Phone: 623 • 547 • 2500
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85340

PRELIMINARY WATER & SEWER REPORT
FOR
TY JENKINS HANGAR
16061 N. 81ST STREET
SCOTTSDALE, ARIZONA 85260

PREPARED FOR:

Larson Associates Architects
3807 N. 24th Street Suite 100
Phoenix, Arizona 85016

Job Number 24-013
September 17 2024

at your service

INTRODUCTION

In accordance with Arizona Administrative Code R18-4-505.B and R18-9-E301.C, the following preliminary water & sewer report is being provided in conjunction with the Ty Jenkins Hanger project.

The project is located at 116061 N. 81st Street in Scottsdale, Arizona. The parcel is Lot 34 of North Scottsdale Airpark Unit 1 as recorded in Book 327 of Records, Page 12 at the Maricopa County Recorder's Office.

DESIGN CRITERIA

An existing 12" water line is located in 81st Street. The intent is to tap this existing water main to serve the buildings fire and domestic demand. An existing public fire hydrant is located near the northwest property corner. This hydrant will provide the required fire coverage for the project.

An 8" sewer main is also located within the 81st Street right of way. This main will be tapped to provide sewer service for the new building.

DEMANDS

WATER

The estimated average day water demand for this property is established by Figure 6.1-2 in the City of Scottsdale DSPM. Office Land Use was used to determine the flow from the office area of the building. The Ty Jenkins Hangar has a total office floor area of 4,961 square feet. The hangar portion of the building will be provided with a hose bib for washing the hangar floor. It is estimated that the floor will be washed once per week and will use approximately 200 gallons per washing operation with a peak flow of 10 gallons per minute.

The water use computations are summarized in the table below.

	GPD/SF	GPD	GPM/SF	GPM
Inside Use	0.5	2,481	.000695	3.4
Outside Use	0.1	496	.000139	0.7
Total Use	0.6	2,977	.000834	4.1

The maximum day flow peaking factor is 2.0 giving a maximum day flow of 5,954 gallons per day and 8.2 gallons per minute. The peak hour flow is 3.5 times the average day flow giving a peak hour flow of 10,420 gallons per day and 14.3 gallons per minute. Adding the floor washing operation to the peak hour gives a flow of 10,200 gallons per day and 24.3 gallons per minute.

The fire flow requirement was determined using the International Fire Code Appendix B. The total fire flow area of the building is 17,081 square feet with a V-B construction type. Per table B105.1 the required fire flow is 3,500 gpm. The code allows a 50% reduction for buildings that are equipped with automatic fire sprinkler systems. The required fire flow after the reduction is 1,750 gpm.

SEWER

The average daily sewer flow is established by Figure 7.1-2 in the DSPM. For an office land use, the average daily sewage flow is estimated to be 0.4 gallons per square foot with a peaking factor of 3.0. Using the Ty Jenkins Hangar office area, the average daily sewage flow computes to 1,984 gallons per day with ae peak flow of 5,952 gallons per day. Adding the floor washing operation to the peak office flow yields a total wastewater flow of 6,152 gallons per day. Assuming that the sewer flow occurs over a 12 hour period, the peak sewer discharge from the project is 8.54 gallons per minute.

EXISTING WATER FACILITIES

An existing 12" PVC water line is located in 81st Street. A flow test was performed on this waterline on September 16th, 2024. The results are listed in the table below:

	Raw Test Data	Data with 10% Safety Factor
Static Pressure (psi)	67.0	60.3
Residual Pressure (psi)	51.0	44.3
Flow (gpm)	1,783	1,783
Flow at 20 psi (gpm)	3,191	2,937

See Appendix for the flow test results.

PROPOSED WATER FACILITIES

A new 1" water meter is proposed to serve the new building's domestic demand. A new ¾" water meter will be used to provide for the project's irrigation demands.

A new 8" fire line will be extended from the public main extension to serve the fire sprinkler system for the project. An 8" gate valve will be the demarcation point between the public and private water lines. The existing fire hydrant located within the right of way adjacent to the lot is within 140 feet of the proposed fire department connection located on the north face of the building. This hydrant provides adequate fire coverage for the project. Additional public hydrants are located 325 feet north and 125 feet south of the Ty Jenkins lot. No additional fire hydrants are required for this project.

See the Appendix for the proposed water layout.

A simple water model was prepared to confirm the fire demand for the building could be met with an 8" fire line. The domestic demand was ignored given the fact that if the building was burning, there would be no domestic demand. Given the proposed fire line layout, the system can provide 2,178 gpm while retaining 20 psi in the public system.

EXISTING SEWER FACILITIES

An existing 8" sewer line is located within 81st Street. This line conveys wastewater to the south and is approximately nine feet deep in the area. Based on the city's quarter section map, the 8" line has a slope of 0.0150 feet per foot. Using Manning's formula, the sewer has a capacity of 506 gpm when flowing 75% full.

PROPOSED SEWER FACILITIES

The minimum sewer service size for commercial land uses is 6". The Ty Jenkins Hangar will be provided with a new 6" SDR 35 PVC sewer service constructed in accordance with MAG Standard Detail 440-3. Based upon the topographic survey done for this project, the invert of the existing 8" sewer main at the proposed location of the sewer service is 1498.30. The invert of the sewer service at the sewer main will be 1498.97. The sewer service will be constructed at a slope of ¼" per foot which equals 2.083%. The invert of the sewer service where it crosses the existing water main in 81st Street will be 1499.46. The invert of the existing 12" water main is approximately 1502.64. The new sewer service will cross under the existing water main with approximately 2.62 feet of clearance.

The 6" sewer line can convey 331 gpm when flowing 75% full. Given the peak sewer discharge from the project is 8.54 gpm, the 6" service line is more than adequate to serve this project. The depth of flow in the sewer service line was calculated at 0.6" given the peak discharge from the building. The anticipated velocity was 1.7 feet per second.

The hangar area will install a trench drain to collect water used in washing the hangar floor. This trench drain will discharge into a sand/oil separator prior to discharging to the sewer service line. The separator will be designed by the plumbing engineer.

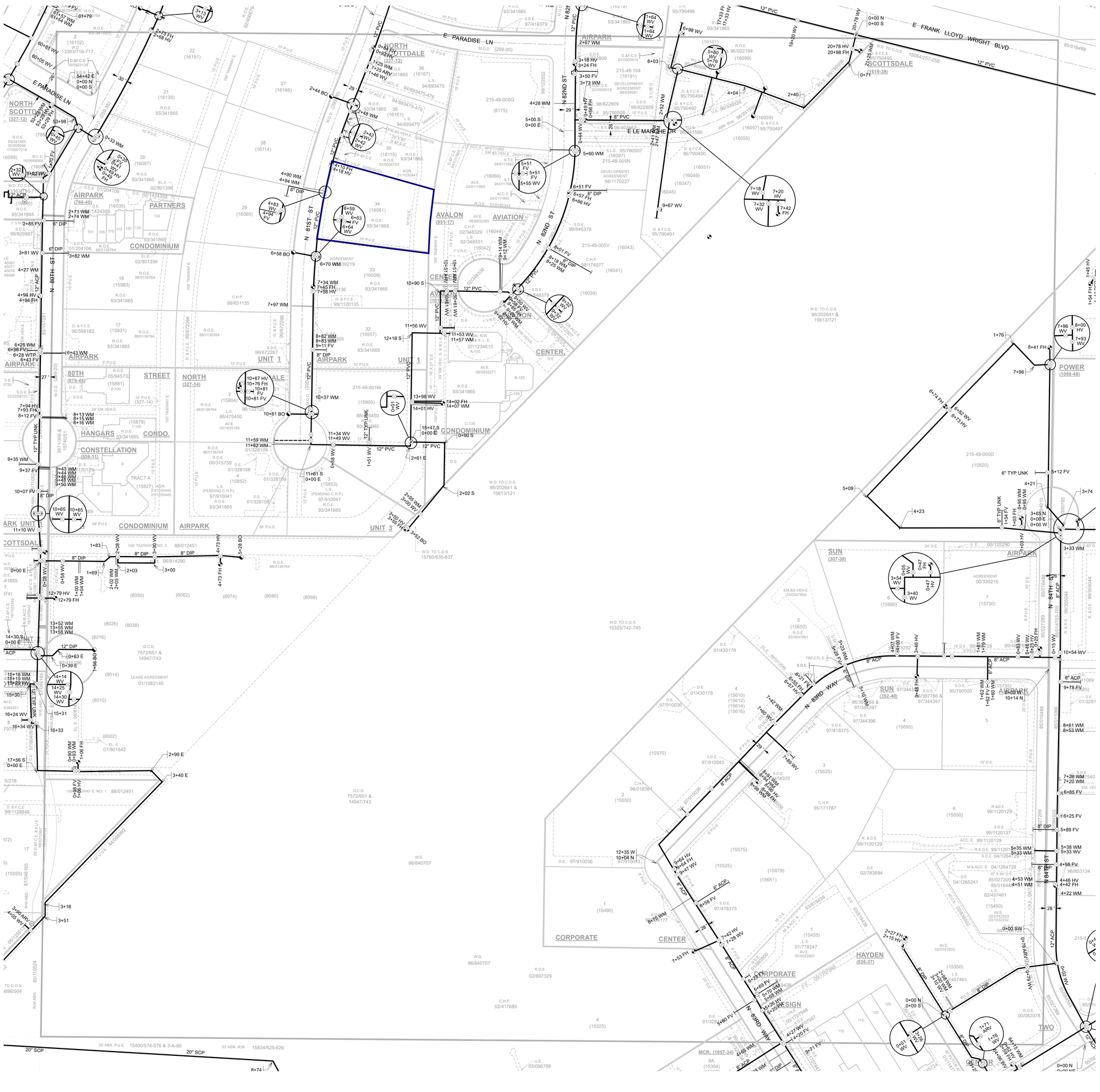
See the Appendix for the proposed sewer layout.

Copies of all calculations are also included in the Appendix.

APPENDIX

QUARTER SECTION MAPS
DSPM FIGURE 6.1-2
DSPM FIGURE 7.1-2
FLOW TEST RESULTS
FIRE FLOW MODEL RESULTS
SEWER CALCULATIONS
UTILITY EXHIBIT

36-47



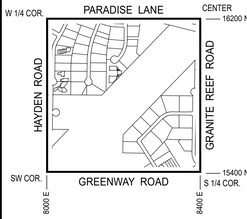
GENERAL NOTES:

- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS 'CALCULATED' ON THE MAP.

LEGEND:

- Air Release Valve (ARV)
- Non-potable Air Release Valve (NPARV)
- Blowoff (BO)
- Cap (CAP)
- Cathodic Protection (CPT)
- Fill Drain (FBO)
- Fire Hydrant (FH)
- Non-GPS Point
- Pressure Reducing Valve (PRV)
- Pump (WP)
- Reducer
- Sample Station (SS)
- Water Manhole (WMH)
- Non-Potable Manhole (NPMH)
- Well (WELL)
- Valve (V)
- Non-potable Valve (NPV)
- Vault (WVT)
- Water Main
- Non-Potable Main (NP)
- Fire / Private Main
- Non-Scottsdale Main

VICINITY MAP



NORTH

SCALE: 1" = 100'

0 50 100 200

The map scale of 1" = 100' is based on a full size print of 30" x 36"

WATER

QUARTER SECTION MAP

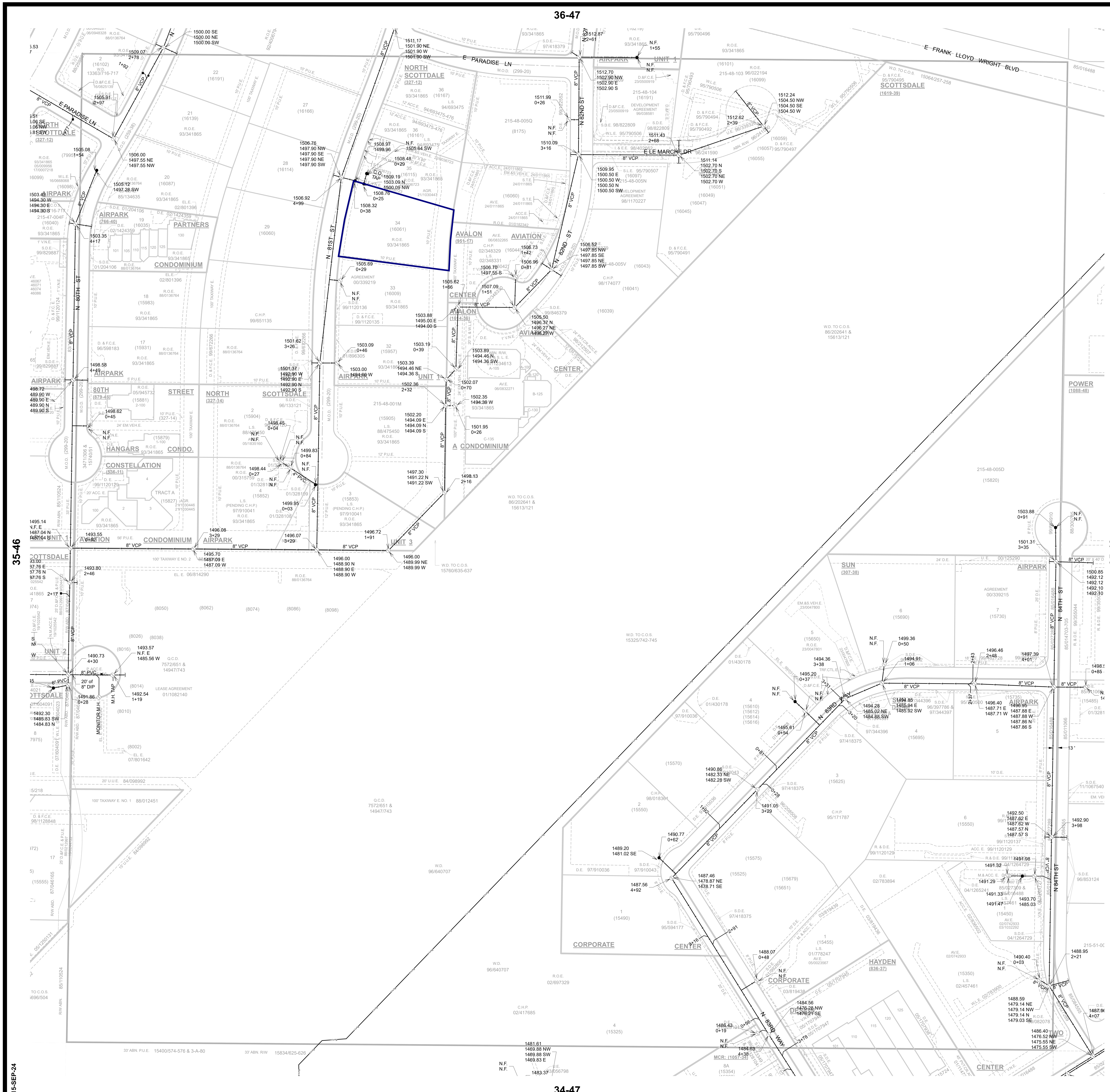
35-47

SW 1/4 SEC. 1 T3N R4E

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251



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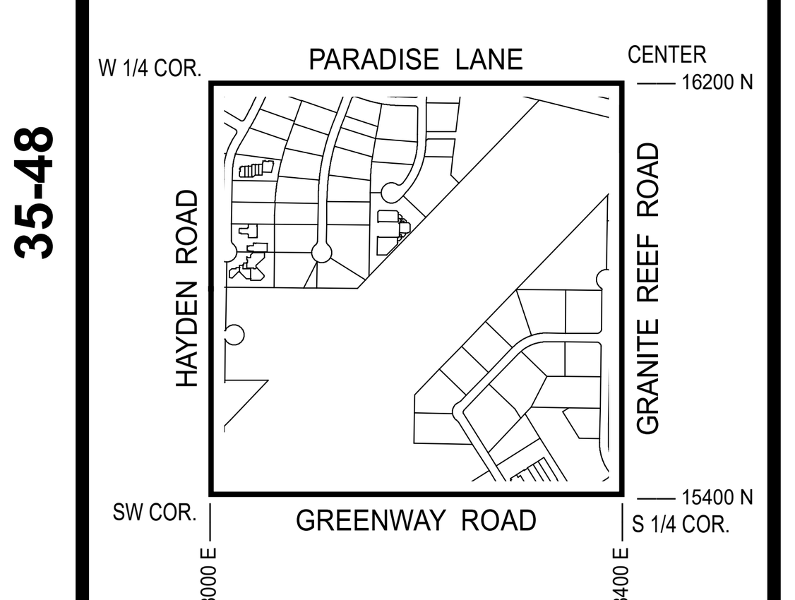
LEGEND:

- Cleanout
- Lift Station
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Sewer Main - Private

VICINITY MAP



NORTH

SCALE: 1" = 100'

0 50 100 200

The map scale of 1" = 100' is based on a full size print of 30" x 36"

SEWER

QUARTER SECTION MAP

35-47

SW 1/4 SEC. 1 T3N R4E

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

N O T I C E

THIS DOCUMENT IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT ITS ACCURACY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION

THE CITY OF SCOTTSDALE

15-SEP-24

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

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

Flow Test Summary

Project Name:	EJFT 24328 - Jenkins Hanger
Project Address:	16061 N 81st St, Scottsdale, AZ 85260
Date of Flow Test:	2024-09-16
Time of Flow Test:	7:10 AM
Data Reliable Until:	2025-03-16
Conducted By:	Alonzo M. & Simon R. (EJ Flow Test) 623.999.7637
Witnessed By:	Chris Mendez (City of Scottsdale) 602.908.9046
City Forces Contacted:	City of Scottsdale (602.908.9046)
Permit Number:	C76413

Raw Flow Test Data

Static Pressure:	67.0 PSI
Residual Pressure:	51.0 PSI
Flowing GPM:	1,783
GPM @ 20 PSI:	3,191

Data with a 10 % Safety Factor

Static Pressure:	60.3 PSI
Residual Pressure:	44.3 PSI
Flowing GPM:	1,783
GPM @ 20 PSI:	2,937

Hydrant F_1

Pitot Pressure (1):	25	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	4	inches

Additional Coefficient 0.83 on orifice #1

Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
326 ft (measured linearly)

Static-Residual Elevation
1509 ft (above sea level)

Flow Hydrant (F_1) Elevation
1514 ft (above sea level)

Elevation & distance values are approximate

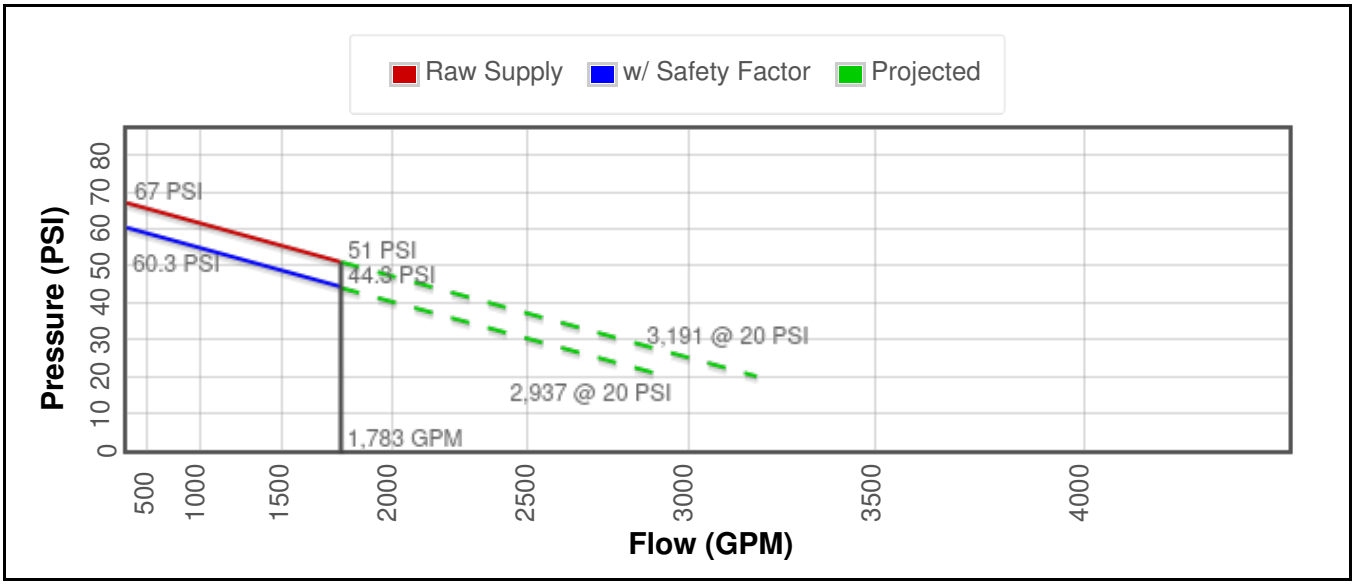
Flow Test Summary

Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph

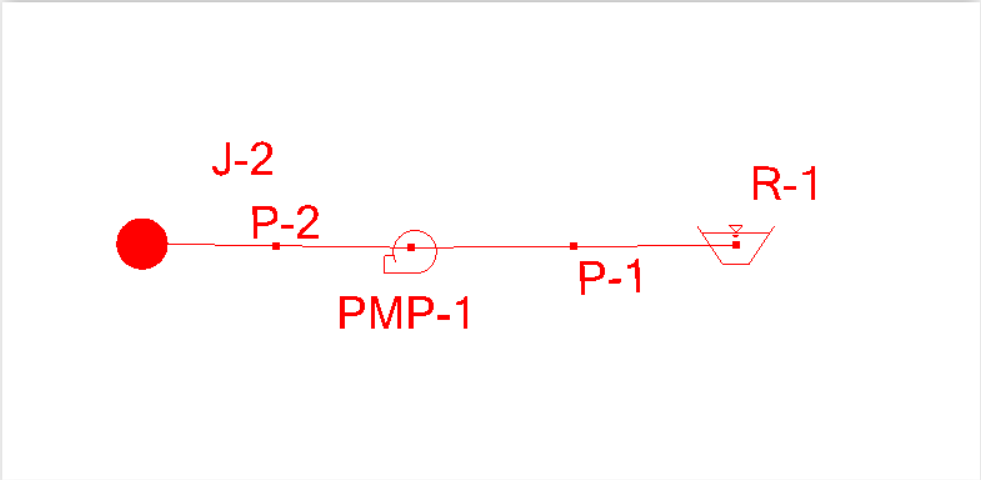


Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)
J-2	<None>	3	True	1,750	2,178

Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Pressure (Calculated Zone Lower Limit) (psi)
1,750	2,178	20.0	20.0	20.0	20.0

Junction w/ Minimum Pressure (Zone)	Pressure (System Lower Limit) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Is Fire Flow Run Balanced?
J-2	(N/A)	20.0	J-2	True



Worksheet for 8" Sewer Main- 81st Street

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.011 ft/ft
Normal Depth	6.0 in
Diameter	8.0 in

Results	
Discharge	506.76 gpm
Flow Area	0.3 ft²
Wetted Perimeter	1.4 ft
Hydraulic Radius	2.4 in
Top Width	0.58 ft
Critical Depth	6.0 in
Percent Full	75.0 %
Critical Slope	0.010 ft/ft
Velocity	4.02 ft/s
Velocity Head	0.25 ft
Specific Energy	0.75 ft
Froude Number	1.016
Maximum Discharge	597.81 gpm
Discharge Full	555.74 gpm
Slope Full	0.009 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	75.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.0 in
Critical Depth	6.0 in
Channel Slope	0.011 ft/ft
Critical Slope	0.010 ft/ft

Worksheet for 6" Sewer Service 75% Full

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.021 ft/ft
Normal Depth	4.5 in
Diameter	6.0 in

Results	
Discharge	331.19 gpm
Flow Area	0.2 ft²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.8 in
Top Width	0.43 ft
Critical Depth	5.2 in
Percent Full	75.0 %
Critical Slope	0.016 ft/ft
Velocity	4.67 ft/s
Velocity Head	0.34 ft
Specific Energy	0.71 ft
Froude Number	1.363
Maximum Discharge	390.69 gpm
Discharge Full	363.19 gpm
Slope Full	0.017 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	75.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.5 in
Critical Depth	5.2 in
Channel Slope	0.021 ft/ft
Critical Slope	0.016 ft/ft

Worksheet for 6" Sewer Service Flowing Peak Discharge

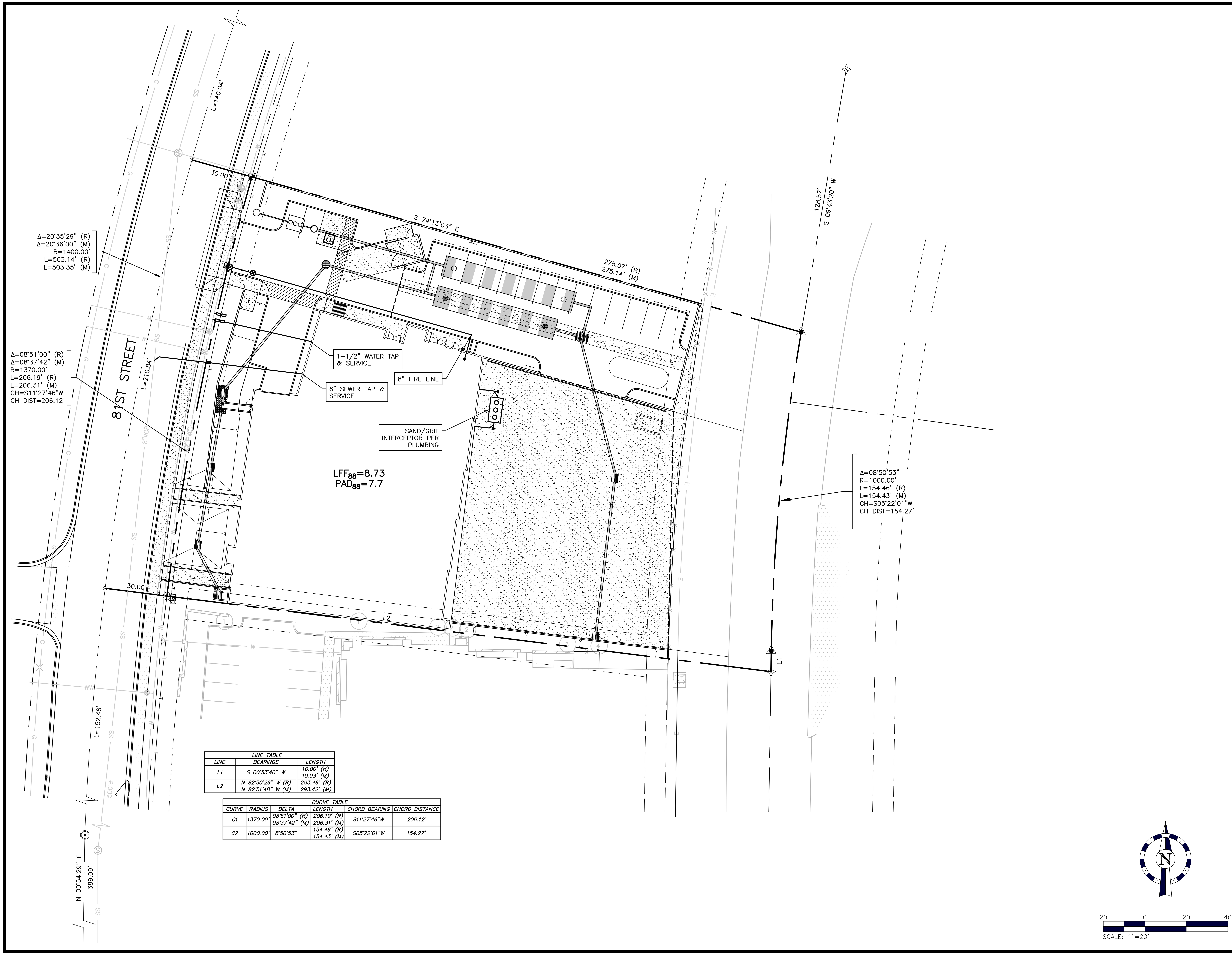
Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.021 ft/ft
Diameter	6.0 in
Discharge	8.54 gpm

Results	
Normal Depth	0.6 in
Flow Area	0.0 ft²
Wetted Perimeter	0.3 ft
Hydraulic Radius	0.4 in
Top Width	0.31 ft
Critical Depth	0.8 in
Percent Full	10.6 %
Critical Slope	0.008 ft/ft
Velocity	1.71 ft/s
Velocity Head	0.05 ft
Specific Energy	0.10 ft
Froude Number	1.589
Maximum Discharge	390.69 gpm
Discharge Full	363.19 gpm
Slope Full	0.000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	10.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 in
Critical Depth	0.8 in
Channel Slope	0.021 ft/ft
Critical Slope	0.008 ft/ft


81ST STREET
30.00'
L=140.04'
L=210.84'
L=152.48'
S 74°13'03" E
275.07' (R)
275.14' (M)
128.57'
S 09°43'20" W
Δ=20°35'29" (R)
Δ=20°36'00" (M)
R=1400.00'
L=503.14' (R)
L=503.35' (M)
Δ=08°51'00" (R)
Δ=08°37'42" (M)
R=1370.00'
L=206.19' (R)
L=206.31' (M)
CH=S11°27'46"W
CH DIST=206.12'
Δ=08°50'53"
R=1000.00'
L=154.46' (R)
L=154.43' (M)
CH=S05°22'01"W
CH DIST=154.27'
1-1/2" WATER TAP & SERVICE
8" FIRE LINE
6" SEWER TAP & SERVICE
SAND/GRIT INTERCEPTOR PER PLUMBING
LFF_{88}=8.73
PAD_{88}=7.7
L1
L2
N 00°54'29" E
389.09'
SCALE: 1"=20'

LINE TABLE		
LINE	BEARINGS	LENGTH
L1	S 00°53'40" W	10.00' (R) 10.03' (M)
L2	N 82°50'29" W (R) N 82°51'48" W (M)	293.46' (R) 293.42' (M)

CURVE TABLE					
CURVE	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD DISTANCE
C1	1370.00'	08°51'00" (R) 08°37'42" (M)	206.19' (R) 206.31' (M)	S11°27'46"W	206.12'
C2	1000.00'	8°50'53"	154.46' (R) 154.43' (M)	S05°22'01"W	154.27'

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

REV	DATE	DESCRIPTION	BY

ZELL COMPANY, L.L.C.
PO Box 2191
Litchfield Park, Arizona 85340
Phone: 623•547•2500

Registered Professional Engineer (Civil)
24449
KENNETH W. ZELL
Date Signed 09-30-2024
ARIZONA, U.S.A.
EXPIRES 12/31/2025

PROJECT
TY JENKINS HANGAR

LOCATION
SCOTTSDALE, ARIZONA 85260

DRAWN BY RR
DESIGNED BY KZ
REVIEWED BY KZ
DATE OCT 2024

TITLE
DESIGN REVIEW -CIVIL PLAN CONCEPTUAL UTILITY PLAN

SITE ADDRESS
16061 N. 81ST STREET, SCOTTSDALE, AZ

SCALE: 1:20
JOB NO.: 24-013

Plot Date/Time: 9/28/2024 1:55 PM Layout Name: 03-DR CU
Full File Path: T:\draft_users\cad01-drafting\24-013 Ty Jenkins Hangar\24-013.dwg