3 engineering

The Toy Barn at the Airpark
Water Design Report

3 engineering Job #: 5008
July 11, 2017
COS# 314-PA-17

Accepted For:
City of Scottsdale
Water Resources Department
9379 E. San Salvador
Scottsdale, Arizona

By: _____
Date: 8/3/17

3engineering

planning civil engineering surveying

THE TOY BARN AT THE AIRPARK

WATER DESIGN REPORT

Prepared for:

7800 E Greenway LLC
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Scottsdale, Arizona 85255
Contact: Jason Phillips
Phone: (602) 920-3998

Expires 12/31/2018
Matthew J. Mancini, P.E.

July 11, 2017

Submittal to:

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Job Number 5008

Table of Contents

Tables

Appendices

Exhibits

1. Introduction

The purpose of this water report is to present the existing and proposed water plan for the project, The Toy Barn at the Airpark (Site). It is our opinion the proposed water concept is in accordance with the City of Scottsdale's Design Standards & Policies Manual (Ref. 1).

The Site, is located in Section 2, Township 3 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale, Arizona. The Site is located North of E. Greenway Road, and East of 78th Street, Scottsdale, Arizona 85254 (APN 215-47-003R). The Site is bound on the north and east by existing commercial development and an office building, respectively, on the south by Greenway Road, and on the west by 78th Street. See Appendix A for a Vicinity Map.

The Site is zoned I-1. The Site currently exists as a vacant un-developed parcel. The intent of this project is to construct 18 Garage Storage Condominiums and a Clubhouse, including new site utility, drainage, and circulatory infrastructure.

2. Design Documentation

Demands were calculated using the City of Scottsdale Design Standards and Policies Manual, which will serve as the basis of design for this project, and using Table 6.1-2 Average Day Demands. The site is in accordance with the City of Scottsdale design standards for water design.

3. Existing Conditions

The Site currently exists as a vacant un-developed parcel. See Appendix A for a vicinity map. The existing topography slopes from northeast to southwest at approximately 1/2 percent (0.5 %).

The Site is bounded on the north and east by an existing office building and commercial development, on the south by E. Greenway Road, and on the west by 78th Street. There is an existing 12" water line in Greenway Road. The 12" water line in Greenway Road will be used to service the proposed project. See Exhibit WE1 for water design.

4. Proposed Conditions

The project consists of an 18 Unit Garage Storage and Clubhouse project on 1.3 acres. The on-site water system will be private. The site proposes 6-inch fire lines with 6-inch building connections. Onsite Fire Service will be provided by the City of Scottsdale. See WE1 for the water design. The fire flow demand for the site is 1,500 gpm based on Section B105.1 of the International Fire Code at Type VB construction.

5. Computations

The following demand criteria were used in determining the system demands for the proposed site.

1. Domestic Demand (commercial) = 0.8 gallons per day/sf = 0.8 x 25,190 = 20,152 gpd or 14.0 gpm
2. Max Day Demand = 2.0 x 14.0 gpm = 28.0 gpm
3. Peak Hour Demand = 3.5 x 14.0 gpm = 49.0 gpm

TABLE 1: ON-SITE WATER DEMANDS	
Number of Units 18 w/ clubhouse (total square footage)	(25,190 total sf) Bldg A (7,500 sf) Bldg B (10,190 sf) Bldg C (7,500 sf)
Fire flow (2,750 gpm – 10,190 sf x 0.5 for sprinkler = 1,375 gpm) USE 1,500 gpm	1,500 gpm
Max Day Demand	28.0 gpm
Fire flow + Max Day Demand	1,528 gpm

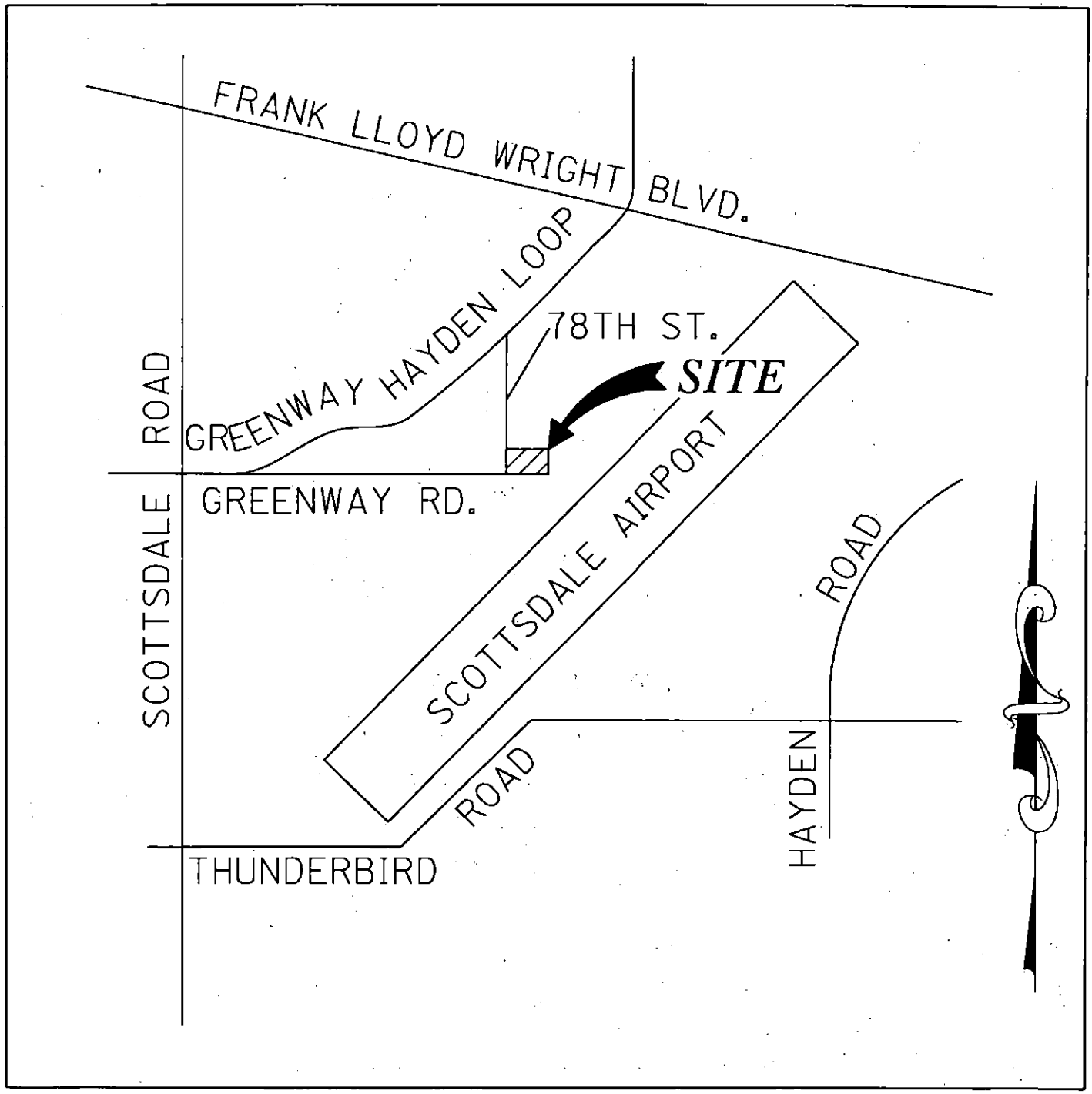
A WaterCAD model has been prepared to evaluate the onsite pressures at the onsite fire hydrants to assure adequate fire flow during emergency conditions. See Appendix C for the WaterCAD model results.

6. ***Summary***

The Max Day Plus Fire Flow demand for the proposed site is 1,528 gpm. Per the WaterCAD results, the minimum pressure at fire flow conditions is 65.03 psi without including a headloss through the site's backflow preventer. Therefore, this site meets the requirements for fire flow.

APPENDIX A

Vicinity Map



VICINITY MAP

N.T.S.

APPENDIX B

Fire Flow Test

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Toy Barn at the Airpark
Project Address:	7800 East Greenway Road, Scottsdale, Arizona 85260
Client Project No.:	5008
Arizona Flow Testing Project No.:	17094
Flow Test Permit No.:	C53004
Date and time flow test conducted:	April 27, 2017 at 8:00 AM
Data is current and reliable until:	October 27, 2017
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Phil Cipolla –City of Scottsdale-Inspector (602-828-0847)

Raw Test Data

Static Pressure: **82.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **70.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **26.0 PSI**
(Measured in pounds per square inch)

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

Coefficient of Diffuser: Big Boy Hose Monster

Flowing GPM: **1,917 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **4,653 GPM**

Data with 10 PSI Safety Factor

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

Residual Pressure: **60.0 PSI**
(Measured in pounds per square inch)

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

Distance between hydrants: Approx. 370 Feet

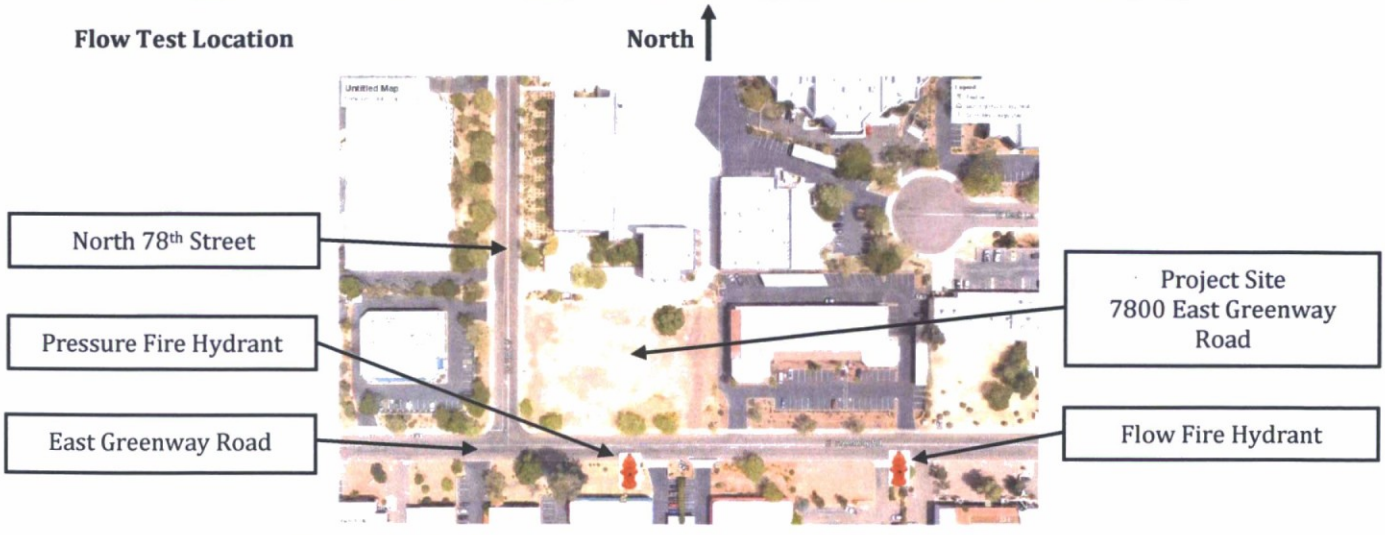
Main size: Not Provided

Flowing GPM: **1,917 GPM**

GPM @ 20 PSI: **4,231 GPM**

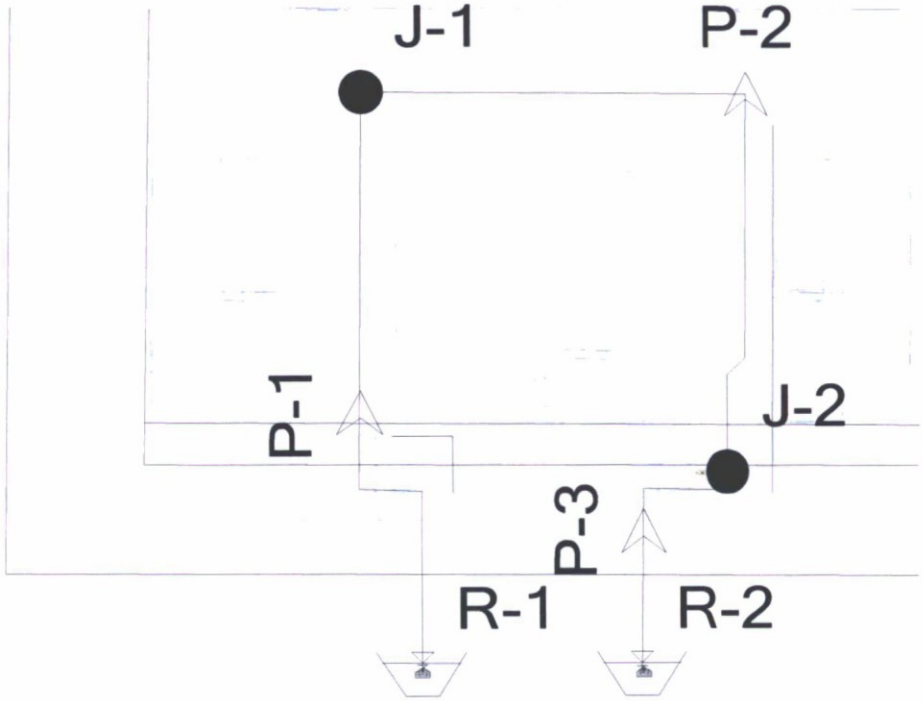
Flow Test Location

North



APPENDIX C

WaterCAD Model


J-1
P-2
P-1
J-2
P-3
R-1
R-2

Scenario: Avg Day
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	80.00	Zone	Demand	14.00	Fixed	14.00	243.85	70.89
J-2	78.80	Zone	Demand	0.00	Fixed	0.00	243.85	71.41

Scenario: Avg Day
Steady State Analysis
Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Check Valve?	Minor Loss Coefficient	Control Status	Discharge (gpm)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	232.00	6.0	Ductile Iron	130.0	false	0.00	Open	7.94	243.85	243.85	0.00	0.01	0.09
P-2	279.00	6.0	Ductile Iron	130.0	false	0.00	Open	-6.08	243.85	243.85	0.00	0.01	0.07
P-3	104.00	6.0	Ductile Iron	130.0	false	0.00	Open	-6.08	243.85	243.85	0.00	0.01	0.07

Steady State Analysis
Reservoir Report

Label	Elevation (ft)	Zone	Inflow (gpm)	Calculated Hydraulic Grade (ft)
R-1	243.85	Zone	-7.94	243.85
R-2	243.85	Zone	-6.06	243.85

Scenario: Max Day
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	80.00	Zone	Demand	28.00	Fixed	28.00	243.84	70.89
J-2	78.60	Zone	Demand	0.00	Fixed	0.00	243.85	71.41

Scenario: Max Day
Steady State Analysis
Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Check Valve?	Minor Loss Coefficient	Control Status	Discharge (gpm)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	232.00	6.0	Ductile Iron	130.0	false	0.00	Open	15.88	243.65	243.64	0.01	0.03	0.18
P-2	279.00	6.0	Ductile Iron	130.0	false	0.00	Open	-12.12	243.64	243.65	0.01	0.02	0.14
P-3	104.00	6.0	Ductile Iron	130.0	false	0.00	Open	-12.12	243.65	243.65	0.00	0.02	0.14

Steady State Analysis
Reservoir Report

Label	Elevation (ft)	Zone	Inflow (gpm)	Calculated Hydraulic Grade (ft)
R-1	243.85	Zone	-15.88	243.85
R-2	243.85	Zone	-12.12	243.85

Scenario: Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	80.00	Zone	Demand	49.00	Fixed	49.00	243.83	70.88
J-2	78.80	Zone	Demand	0.00	Fixed	0.00	243.84	71.41

Scenario: Peak Hour
Steady State Analysis
Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Check Valve?	Minor Loss Coefficient	Control Status	Discharge (gpm)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	232.00	6.0	Ductile Iron	130.0	false	0.00	Open	27.80	243.85	243.83	0.02	0.10	0.32
P-2	279.00	6.0	Ductile Iron	130.0	false	0.00	Open	-21.20	243.83	243.84	0.02	0.06	0.24
P-3	104.00	6.0	Ductile Iron	130.0	false	0.00	Open	-21.20	243.84	243.85	0.01	0.06	0.24

Steady State Analysis
Reservoir Report

Label	Elevation (ft)	Zone	Inflow (gpm)	Calculated Hydraulic Grade (ft)
R-1	243.85	Zone	-27.80	243.85
R-2	243.85	Zone	-21.20	243.85

Scenario: Max Day + Fire
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	80.00	Zone	Demand	1,549.00	Fixed	1,549.00	230.31	65.03
J-2	78.80	Zone	Demand	0.00	Fixed	0.00	240.17	69.82

Scenario: Max Day + Fire
Steady State Analysis
Pipe Report

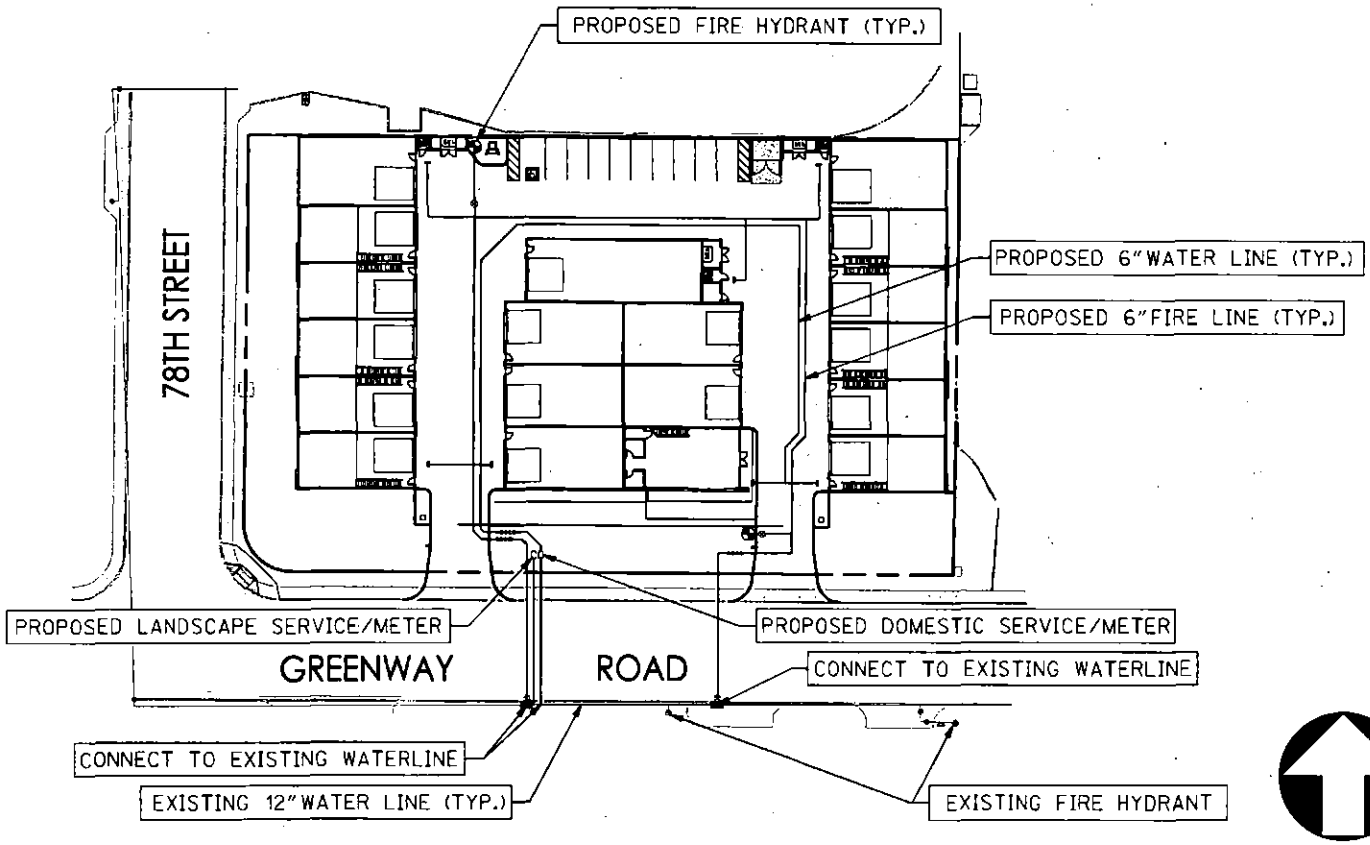
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Check Valve?	Minor Loss Coefficient	Control Status	Discharge (gpm)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	232.00	8.0	Ductile Iron	130.0	false	0.00	Open	878.69	243.85	230.31	13.54	58.37	9.97
P-2	279.00	8.0	Ductile Iron	130.0	false	0.00	Open	-670.31	230.31	240.17	9.86	35.36	7.61
P-3	104.00	8.0	Ductile Iron	130.0	false	0.00	Open	-670.31	240.17	243.85	3.68	35.36	7.61

Steady State Analysis
Reservoir Report

Label	Elevation (ft)	Zone	Inflow (gpm)	Calculated Hydraulic Grade (ft)
R-1	243.85	Zone	-878.69	243.85
R-2	243.85	Zone	-670.31	243.85

EXHIBIT 1

Water Design



SCALE: 1"=60'

WE1

TOY BARN AT THE AIRPARK

7800 E. GREENWAY ROAD SCOTTSDALE, AZ 85260

WATER EXHIBIT - WE1

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planning civil engineering surveying

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PHONE: (602) 334-4387 - FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 07/11/17

PROJECT NO. 5008

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