CITY OF SCOTTSDALE

Abbreviated Water and Sewer Needs

HUNTER
ENGINEERING
CIVIL AND SURVEY

Water Basis of Design Report
For
4440 Saddlebag Trail at
4440 North Saddlebag Trail
Scottsdale, Arizona 85251

FINAL Basis of Design Report

- ☐ APPROVED
- ☑ APPROVED AS NOTED
- ☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY ldillon DATE 11/2/2020

Registered Professional Engineer (Civil)
CERTIFICATE NO. 42104
LARRY M. TALBOTT
Date Signed 10/6/20
ARIZONA U.S.A

As-noted comments (for posterity):
1) gpm (not gpd) values from DS&PM table are to be used with peaking factors
2) City uses 2015 IFC code.
3) fire flow would be 75% reduction for sprinklers, irrelevant since min value used
4) pump curve should be based on reduced to 72psi max static pressure

As-noted comments to address on plans:
5) Water service line to be min 1" type K copper
6) Meter required to be located in easement in safe and accessible location for City. Sizing per IPC fixture count flow plus "continuous flow" X1.5 and use DS&PM table.
7) RPP backflow required on domestic meter in safe and accessible location to City but on private property.
8) PRV required for building due to static pressure.
9) Fire line riser room not shown, discuss and address details with fire dpt.

October 2020

Prepared by:
Hunter Engineering, Inc.
10450 North 74th Street, #200
Scottsdale, AZ 85258

WATER BASIS OF DESIGN REPORT
FOR

4440 SADDLEBAG TRAIL
AT 4440 NORTH SADDLEBAG TRAIL
SCOTTSDALE, ARIZONA 85251

PREPARED FOR

AV3 DESIGN STUDIO
PO BOX 16792
PHOENIX, AZ 85011

PREPARED BY

CESAR CAMPA
HUNTER ENGINEERING, Inc.
10450 NORTH 74TH STREET, #200
SCOTTSDALE, AZ 85258
(480) 991-3985

October 2020
H.E. PROJECT NO. ARTI011

TABLE OF CONTENTS

1.0 INTRODUCTION

This water basis of design report has been prepared under a contract from AV3 Design Studio, developer of the Saddlebag Trail project. The purpose of this report is to provide a final water analysis, required by the City of Scottsdale, to support this development. Preparation of this report has been done according to the procedures detailed in Chapter 6 of the *City of Scottsdale Design Standards & Policies Manual dated January, 2018 (CSDSPM) (Reference 1).*

This development project is located near the intersection of Camelback Road & Saddle Trail within the City of Scottsdale, Maricopa County, Arizona. The proposed project is located within an existing fully developed commercial site. The existing parcel is bound by commercial developments to the south, public alley to the north and west, and North Saddlebag Road to the east. The site is specifically located in Lot 31 and 32, of "camelback park plaza" book 86 of maps, page 13, office of recorder, Maricopa County, Arizona. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system. Access to the site is provided from Saddlebag Trail.

The development proposes the construction of a new two story restaurant/bar building. Site improvements will include construction of driveway entrances, sidewalk/hardscape, landscape areas, parking spaces and supporting infrastructure including water, sewer and fire line service. The overall project site is approximately 0.10 ac. Figure 2 illustrates the proposed improvements for the project.

2.0 EXISTING CONDITIONS

The proposed project is located on a commercial developed parcel. There is an existing 6" ACP public water line that runs across the N. Saddlebag Trail on the east side of the building. There is an existing domestic water service to the site. The size is not shown on the city quarter section maps or the ALTA survey provided.

3.0 PROPOSED WATER DISTRIBUTION SYSTEM

The new building, will connect to the existing 6" ACP on North Saddlebag Trail for a new domestic and fire service. See Water Exhibit located in the appendix.

Figure 6.1-2 in the City of Scottsdale *Design Standards & Policies Manual* was used to calculate the Average Day Demand (ADD). Per Table 6.1-2, 1.3 gallons per day (gpd) per square feet for restaurant use was used. The Maximum Day Demand is 2.0 times the ADD, and the Peak Hour Demand (PHD) is 3.5 times the ADD. See Appendix B for a summary of these calculations.

The proposed 1st floor will be 2,374 square feet, and 2nd floor is 416 square feet. The building will be type V-B construction. Per the 2006 International Fire Code, the minimum base

fire flow rate for a 1st floor of this size and construction type is 1500 gallons per minute (GPM). A fire flow of 1,500 GPM is used for the site analysis. Per City of Scottsdale, pressure requirements, minimum acceptable design pressures are 30 psi at the hydrant under design fire flow requirements and minimum residual pressure 50 psi at highest finished floor for domestic demand. The required and the calculated fire flows are tabulated below.

Building	Construction Type	Building Area (sf)	Minimum Required Fire Flow for Buildings Table B105.1 2006 International Fire Code		Min Fire Flow w/ 50% Sprinkler Reduction	Lowest Available Pressure (psi)	Model Node
1st Floor	V-B	2,374	1500	gpm	1,500	94.20	J2
2nd Floor	V-B	416	1500	gpm	1,500	94.20	J2
1st Floor Patio	V-B	214	1500	gpm	1,500	94.20	J2
2nd Floor Patio	V-B	2,165	1500	gpm	1,500	94.20	J2

A City of Scottsdale fire flow test was completed on December 27, 2019, by Arizona Flow Testing, LLC. This test data was used to model the proposed system using WaterCad, a pipe network analysis program by Haestad Methods. A reservoir and pump was added to the model near the flow test location to simulate pressure versus flow curve. Note that the pipes PX-1 and PX-2 connecting the pumps and reservoirs are not a part of the system and are oversized to 120-inches to minimize system losses. Pipes and junctions were added to the network model matching the pipe sizes, materials and elevations of the proposed and existing system.

The fire flow model was set up such that full fire flow demand was taken out of the main node adjacent to the site. The lowest resultant pressure based upon the required fire flow was calculated to be 94.20 psi, at J-2. Results and data from the WaterCAD is shown in Appendix B.

4.0 CONCLUSIONS

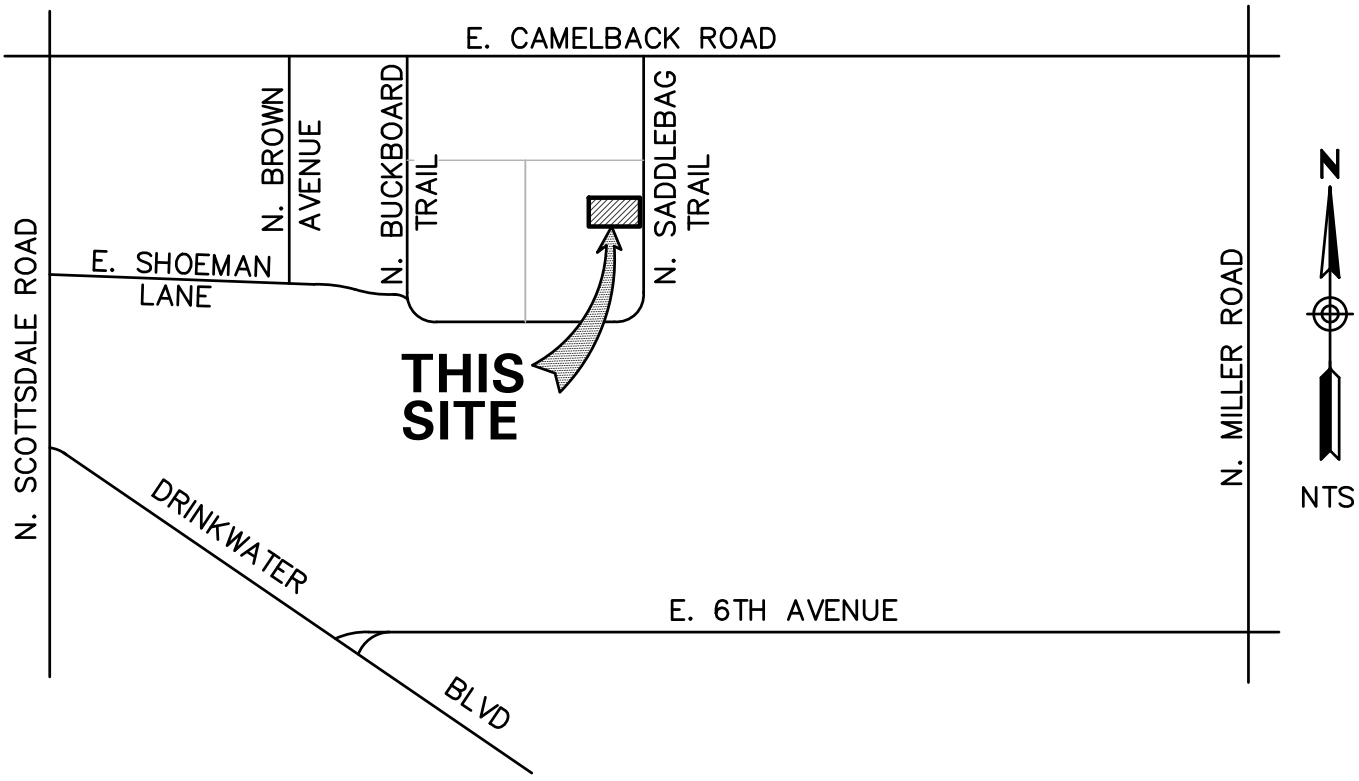
Based on the results of this study, it can be concluded that:

- The existing public water system is adequate to support this development.

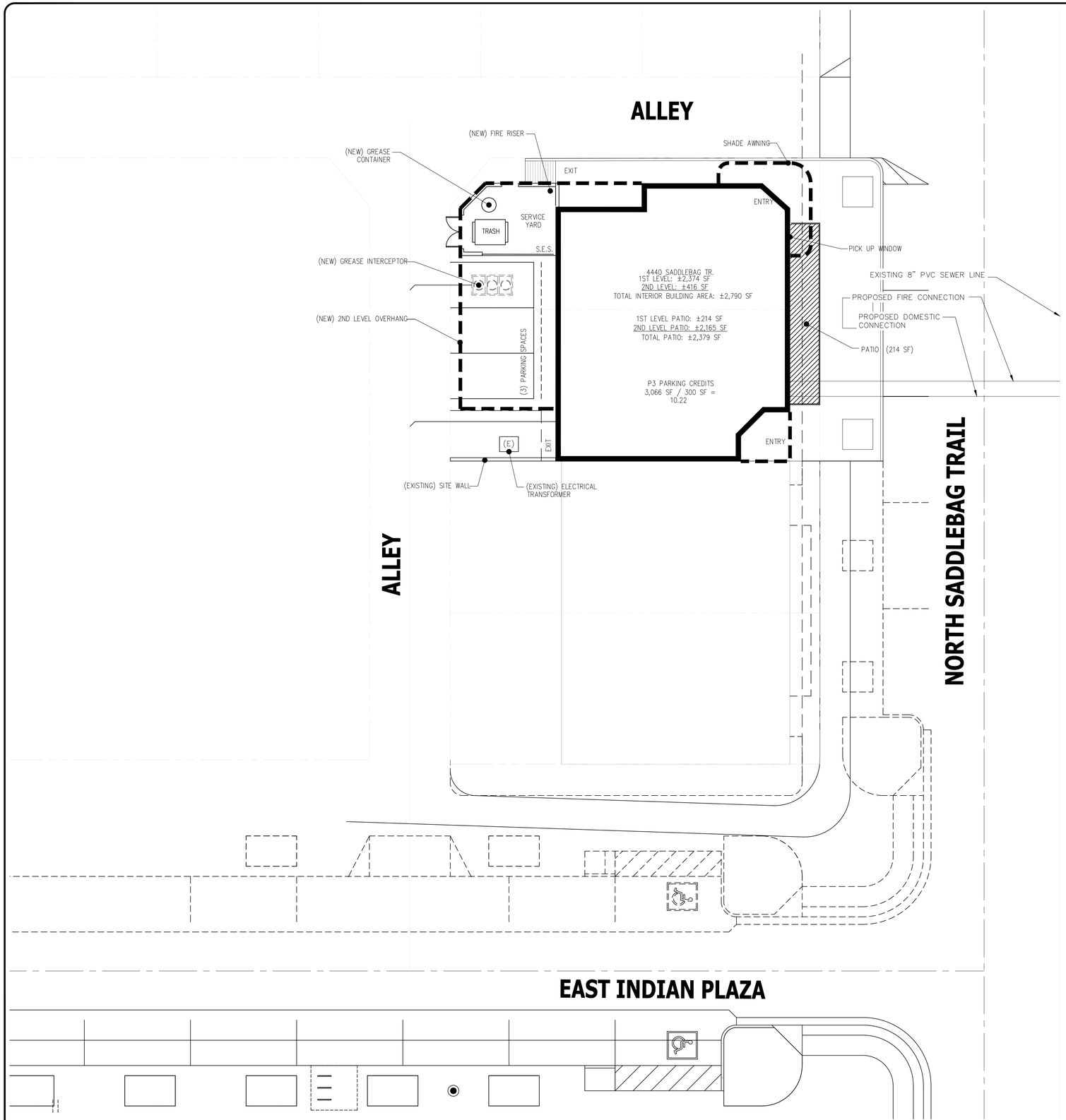
5.0 REFERENCES

1) City of Scottsdale Design Standard & Policies Manual, January 2018.

APPENDIX A
FIGURES



VICINITY MAP
FIGURE 1



NO.	DATE	REVISION	BY

PURPOSE:
SEWER REPORT EXHIBIT

DESIGN BY: LT
DRAWN BY: CC
CHECKED BY: LT

HUNTER ENGINEERING
CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

WATER EXHIBIT
FOR
SADDLEBAG TRAIL
4440 SADDLEBAG TRAIL
SCOTTSDALE, AZ. 85251

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION.
AR ZONA811 BLUE STAKE, INC.
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

PROJECT NAME:
SADDLEBAG TRAIL

HE NO.: ARTI011
SCALE: 1:10

SHEET:
EX 1

APPENDIX B
CALCULATIONS AND DATA SHEET

Project:	SADDLEBAG	10/5/2020
Project Number:	ARTI011	
City:	Scottsdale	
Area Building:	0.10 AC	

DOMESTIC DEMAND SUMMARY *(PER CITY OF SCOTTSDALE DESIGN STANDARD AND POLICIES MANUAL, JULY 2018)*

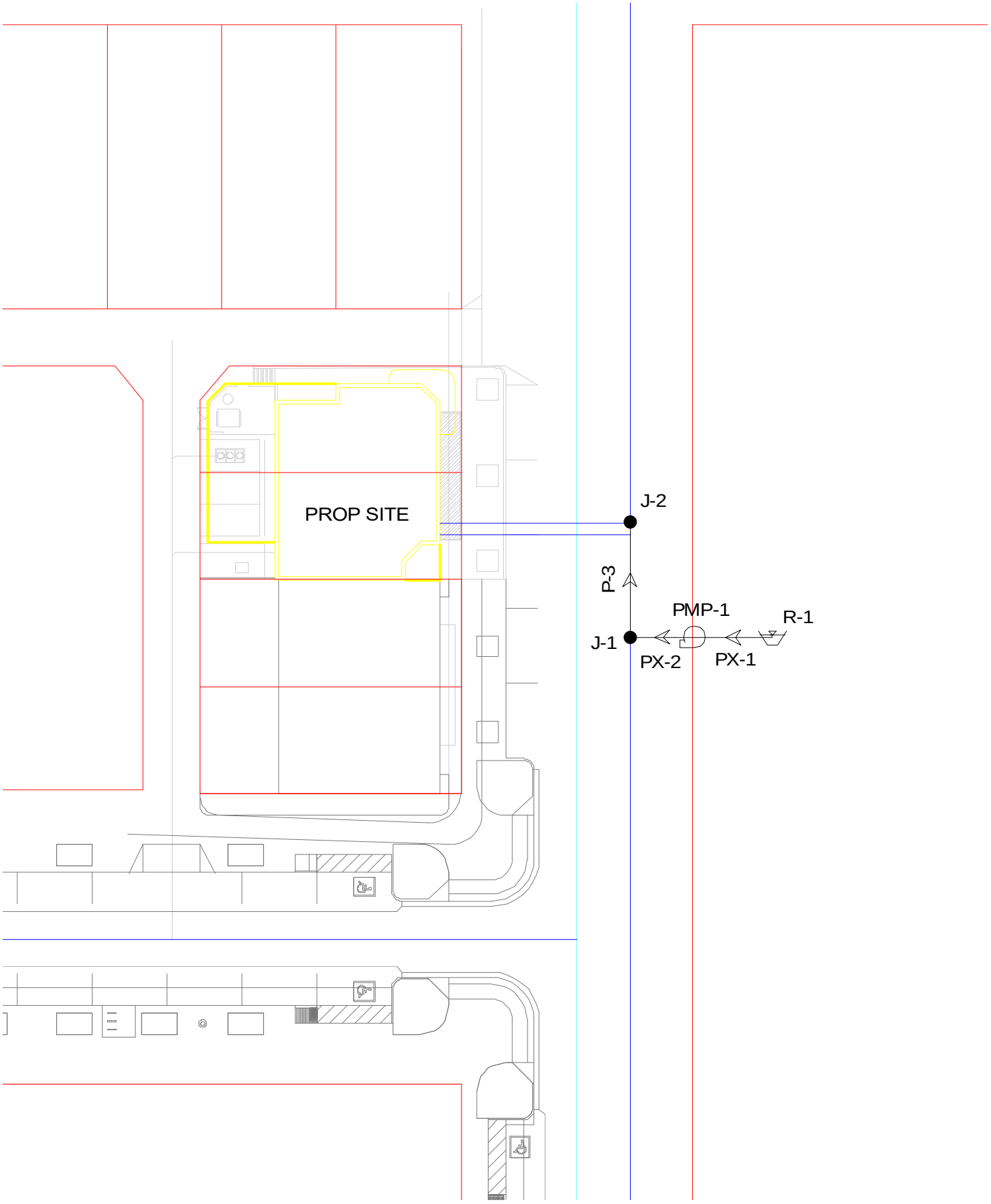
Site	Site Use	Building Area (sf)	Average Day Demand (gpd) Gross Bldg Area (sf) per Table 6-1.2 Average Day Water Demands	Average Day Demand (ADD) (gpd)	Max Day Demand (MDD) (ADD*2.0) (gpd)	Average Day Demand (ADD) (gpm)	Max Day Demand (MDD) (ADD*2.0) (gpm)	Peak Hour Demand (PHD) (ADD*3.0) (gpm)
1st Floor	Restaurant	2,374	1.3 per sf	3,086	6,172	2.1	4.3	6.4
2nd Floor	Restaurant	416	1.3 per sf	541	1,082	0.4	0.8	1.1
1st Floor Patio	Restaurant	214	1.3 per sf	278	556	0.2	0.4	0.6
2nd Floor Patio	Restaurant	2,165	1.3 per sf	2,815	5,629	2.0	3.9	5.9
			Total:	**6,720**	**13,439**	**4.7**	**9.3**	**14.0**

FIRE FLOW SUMMARY

Building	Construction Type	Building Area (sf)	Minimum Required Fire Flow for Buildings Table B105.1 2006 International Fire Code	Min Fire Flow w/ 50% Sprinkler Reduction	Lowest Available Pressure (psi)	Model Node	Sprinkler Reduction Required	Building Sprinklered
1st Floor	V-B	2,374	1,500 gpm	1,500.0	94.20	J2	NO	YES
2nd Floor	V-B	416	1,500 gpm	1,500.0	94.20	J2	NO	YES
1st Floor Patio	V-B	214	1,500 gpm	1,500.0	94.20	J2	NO	YES
2nd Floor Patio	V-B	2,165	1,500 gpm	1,500.0	94.20	J2	NO	YES
	Total:	5,169						

* Minimum acceptable design pressures are 40 psi under Peak Hour demands and 20 psi under Max Day + Fire Flow demands.

Scenario: Peak



Hunter Engineering, Inc
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666
Project Engineer: Larry Talbott
Water

Scenario: Peak
Steady State Analysis
Junction Report

Label	Elevation (ft)	Base Flow (gpm)	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	0.00	0.00	240.24	103.94
J-2	0.00	14.00	14.00	240.24	103.94

Scenario: Fire
Steady State Analysis
Junction Report

Label	Elevation (ft)	Base Flow (gpm)	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	0.00	0.00	222.80	96.40
J-2	0.00	1,509.30	1,509.30	217.72	94.20

Hunter Engineering, Inc
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

Scenario: Hydrant Test 1
Steady State Analysis
Junction Report

Label	Elevation (ft)	Base Flow (gpm)	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	0.00	0.00	240.24	103.94
J-2	0.00	0.00	0.00	240.24	103.94

Scenario: Hydrant Test 2
Steady State Analysis
Junction Report

Label	Elevation (ft)	Base Flow (gpm)	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	2,882.00	2,882.00	182.49	78.95
J-2	0.00	0.00	0.00	182.49	78.95

Hunter Engineering, Inc
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

Scenario: Hydrant Test 3
Steady State Analysis
Junction Report

Label	Elevation (ft)	Base Flow (gpm)	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	5,546.00	5,546.00	46.20	19.99
J-2	0.00	0.00	0.00	46.20	19.99

Hunter Engineering, Inc
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

Scenario: Peak
Steady State Analysis
Pipe Report

Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-3	32.00	6.0	Ductile Iron	130.0	14.00	240.24	240.24	0.00	0.03	0.16
PX-1	1.00	120.0	Ductile Iron	130.0	14.00	0.00	-0.00	0.00	0.00	0.00
PX-2	1.00	120.0	Ductile Iron	130.0	14.00	240.24	240.24	0.00	0.00	0.00

Detailed Report for Pump: PMP-1

Scenario Summary	
Scenario	Peak
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

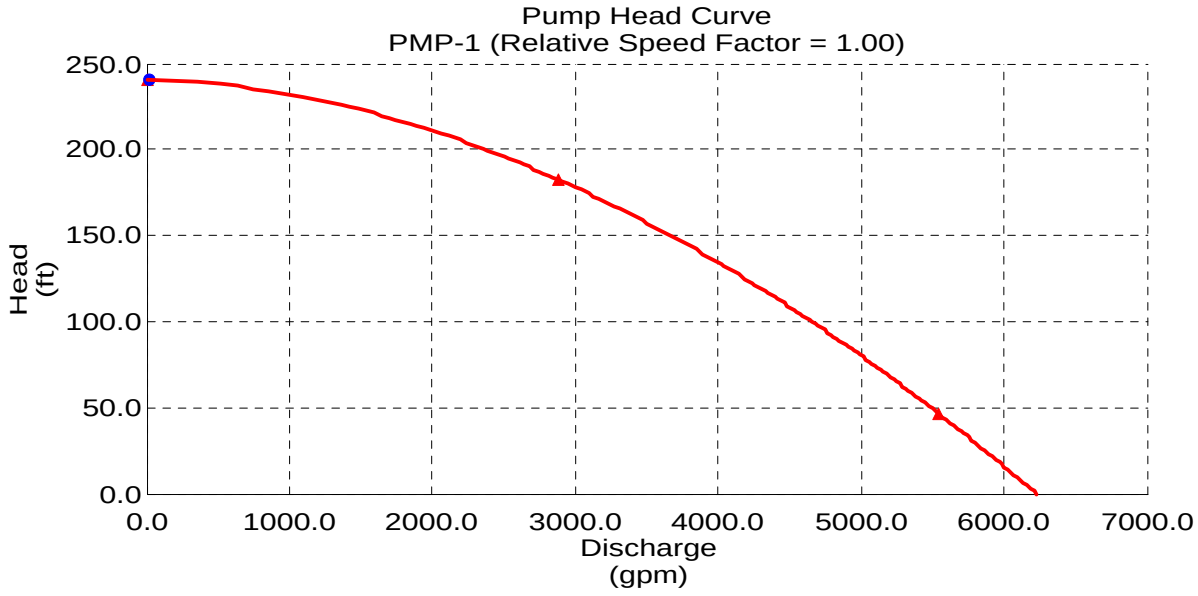
Geometric Summary				
X	-71.80	ft	Upstream Pipe	PX-1
Y	17,654.22	ft	Downstream Pipe	PX-2
Elevation	0.00	ft		

Pump Definition Summary	
Pump Definition	Default Pump Definition

Initial Status			
Initial Pump Status	On	Initial Relative Speed Facto	1.00

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	On	-0.00	240.24	14.00	240.24	1.00	0.85



Hunter Engineering, Inc
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

Detailed Report for Reservoir: R-1

Scenario Summary	
Scenario	Peak
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	-49.96 ft	Elevation	0.00 ft
Y	17,653.97 ft	Zone	Zone

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	0.00	14.00	14.00

APPENDIX C
FIRE HYDRANT FLOW TEST

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	4440 Saddlebag Trail
Project Address:	4440 North Saddlebag Trail, Scottsdale, Arizona, 85251
Client Project No.:	ARTI011
Arizona Flow Testing Project No.:	19482
Flow Test Permit No.:	C60846
Date and time flow test conducted:	December 27, 2019 at 7:30 AM
Data is current and reliable until:	June 27, 2020
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **104.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **79.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **45.0 PSI**

(Measured in pounds per square inch)

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

Coefficient of Diffuser: 0.9

Flowing GPM: **2,882 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **5,546 GPM**

Data with 32 PSI Safety Factor

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

Residual Pressure: **47.0 PSI**
(Measured in pounds per square inch)

Distance between hydrants: Approx.: 370 feet

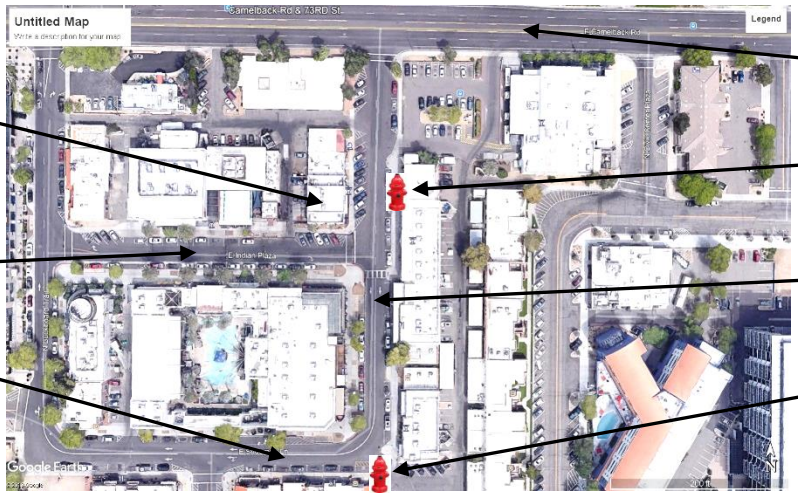
Main size: Not Provided

Flowing GPM: **2,882 GPM**

GPM @ 20 PSI**:** **4,281 GPM**

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

Flow Test Location **North**



Project Site
4440 North Saddlebag Trail

East Indian Plaza

East Shoeman Lane

East Indian School Road

Pressure Fire Hydrant

North Saddlebag Trail

Flow Fire Hydrant

APPENDIX D
REFERENCES

d. Pipe flow velocity in feet per second (fps)
e. Each pipe segment's head loss rate (ft. /1,000ft or psi/ft.)
f. PRVs: Upstream and downstream pressures (psi or HGL elevation)
g. Tanks: Inflow and outflow (gpm)
h. Shows all units for the values presented or provide a legend on the diagram page that indicates the units used

AVERAGE DAY WATER DEMANDS [1]							
IN GALLONS PER DAY (GPD) [2]				IN GALLONS PER MINUTE (GPM) [2][3]			
Land Use	Inside Use	Outside Use	Total Use	Inside Use	Outside Use	Total Use	Units
Residential Demand per Dwelling Unit							
< 2 dwelling unit per acre (DU/ac)	208.9	276.7	485.6	0.30	0.39	0.69	per unit
2 – 2.9 DU/ac	193.7	276.7	470.4	0.27	0.39	0.66	per unit
3 – 7.9 DU/ac	175.9	72.3	248.2	0.25	0.11	0.36	per unit
8 – 11.9 DU/ac	155.3	72.3	227.6	0.22	0.11	0.33	per unit
12 – 22 DU/ac	155.3	72.3	227.6	0.22	0.11	0.33	per unit
High Density Condominium (condo)	155.3	30	185.3	0.22	0.05	0.27	per unit
Resort Hotel (includes site amenities)	401.7	44.6	446.3	0.56	0.07	0.63	per room
Service and Employment							
Restaurant	1.2	0.1	1.3	1.67E-03	1.39E-04	1.81E-03	per square foot (sq.ft.)
Commercial/ Retail	0.7	0.1	0.8	9.73E-04	1.39E-04	1.11E-03	per sq.ft.
Commercial High Rise	0.5	0.1	0.6	6.95E-04	1.39E-04	8.34E-04	per sq.ft.

AVERAGE DAY WATER DEMANDS [1]							
IN GALLONS PER DAY (GPD) [2]				IN GALLONS PER MINUTE (GPM) [2][3]			
Office	0.5	0.1	0.6	6.95E-04	1.39E-04	8.34E-04	per sq.ft.
Institutional	670	670	1340	0.94	0.94	1.88	per acre
Industrial	873	154	1027	1.22	0.22	1.44	per acre
Research and Development	1092	192	1284	1.52	0.27	1.79	per acre
Special Use Areas							
Natural Area Open Space	0	0	0	0.0	0.0	0.0	per acre
Developed Open Space – Parks	0	1786	1786	0.0	2.49	2.49	per acre
Developed Open Space – Golf Course	0	4285	4285	0.0	5.96	5.96	per acre

Notes:
(1) These values shall not be used directly for service line or water meter sizing.
(2) Gallon per day values are provided for reference only. The instantaneous gallon per minute flow rates presented are intended for use in the required hydraulic modeling scenarios. The gpm values assume a 12-hour active water use period per 24-hour day. In large or specialty developments or master plans the hydraulic analysis criteria and parameters should be discussed with the Water Resources Department. Seasonal peaking should also be considered. Upon review, the Water Resources Department reserves the right to designate flows to be used in hydraulic modeling scenarios that may be different from those presented here.
(3) The hydraulic modeling peaking factors used in select modeling scenarios are to be applied to the gpm values shown here. Max day and peak hour peaking factors can be found in Section 6-1.404.

FIGURE 6-1.2 AVERAGE DAY WATER DEMANDS

HUNTER
ENGINEERING

CIVIL AND SURVEY

Sewer Basis of Design Report
For
4440 Saddlebag Trail at
4440 North Saddlebag Trail
Scottsdale, Arizona 85251

FINAL Basis of Design Report

- ☐ APPROVED
- ☑ APPROVED AS NOTED
- ☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY ldillon DATE 11/2/2020

As-noted comments to address on plans:
1) Utilize MAG detail 440-3 for 6" service connection.

Registered Professional Engineer (Civil)
CERTIFICATE NO. 42104
LARRY M. TALBOTT
Date Signed 10/6/20
ARIZONA U.S.A

October 2020

Prepared by:
Hunter Engineering, Inc.
10450 North 74th Street, #200
Scottsdale, AZ 85258

SEWER BASIS OF DESIGN REPORT
4440 SADDLEBAG TRAIL AT
4440 NORTH SADDLEBAG TRAIL
SCOTTSALE, ARIZONA 85251

PREPARED FOR

AV3 DESIGN STUDIO
PO Box 16792
PHOENIX, AZ 85011

PREPARED BY

CESAR CAMPA
HUNTER ENGINEERING, INC.
10450 NORTH 74TH STREET, #200
SCOTTSDALE, AZ 85258
(480) 991-3985

October 2020
H.E. PROJECT NO. ARTI011

Table of Contents

1.0 INTRODUCTION

This sewer basis of design report has been prepared under a contract from AV3 Design Studio, developer of the Saddlebag Trail project. The purpose of this report is to provide a final sewer analysis, required by the City of Scottsdale, to support this development. Preparation of this report has been done according to the procedures detailed in Chapter 7 of the *City of Scottsdale Design Standards & Policies Manual dated January, 2018 (CSDSPM) (Reference 1).*

This development project is located near the intersection of Camelback Road & Saddle Trail within the City of Scottsdale, Maricopa County, Arizona. The proposed project is located within an existing fully developed commercial site. The existing parcels are bound by commercial developments to the south, public alley to the north and west, and North Saddlebag Road to the east. The site is specifically located in Lot 31 and 32, of "camelback park plaza" book 86 of maps, page 13, office of recorder, Maricopa County, Arizona. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system. Access to the site is provided from Saddlebag Trail.

The development proposes the construction of a new two-story restaurant/bar building. Site improvements will include construction of driveway entrances, sidewalk/hardscape, landscape areas, parking spaces and supporting infrastructure including water, sewer and fire line service. The overall project site is approximately 0.10 ac. Figure 2 illustrates the proposed improvements for the project.

2.0 EXISTING CONDITIONS

The proposed project is located on an existing commercially developed parcel. There is an existing 8" public sewer main running north and south in the existing public alley. The site has an existing sewer service; however, no sizes are provided on the city quarter section maps or the survey provided for this project.

3.0 PROPOSED IMPROVEMENTS

This project proposes to connect to the existing public 8-inch gravity sewer main in the alley. It is anticipated that the project will have a grease interceptor. It will either tie the grease and domestic waste into a single service or utilize two new services. This will be determined with the final plumbing plans prepared by the plumbing consultant with the construction documents.

Wastewater flows for the proposed site were calculated in accordance with the CSDSPM (Reference 1). A restaurant uses average day sewer demand (ADSD) of 1.2 and peaking factor of 6 for restaurant use was obtained from the CSDSPM Figure 7.1-2. According to the calculations provided in Appendix B, the proposed Building will have an estimated Average Daily Flow of 6,203 GPD and a Peak Hour Flow of 25.8 GPM. This demand was used to calculate the proposed and existing pipe capacities.

The capacity analysis calculation for the proposed 6” sewer lines is as follows:

- With 1.1% slope flowing full, the capacity is 264 GPM.
- With 1.1% slope flowing 2/3 full, the capacity is 204 GPM.
- With 1.1% slope flowing ½ full, the capacity is 132 GPM.

The capacity of the proposed 6” sewer lines under three scenarios is greater than the estimated Peak Hour Flow of 25.8 GPM generated from restaurant bar.

The sanitary sewer pipe and fitting material for this project has been designated as PVC SDR-35. Trenching and bedding details for this project are to be per MAG Standard Specifications Section 601. Trench width above the installed pipe may be as wide as necessary to properly brace/install the work. Bedding, backfill and compaction shall be installed per MAG Standard Specification 601.4.

4.0 CONCLUSIONS

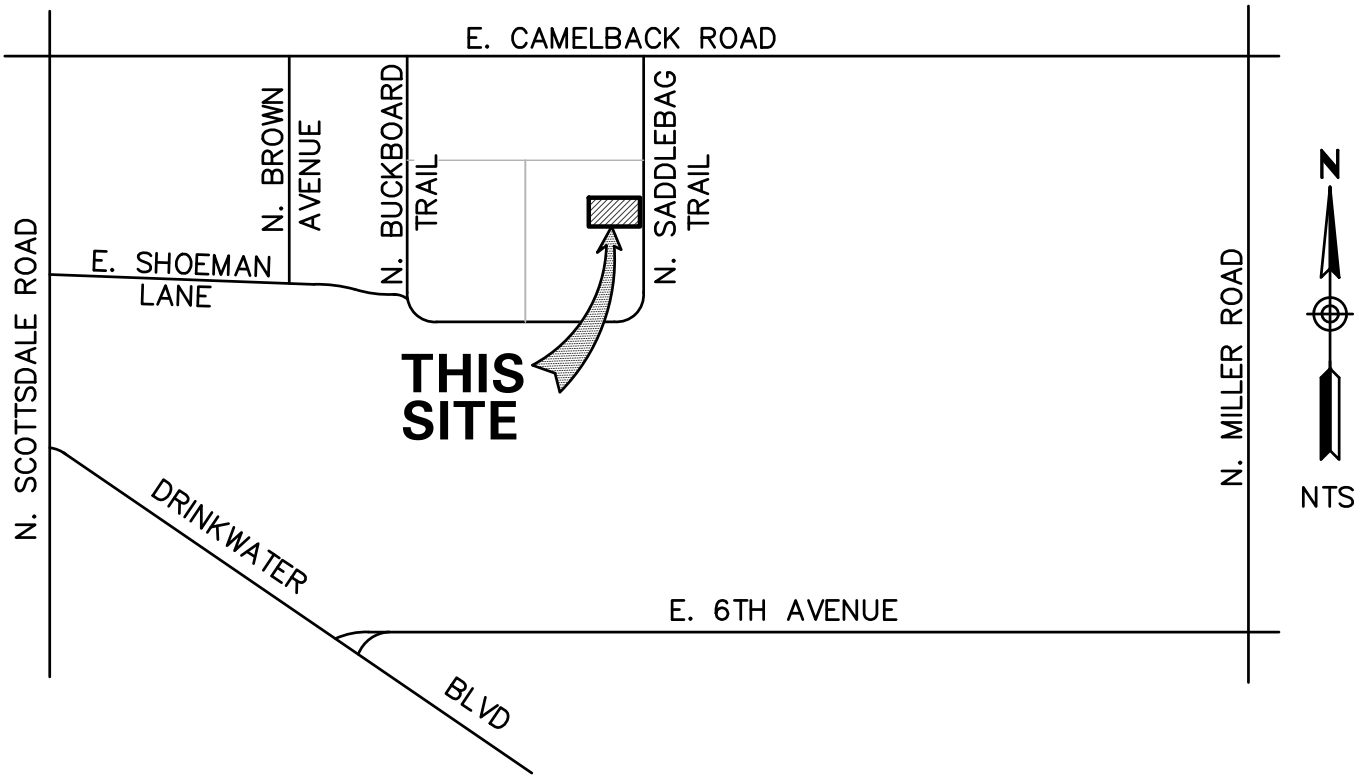
Based on the results of this study, it can be concluded that:

- The existing private wastewater service line is adequate to serve the site wastewater demand requirements, as set forth by the City of Scottsdale.
- The City of Scottsdale has adequate capacity in their system to accommodate the proposed development.

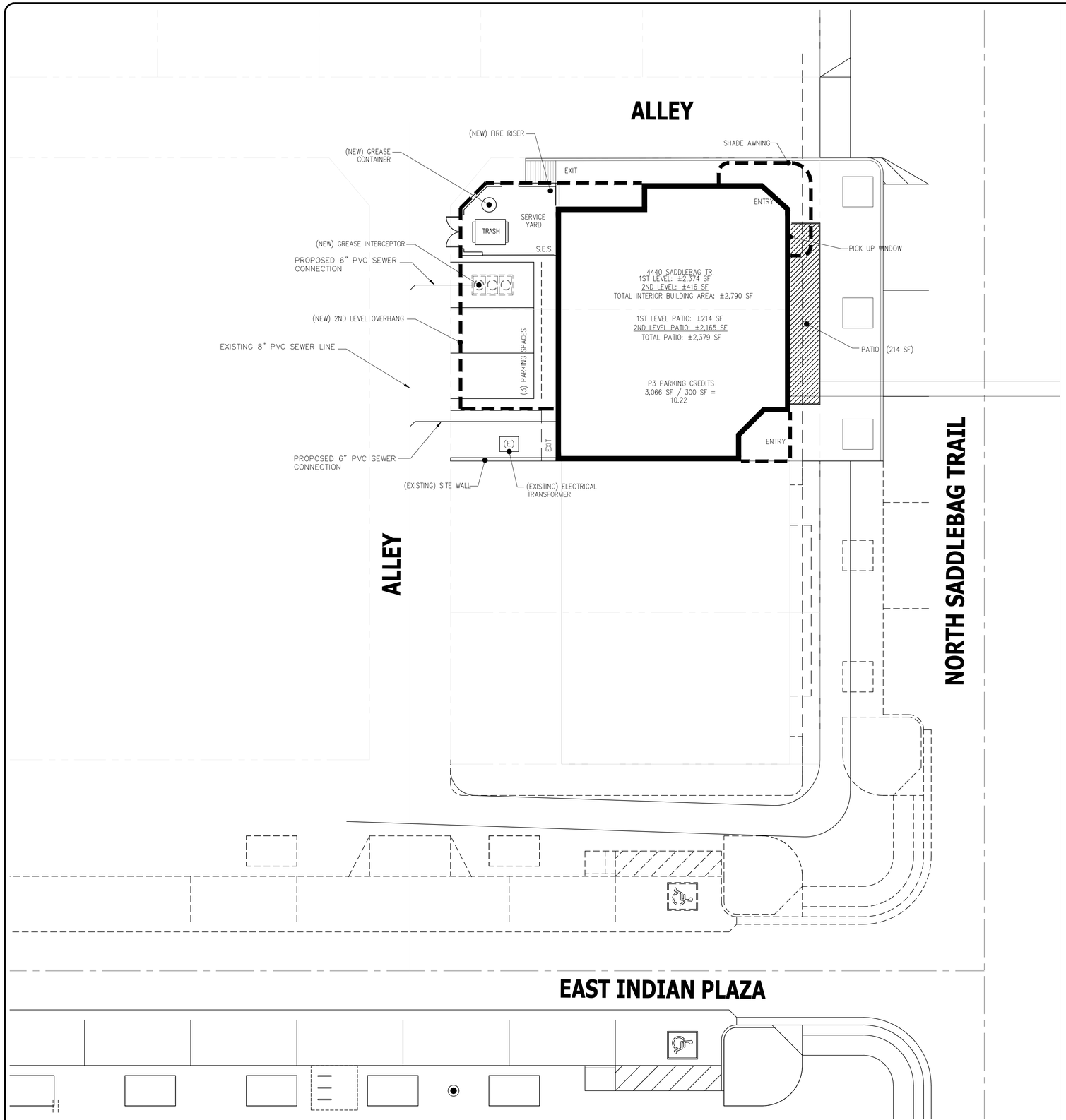
5.0 REFERENCES

1) City of Scottsdale Design Standards & Policies Manual, 2018.

APPENDIX A
FIGURES



VICINITY MAP
FIGURE 1



NO.	DATE	REVISION	BY

PURPOSE:
SEWER REPORT EXHIBIT

DESIGN BY: LT
DRAWN BY: CC
CHECKED BY: LT

HUNTER ENGINEERING
CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ. 85258
T 480 991 3985
F 480 991 3986

SEWER EXHIBIT FOR SADDLEBAG TRAIL 4440 SADDLEBAG TRAIL SCOTTSDALE, AZ. 85251

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
AR ZONA811 BLUE STAKE, INC.
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

PROJECT NAME:
SADDLEBAG TRAIL

HE NO.: ARTI011
SCALE: 1:10

SHEET:
EX 1

APPENDIX B
SEWER CAPACITY WORKSHEETS

Project: SADDLEBAG
Project No.: ARTI011
City: SCOTTSDALE, AZ
Date: 10/5/2020

PROJECTED SANITARY SEWER LOADS

Land Use	Building Area (sf)	Average Day Sewer Demand (gpd) City of Scottsdale Figure 7-1.2 (Restaurant)		Peaking Factor Figure 7-1.2	Average Daily Flow (gpd)	Average Daily Flow (gpm)	Peak Flow (gpm)
1st floor	2,374	1.2	per sf	6	2,849	2.0	12.0
2nd floor	416	1.2	per sf	6	499	0.3	1.8
1st floor patio	214	1.2	per sf	6	257	0.2	1.2
2nd floor patio	2,165	1.2	per sf	6	2,598	1.8	10.8
Total					**6,203**		**25.8**

HUNTER
ENGINEERING

6" d/D = 1/2 @ 1.1%
Worksheet for Circular Channel

Project Description	
Worksheet	6" d/D = 1/2 @ 1.1%
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coeffic	0.013	
Channel Slope	1.10	%
Depth	0.25	ft
Diameter	6.0	in

Results			
Discharge	132.06	gpm	**>25.8 gpm**
Flow Area	0.1	ft²	
Wetted Perime	0.79	ft	
Top Width	0.00	ft	
Critical Depth	0.27	ft	
Percent Full	50.0	%	
Critical Slope	0.81	%	
Velocity	3.00	ft/s	
Velocity Head	0.14	ft	
Specific Energy	0.39	ft	
Froude Number	1.19		
Maximum Disc	284.12	gpm	
Discharge Full	264.12	gpm	
Slope Full	0.27	%	
Flow Type	Supercritical		

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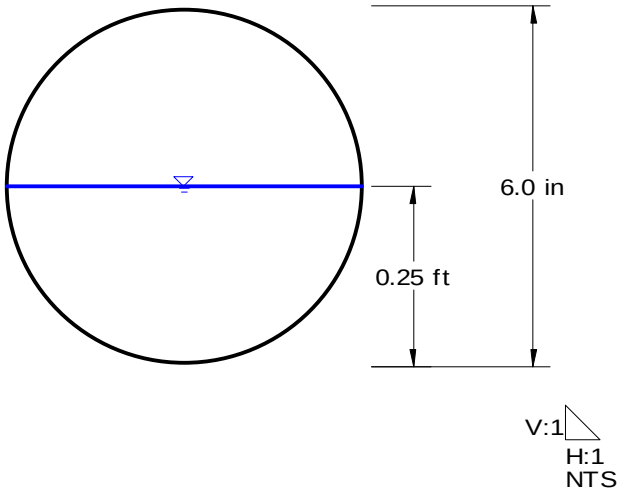
6" d/D = 1/2 @ 1.1%
Cross Section for Circular Channel

Project Description	
Worksheet	6" d/D = 1/2 @ 1.1%
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coeffic	0.013	
Channel Slope	1.10	%
Depth	0.25	ft
Diameter	6.0	in
Discharge	32.06	gpm



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6" d/D = 2/3 @ 1.1.%
Worksheet for Circular Channel

Project Description	
Worksheet	6" d/D = 2/3 @ 1.1%
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coeffic	0.013	
Channel Slope	1.10	%
Depth	0.33	ft
Diameter	6.0	in

Results			
Discharge	204.15	gpm	**>25.8 gpm**
Flow Area	0.1	ft²	
Wetted Perime	0.95	ft	
Top Width	0.00	ft	
Critical Depth	0.34	ft	
Percent Full	66.0	%	
Critical Slope	0.99	%	
Velocity	3.31	ft/s	
Velocity Head	0.17	ft	
Specific Energy	0.50	ft	
Froude Numbe	1.08		
Maximum Disc	284.12	gpm	
Discharge Full	264.12	gpm	
Slope Full	0.66	%	
Flow Type	Supercritical		

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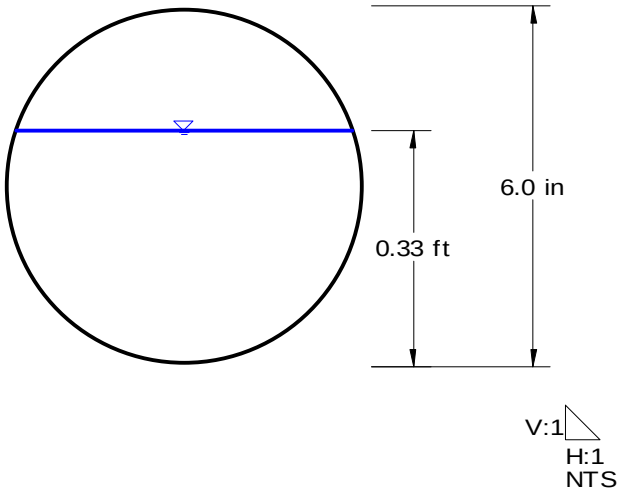
6" d/D=2/3 S=1.1
Cross Section for Circular Channel

Project Description	
Worksheet	6" d/D = 2/3 @ 1.1%
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.013	
Channel Slope	1.10	%
Depth	0.33	ft
Diameter	6.0	in
Discharge	204.15	gpm



6" Full Capacity @ 1.1%
Worksheet for Circular Channel

Project Description	
Worksheet	6" Full @ 1.1%
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coeffic	0.013	
Channel Slope	1.10	%
Depth	0.50	ft
Diameter	6.0	in

Results			
Discharge	264.12	gpm	**>25.8 gpm**
Flow Area	0.2	ft²	
Wetted Perime	1.57	ft	
Top Width	0.00	ft	
Critical Depth	0.39	ft	
Percent Full	100.0	%	
Critical Slope	1.21	%	
Velocity	3.00	ft/s	
Velocity Head	0.14	ft	
Specific Energy	0.64	ft	
Froude Numbe	0.00		
Maximum Disc	284.12	gpm	
Discharge Full	264.12	gpm	
Slope Full	1.10	%	
Flow Type	Subcritical		

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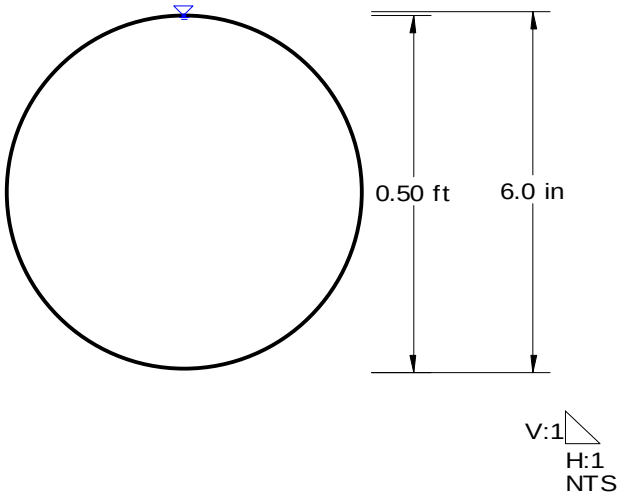
6" Full Capacity @ 1.1%
Cross Section for Circular Channel

Project Description	
Worksheet	6" Full @ 1.1%
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coeffic	0.013	
Channel Slope	1.10	%
Depth	0.50	ft
Diameter	6.0	in
Discharge	264.12	gpm



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APPENDIX C
REFERENCE MATERIAL

LAND USE	DEMAND (gpd)	DESIGN PEAKING FACTOR
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium (Condo)	140 per unit	4.5
Resort Hotel (includes site amenities)	380 per room.	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3
Clubhouse for Subdivision Golf Course	100 per patron x 2 patrons per du per day	4.5
Fitness Center/ Spa/ Health club	0.8 per sq. ft.	3.5

FIGURE 7-1.2 AVERAGE DAY SEWER DEMAND IN GALLONS PER DAY & PEAKING FACTORS BY LAND USE

HYDRAULIC DESIGN 7-1.404

No public SS lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

SS lines shall be designed and constructed to give mean full flow velocities equal to or greater than 2.5 fps, based upon Manning's Formula, using an "n" value of 0.013.

To prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities shall be analyzed for minimum, average day and peak day design flow conditions for each reach of pipe.

The SS system shall be designed to achieve uniform flow velocities through consistent slopes. Abrupt changes in slope shall be evaluated for hydraulic jump.

The depth to diameter ratio (d/D) for gravity SS pipes 12 inches in diameter and less shall not exceed 0.65 in the ultimate peak flow condition. This d/D ratio includes an allowance for system infiltration and inflow.

The d/D for gravity drains greater than 12 inches diameter shall not exceed 0.70 for the ultimate peak flow condition. This d/D includes an allowance for system infiltration and inflow.

Measures to mitigate hydrogen sulfide shall be analyzed at manhole drops, abrupt changes in pipe slope or direction and at changes in pipe diameter.

MANHOLES AND CLEAN OUTS 7-1.405

Manholes in city streets shall be located near the center of the inside traffic lane, rather than on or near the line separating traffic lanes. Manholes shall not be in bike trails, equestrian trails, sidewalks, crosswalks or wash crossings. Manholes are required at all