

Water Basis of Design

For
Self Storage
FLW / Hayden Rd Self Storage
Scottsdale, AZ

Scottsdale Case:

Job: 528
April 2021
8-ZN-2021

Prepared by:

Steve Bowser, PE
Helix Engineering, LLC
3240 E. Union Hills Dr #113
Phoenix, AZ 85050
602-788-2616
sb@hxeng.com



EXPIRES 9-30-23

FINAL Basis of Design Report

- APPROVED
- APPROVED AS NOTED
- REVISE AND RESUBMIT



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 rsacks

DATE 1/25/2022

**Water Basis of Design
FOR
Self Storage
FLW / Hayden Self Storage
Scottsdale, Arizona**

- A. INTRODUCTION**
- B. DESIGN DOCUMENTATION**
- C. EXISTING CONDITIONS**
- D. PROPOSED CONDITIONS**
- E. COMPUTATIONS**
- F. SUMMARY**
- G. SUPPORTING MAPS / REFERENCES**

Figure 1-Vicinity Map..... 5
Figure 2-Water/Sewer Map..... 6
Figure 3 - Network Analysis and Flow Test.....7
Figure 4 - WS prelim plan.....8

A. Introduction

The proposed site is located north of the intersection of Frank Lloyd Wright and Hayden Road within the City of Scottsdale, Arizona. The site is situated within the Southeast Quarter of Section 1, Township 3 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is currently a vacant remnant land parcel left over from original construction of the Central Arizona Project. This site is bounded by CAP property to the north, retail property on the south and public streets on the east and west end. This project will develop a self storage building on the site.

B. Design Documentation

Project will be analyzed using the design criteria from the DSPM. Water demand of 0.6 gal per sf per day for office uses for the approx 3600 SF office. The only area within the project that generates water demand is the office area. Peak factor per the DSPM of 2x for the Max Day Demand and 3.5x for the Peak Hr Demand will be used.

Largest building is 121,500 SF and type IIB construction, fire flow per IFC will be 7500 gpm, with a 75% reduction, a fire flow of 1875 gpm will be required.

An EPANET analysis will be performed based on a recent flow test. Ability to achieve 1875 would generally be expected to be available in this area.

C. Existing Conditions

Several major water and sewer facilities are adjacent to the site based on the proximity of the site to the pump station along the north side of the SRP. Water infrastructure to be connected to is a 6" looped line approximately 50' south of the entry along the private accessway north of the intersection of Hayden and Frank Lloyd Wright. A 14" RCP main is located in Frank Lloyd Wright at the west end of the site. The onsite water loop will be connected to both these locations.

D. Proposed Conditions

An 8" public line will connect to the 6" public line near the northwest corner of the existing Vans Pro Shop retail building south of the site (line located on the Vans Pro shop will require water easement to be granted by separate instrument). The 8" main will loop thru the site and connect to the 14" RCP main at the west end of the site. New fire hydrants will be located on this line. Fire riser connections will also be made from this line.

This project is in is in city water zone 3. North of the CAP, properties are located in zone 4, however all connections for this site will be in zone 3.

A 1" domestic meter and 1" landscape (100% drip landscape) meter will be placed side by side tapping the existing 8" main along the south side of the site.

E. Computations

Office: Average Day Demand: 0.6 gallons per SF= 2160 gal per day

Max Day Demand: 2x Average Day Demand = 2 x 2160= 4320 gal per day

Peak Hour Demand: 3.5x Average Day Demand (use a conservative 10 operational day) = (3.5 x 2160) / 10 hours = 756 gal per hour (13 gpm)

F. SUMMARY

- This project is the construction of one storage building with one office area.
- Site currently has a 6" main approximately 60' south of the entry point of the site, and a 14" RCP main in Frank Lloyd Wright at the west end of the site.
- Project will construct two new hydrants along the new 8" onsite public main.
- Fire flow (using the 75% reduction) will be 1750 gpm

G. SUPPORTING MAPS / REFERENCES

1. City of Scottsdale, Design Standards and Procedures Manual, 2018.
2. QS Map 35-48



Figure 1-VICINITY MAP

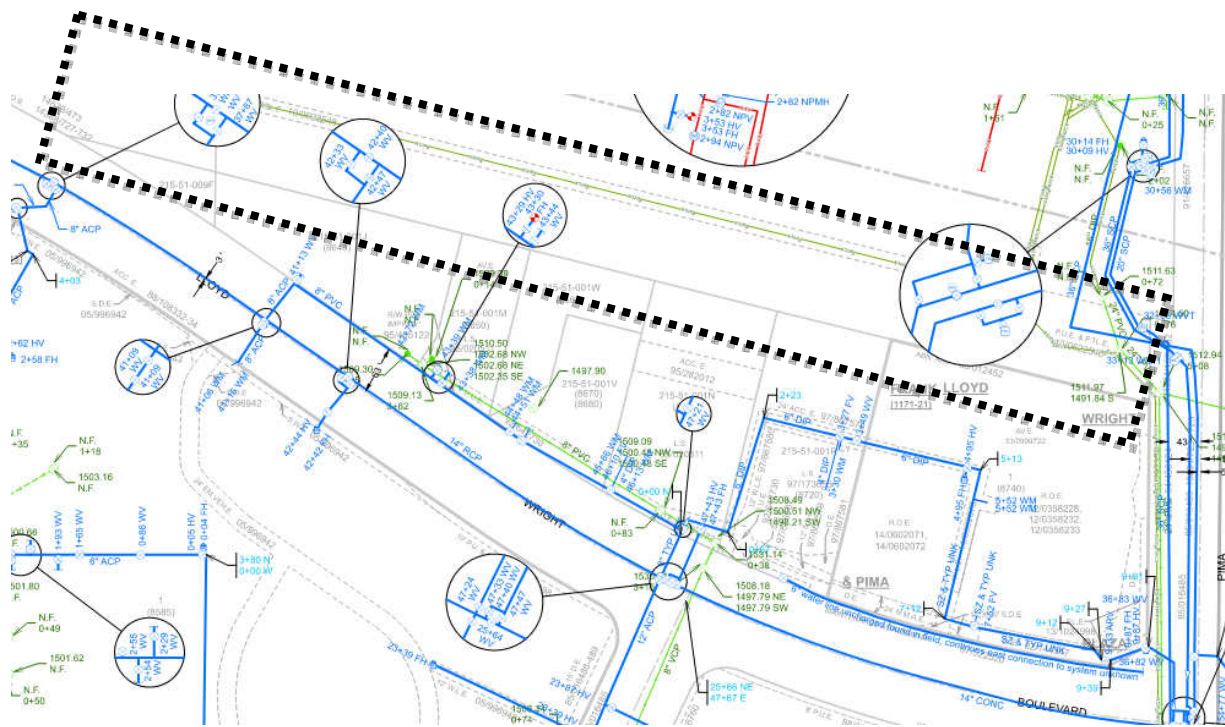
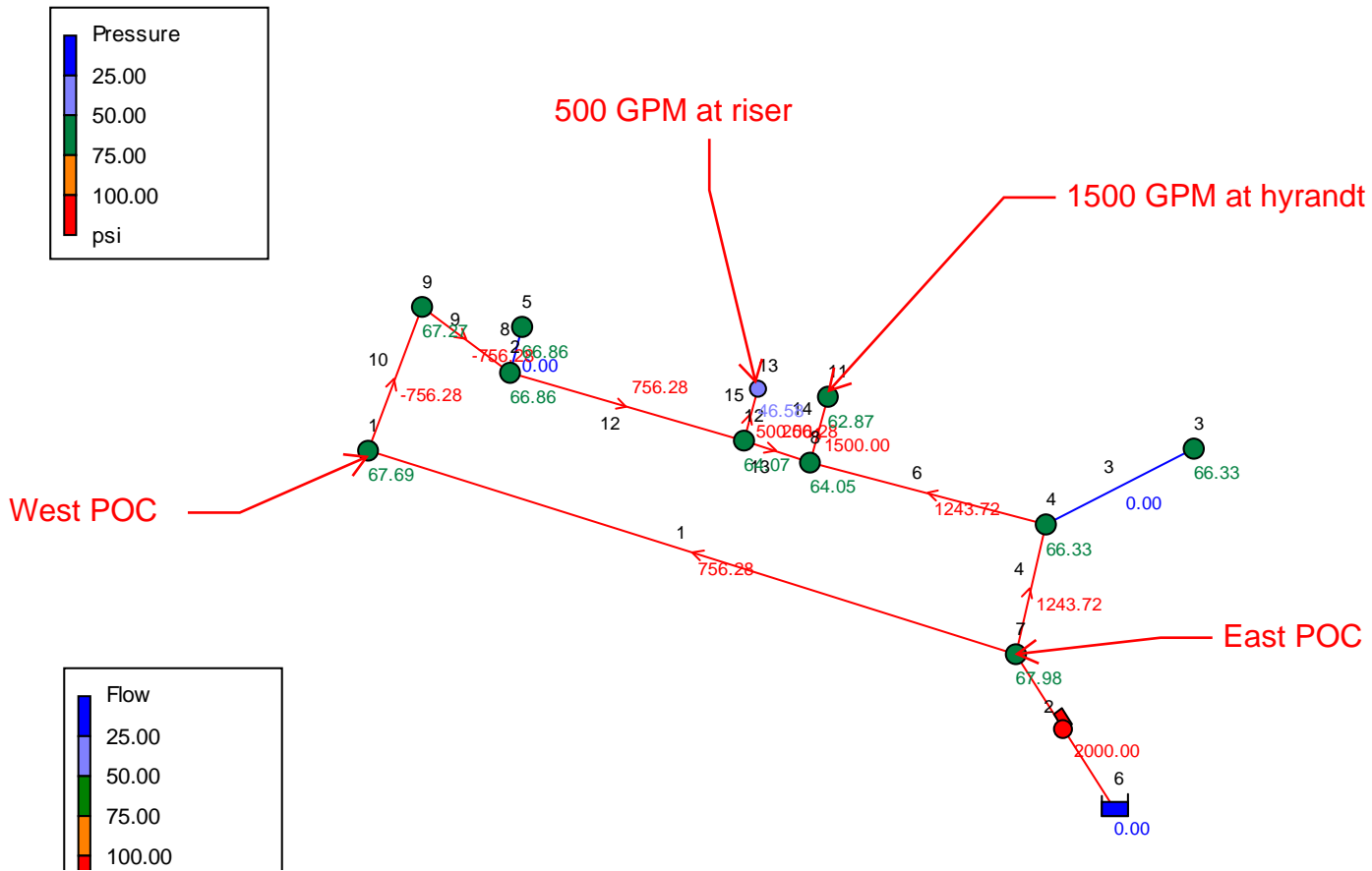


Figure 2-WATER-SEWER QS MAP



Network Table - Nodes

Node ID	Demand GPM	Pressure psi
Junc 1	0.00	67.69
Junc 2	0.00	66.86
Junc 3	0.00	66.33
Junc 4	0.00	66.33
Junc 5	0.00	66.86
Junc 7	0.00	67.98
Junc 8	0.00	64.05
Junc 9	0.00	67.27
Junc 11	1500.00	62.87
Junc 12	0.00	64.07
Junc 13	500.00	46.58
Resvr 6	-2000.00	0.00

FH 1500 GPM

RISER 500 GPM

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps
Pipe 1	1100	14	140	756.28	1.58
Pipe 4	160	8	140	1243.72	7.94
Pipe 6	220	8	140	1243.72	7.94
Pipe 8	40	6	140	0.00	0.00
Pipe 9	100	8	140	-756.28	4.83
Pipe 10	100	8	140	-756.28	4.83
Pipe 12	680	8	140	756.28	4.83
Pipe 13	20	8	140	256.28	1.64
Pipe 14	20	6	140	1500.00	17.02
Pipe 15	80	8	140	500.00	3.19
Pipe 3	150	8	140	0.00	0.00
Pump 2	#N/A	#N/A	#N/A	2000.00	0.00

HYDFLOW Version 2.0
 Hydrant Flow Test Calculations Template
 Copyright 2002 Timmons Engineering Software. All Rights Reserved

Situation: 528 FLW storage Date: 11/09/21

HYDRANT FLOW CALCULATIONS

Supply Pressure:	76.00	
Supply Elevation:	0.00	
Test Point Static Pressure:	76.00	(No Hydrant Flow)
Test Point Elevation	0.00	
Test Point Residual Pressure:	69.00	(Hydrant Flowing)

a.	Supply HGL:	175.56
b.	Test Point Static HGL:	175.56
c.	Test Point Residual HGL:	159.39

Static Head Loss (a-b):	0
Residual Head Loss(a-c):	16.17

	Hydrant:		
	#1	#2	#3
Flow Pressure in PSI:	28.00	0.00	0.00
Nozzle Diameter in Inches:	4.00	2.50	2.50
Calculated Flow in GPM:	1887.2	0.0	0.0

additional 0.83 coefficient added

Total Hydrant Flows in GPM:	1887.2
-----------------------------	--------

System Equivalent Base Flow in GPM:	0.0
-------------------------------------	-----

System Base Flow Peaking Factor:	1
Source Pressure:	76
Source HGL	175.56

Test Point Available Flow:

Residual Pressure	HGL	Total Flow	Equip Base Flow	Available GPM
20	46	5807	0	5807
27	62	5403	0	5403
34	79	4971	0	4971
41	95	4504	0	4504
48	111	3993	0	3993
55	127	3418	0	3418
62	143	2745	0	2745
69	159	1887	0	1887
76	176	0	0	0



Flow Test Summary

Project Name: EJFT 21462 - FLW Storage
Project Address: N Hayden Rd & E Frank Lloyd Wright Blvd, Scottsdale, AZ 85260
Date of Flow Test: 2021-11-04
Time of Flow Test: 8:00 AM
Data Reliable Until: 2022-05-04
Conducted By: Eder Cueva & Caleb Crabbs (EJ Flow Tests) 602.999.7637
Witnessed By: Aaron Roby (City of Scottsdale) 480.407.7022
City Forces Contacted: City of Scottsdale (480.407.7022)
Permit Number: C66646

Raw Flow Test Data

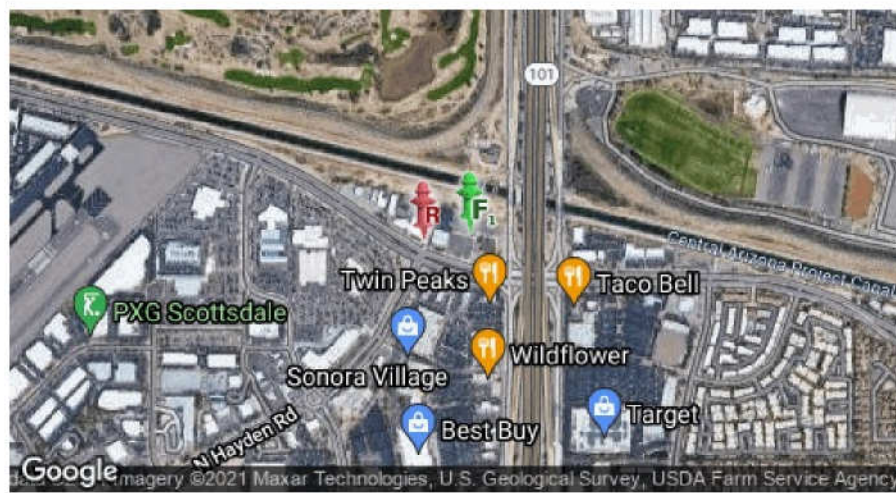
Static Pressure: 76.0 PSI
Residual Pressure: 69.0 PSI
Flowing GPM: 1,887
GPM @ 20 PSI: 5,801



Data with a 10 % Safety Factor

Static Pressure: 68.4 PSI
Residual Pressure: 61.4 PSI
Flowing GPM: 1,887
GPM @ 20 PSI: 5,361

Hydrant F₁

Pitot Pressure (1): 28 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 4 inches
Additional Coefficient 0.83 on orifice #1

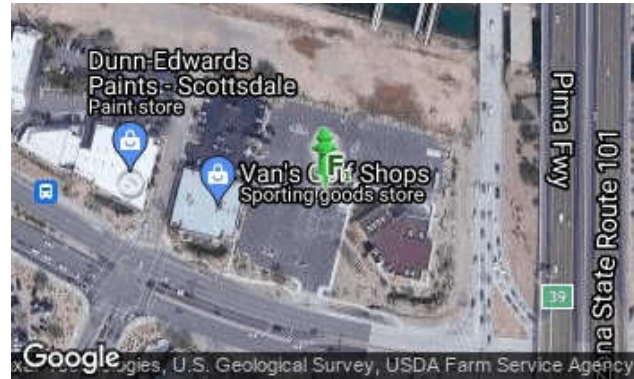


 Static-Residual Hydrant
 Flow Hydrant
Distance Between F₁ and R
347 ft (measured linearly)
Static-Residual Elevation
1513 ft (above sea level)
Flow Hydrant (F₁) Elevation
1512 ft (above sea level)
Elevation & distance values are approximate

Static-Residual Hydrant



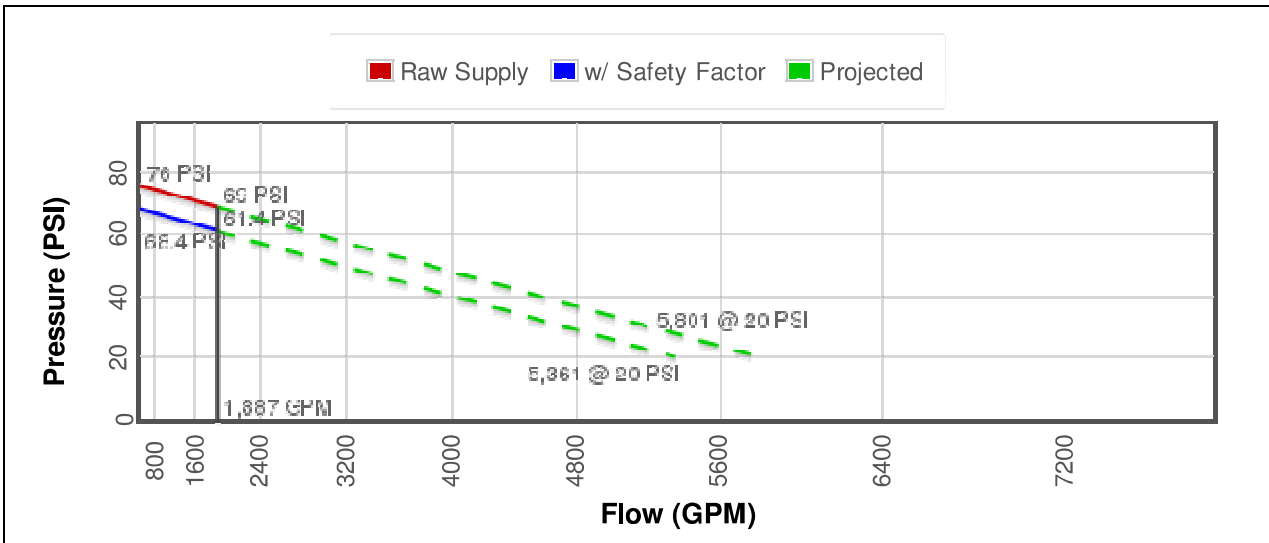
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve N^{1.85} Graph

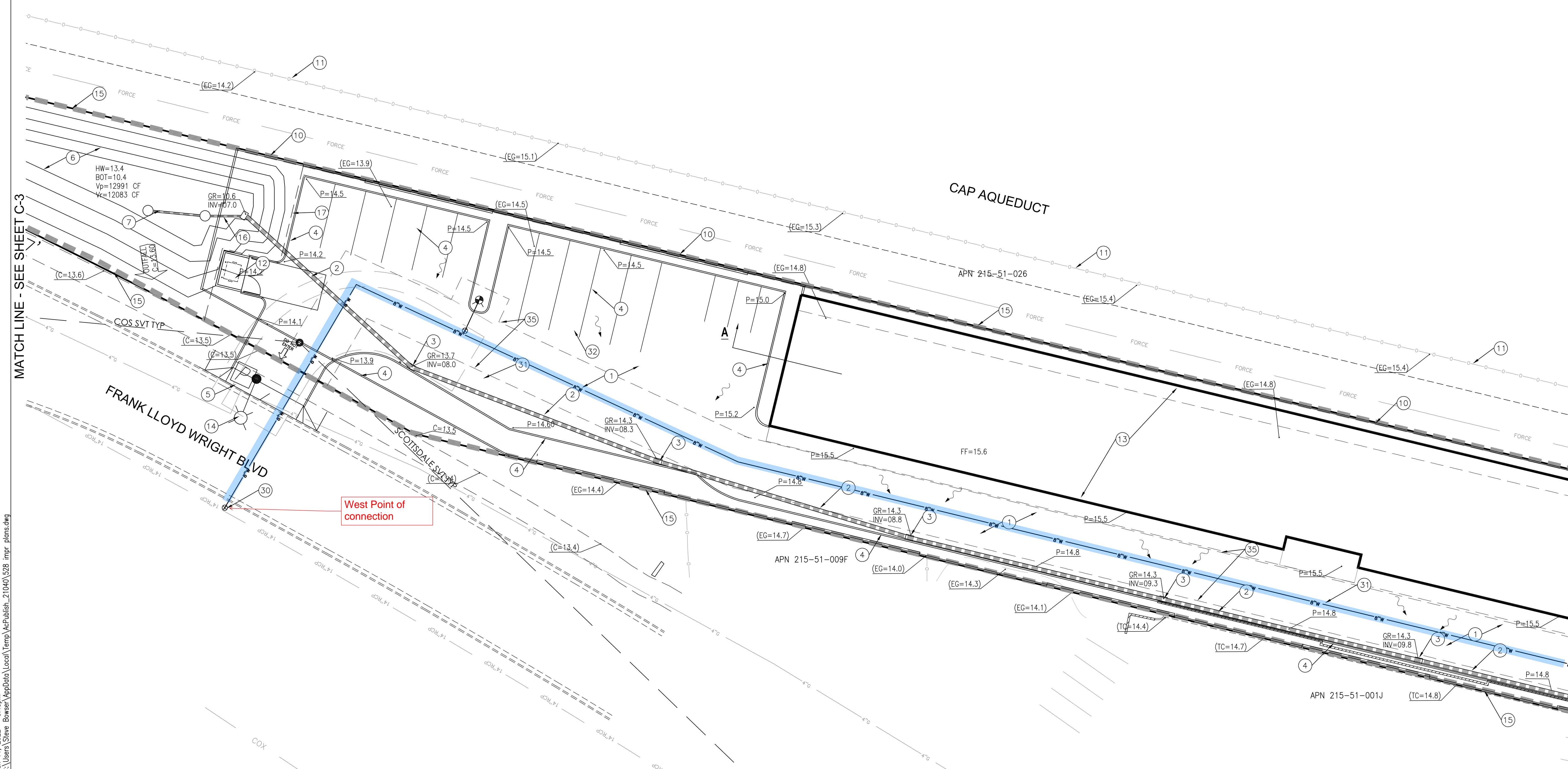
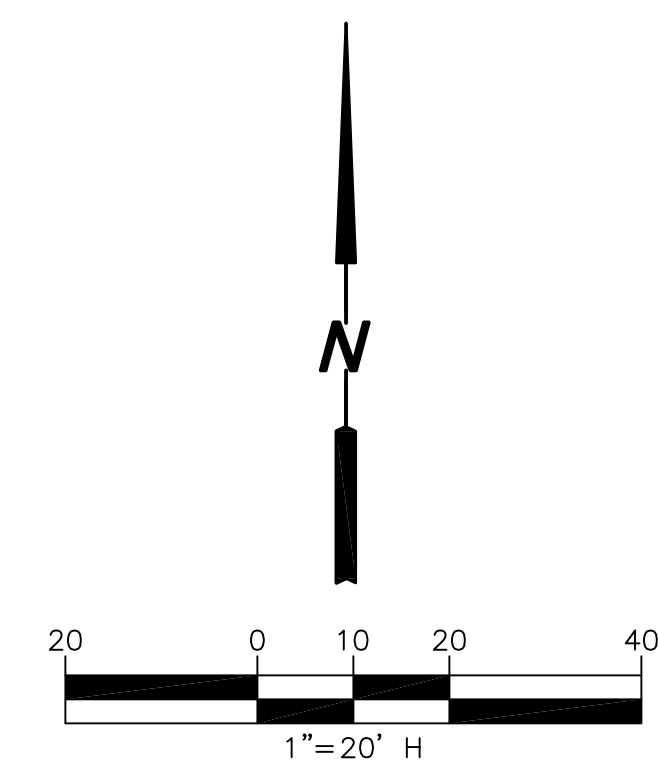


GRADING PLAN NOTES

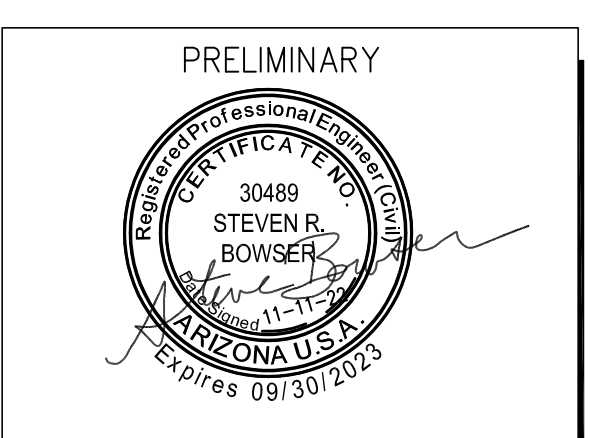
1. ONSITE ASPHALT PAVING
2. CONSTRUCT ONSITE STORM DRAIN
3. CONSTRUCT STORM INLET
4. CONSTRUCT CURB PER MAG STD DET 222
5. CONSTRUCT DRIVE PER COS STD DET 2251-2
6. CONSTRUCT SURFACE BASIN
7. CONSTRUCT DUAL CHAMBER DRYWELL
8. INSTALL 96" CMP UG RETENTION. INVERT OF PIPE SHALL BE FLUSH PER COS STD DET 2254
9. SAWCUT AND MATCH ONSITE PRIVATE EXISTING DRIVE
10. LIMIT OF DISTURBANCE
11. EXISTING CAP SECURITY FENCE
12. CONSTRUCT REFUSE ENCLOSURE
13. NEW BUILDING
14. RELOCATE PUBLIC STREET LIGHT
15. DRAINAGE AREA
16. 12" STORM DRAIN TO DRYWELL. FLOW MUST BE POSITIVE TO DRYWELL
17. DRAINAGE EASEMENT BY SEP INSTRUMENT OR MOD

30. CONNECT TO EXISTING WATER
31. NEW 8" PUBLIC WATER
32. NEW PUBLIC FIRE HYDRANT
33. NEW WATER METERS
34. NEW PRIVATE FIRELINE
35. 20' PUBLIC WATER ESMT

40. NEW 6" PRIVATE SEWER SERVICE - MIN SLOPE 1.04%
41. CONNECT TO EXISTING SEWER MH. INSTALL DROP PER MAG STD DET 426.



CLIENT:
RKA Architects, Inc.
2233 East Thomas Rd
Phoenix, AZ 85016
(602) 955-3900



Helix Engineering, LLC
Engineering / Surveying / Consulting
3240 E Union Hills
Suite 113
Phoenix AZ 85050
(PH) 602-788-2616
www.hxeng.com

THIS DRAWING IS COPYRIGHTED AND IS THE SOLE PROPERTY OF THE OWNER. IT IS PRODUCED SOLELY FOR USE BY THE OWNER AND ITS AFFILIATES. REPRODUCTION OR USE OF THIS DRAWING AND/OR THE INFORMATION CONTAINED IN IT IS FORBIDDEN WITHOUT THE WRITTEN PERMISSION OF THE OWNER.

TWO WORKING DAYS BEFORE YOU DIG.
CALL FOR THE BLUE STAKES
1-800-782-5348
BLUE STAKE CENTER

RELEASE	
DATE	
3-30-21	PRELIM ENGR
4-28-21	REV SP
9-30-21	CITY COMMENTS
1-11-22	REV SP

REVISIONS	
NO.	DATE
1	
2	
3	

PROJECT NAME

SELF STORAGE

PROJECT ADDRESS

FLW / Hayden
SCOTTSDALE, ARIZONA
85260

PROJECT AREA

HELIX JOB NUMBER

528

SHEET TITLE

PRELIMINARY
G / D PLAN

SHEET

C-4

PAGE

4 OF 6

Jun 11, 2022 3:46pm
 C:\Users\Steve.Bowser\AppData\Local\Temp\Temp\Publish_21040\528_inpr.plots.dwg

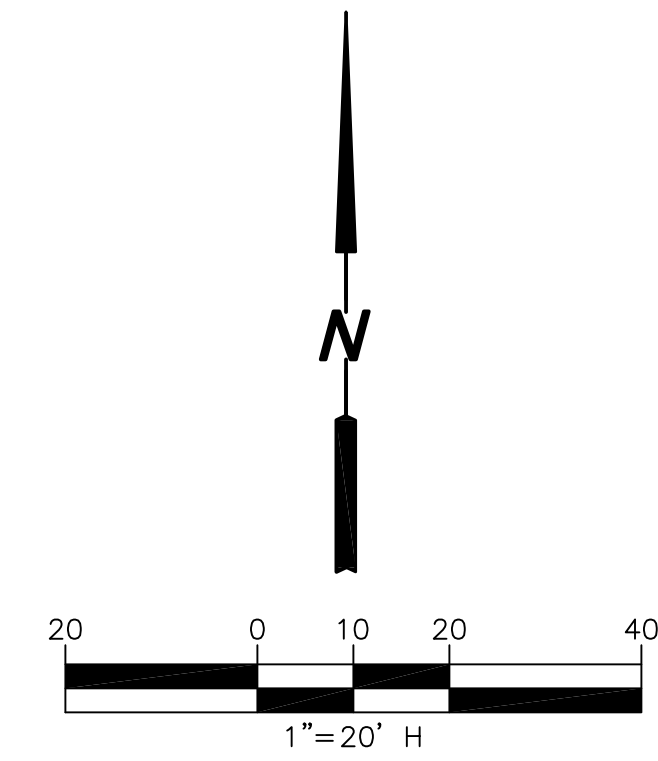
COS 8-2N-2021

GRADING PLAN NOTES

1. ONSITE ASPHALT PAVING
2. CONSTRUCT ONSITE STORM DRAIN
3. CONSTRUCT STORM INLET
4. CONSTRUCT CURB PER MAG STD DET 222
5. CONSTRUCT DRIVE PER COS STD DET 2251-2
6. CONSTRUCT SURFACE BASIN
7. CONSTRUCT DUAL CHAMBER DRYWELL
8. INSTALL 96" CMP UG RETENTION. INVERT OF PIPE SHALL BE FLUSH PER COS STD DET 2254
9. SAWCUT AND MATCH ONSITE PRIVATE EXISTING DRIVE
10. LIMIT OF DISTURBANCE
11. EXISTING CAP SECURITY FENCE
12. CONSTRUCT REFUSE ENCLOSURE
13. NEW BUILDING
14. RELOCATE PUBLIC STREET LIGHT
15. DRAINAGE AREA
16. 12" STORM DRAIN TO DRYWELL. FLOW MUST BE POSITIVE TO DRYWELL
17. DRAINAGE EASEMENT BY SEP INSTRUMENT OR MOD

30. CONNECT TO EXISTING WATER
31. NEW 8" PUBLIC WATER
32. NEW PUBLIC FIRE HYDRANT
33. NEW WATER METERS
34. NEW PRIVATE FIRELINE
35. 20' PUBLIC WATER ESMT

40. NEW 6" PRIVATE SEWER SERVICE - MIN SLOPE 1.04%
41. CONNECT TO EXISTING SEWER MH. INSTALL DROP PER MAG STD DET 426.



CLIENT:
RKA Architects, Inc.

2233 East Thomas Rd
Phoenix, AZ 85016
(602) 955-3900

PRELIMINARY



Helix Engineering, LLC

Engineering / Surveying / Consulting

3240 E Union Hills
Suite 113
Phoenix AZ 85050
(PH) 602-788-2616
www.hxeng.com

THIS DRAWING IS COPYRIGHTED AND IS THE SOLE PROPERTY OF THE OWNER. IT IS PRODUCED SOLELY FOR USE BY THE OWNER AND ITS AFFILIATES. REPRODUCTION OR USE OF THIS DRAWING AND/OR THE INFORMATION CONTAINED IN IT IS FORBIDDEN WITHOUT THE WRITTEN PERMISSION OF THE OWNER.

TWO WORKING DAYS BEFORE YOU DIG.
CALL FOR THE BLUE STAKES
1-800-782-5348
BLUE STAKE CENTER

RELEASE	
DATE	
3-30-21	PRELIM ENGR
4-28-21	REV SP
9-30-21	CITY COMMENTS
1-11-22	REV SP

REVISIONS	
NO.	DATE
1	C-3

PROJECT NAME

SELF STORAGE

PROJECT ADDRESS

FLW / Hayden
SCOTTSDALE, ARIZONA
85260

PROJECT AREA

HELIX JOB NUMBER

528

SHEET TITLE

PRELIMINARY
G / D PLAN

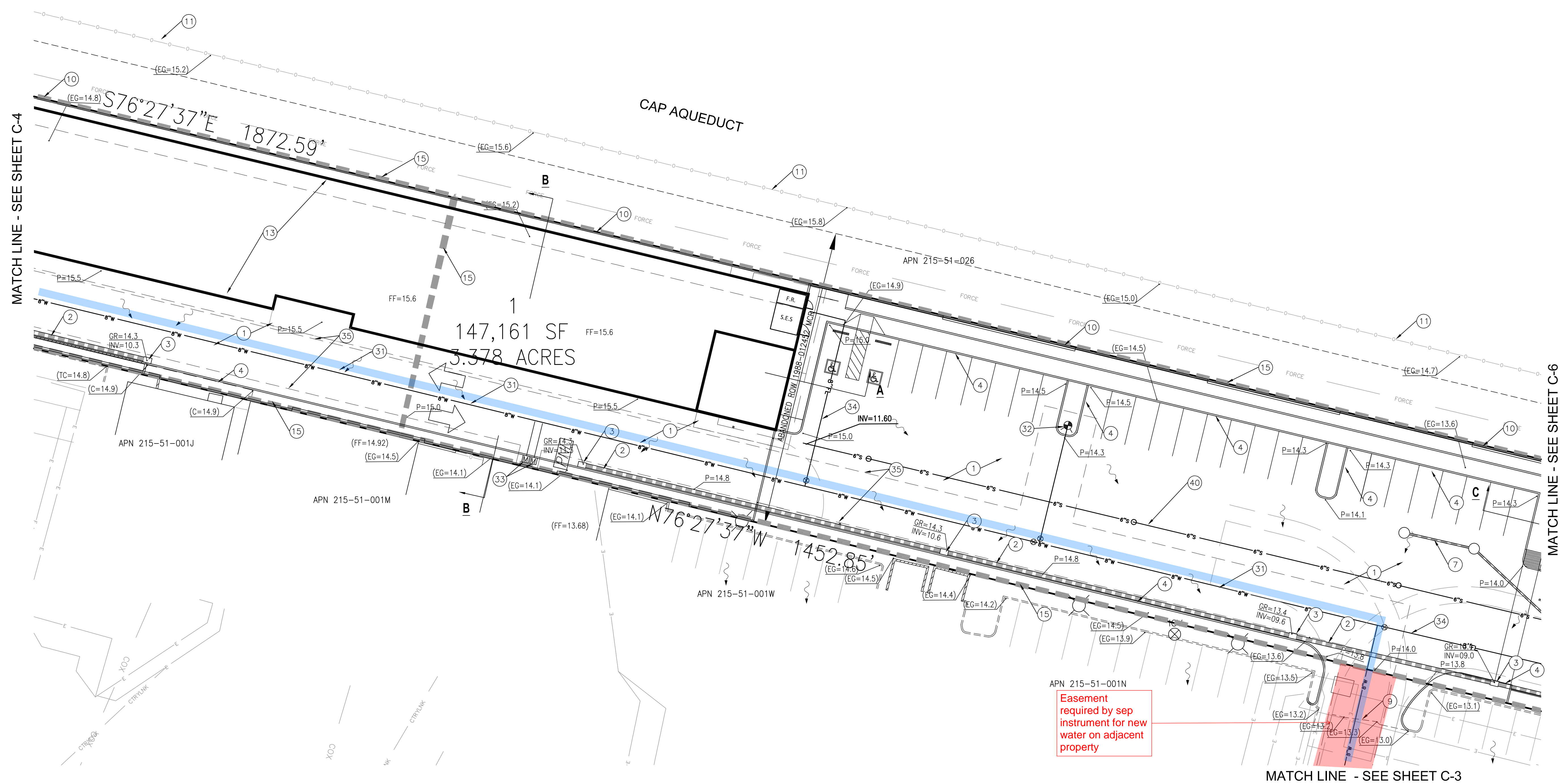
SHEET

C-5

PAGE

5 OF 6

PLOT SCALE: 1:1 @ 24"x36"; 1:2.2 @ 11"x17"



APN 215-51-001N
Easement required by sep instrument for new water on adjacent property

Jun 11, 2022 3:46pm C:\Users\Steve.Bowser\AppData\Local\Temp\publish_21040\528_inpr.plans.dwg

COS 8-2N-2021