



## Water Study



Engineering and Environmental Consultants, Inc.

7740 N. 16th Street, Suite 135 | Phoenix, Arizona 85020 | Tel 602.248.7702 | Fax 602.248.7851

## WATER DISTRIBUTION SYSTEM

### BASIS OF DESIGN REPORT

FOR

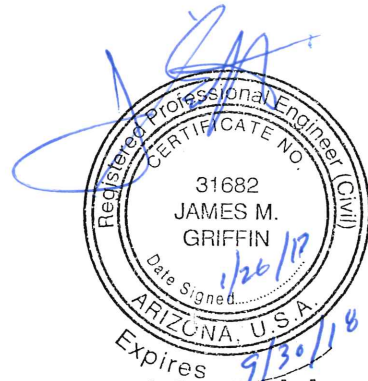
### LOMAS VERDES ESTATES

6501 E. Red Bird Road  
Scottsdale, Arizona 85266

#### OWNER:

Lomas Verdes Estates, LLC  
7001 E. Main Street; Suite 101  
Scottsdale, AZ 85251  
Phone: (480) 221-9311

January 25, 2017



City of Scottsdale  
Water Resources Administration  
9379 E. San Salvador  
Scottsdale, AZ 85258

PREPARED BY:

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SEE COMMENTS  
R. SACKS  
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Model Results;

- Average Day
- Maximum Day
- Peak Hour
- Maximum Day with Fire Demand
- Fire Demand at 30 psi

## INTRODUCTION

Lomas Verdes Estates is a single family custom and semi-custom residential subdivision to be constructed on approximately 7 acres. The site is located East of 64<sup>th</sup> Street and South of Red Bird Road. The site is bordered to the North, West and South by existing residential properties. The site lies within the North half of the South half of the Southwest Quarter of Section 34, Township 5 North, Range 4 East of Gila and Salt River Base and Meridian. The Assessor's Parcel Number for this property is 212-10-003F. Based on the information provided on the Maricopa County Assessor's Maps, the site has a Latitude of 33°43'45"N and a Longitude 111°56'33"W at the approximate center of the site. The approximate elevation of the site is 1964.00. See the Appendix for a Vicinity Map.

## EXISTING CONDITIONS

The property is currently zoned R1-43 and is approximately 8 acres in size. The slope of the land is generally from northeast to southwest. There is approximately 16-feet of fall from the rear (north) of the site to the front (south) of the site. A horse stable and fencing exist along the southeast corner of property. An existing fence follows the south property line and a portion of the east line. The site consists of native desert with a cleared/dirt area in the southeast corner for horse training. The site is in Flood Zone X, as depicted on the FEMA Flood Insurance Rate Map. A site aerial map has been provided within the Appendix.

There is an existing 12" public water main in 64<sup>th</sup> street.

## PROPOSED CONDITIONS

Lomas Verdes Estates will provide a new public water main connecting to the existing 12" main in 64<sup>th</sup> Street and extending an 8" water main, via a tapping sleeve and valve, to the end of the site cul-de-sac. The new water main will be located within public right of way to be dedicated as part of this project development. The proposed development will provide one new public fire hydrant near the southeast corner of the site. Additionally, 6 new domestic water meters and a landscape meter are to be provided for the proposed development.

— SHOW SITE PLAN W/ WATERLINE  
ROADWAY IS PRIVATE SO 20'  
EASEMENT W/IN TRACT IS  
NEEDED

## **WATER ANALYSIS DATA**

Per City of Scottsdale DS&PM manual, Figure 6.1-2 Average Day Water Demands in Gallons per day, this projects Residential Demand per dwelling unit is  $<2\text{DU}/\text{ac} = 485.6 \text{ gpd}$

Average Day Demand =  $485.6 \text{ gpd} \times 6 \text{ dwellings} = 2,913.6 \text{ gpd}$  or  $2.02 \text{ gpm}$

Maximum Day Demand = Average Day Demand  $\times 2 = 5,827.20 \text{ gpd}$  or  $4.05 \text{ gpm}$

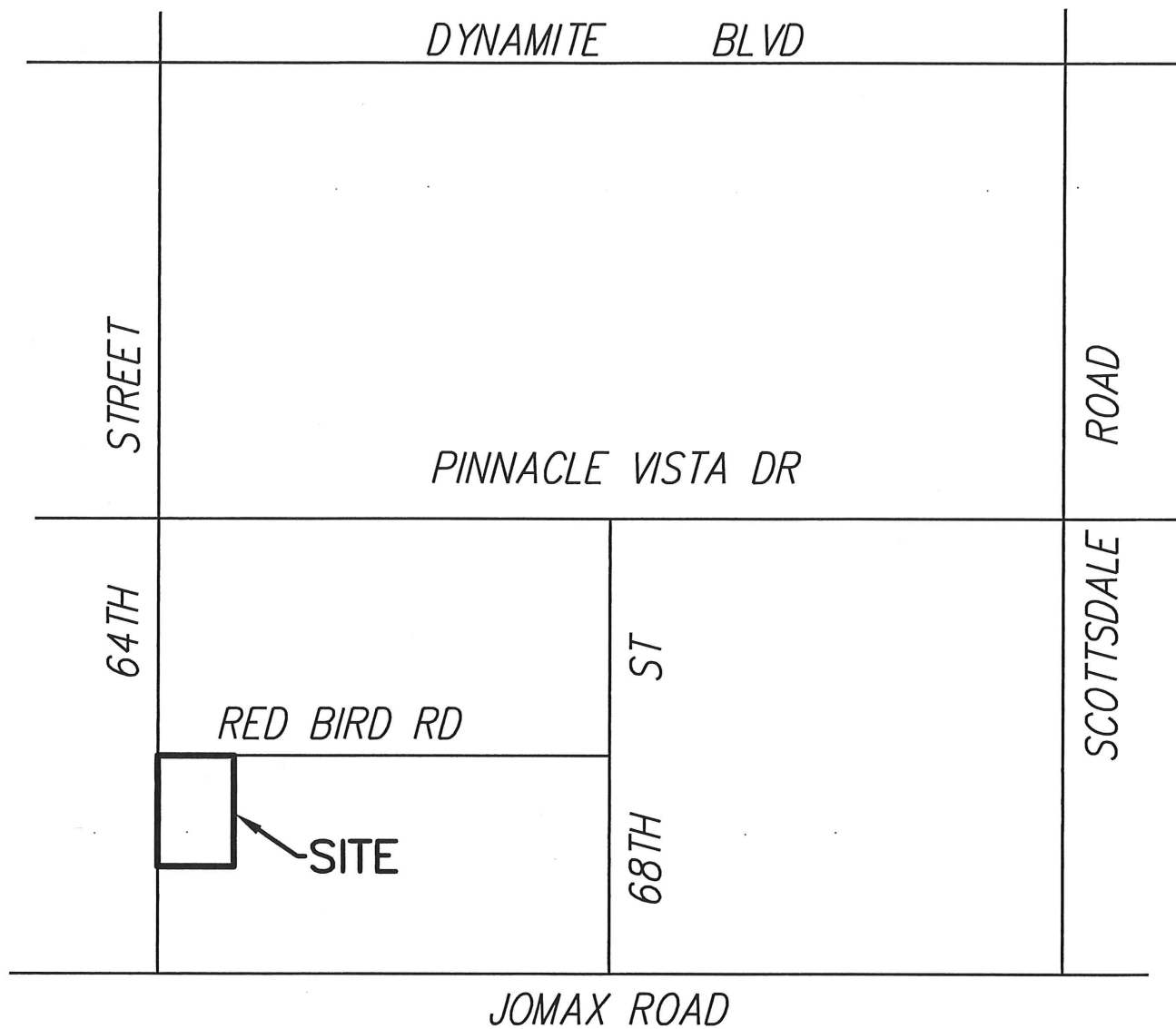
Peak Hour = Maximum Day Demand  $\times 3.5 = 10,197.60 \text{ gpd}$  or  $7.08 \text{ gpm}$

Fire Flow Demand =  $500 \text{ gpm}$  with  $30 \text{ psi}$  residual

Maximum Day with Fire Demand =  $507.08 \text{ gpm}$

Based on the Fire Hydrant Flow Test Results, the existing 12-inch waterline and the new 8-inch waterline are adequately sized to provide water supply for the proposed demand and intended use.

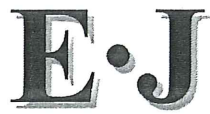
## APPENDIX "A"



## VICINITY MAP

## **APPENDIX "B"**





# Flow Test Summary

Project Name: EJFT 17018  
Project Address: 26697-26891 N 64th St, Scottsdale, AZ 85266  
Date of Flow Test: 2017-02-01  
Time of Flow Test: 8:15 AM  
Data Reliable Until: 2017-08-01  
Conducted By: Eder Cueva & Matt Young (EJ Flow Tests) 602.999.7637  
Witnessed By: Jim Tunnell (City of Scottsdale) 602.819.7718  
City Forces Contacted: City of Scottsdale  
Permit Number: C52492

**Note** Max Static Pressure of 72 PSI utilized as a safety factor

## Raw Flow Test Data

Static Pressure: 106.0 PSI  
Residual Pressure: 66.0 PSI  
Flowing GPM: 2,176  
GPM @ 20 PSI: 3,289

## Data with a 34 PSI Safety Factor

Static Pressure: 72.0 PSI  
Residual Pressure: 32.0 PSI  
Flowing GPM: 2,176  
GPM @ 20 PSI: 2,507

## Hydrant F<sub>1</sub>

Pitot Pressure (1): 42 PSI  
Coefficient of Discharge (1): 0.9  
Hydrant Orifice Diameter (1): 2.5 inches  
Pitot Pressure (2): 42 PSI  
Coefficient of Discharge (2): 0.9  
Hydrant Orifice Diameter (2): 2.5 inches



Static-Residual Hydrant



Flow Hydrant

Distance Between F<sub>1</sub> and R  
1271 ft (measured linearly)

Static-Residual Elevation  
1969 ft (above sea level)

Flow Hydrant (F<sub>1</sub>) Elevation  
1948 ft (above sea level)

Elevation & distance values are approximate

EJ Flow Tests, LLC

21505 North 78th Ave. | Suite 125 | Peoria, Arizona 85382 | (602) 999-7637 | [www.ejengineering.com](http://www.ejengineering.com)  
John L. Echeverri | NICET Level IV 078493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

# E·J | Flow Test Summary

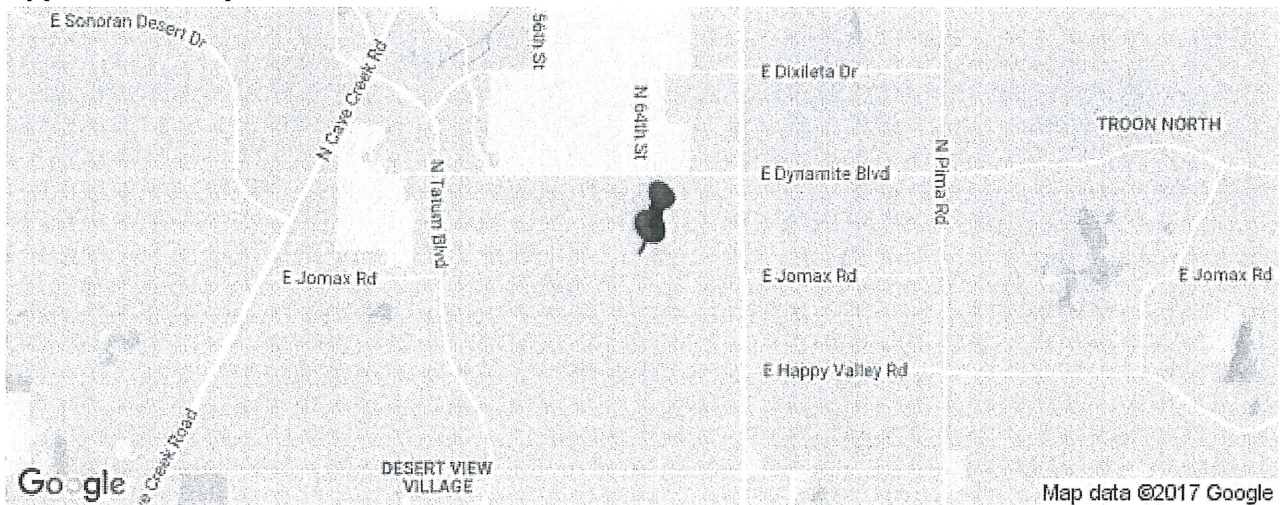
## Static-Residual Hydrant



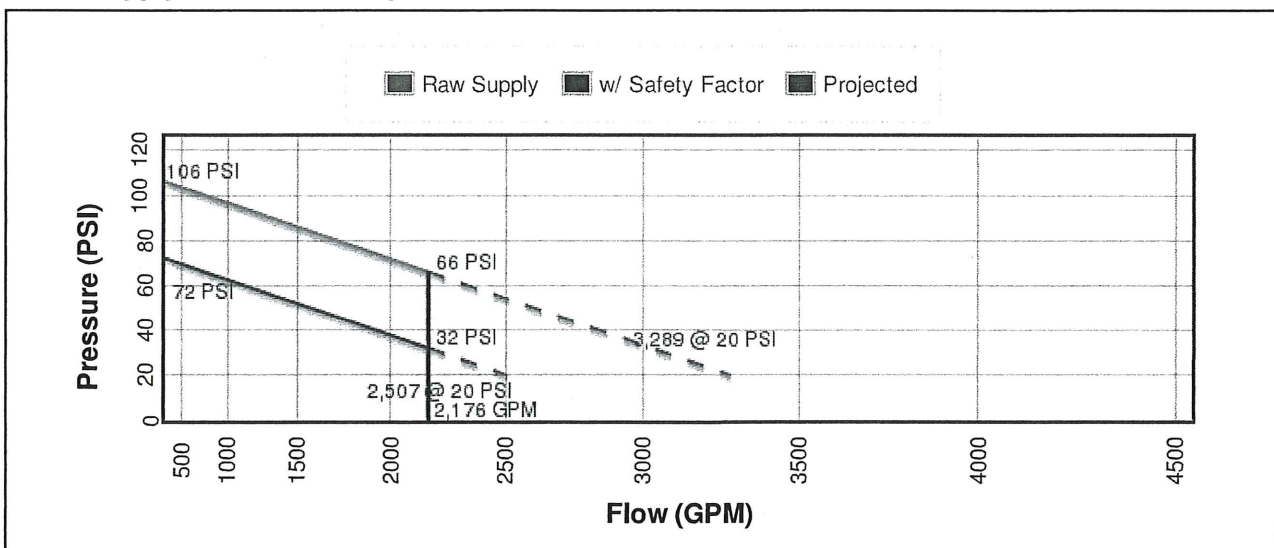
## Flow Hydrant (only hydrant F1 shown for clarity)



## Approximate Project Site



## Water Supply Curve N<sup>1.85</sup> Graph



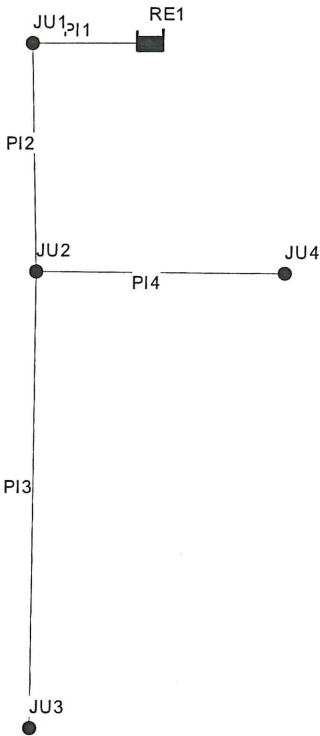
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## APPENDIX "C"

LOMAS VERDES ESTATES - WATER MODEL

Day 1





\*\*\*\*\*  
 \* E P A N E T \*  
 \* Hydraulic and Water Quality \*  
 \* Analysis for Pipe Networks \*  
 \* Version 2.0 \*  
 \*\*\*\*\*

Input File: 16534.net

## AVERAGE DAY DEMAND

## Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	RE1	JU1	1000	24
PI2	JU2	JU1	245	12
PI3	JU3	JU2	1026	12
PI4	JU2	JU4	298	8

## Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
JU1	0.00	2131.17	72.00	0.00
JU2	0.00	2131.17	73.73	0.00
JU3	0.00	2131.17	81.10	0.00
JU4	2.02	2131.17	71.13	0.00
RE1	-2.02	2131.17	0.00	0.00 Reservoir

## Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/kft	Status
PI1	2.02	0.00	0.00	Open
PI2	-2.02	0.01	0.00	Open
PI3	0.00	0.00	0.00	Open
PI4	2.02	0.01	0.00	Open

\*\*\*\*\*  
 \* E P A N E T \*  
 \* Hydraulic and Water Quality \*  
 \* Analysis for Pipe Networks \*  
 \* Version 2.0 \*  
 \*\*\*\*\*

Input File: 16534.net

PEAK DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	RE1	JU1	1000	24
PI2	JU2	JU1	245	12
PI3	JU3	JU2	1026	12
PI4	JU2	JU4	298	8

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
JU1	0.00	2131.17	72.00	0.00
JU2	0.00	2131.17	73.73	0.00
JU3	0.00	2131.17	81.10	0.00
JU4	7.08	2131.17	71.13	0.00
RE1	-7.08	2131.17	0.00	0.00 Reservoir

Link Results:

Link ID	Flow GPM	Velocity Unit fps	Headloss ft/kft	Status
PI1	7.08	0.01	0.00	Open
PI2	-7.08	0.02	0.00	Open
PI3	0.00	0.00	0.00	Open
PI4	7.08	0.05	0.00	Open

\*\*\*\*\*  
 \* E P A N E T \*  
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 \* Analysis for Pipe Networks \*  
 \* Version 2.0 \*  
 \*\*\*\*\*

Input File: 16534.net

MAXIMUM DAY DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	RE1	JU1	1000	24
PI2	JU2	JU1	245	12
PI3	JU3	JU2	1026	12
PI4	JU2	JU4	298	8

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
JU1	0.00	2131.17	72.00	0.00
JU2	0.00	2131.17	73.73	0.00
JU3	0.00	2131.17	81.10	0.00
JU4	4.05	2131.17	71.13	0.00
RE1	-4.05	2131.17	0.00	0.00 Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/kft	Status
PI1	4.05	0.00	0.00	Open
PI2	-4.05	0.01	0.00	Open
PI3	0.00	0.00	0.00	Open
PI4	4.05	0.03	0.00	Open

\*\*\*\*\*  
 \* E P A N E T \*  
 \* Hydraulic and Water Quality \*  
 \* Analysis for Pipe Networks \*  
 \* Version 2.0 \*  
 \*\*\*\*\*

Input File: 16534.net

MAXIMUM DAY DEMAND PLUS FIRE DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	RE1	JU1	1000	24
PI2	JU2	JU1	245	12
PI3	JU3	JU2	1026	12
PI4	JU2	JU4	298	8

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
JU1	0.00	2131.15	71.99	0.00
JU2	0.00	2130.97	73.65	0.00
JU3	0.00	2130.97	81.01	0.00
JU4	507.08	2129.42	70.38	0.00
RE1	-507.08	2131.17	0.00	0.00 Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/kft	Status
PI1	507.08	0.36	0.02	Open
PI2	-507.08	1.44	0.72	Open
PI3	0.00	0.00	0.00	Open
PI4	507.08	3.24	5.19	Open



\*\*\*\*\*  
 \* E P A N E T \*  
 \* Hydraulic and Water Quality \*  
 \* Analysis for Pipe Networks \*  
 \* Version 2.0 \*  
 \*\*\*\*\*

Input File: 16534.net

FIRE FLOW DEMAND @ 30 PSI

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
PI1	RE1	JU1	1000	24
PI2	JU2	JU1	245	12
PI3	JU3	JU2	1026	12
PI4	JU2	JU4	298	8

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
JU1	0.00	2129.83	71.42	0.00
JU2	0.00	2120.25	69.00	0.00
JU3	0.00	2120.25	76.37	0.00
JU4	4382.00	2036.26	30.01	0.00
RE1	-4382.00	2131.17	0.00	0.00 Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/kft	Status
PI1	4382.00	3.11	1.34	Open
PI2	-4382.00	12.43	39.11	Open
PI3	0.00	0.00	0.00	Open
PI4	4382.00	27.97	281.85	Open