cutting through the Velvet Shadows subdivision were evaluated.

Based on the proposed DM 19 trip distribution and assignment pattern discussed in the previous section, 50 percent of the residential trips generated by the proposed development would travel from the site to/from Pima Road south of Stagecoach Pass Road. There are two possible alternative routes/options to go south onto Pima Road from the proposed site/s main entrance on Cave Creek Road. The reverse trip from northbound Pima Road to the site was also evaluated.

Option 1 (Preferred Route)

Leaving the site and wanting to go south on Pima Road, make a right-turn onto Cave Creek Road via proposed Access 1, travel two blocks west, make a left-turn onto southbound Pima Road at the four-way stop-controlled intersection, and travel south on Pima Road past Stagecoach Pass Road. The total distance travelled between the project access point on Cave Creek Road and Stagecoach Pass Road just north of Pima Road is approximately 0.77 miles. When returning to the site from the south on Pima Road, the preferred route is to travel northbound on Pima Road past Stagecoach Pass Road, turn right onto Cave Creek Road at the four-way stop intersection, and turn left into the site project Access 1.

Option 2 (Less Desirable Route)

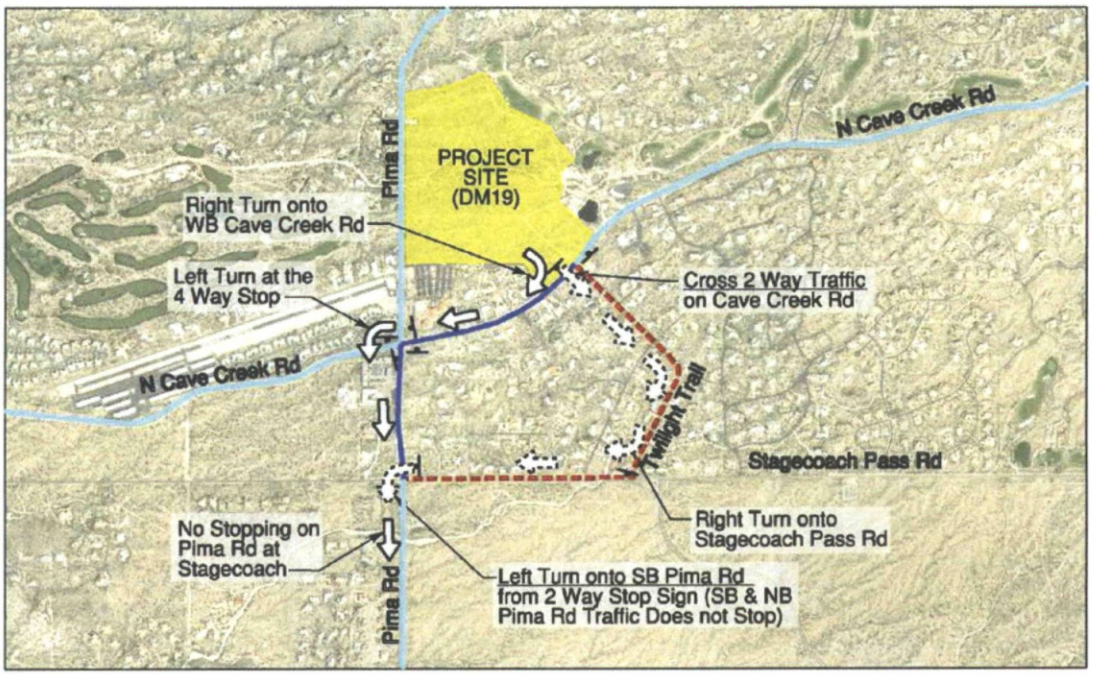
Leaving the site and wanting to go south on Pima Road, at the stop sign on Cave Creek Road, proceed straight south from project Access 1 across Cave Creek Road into the Velvet Shadows residential subdivision, travel on the residential street, Twilight Trail, to the stop sign, turn right onto Stagecoach Pass Road and make a left-turn at 2-way stop-controlled Pima Road/Stagecoach Pass Road intersection (Stagecoach Pass Road is stop-controlled and Pima Road is free flow) to proceed south on Pima Road. The total distance travelled between the project Access 1 on Cave Creek Road and Pima Road

just east of Stagecoach Pass Road is approximately 1.15 miles. When returning to the site from the south on Pima Road, make a right-turn onto Stagecoach Pass Road, turn left onto residential Street Twilight Trail, travel north to the stop sign at Cave Creek Road, and proceed straight across Cave Creek Road into the site. It should be noted that through traffic on Cave Creek Road does not stop while northbound traffic on Twilight Trail and southbound traffic existing the site via Cave Creek Road would stop. The alternative routes from the site to southbound on Pima Road are shown in Figure 8. The alternative routes from south Pima Road to the site main entrance are shown in Figure 9.

Alternative Options Comparison

Option 2 appears to be more difficult and not a short-cut for several reasons as follows:

- According to the Town of Carefree General Plan 2030, November 2012, Cave Creek Road is classified as an arterial roadway with an average daily traffic (ADT) of 11,000 vehicles (2008 data) east of Pima Road. Making a right turn from the project site onto Cave Creek Road is both safer and easier than waiting for a large gap and going straight across a four-lane arterial roadway with a landscaped median. The safety concern is crossing relatively high traffic volumes that are moving eastbound and westbound on Cave Creek Road at or near the speed limit. The driver has to look for traffic in both directions and find a suitable gap to cross a nearly five-lane arterial roadway to proceed straight south into the neighborhood. It is significantly easier and safer to make a right-turn onto westbound Cave Creek Road than to proceed straight across two directions of free-flow traffic on Cave Creek Road.
- Travelling on a residential street is slower and less comfortable than travelling on an arterial street like Cave Creek Road and Pima Road.
- Turning left from Cave Creek Road onto Pima Road at the Cave Creek Road/Pima Road 4-way stop-controlled intersection is much easier and safer than the two movements required in Option 2. At the 4-way stop intersection, the queue of traffic gradually moves up until you are looking at the other vehicles and confirming whose turn it is next to proceed. While it is more complicated for the driver than traveling through a traffic signal or a roundabout, the low speed and close proximity of the conflicting vehicles make a left turn a little slow but typically very safe.
- The Option 2 movements of proceeding straight across Cave Creek Road into the residential neighborhood, and turning left onto Pima Road from Stagecoach Pass Road at a 2-way stop-controlled intersection where Pima Road northbound-southbound traffic does not stop are both problematic and more difficult than using the major streets and a 4-way stop intersection.
- The total distance traveled in Option 2 is approximately 1.15 miles which is more than as compared to 0.77 miles in Option 1.



LEGEND

Option 1: Preferred Route (Faster and Safer) (Distance = 0.77 miles)

Option 2: Less Desirable Route (Distance = 1.15 miles)

Stop Sign

DESERT MOUNTAIN PARCEL 19 (DM19) TRAFFIC IMPACT MITIGATION ANALYSIS	FIGURE 8 ALTERNATE ROUTES FROM DESERT MOUNTAIN PARCEL TO SOUTH PIMA ROAD
Stanley Consultants INC.	

5/26/2016 20747...\CAD\Exhibits\Figure 8.dgn

Figure 8 – Alternate Routes from Desert Mountain Parcel to South Pima Road

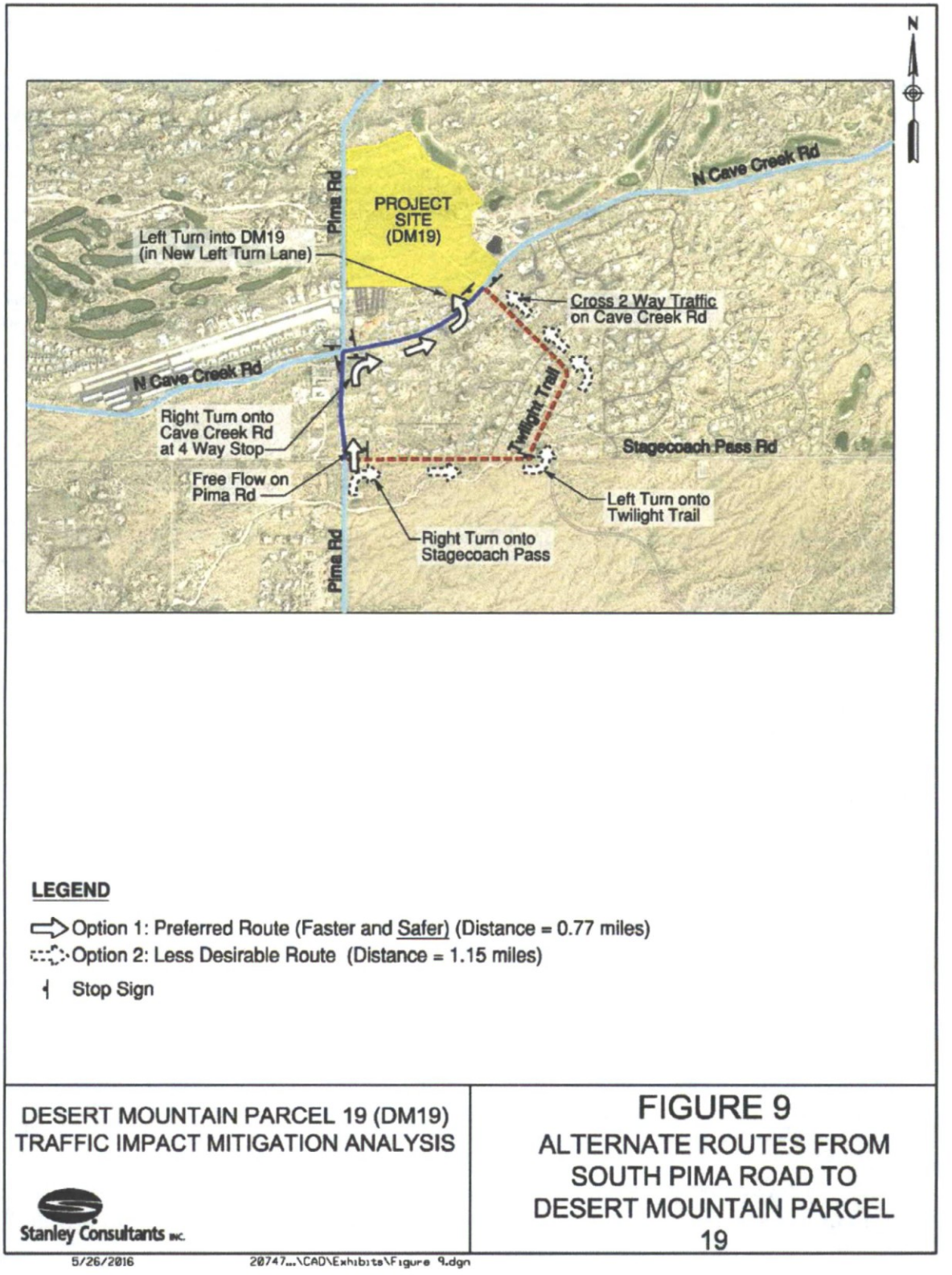


Figure 9 – Alternate Routes from South Pima Road to Desert Mountain Parcel 19

A few motorists may try the alternative Option 2 route through the residential neighborhood, but it is estimated and predicted that none of the traffic generated by the proposed Desert Mountain development will prefer Option 2 route through the neighborhood to the south on Pima Road. The trips generated by the proposed development were assigned to the roadway network based on alternative Option 1. The project is expected to add 220 daily vehicular trips onto southbound Pima Road north of Stagecoach Pass Road. The project is not expected to add any traffic on Stagecoach Pass Road east of Pima Road.

It is anticipated that the traffic proceeding straight across Cave Creek Road to Velvet Shadows will be limited to Velvet Shadows residents and neighbors going to and from the site with very few if any cutting through to get to Pima Road southbound. It is anticipated that the new proposed development will not disrupt or disturb the residential street operations to the south.

City of Scottsdale Draft Traffic Signal Warrant Study

The City of Scottsdale prepared a Draft Traffic Signal Warrant Study, April 2016 for the intersection of Pima Road/Stagecoach Pass Road. The study reviewed all the nine traffic signal warrants defined in the 2009 Manual on Uniform Traffic Control Devices (MUTCD) and Warrant 1: Eight Hour Vehicular Volume, Warrant 2: Four Hour Vehicular Volume and Warrant 3: Peak Hour Vehicular Volume were met at this intersection. A traffic signal is warranted at this intersection. However, the City's draft report recommends consideration the construction of a roundabout at this intersection due to the reduced number of crashes, reduced number of serious injury and fatal accidents, the reduced traffic delay and the reduced speeds of a roundabout versus a traffic signal.

8. CONCLUSIONS AND RECOMMENDATIONS

- The proposed DM19 development would rezone the site from commercial development to 190 residential units and one short golf course.
- The proposed project is expected to generate an average of 887 net-new daily external vehicular trips, including 49 trips during the AM peak hour and 71 trips during the PM peak hour.
- The proposed development (887 trips) will generate 11 percent of the vehicular trips that would be generated by the existing approved commercial plan (8,367 trips).
- Under existing conditions, the study intersections operate at an overall LOS B or better and all the stop-controlled approaches operate at an overall LOS C or better during both peak hours.
- With the addition of project traffic to existing traffic volumes, the study intersections are expected to operate at the same LOS as existing conditions.

- The proposed development will not disrupt or disturb the residential street operations on the south side of Cave Creek Road.
- At the intersection of Pima Road/Stagecoach Pass Road, a traffic signal is warranted based on the City of Scottsdale Draft Traffic Signal Warrant Study, April 2016. However, the City has recommended to consider the construction of a roundabout at this intersection.

Recommendation

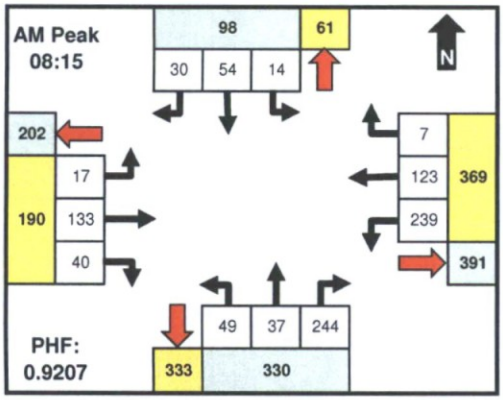
At the intersection of Cave Creek Road/Twilight Trail Access 1, it is recommended that the site access improvements include an eastbound left-turn lane, a westbound left-turn lane, a westbound right-turn lane, and a separate southbound right-turn lane, all with a minimum of 100 feet of storage length.

APPENDIX A
Traffic Volumes

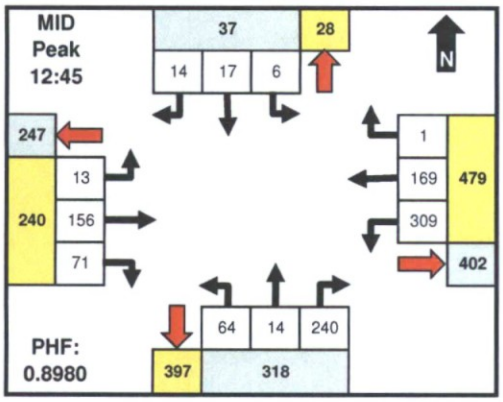
TRAFFIC RESEARCH & ANALYSIS, INC.
Specializing in Traffic Data Collection

Traffic Research & Analysis, Inc.
3844 East Indian School Road
Phoenix, AZ 85018
(602) 840-1500

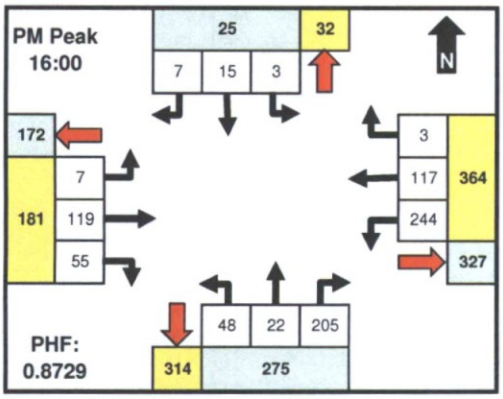
Intersection TMC: 1602476
Count Date: 5/3/2016



	From North				From East				From South				From West				INTSEC
	PIMA RD				CAVE CREEK RD				PIMA RD				CAVE CREEK RD				
Time	LT	Thru	RT	Ped	LT	Thru	RT	Ped	LT	Thru	RT	Ped	LT	Thru	RT	Ped	TOTAL
8:00	1	4	1	0	60	24	2	0	8	9	59	0	5	34	10	0	217
8:15	2	7	1	0	64	36	3	0	8	5	56	0	2	41	9	0	234
8:30	6	29	12	0	56	29	0	0	15	8	65	0	6	31	11	0	268
8:45	0	8	7	0	55	31	4	0	15	9	62	0	6	37	14	0	248
9:00	6	10	10	0	64	27	0	0	11	15	61	0	3	24	6	0	237
9:15	0	8	4	0	69	26	0	0	12	3	57	0	0	28	9	0	216
9:30	0	7	5	0	67	33	0	0	9	6	62	0	1	24	5	0	219
9:45	2	4	0	0	63	36	0	0	15	7	59	0	3	35	15	0	239
Total	17	77	40	0	498	242	9	0	93	62	481	0	26	254	79	0	1878
Pk Hr																	8:15 AM
Pk Vol	14	54	30	0	239	123	7	0	49	37	244	0	17	133	40	0	987
PHF	0.583	0.466	0.625	0.000	0.934	0.854	0.438	0.000	0.817	0.617	0.938	0.000	0.708	0.811	0.714	0.000	0.921



Time	LT	Thru	RT	Ped	LT	Thru	RT	Ped	LT	Thru	RT	Ped	LT	Thru	RT	Ped	TOTAL
12:00	0	8	2	0	64	33	2	0	19	2	53	0	2	34	14	0	233
12:15	1	6	4	0	67	32	5	0	17	7	52	0	5	29	15	0	240
12:30	2	7	2	0	56	36	1	0	15	5	51	0	3	23	19	0	220
12:45	2	4	4	0	72	39	0	0	22	3	47	0	4	36	23	0	256
13:00	2	6	1	0	71	40	1	0	24	4	65	0	1	36	9	0	260
13:15	1	6	4	0	79	41	0	0	9	0	53	0	6	43	17	0	259
13:30	1	1	5	0	87	49	0	0	9	7	75	0	2	41	22	0	299
13:45	0	7	6	0	70	44	0	0	15	1	33	0	4	34	16	0	230
Total	9	45	28	0	566	314	9	0	130	29	429	0	27	276	135	0	1997
Pk Hr																	12:45 PM
Pk Vol	6	17	14	0	309	169	1	0	64	14	240	0	13	156	71	0	1074
PHF	0.750	0.708	0.700	0.000	0.888	0.862	0.250	0.000	0.667	0.500	0.800	0.000	0.542	0.907	0.772	0.000	0.898



Time	LT	Thru	RT	Ped	LT	Thru	RT	Ped	LT	Thru	RT	Ped	LT	Thru	RT	Ped	TOTAL
16:00	1	5	3	0	70	37	0	0	12	4	59	0	2	31	18	0	242
16:15	2	2	2	0	63	26	1	0	9	7	44	0	4	30	13	0	203
16:30	0	4	2	0	53	26	1	0	11	8	50	0	1	33	6	0	195
16:45	0	4	0	0	58	28	1	0	16	3	52	0	0	25	18	0	205
17:00	2	9	4	0	58	23	2	0	17	2	45	0	3	23	7	0	195
17:15	0	4	2	0	66	29	0	0	9	2	41	0	3	31	21	0	208
17:30	0	4	3	0	64	20	2	0	14	3	45	0	3	25	9	0	192
17:45	0	2	1	0	45	20	1	0	13	9	31	0	1	15	10	0	148
Total	5	34	17	0	477	209	8	0	101	38	367	0	17	213	102	0	1588
Pk Hr																	4:00 PM
Pk Vol	3	15	7	0	244	117	3	0	48	22	205	0	7	119	55	0	845
PHF	0.375	0.750	0.583	0.000	0.871	0.791	0.750	0.000	0.750	0.688	0.869	0.000	0.438	0.902	0.764	0.000	0.873

Intersection Statistics

Per	Peak Hour	Pk Hr Vol	Peak Intvl	Pk Intv Vol	PHF
AM	8:15 AM	987	8:30 AM	268	0.921
MID	12:45 PM	1074	1:30 PM	299	0.898
PM	4:00 PM	845	4:00 PM	242	0.873

Peak Hour Statistics by Approach

Per	Peak Hour	Vol	PHF	Peak Hour	Vol	PHF	Peak Hour	Vol	PHF	Peak Hour	Vol	PHF
AM	8:30 AM	100	0.532	9:00 AM	385	0.963	8:30 AM	333	0.946	8:00 AM	206	0.904
MID	12:00 PM	42	0.955	1:00 PM	482	0.886	12:45 PM	318	0.855	12:45 PM	240	0.909
PM	4:45 PM	32	0.533	4:00 PM	364	0.850	4:00 PM	275	0.917	4:00 PM	181	0.887

Comments

Approach & Departure Volumes (No Peds)

Per	Approach	Depart	Approach	Depart	Approach	Depart	Approach	Depart
AM	134	97	749	752	636	654	359	375
MID	82	65	889	714	588	746	438	472
PM	56	63	694	585	506	613	332	327

Traffic Research & Analysis, Inc.
3844 East Indian School Road
Phoenix, AZ 85018
(602) 840-1500

Client: Stanley
File Number: 1602472
Route: N CAVE CREEK RD
Location: W of N PIMA RD

Site Ref: 1
Direction: EB
Latitude: 33.8
Longitude: -111.

Count Date	5/5/2016																	Aver
Count Time	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	AM
00:00	0	50																0
00:15	0	49																0
00:30	0	45																0
00:45	0	63																0
01:00	0	46																0
01:15	0	66																0
01:30	0	65																0
01:45	0	54																0
02:00	0	65																0
02:15	0	49																0
02:30	0	44																0
02:45	0	49																0
03:00	0	45																0
03:15	0	38																0
03:30	0	51																0
03:45	0	52																0
04:00	8	51																8
04:15	1	47																1
04:30	2	40																2
04:45	2	43																2
05:00	4	33																4
05:15	7	55																7
05:30	6	37																6
05:45	13	26																13
06:00	16	23																16
06:15	20	18																20
06:30	17	11																17
06:45	29	9																29
07:00	38	9																38
07:15	33	15																33
07:30	44	18																44
07:45	41	14																41
08:00	49	12																49
08:15	52	9																52
08:30	48	18																48
08:45	57	10																57
09:00	33	5																33
09:15	37	12																37
09:30	30	13																30
09:45	53	7																53
10:00	52	9																52
10:15	57	1																57
10:30	50	2																50
10:45	51	0																51
11:00	53	1																53
11:15	40	2																40
11:30	49	1																49
11:45	50	0																50
Totals	**1042**	**1382**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1042**
Day Total	**2424**		**0**		**0**		**0**		**0**		**0**		**0**		**0**			**24**
AM Pct	43.0%																	43.
Peak Hour	9:45	13:15																9:45
Peak Volume	212	250																212
P.H.F	0.9298	0.9470																0.9298

Traffic Research & Analysis, Inc.
3844 East Indian School Road
Phoenix, AZ 85018
(602) 840-1500

:180
8928
rage
PM
50
49
45
63
46
66
65
54
65
49
44
49
45
38
51
52
51
47
40
43
33
55
37
26
23
18
11
9
9
15
18
14
12
9
18
10
5
12
13
7
9
1
2
0
1
2
1
0
1382
24
0%
13:15
250
0.9470

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Client:	Stanley	Site Ref:	1
File Number:	1602474	Direction:	NB
Route:	N PIMA RD	Latitude:	33.8169
Location:	S of E CAVE CREEK RD	Longitude:	-111.8913

Count Date	5/5/2016																Average	
Count Time	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
00:00	2	130															2	130
00:15	0	159															0	159
00:30	2	121															2	121
00:45	2	146															2	146
01:00	1	182															1	182
01:15	4	120															4	120
01:30	3	182															3	182
01:45	1	97															1	97
02:00	0	149															0	149
02:15	1	137															1	137
02:30	1	131															1	131
02:45	2	122															2	122
03:00	1	150															1	150
03:15	1	129															1	129
03:30	1	130															1	130
03:45	1	146															1	146
04:00	3	127															3	127
04:15	9	105															9	105
04:30	15	120															15	120
04:45	36	129															36	129
05:00	25	110															25	110
05:15	32	94															32	94
05:30	31	103															31	103
05:45	48	86															48	86
06:00	36	113															36	113
06:15	82	89															82	89
06:30	95	60															95	60
06:45	113	56															113	56
07:00	121	66															121	66
07:15	126	67															126	67
07:30	158	68															158	68
07:45	186	61															186	61
08:00	143	61															143	61
08:15	117	64															117	64
08:30	152	55															152	55
08:45	179	43															179	43
09:00	156	44															156	44
09:15	130	32															130	32
09:30	157	38															157	38
09:45	164	32															164	32
10:00	129	18															129	18
10:15	111	15															111	15
10:30	124	11															124	11
10:45	116	8															116	8
11:00	132	10															132	10
11:15	138	5															138	5
11:30	129	3															129	3
11:45	142	2															142	2
Totals	**3358**	**4126**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3358**	**4126**
Day Total	**7484**		**0**		**0**		**0**		**0**		**0**		**0**				**7484**	
AM Pct	44.9%																44.9%	
Peak Hour	8:45	12:45															8:45	12:45
Peak Volume	622	630															622	630
P.H.F	0.8687	0.8654															0.8687	0.8654

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Client: Stanley
File Number: 1602475
Route: PIMA RD
Location: N of E CAVE CREEK RD

Site Ref: 1
Direction: SB
Latitude: 33.8193
Longitude: -111.8913

Count Date	5/5/2016																Average	
Count Time	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
00:00	0	9															0	9
00:15	0	10															0	10
00:30	0	11															0	11
00:45	0	9															0	9
01:00	0	10															0	10
01:15	2	10															2	10
01:30	1	8															1	8
01:45	0	13															0	13
02:00	0	6															0	6
02:15	0	23															0	23
02:30	0	10															0	10
02:45	2	6															2	6
03:00	1	11															1	11
03:15	0	11															0	11
03:30	0	6															0	6
03:45	0	6															0	6
04:00	0	10															0	10
04:15	1	5															1	5
04:30	1	6															1	6
04:45	1	3															1	3
05:00	0	15															0	15
05:15	0	6															0	6
05:30	0	8															0	8
05:45	4	2															4	2
06:00	1	5															1	5
06:15	3	4															3	4
06:30	4	5															4	5
06:45	3	1															3	1
07:00	5	3															5	3
07:15	6	3															6	3
07:30	14	1															14	1
07:45	7	0															7	0
08:00	5	0															5	0
08:15	6	7															6	7
08:30	48	13															48	13
08:45	16	2															16	2
09:00	25	0															25	0
09:15	13	1															13	1
09:30	13	0															13	0
09:45	6	1															6	1
10:00	7	0															7	0
10:15	9	0															9	0
10:30	8	1															8	1
10:45	9	0															9	0
11:00	4	0															4	0
11:15	14	0															14	0
11:30	13	0															13	0
11:45	11	0															11	0
Totals	**263**	**261**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**263**	**261**
Day Total	**524**		**0**		**0**		**0**		**0**		**0**		**0**		**0**		**524**	
AM Pct	50.2%																50.2%	
Peak Hour	8:30	13:45															8:30	13:45
Peak Volume	102	52															102	52
P.H.F	0.5313	0.5652															0.5313	0.5652

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Client:	Stanley	Site Ref:	1
File Number:	1602473	Direction:	WB
Route:	N CAVE CREEK RD	Latitude:	33.8188
Location:	E of N PIMA RD	Longitude:	-111.8891

Count Date	5/5/2016																		Average	
Count Time	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
00:00	2	92																	2	92
00:15	0	119																	0	119
00:30	0	99																	0	99
00:45	1	120																	1	120
01:00	1	119																	1	119
01:15	2	126																	2	126
01:30	0	140																	0	140
01:45	1	121																	1	121
02:00	0	130																	0	130
02:15	0	133																	0	133
02:30	0	130																	0	130
02:45	1	140																	1	140
03:00	1	120																	1	120
03:15	1	106																	1	106
03:30	0	101																	0	101
03:45	0	105																	0	105
04:00	8	113																	8	113
04:15	1	93																	1	93
04:30	4	82																	4	82
04:45	4	91																	4	91
05:00	7	84																	7	84
05:15	12	94																	12	94
05:30	11	88																	11	88
05:45	25	70																	25	70
06:00	30	78																	30	78
06:15	37	59																	37	59
06:30	31	49																	31	49
06:45	53	36																	53	36
07:00	69	39																	69	39
07:15	60	26																	60	26
07:30	79	23																	79	23
07:45	74	23																	74	23
08:00	89	20																	89	20
08:15	104	17																	104	17
08:30	93	10																	93	10
08:45	94	11																	94	11
09:00	93	15																	93	15
09:15	100	22																	100	22
09:30	111	19																	111	19
09:45	105	17																	105	17
10:00	107	20																	107	20
10:15	113	7																	113	7
10:30	125	9																	125	9
10:45	132	7																	132	7
11:00	116	6																	116	6
11:15	122	2																	122	2
11:30	95	3																	95	3
11:45	114	2																	114	2
Totals	**2228**	**3136**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2228**	**3136**
Day Total	**5364**		**0**		**0**		**0**		**0**		**0**		**0**		**0**				**5364**	
AM Pct	41.5%																		41.5%	
Peak Hour	10:30	14:00																	10:30	14:00
Peak Volume	495	533																	495	533
P.H.F	0.9375	0.9518																	0.9375	0.9518

APPENDIX B

Crash Data

Maricopa County Sheriff's Office
Location History

Period covered: January 1, 2012 to September 23, 2013

Incident/DR #	XRef Incident #	Disposition	Date	Time	Incident Location	Description of Call Type	Final Call Type	Deputy Serial #
MA12004289		8	1/8/2012 12:16:20 PM		E CAVE CREEK RD/N PIMA RD ,CRF	VEHICLE ACCIDENT W/INJURIES	962	S1481
MA12049718		8	3/22/2012 8:10:21 AM		E CAVE CREEK RD/N PIMA ,CRF	VEHICLE ACCIDENT W/INJURIES	962	S0997
MA12101315		8	6/7/2012 10:53:52 AM		E CAVE CREEK RD/N PIMA ,CRF	VEHICLE ACCIDENT NO INJURY	961	S1813
MA12105441		8	6/13/2012 8:23:13 PM		E CAVE CREEK RD/N PIMA ,CRF	VEHICLE ACCIDENT NO INJURY	961	S0950
MA12134068		10	7/28/2012 7:40:51 AM		E CAVE CREEK RD/N PIMA ,CRF	INJURED/SICK PERSON	901	S1179
MA13031502		8	2/16/2013 3:48:06 PM		E CAVE CREEK RD/N PIMA RD ,CRF	VEHICLE ACCIDENT FATALITY	963	S1179
MA13128644		8	7/5/2013 3:03:55 PM		E CAVE CREEK RD/N PIMA ,CRF	VEHICLE ACCIDENT W/INJURIES	962	S1179

Disposition Descriptions

1 Information Received
2 Police Service Report Written (DR) Incident # is DR #
3 Unable to Locate/Gone on Arrival
4 Civil Matter
5 Detail Completed
6 Offense Report Written (DR) Incident # is DR #
7 Field interview card completed
8 Vehicle Accident Report Written (DR) Incident # is DR #
9 Assist to other Agency-
10 Turned Over to other Agency
11 Property Invoice (only) Written (DR) Incident # is DR #
12 Tow Truck Request (only) Written (DR) Incident # is DR #
13 Cancel Incident Prior to unit being Dispatched
14 Cancel Incident after Unit has been Dispatched

Prepared by MCSO, Telecommunications Technology Division, 602-876-1033

Maricopa County Sheriff's Office
Location History

Period covered: September 24, 2013 to May 31, 2016

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC13223818	IR13189397		11/21/2013	11:14:37	771609 - A476

Description of Event:

VEHICLE CRASH NO INJURY

Event Location — *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC13226990	IR13189753		11/26/2013	09:21:03	117502 -

Description of Event:

VEHICLE CRASH NO INJURY

Event Location — *Location Name:*

N PIMA RD/E CAVE CREEK RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14006587	IR14000796		01/11/2014	13:10:54	771285 - A433

Description of Event:

VEHICLE CRASH NO INJURY

Event Location — *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14020884	IR14002655		02/02/2014	12:35:20	119326 -

Description of Event:

VEHICLE CRASH NO INJURY HIT AND RUN 961

Event Location — *Location Name:*

N PIMA RD/E CAVE CREEK RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14034790	IR14004364		02/22/2014	14:52:10	771647 - A434

Description of Event:

VEHICLE CRASH NO INJURY

Event Location — *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14052665	IR14006602		03/20/2014	16:50:39	771609 - G476

Description of Event:

VEHICLE CRASH NO INJURY

Event Location *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14116282	IR14014529		06/24/2014	14:52:20	771179 - A434

Description of Event:

VEHICLE CRASH NO INJURY

Event Location *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14170080	IR14020971		09/10/2014	06:53:31	771869 - A430

Description of Event:

VEHICLE CRASH W/INJURIES

Event Location *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14230738	IR14028556		12/08/2014	20:54:15	770920 - L433

Description of Event:

VEHICLE CRASH NO INJURY

Event Location *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC14230942	IR14028577		12/09/2014	08:33:30	771256 - A434

Description of Event:

VEHICLE CRASH NO INJURY

Event Location *Location Name:*

N PIMA RD/E CAVE CREEK RD :JUST NOF

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC15041194	IR15004978		02/27/2015	13:55:50	771356 - A434

Description of Event:

VEHICLE CRASH NO INJURY 961 INVOLVING ALCOHOL

Event Location *Location Name:*

N PIMA RD/E CAVE CREEK RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC15170962	IR15019929		08/10/2015	13:47:48	771179 - A434

Description of Event:

VEHICLE CRASH NO INJURY

Event Location *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC15285997	IR15032965		12/25/2015	18:20:45	772059 - L434

Description of Event:

VEHICLE CRASH NO INJURY HIT AND RUN 961

Event Location *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC16094247	IR16010732		04/22/2016	15:49:42	771609 - A476

Description of Event:

VEHICLE CRASH NO INJURY

Event Location *Location Name:*

E CAVE CREEK RD/N PIMA RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC16108646	IR16012387		05/09/2016	13:38:01	772047 - A434

Description of Event:

VEHICLE CRASH NO INJURY

Event Location *Location Name:*

N PIMA RD/E CAVE CREEK RD

Event #	IR #	Cross Reference Event	Date	Time	Deputy/DO Serial # - Unit
MC16114098	IR16013036		05/15/2016	18:23:16	771414 - L430

Description of Event:

VEHICLE CRASH W/INJURIES

Event Location *Location Name:*

N PIMA RD/E CAVE CREEK RD

CITY OF SCOTTSDALE '11 -'12 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV #1	INJ. SEV #2	PHYS. COND. #1	PHYS. COND. #2	VIOLATION #1	VIOLATION #2	ACTION #1	ACTION #2	TRAV. DIR. #1	TRAV. DIR. #2	MANNER OF COLLISION	COMMENTS
11-06062	110312	1639	PIMA		STAGECOACH PASS	RD	AT		1	1	0	0	3	0	4	1	E	S	4	
12-22365	121009	0703	PIMA	RD	STAGECOACH PASS	RD	AT		1	1	0	0	7	1	4	1	SB	NB	3	
12-26524	121129	1039	PIMA	RD	STAGECOACH PASS	RD	W	250	1	3	0	0	7	1	6	1	WB	WB	3	

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV #1	INJ. SEV #2	PHYS. COND. #1	PHYS. COND. #2	VIOLATION #1	VIOLATION #2	ACTION #1	ACTION #2	TRAV. DIR. #1	TRAV. DIR. #2	MANNER OF COLLISION	COMMENTS

KEY (January 1, 2011-June 21,2011)

INJURY SEVERITY: 1=NO INJURY, 2=POSSIBLE INJURY, 3=NON-INCAPACITATING INJURY, 4=INCAPACITATING INJURY, 5=FATAL INJURY, 99=NOT REPORTED / UNKNOWN

PHYSICAL CONDITION: 0=NO APPARENT INFLUENCE, 1=ILLNESS, 2=PHYSICAL IMPAIRMENT, 3=FELL ASLEEP / FATIGUED 4=ALCOHOL, 5=DRUGS, 6=MEDICATIONS, A=NO TEST GIVEN, B=TEST GIVEN, C=TEST REFUSED, D=TESTING UNKNOWN, 97=OTHER, 99=UNKNOWN

VIOLATION: 0=NO IMPROPER ACTION, 1=SPEED TOO FAST FOR CONDITIONS, 2=EXCEEDED LAWFUL SPEED 3=FAILED TO YIELD RIGHT-OF-WAY, 4=FOLLOWED TOO CLOSELY. 5=FAILED TO OBEY STOP SIGN, 6=FAILED TO STOP FOR RED SIGNAL, 7=DISREGAREDED TRAFFIC SIGNAL 8=MADE IMPROPER TURN, 9=DROVE/RODE IN OPPOSING TRAFFIC LANE, 10=KNOWINGLY OPERATED WITH FAULTY / MISSING EQUIPMENT, 11=REQUIRED MOTORCYCLE SAFETY EQUIPMENT NOT USED, 12=PASSED IN NO PASSING ZONE, 13=UNSAFE LANE CHANGE, 14=FAILED TO KEEP IN PROPER LANE, 15=DISREGARDED PAVEMENT MARKINGS, 16=OTHER UNSAFE PASSING, 17=INATTENTION/DISTRACTION, 18=DID NOT USE CROSSWALK, 19=WALKED ON WRONG SIDE OF ROAD, 20 ELECTRONIC COMMUNICATIONS DEVICE, 97=OTHER, 99 UNKNOWN

ACTION: 1=GOING STRAIGHT AHEAD, 2=SLOWING IN TRAFFICWAY, 3=STOPPED IN TRAFFICWAY, 4=MAKING LEFT TURN, 5=MAKING RIGHT TURN, 6=MAKING U-TURN, 7=OVERTAKING/PASSING, 8=CHANGING LANES, 9=NEGOTIATING A CURVE, 10=BACKING, 11=AVOIDING VEH/OBJ/PED/CYCLIST/ANIMAL, 12=ENTERING PARKING POSITION, 13=LEAVING PARKING POSITION, 14=PROPERLY PARKED, 15=IMPROPERLY PARKED, 16=DRIVERLESS MOVING VEHICLE, 17=CROSING ROAD, 18=WALKING WITH TRAFFIC, 19=WALKING AGAINST TRAFFIC, 20=STANDING, 21=LYING, 22=GETTING ON OR OFF VEHICLE, 23=WORKING ON/PUSHING VEHICLE, 24=WORKING ON ROAD, 97=OTHER, 99=UKNOWN

MANNER OF COLLISION: 1=SINGLE VEHICLE, 2=ANGLE (front to side) SAME DIRECTION, 3=ANGLE (front to side) OPPOSITE DIRECTION, 4=ANGLE (front to side) RIGHT ANGLE, 5=ANGLE - DIRECTION NOT SPECIFIED, 6=REAR END, 7=HEAD-ON, 8=SIDESWIPE, SAME DIRECTION, 9=SIDESWIPE, OPPOSITE DIRECTION, 10=REAR-TO-SIDE 11=REAR-TO-REAR 97=OTHER 99=UNKNOWN D=U-Turn, @=Pedestrian, #=Pedalcycle

KEY (June 22, 2011-December 31,2012)

INJURY SEVERITY: 1=NO INJURY, 2=POSSIBLE INJURY, 3=NON-INCAPACITATING INJURY, 4=INCAPACITATING INJURY, 5=FATAL INJURY, 99=NOT REPORTED / UNKNOWN

PHYSICAL CONDITION: 0=NO APPARENT INFLUENCE, 1=ILLNESS, 2=PHYSICAL IMPAIRMENT, 3=FELL ASLEEP / FATIGUED 4=ALCOHOL, 5=DRUGS, 6=MEDICATIONS, A=NO TEST GIVEN, B=TEST GIVEN, C=TEST REFUSED, D=TESTING UNKNOWN, 97=OTHER, 99=UNKNOWN

VIOLATION: 1=NO IMPROPER ACTION, 2=SPEED TOO FAST FOR CONDITIONS, 3=EXCEEDED LAWFUL SPEED 4=FOLLOWED TOO CLOSELY. 5=RAN STOP SIGN, 6=DISREGAREDED TRAFFIC SIGNAL7=MADE IMPROPER TURN, 8=DROVE/RODE IN OPPOSING TRAFFIC LANE, 9=KNOWINGLY OPERATED WITH FAULTY / MISSING EQUIPMENT, 10=REQUIRED MOTORCYCLE SAFETY EQUIPMENT NOT USED, 11=PASSED IN NO PASSING ZONE, 12=UNSAFE LANE CHANGE, 13=FAILED TO KEEP IN PROPER LANE, 14=DISREGARDED PAVEMENT MARKINGS, 15=OTHER UNSAFE PASSING, 16=INATTENTION/DISTRACTION, 17=DID NOT USE CROSSWALK, 18=WALKED ON WRONG SIDE OF ROAD, 19=ELECTRONIC COMMUNICATIONS DEVICE, 97=OTHER, 99 UNKNOWN

ACTION: 1=GOING STRAIGHT AHEAD, 2=SLOWING IN TRAFFICWAY, 3=STOPPED IN TRAFFICWAY, 4=MAKING LEFT TURN, 5=MAKING RIGHT TURN, 6=MAKING U-TURN, 7=OVERTAKING/PASSING, 8=CHANGING LANES, 9=NEGOTIATING A CURVE, 10=BACKING, 11=AVOIDING VEH/OBJ/PED/CYCLIST/ANIMAL, 12=ENTERING PARKING POSITION, 13=LEAVING PARKING POSITION, 14=PROPERLY PARKED, 15=IMPROPERLY PARKED, 16=DRIVERLESS MOVING VEHICLE, 17=CROSING ROAD, 18=WALKING WITH TRAFFIC, 19=WALKING AGAINST TRAFFIC, 20=STANDING, 21=LYING, 22=GETTING ON OR OFF VEHICLE, 23=WORKING ON/PUSHING VEHICLE, 24=WORKING ON ROAD, 97=OTHER, 99=UKNOWN

MANNER OF COLLISION: 1=SINGLE VEHICLE, 2=ANGLE (front to side, other than left turn), 3=LEFT TURN, 4=REAR END, 5=HEAD-ON (front to front, other than left turn), 6=SIDESWIPE (same direction), 7=SIDESWIPE (opposite direction), 8=REAR-TO-SIDE, 9=REAR TO REAR, 97=OTHER, 99=UNKNOWN

TOTAL **3**

CITY OF SCOTTSDALE '13 -'14 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV #1	INJ. SEV #2	PHYS. COND. #1	PHYS. COND. #2	VIOLATION #1	VIOLATION #2	ACTION #1	ACTION #2	TRAV. DIR. #1	TRAV. DIR. #2	MANNER OF COLLISION	COMMENTS
14-27050	141216	0651	PIMA	RD	STAGECOACH PASS	RD	AT		1	1	0	0	97	1	4	97	SB	SB	3	CAR/BICYCLE
14-22373	141017	1554	PIMA	RD	STAGECOACH PASS	RD	AT		1	1	97	0	97	1	1	1	wb	nb	2	
14-16986	140807	1500	PIMA	RD	STAGECOACH PASS	RD	AT		3	1	0	0	97	1	1	1	EB	SB	2	

KEY

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ACTION: 1=GOING STRAIGHT AHEAD, 2=SLOWING IN TRAFFICWAY, 3=STOPPED IN TRAFFICWAY, 4=MAKING LEFT TURN, 5=MAKING RIGHT TURN, 6=MAKING U-TURN, 7=OVERTAKING/PASSING, 8=CHANGING LANES, 9=NEGOTIATING A CURVE, 10=BACKING, 11=AVOIDING VEH/OBJ/PED/CYCLIST/ANIMAL, 12=ENTERING PARKING POSITION, 13=LEAVING PARKING POSITION, 14=PROPERLY PARKED, 15=IMPROPERLY PARKED, 16=DRIVERLESS MOVING VEHICLE, 17=CROSING ROAD, 18=WALKING WITH TRAFFIC, 19=WALKING AGAINST TRAFFIC, 20=STANDING, 21=LYING, 22=GETTING ON OR OFF VEHICLE, 23=WORKING ON/PUSHING VEHICLE, 24=WORKING ON ROAD, 97=OTHER, 99=UKNOWN

MANNER OF COLLISION: 1=SINGLE VEHICLE, 2=ANGLE (front to side, other than left turn), 3=LEFT TURN, 4=REAR END (front to rear), 5=HEAD-ON (front to front, other than left turn), 6=SIDESWIPE (same direction), 7=SIDESWIPE (opposite direction), 8=REAR-TO-SIDE, 9=REAR TO REAR, 97=OTHER, 99=UNKNOWN

TOTAL **3**

CITY OF SCOTTSDALE '15 -'16 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV #1	INJ. SEV #2	PHYS. COND. #1	PHYS. COND. #2	VIOLATION #1	VIOLATION #2	ACTION #1	ACTION #2	TRAV. DIR. #1	TRAV. DIR. #2	MANNER OF COLLISION	COMMENTS
15-13326	150613	1633	PIMA	RD	STAGECOACH	PASS	E	101	3		0		1		1		WB		1	

KEY

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ACTION: 1=GOING STRAIGHT AHEAD, 2=SLOWING IN TRAFFICWAY, 3=STOPPED IN TRAFFICWAY, 4=MAKING LEFT TURN, 5=MAKING RIGHT TURN, 6=MAKING U-TURN, 7=OVERTAKING/PASSING, 8=CHANGING LANES, 9=NEGOTIATING A CURVE, 10=BACKING, 11=AVOIDING VEH/OBJ/PED/CYCLIST/ANIMAL, 12=ENTERING PARKING POSITION, 13=LEAVING PARKING POSITION, 14=PROPERLY PARKED, 15=IMPROPERLY PARKED, 16=DRIVERLESS MOVING VEHICLE, 17=CROSING ROAD, 18=WALKING WITH TRAFFIC, 19=WALKING AGAINST TRAFFIC, 20=STANDING, 21=LYING, 22=GETTING ON OR OFF VEHICLE, 23=WORKING ON/PUSHING VEHICLE, 24=WORKING ON ROAD, 97=OTHER, 99=UKNOWN

MANNER OF COLLISION: 1=SINGLE VEHICLE, 2=ANGLE (front to side, other than left turn), 3=LEFT TURN, 4=REAR END (front to rear), 5=HEAD-ON (front to front, other than left turn), 6=SIDESWIPE (same direction), 7=SIDESWIPE (opposite direction), 8=REAR-TO-SIDE, 9=REAR TO REAR, 97=OTHER, 99=UNKNOWN

TOTAL **1**

APPENDIX C

Capacity Analysis

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	17	133	40	0	239	123	7	0	49	37	244
Future Vol, veh/h	0	17	133	40	0	239	123	7	0	49	37	244
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	145	43	0	260	134	8	0	53	40	265
Number of Lanes	0	1	2	0	0	1	2	0	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	3
HCM Control Delay	11.4	15.1	13.3
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	57%	0%	100%	0%	0%	100%	0%	0%	21%	0%
Vol Thru, %	43%	0%	0%	100%	53%	0%	100%	85%	79%	0%
Vol Right, %	0%	100%	0%	0%	47%	0%	0%	15%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	244	17	89	84	239	82	48	68	30
LT Vol	49	0	17	0	0	239	0	0	14	0
Through Vol	37	0	0	89	44	0	82	41	54	0
RT Vol	0	244	0	0	40	0	0	7	0	30
Lane Flow Rate	93	265	18	96	92	260	89	52	74	33
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.184	0.449	0.04	0.195	0.177	0.518	0.165	0.095	0.156	0.062
Departure Headway (Hd)	7.187	6.199	7.786	7.276	6.937	7.29	6.781	6.678	7.609	6.799
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	502	583	462	495	520	499	532	540	474	529
Service Time	4.887	3.899	5.492	4.982	4.643	4.99	4.481	4.378	5.32	4.51
HCM Lane V/C Ratio	0.185	0.455	0.039	0.194	0.177	0.521	0.167	0.096	0.156	0.062
HCM Control Delay	11.5	13.9	10.8	11.7	11.1	17.6	10.8	10.1	11.7	10
HCM Lane LOS	B	B	B	B	B	C	B	B	B	A
HCM 95th-tile Q	0.7	2.3	0.1	0.7	0.6	2.9	0.6	0.3	0.5	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	14	54	30
Future Vol, veh/h	0	14	54	30
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	15	59	33
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	11.2
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	386	5	1	355	14	3
Future Vol, veh/h	386	5	1	355	14	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	420	5	1	386	15	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	425	0	617	212
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	195	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1131	-	422	793
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	819	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1131	-	422	793
Mov Cap-2 Maneuver	-	-	-	-	422	-
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	818	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	460	-	-	1131	-
HCM Lane V/C Ratio	0.04	-	-	0.001	-
HCM Control Delay (s)	13.2	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	7	119	55	0	244	117	3	0	48	22	205
Future Vol, veh/h	0	7	119	55	0	244	117	3	0	48	22	205
Peak Hour Factor	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	137	63	0	280	134	3	0	55	25	236
Number of Lanes	0	1	2	0	0	1	2	0	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	3
HCM Control Delay	10.6	14.4	11.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	69%	0%	100%	0%	0%	100%	0%	0%	17%	0%
Vol Thru, %	31%	0%	0%	100%	42%	0%	100%	93%	83%	0%
Vol Right, %	0%	100%	0%	0%	58%	0%	0%	7%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	205	7	79	95	244	78	42	18	7
LT Vol	48	0	7	0	0	244	0	0	3	0
Through Vol	22	0	0	79	40	0	78	39	15	0
RT Vol	0	205	0	0	55	0	0	3	0	7
Lane Flow Rate	80	236	8	91	109	280	90	48	21	8
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.153	0.381	0.016	0.17	0.19	0.523	0.154	0.082	0.042	0.015
Departure Headway (Hd)	6.86	5.817	7.208	6.701	6.288	6.707	6.201	6.15	7.305	6.516
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	521	617	495	533	568	536	577	581	488	546
Service Time	4.617	3.574	4.972	4.465	4.052	4.46	3.954	3.904	5.083	4.294
HCM Lane V/C Ratio	0.154	0.382	0.016	0.171	0.192	0.522	0.156	0.083	0.043	0.015
HCM Control Delay	10.9	12.1	10.1	10.8	10.5	16.6	10.1	9.5	10.4	9.4
HCM Lane LOS	B	B	B	B	B	C	B	A	B	A
HCM 95th-tile Q	0.5	1.8	0	0.6	0.7	3	0.5	0.3	0.1	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	3	15	7
Future Vol, veh/h	0	3	15	7
Peak Hour Factor	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	3	17	8
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	10.1
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	312	15	4	355	9	2
Future Vol, veh/h	312	15	4	355	9	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	339	16	4	386	10	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	355	0	549	178
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	202	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1200	-	466	834
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1200	-	464	834
Mov Cap-2 Maneuver	-	-	-	-	464	-
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	809	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	505	-	-	1200	-
HCM Lane V/C Ratio	0.024	-	-	0.004	-
HCM Control Delay (s)	12.3	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	19	136	40	0	242	124	7	0	49	39	250
Future Vol, veh/h	0	19	136	40	0	242	124	7	0	49	39	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	21	148	43	0	263	135	8	0	53	42	272
Number of Lanes	0	1	2	0	0	1	2	0	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	3
HCM Control Delay	11.5	15.4	13.5
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	56%	0%	100%	0%	0%	100%	0%	0%	20%	0%
Vol Thru, %	44%	0%	0%	100%	53%	0%	100%	86%	80%	0%
Vol Right, %	0%	100%	0%	0%	47%	0%	0%	14%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	250	19	91	85	242	83	48	69	31
LT Vol	49	0	19	0	0	242	0	0	14	0
Through Vol	39	0	0	91	45	0	83	41	55	0
RT Vol	0	250	0	0	40	0	0	7	0	31
Lane Flow Rate	96	272	21	99	93	263	90	53	75	34
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.189	0.464	0.045	0.201	0.181	0.529	0.168	0.097	0.16	0.064
Departure Headway (Hd)	7.235	6.253	7.854	7.343	7.008	7.357	6.848	6.744	7.683	6.875
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	499	579	458	492	515	495	527	535	469	523
Service Time	4.935	3.953	5.56	5.049	4.714	5.057	4.548	4.444	5.395	4.586
HCM Lane V/C Ratio	0.192	0.47	0.046	0.201	0.181	0.531	0.171	0.099	0.16	0.065
HCM Control Delay	11.6	14.2	10.9	11.9	11.3	18	10.9	10.2	11.9	10.1
HCM Lane LOS	B	B	B	B	B	C	B	B	B	B
HCM 95th-tile Q	0.7	2.4	0.1	0.7	0.7	3	0.6	0.3	0.6	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	14	55	31
Future Vol, veh/h	0	14	55	31
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	15	60	34
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	11.3
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	9	386	5	1	355	23	14	0	3	7	0	4
Future Vol, veh/h	9	386	5	1	355	23	14	0	3	7	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	0	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	420	5	1	386	25	15	0	3	8	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	386	0	0	425	0	0	637	830	212	617	833	193
Stage 1	-	-	-	-	-	-	442	442	-	388	388	-
Stage 2	-	-	-	-	-	-	195	388	-	229	445	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1169	-	-	1131	-	-	362	304	793	374	303	816
Stage 1	-	-	-	-	-	-	564	575	-	607	607	-
Stage 2	-	-	-	-	-	-	788	607	-	753	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1169	-	-	1131	-	-	357	301	793	370	300	816
Mov Cap-2 Maneuver	-	-	-	-	-	-	357	301	-	370	300	-
Stage 1	-	-	-	-	-	-	559	570	-	602	606	-
Stage 2	-	-	-	-	-	-	783	606	-	743	568	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	14.6	13
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	395	1169	-	-	1131	-	-	462
HCM Lane V/C Ratio	0.047	0.008	-	-	0.001	-	-	0.026
HCM Control Delay (s)	14.6	8.1	-	-	8.2	-	-	13
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	2	0	61	4	0	98
Future Vol, veh/h	2	0	61	4	0	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	0	66	4	0	107

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	175	68	0	0	71	0
Stage 1	68	-	-	-	-	-
Stage 2	107	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	815	995	-	-	1529	-
Stage 1	955	-	-	-	-	-
Stage 2	917	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	815	995	-	-	1529	-
Mov Cap-2 Maneuver	815	-	-	-	-	-
Stage 1	955	-	-	-	-	-
Stage 2	917	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	815	1529	-
HCM Lane V/C Ratio	-	-	0.003	-	-
HCM Control Delay (s)	-	-	9.4	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Intersection Delay, s/veh	13
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	9	122	55	0	251	121	3	0	48	24	210
Future Vol, veh/h	0	9	122	55	0	251	121	3	0	48	24	210
Peak Hour Factor	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	10	140	63	0	289	139	3	0	55	28	241
Number of Lanes	0	1	2	0	0	1	2	0	0	0	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	3
HCM Control Delay	10.8	15	12.1
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	67%	0%	100%	0%	0%	100%	0%	0%	14%	0%
Vol Thru, %	33%	0%	0%	100%	43%	0%	100%	93%	86%	0%
Vol Right, %	0%	100%	0%	0%	57%	0%	0%	7%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	72	210	9	81	96	251	81	43	21	9
LT Vol	48	0	9	0	0	251	0	0	3	0
Through Vol	24	0	0	81	41	0	81	40	18	0
RT Vol	0	210	0	0	55	0	0	3	0	9
Lane Flow Rate	83	241	10	93	110	289	93	50	24	10
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.159	0.396	0.021	0.177	0.195	0.544	0.162	0.086	0.05	0.019
Departure Headway (Hd)	6.934	5.901	7.306	6.799	6.39	6.787	6.281	6.232	7.39	6.613
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	516	608	488	525	559	531	569	573	482	538
Service Time	4.699	3.665	5.076	4.569	4.16	4.545	4.039	3.989	5.177	4.4
HCM Lane V/C Ratio	0.161	0.396	0.02	0.177	0.197	0.544	0.163	0.087	0.05	0.019
HCM Control Delay	11	12.5	10.2	11	10.7	17.4	10.3	9.6	10.6	9.5
HCM Lane LOS	B	B	B	B	B	C	B	A	B	A
HCM 95th-tile Q	0.6	1.9	0.1	0.6	0.7	3.2	0.6	0.3	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	3	18	9
Future Vol, veh/h	0	3	18	9
Peak Hour Factor	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	3	21	10
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	10.3
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	312	15	4	355	22	9	0	2	21	0	11
Future Vol, veh/h	8	312	15	4	355	22	9	0	2	21	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	0	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	339	16	4	386	24	10	0	2	23	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	386	0	0	355	0	0	567	760	178	582	768	193
Stage 1	-	-	-	-	-	-	365	365	-	395	395	-
Stage 2	-	-	-	-	-	-	202	395	-	187	373	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1169	-	-	1200	-	-	406	334	834	396	330	816
Stage 1	-	-	-	-	-	-	627	622	-	602	603	-
Stage 2	-	-	-	-	-	-	781	603	-	797	617	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1169	-	-	1200	-	-	397	330	834	392	326	816
Mov Cap-2 Maneuver	-	-	-	-	-	-	397	330	-	392	326	-
Stage 1	-	-	-	-	-	-	622	617	-	597	601	-
Stage 2	-	-	-	-	-	-	767	601	-	789	612	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	13.4	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	439	1169	-	-	1200	-	-	477
HCM Lane V/C Ratio	0.027	0.007	-	-	0.004	-	-	0.073
HCM Control Delay (s)	13.4	8.1	-	-	8	-	-	13.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	5	0	32	4	0	25
Future Vol, veh/h	5	0	32	4	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	0	35	4	0	27

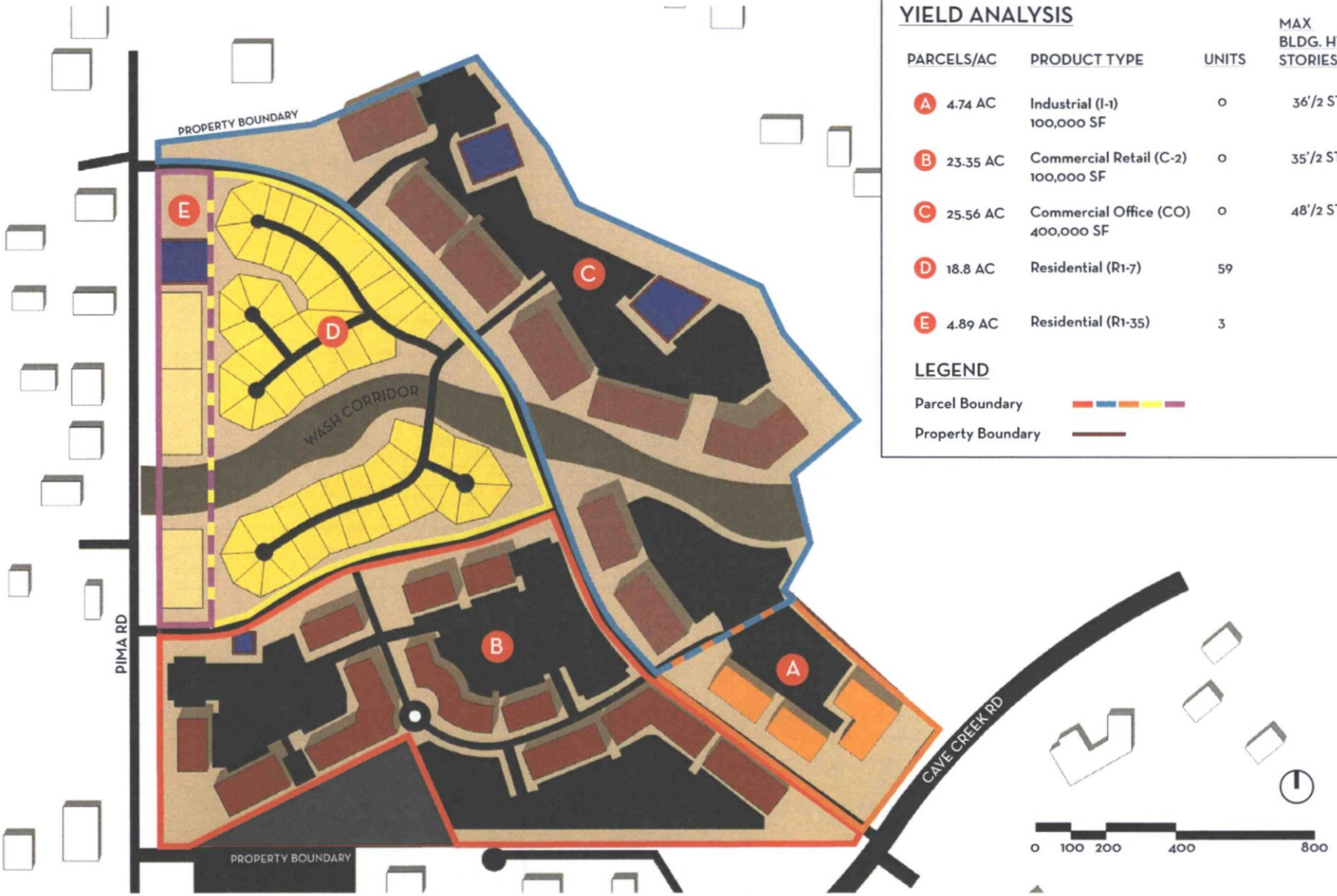
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	64	37	0	0	39	0
Stage 1	37	-	-	-	-	-
Stage 2	27	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	942	1035	-	-	1571	-
Stage 1	985	-	-	-	-	-
Stage 2	996	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	942	1035	-	-	1571	-
Mov Cap-2 Maneuver	942	-	-	-	-	-
Stage 1	985	-	-	-	-	-
Stage 2	996	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	942	1571	-
HCM Lane V/C Ratio	-	-	0.006	-	-
HCM Control Delay (s)	-	-	8.8	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

APPENDIX D

Currently Approved Zoning



YIELD ANALYSIS

PARCELS/AC	PRODUCT TYPE	UNITS	MAX BLDG. HT/ STORIES
A 4.74 AC	Industrial (I-1) 100,000 SF	0	36'/2 ST.
B 23.35 AC	Commercial Retail (C-2) 100,000 SF	0	35'/2 ST.
C 25.56 AC	Commercial Office (CO) 400,000 SF	0	48'/2 ST.
D 18.8 AC	Residential (R1-7)	59	
E 4.89 AC	Residential (R1-35)	3	

LEGEND

Parcel Boundary

Property Boundary

4.3.14

MONTEREY HOMES

Desert Mountain Parcel 19

Currently Approved Plan

DRAFT

SWABACK PARTNERS pllc
Architecture • Planning • Interior Design

Desert Mountain Parcel 19 Currrently Approved Plan (site plan dated 4-3-2014)

Vehicular Trip Rates & Trips

Parcel/Acre (AC)	Product Type	Number of Units	Units	ITE Land Use Number	ITE Land Use No./Type	Weekday Trip Rate per Unit	Weekday Total Trips	AM PEAK Trip Rate per Unit	AM PEAK Number of Trips	AM PEAK In Trips	AM PEAK Out Trips	PM PEAK Trip Rate per Unit	PM PEAK Number of Trips	PM PEAK In Trips	PM PEAK Out Trips
A/4.74	Industrial (I-1)	100	ksf	110	General Light Industrial	6.97	697	0.92	92	81	11	0.97	97	12	85
D/18.8; E/4.89	Residential (R1-7,R1-35)	62	units	210	Single Family Detached Housing	9.52	590	0.75	47	12	35	1.00	62	39	23
C/25.56	Commercial Office (CO)	400	ksf	710	General Office Building	11.03	4412	1.56	624	549	75	1.49	596	101	495
B/23.35	Commercial Retail (C-2)	100	ksf	820	Shopping Center	42.70	4270	0.96	96	60	36	3.71	371	178	193
					Total Trips		9969		859	702	157		1126	330	796
					Internal Reduction (Based on ITE rates for Residential, Retail and Office)	6%	-598	6%	-52	-26	-26	6%	-68	-34	-34
					Total Vehicular Trips Entering and Leaving the Site (without Internal Trips)		**9371**		**807**	**676**	**131**		**1058**	**296**	**762**
					Pass-by Reduction (Based on ITE rates for Land Use 820 Shopping Center)	25%	1003	25%	23	14	8	25%	87	42	45
					Net-New Trips on Cave Creek Road (External)		**8367**		**784**	**662**	**123**		**971**	**254**	**717**

Notes:

1. Parcel A - INDUSTRIAL Floor Area Ratio per site plan = (100,000 sq ft) / (4.74Acres) (43,560 sq ft/ acre) = 0.48 FAR
2. Parcel B - Commercial OFFICE Floor Area Ratio per site plan = (400,000 sq ft) / (25.56 Acres) (43,560 sq ft/ acre) = .09 FAR
3. Parcel C - Commercial RETAIL Floor Area Ratio per site plan = (100,000 sq ft) / (23.35 Acres) (43,560 sq ft/ acre) = .10 FAR
4. Estimates of Pass By Trips are based on Table 5.6 of ITE Trip Gen Manual, 9th Edition
5. Pass By Trips are vehicles driving by the site on Cave Creek Road for another trip purpose, but stop at the site.