



3801 E Florida Ave, Suite 425
Denver, CO 80210

April 29th, 2024

Department of Public Works
El Paso County
3275 Akers Drive
Colorado Springs, CO 80922

RE: Kum & Go at Main St. & Security – Pond Volume Certification

EDARP Filing Number: PPR2225, CON2324

ESQCP Number: ESQ2321

To Whom It May Concern,

Based on the as-built survey information provided by Hansen Company Inc. on February 16, 2024 and Foresight West Surveying Inc. on February 16, 2024 we certify that the on-site storm sewer system, as constructed, is in general conformance with the approved plans providing the required storage volume and meet release rates. The site and adjacent properties (as affected by work performed under the county permit) are stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation and ground cover and the improvements meet or exceed the minimum design requirements.

	Design	Asbuilt
Water Quality Capture Volume (cf)	1,612 cf	1,612 cf
WQ Water Surface Elevation	5721.14'	5721.04'
WQ Release Rate	0.2	0.2
EURV Volume (cf)	5,184 cf	5,184 cf
EURV Water Surface Elevation	5222.88'	5222.78'
WQ Release Rate	0.20	0.20
100-YR Volume (cf)	8,408	8,733
100-YR Water Surface Elevation	5725.12'	5725.02'
100-YR Release Rate	0.71	0.71

If you have any questions, or need any additional information, please feel free to reach out to me at khoutchens@ees.us.com or 970-380-7054.

Respectfully submitted,
Entitlement and Engineering Solutions, Inc



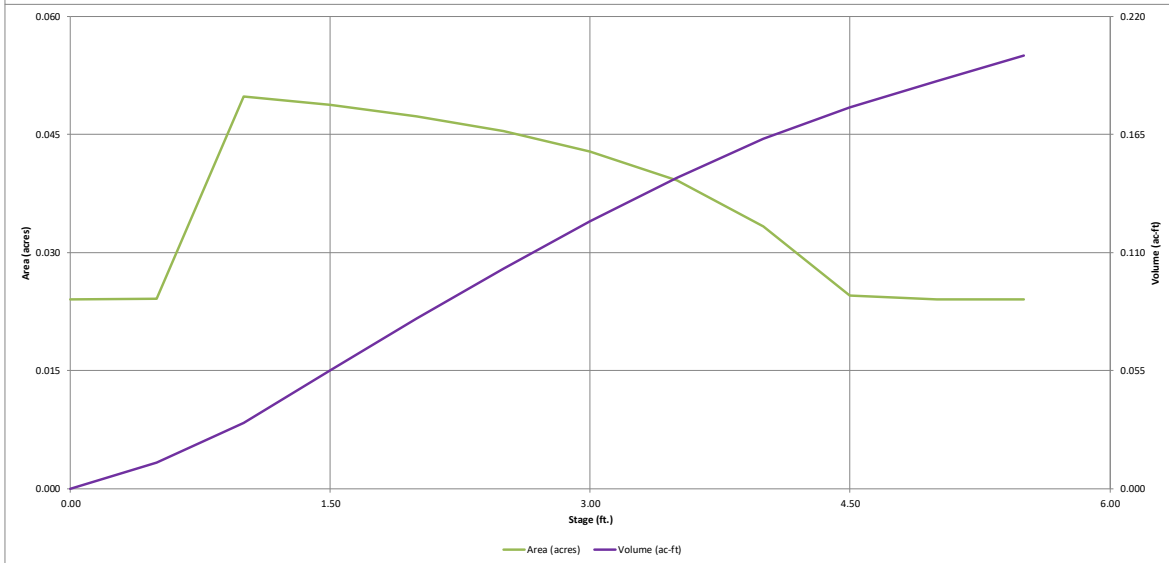
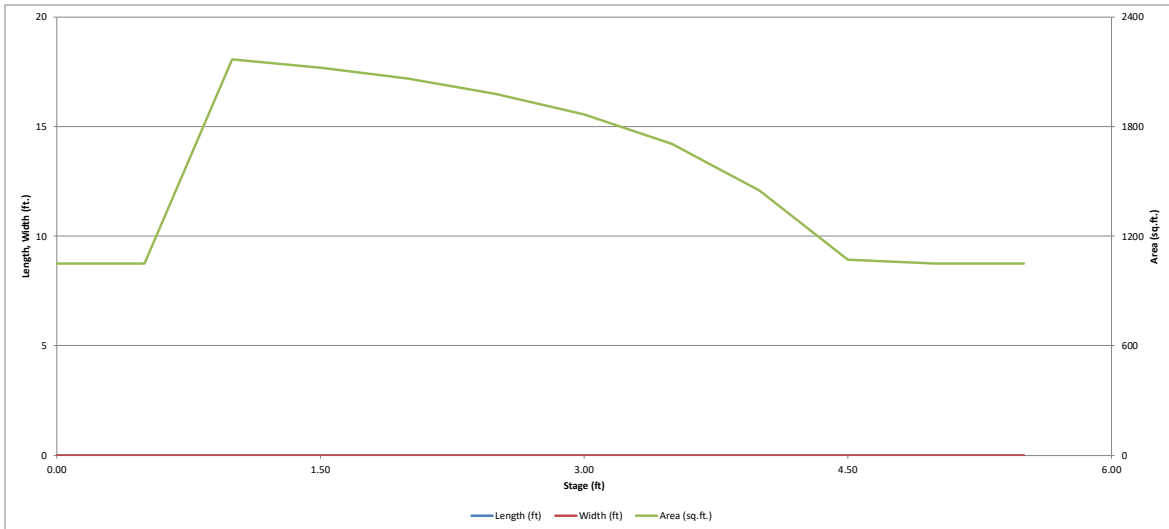
Krysta M. Houtchens, P.E.
Associate/Sector Lead



3801 E Florida Ave, Suite 425
Denver, CO 80210

ATTACHMENTS

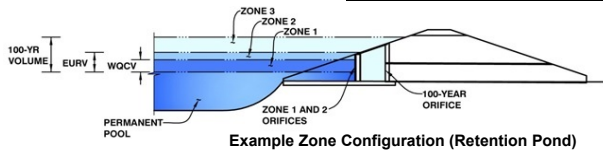




DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project:
Basin ID:



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.14	0.037	Orifice Plate
Zone 2 (EURV)	2.88	0.082	Orifice Plate
Zone 3 (100-year)	5.12	0.073	Rectangular Orifice
Total (all zones)		0.193	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (diameter = 11/16 inch)

Calculated Parameters for Plate
WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.62	1.25					
Orifice Area (sq. inches)	0.40	0.40	0.40					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 3 Rectangular	Not Selected	
Invert of Vertical Orifice =	2.89	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	5.12	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Height =	2.00	N/A	inches
Vertical Orifice Width =	6.00		inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Not Selected	Not Selected	
Overflow Weir Front Edge Height, Ho =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	N/A	N/A	feet
Overflow Weir Grate Slope =	N/A	N/A	H:V
Horiz. Length of Weir Sides =	N/A	N/A	feet
Overflow Grate Type =	N/A	N/A	
Debris Clogging % =	N/A	N/A	%

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H₁ = feet
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area =
Overflow Grate Open Area w/o Debris =
Overflow Grate Open Area w/ Debris =

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe =

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres
Basin Volume at Top of Freeboard = acre-ft

Routed Hydrograph Results

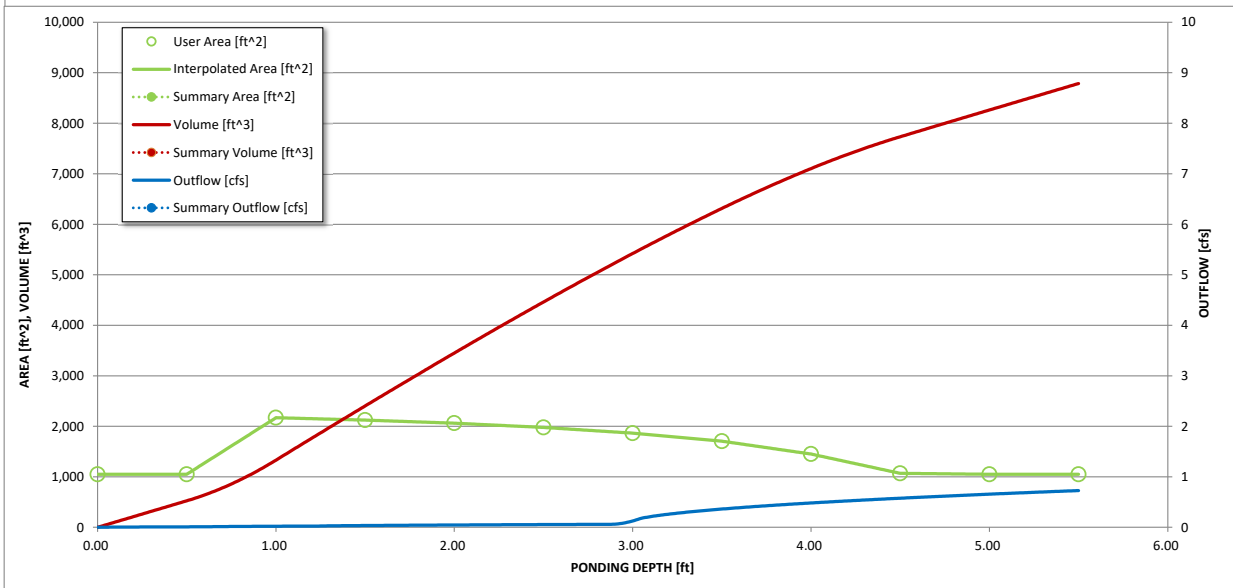
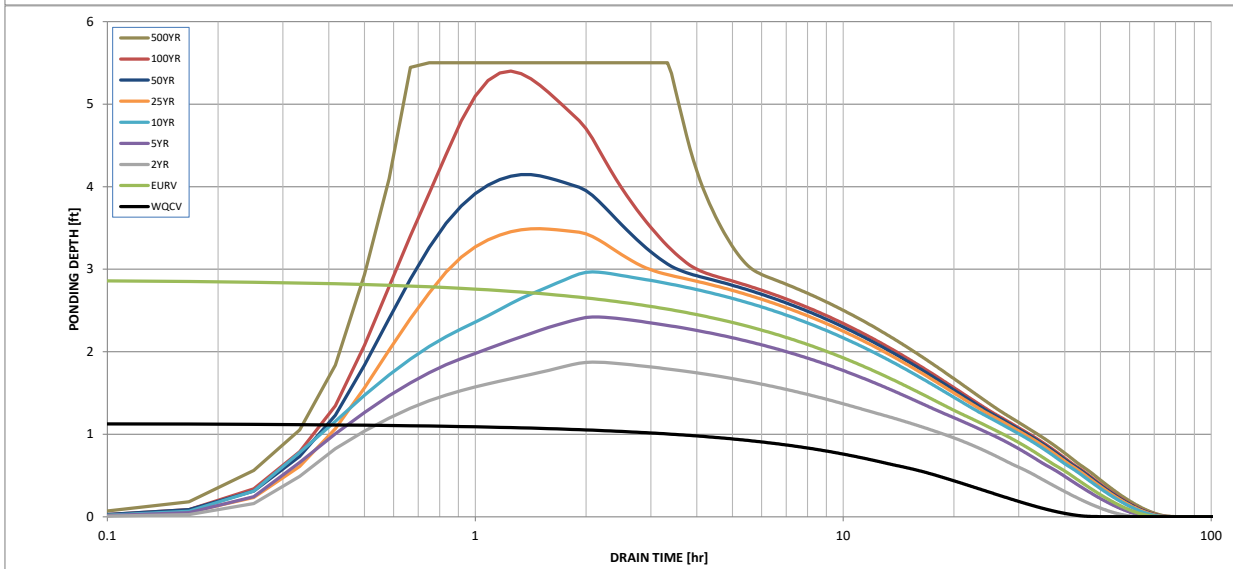
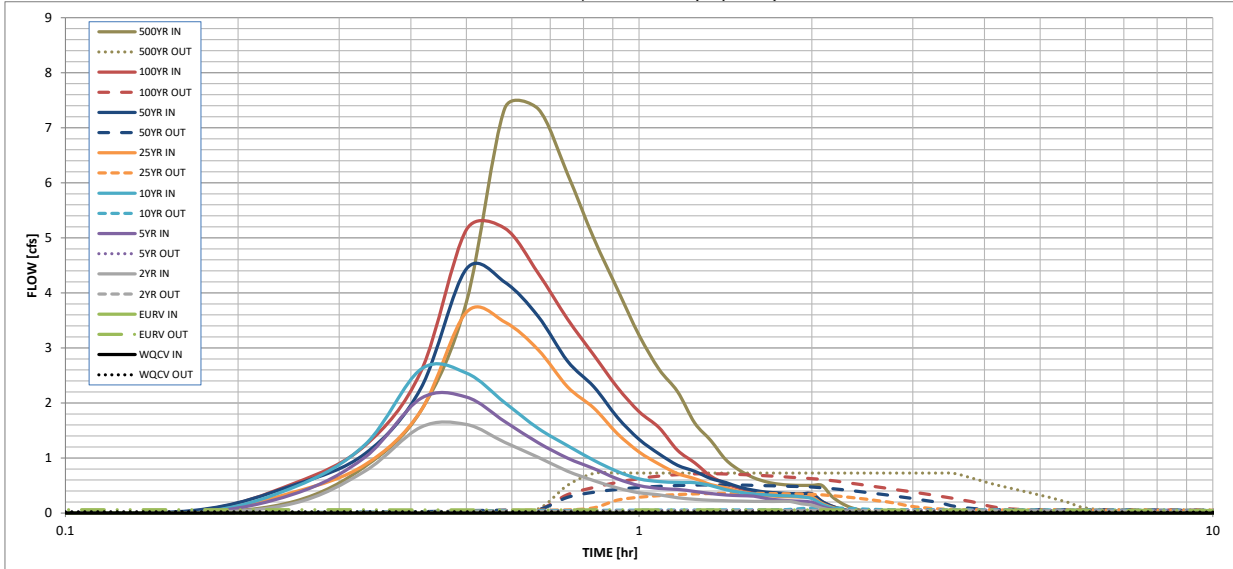
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF)

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period =								
One-Hour Rainfall Depth (in) =	N/A	N/A	0.99	1.27	1.53	1.95	2.31	2.70
CUHP Runoff Volume (acre-ft) =	0.037	0.119	0.079	0.106	0.132	0.178	0.216	0.258
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.079	0.106	0.132	0.178	0.216	0.258
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.2	0.5	1.2	1.6	2.1
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.16	0.35	0.90	1.24	1.65
Peak Inflow Q (cfs) =	N/A	N/A	1.6	2.1	2.6	3.6	4.4	5.2
Peak Outflow Q (cfs) =	0.02	0.06	0.04	0.05	0.09	0.36	0.51	0.71
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.2	0.3	0.3	0.3
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Gate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	56	51	55	58	56	55	53
Time to Drain 99% of Inflow Volume (hours) =	43	63	56	61	65	65	64	63
Maximum Ponding Depth (ft) =	1.14	2.88	1.87	2.42	2.97	3.49	4.15	5.40
Area at Maximum Ponding Depth (acres) =	0.05	0.04	0.05	0.05	0.04	0.04	0.03	0.02
Maximum Volume Stored (acre-ft) =	0.037	0.119	0.073	0.098	0.123	0.145	0.168	0.199

SEE ADDITIONAL CALC TABLE FOR ACTUAL TOTAL DRAIN TIME, WHICH INCLUDES PUMP DRAIN TIME, AS PUMPS ARE LOCATED DOWN STEEM OF HTE ORIFICE PLATE. THIS MHFD SPREADSHEET DOES NOT ACCOUNT FOR THE PUMP DRAIN TIME

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Combined Drain Time								
	WQCV	EURV	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Required Volume (ac-ft)	0.037	0.119	0.079	0.106	0.132	0.178	0.216	2.58
Required Volume (cf)	1,612	5,184	3,441	4,617	5,750	7,754	9,409	112,385
Pump Release Rate (cfs/s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.71
Pump Drain Time (Hrs)	2.2	7.2	4.8	6.4	8.0	10.8	13.1	44.0
Orifice Controlled Drain Time Prior to Pump Release*(Hrs)	43	63	56	61	65	65	64	63
Total Drain Time (Hrs)	45.2	70.2	60.8	67.4	73.0	75.8	77.1	107.0

* Orifice Controlled Drain Time per Mile High Flood District Spreadsheet

Project: **Kum & Go 2232**



Chamber Model -	MC-3500
Units -	Imperial
Number of Chambers -	44
Number of End Caps -	6
Voids in the stone (porosity) -	40 %
Base of Stone Elevation -	5720.00 ft
Amount of Stone Above Chambers -	12 in
Amount of Stone Below Chambers -	9 in
Area of system -	2626 sf

ASBUILT = 5719.9

Min. Area - 2279 sf min. area

StormTech MC-3500 Cumulative Storage Volumes

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Single End Cap (cubic feet)	Incremental Chambers (cubic feet)	Incremental End Cap (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch, EC and Stone (cubic feet)	Cumulative System (cubic feet)	Elevation (feet)
66	0.00	0.00	0.00	0.00	87.53	87.53	8733.65	5725.50
65	0.00	0.00	0.00	0.00	87.53	87.53	8646.11	5725.42
64	0.00	0.00	0.00	0.00	87.53	87.53	8558.58	5725.33
63	0.00	0.00	0.00	0.00	87.53	87.53	8471.05	5725.25
62	0.00	0.00	0.00	0.00	87.53	87.53	8383.51	5725.17
61	0.00	0.00	0.00	0.00	87.53	87.53	8295.98	5725.08
60	0.00	0.00	0.00	0.00	87.53	87.53	8208.45	5725.00
59	0.00	0.00	0.00	0.00	87.53	87.53	8120.91	5724.92
58	0.00	0.00	0.00	0.00	87.53	87.53	8033.38	5724.83
57	0.00	0.00	0.00	0.00	87.53	87.53	7945.85	5724.75
56	0.00	0.00	0.00	0.00	87.53	87.53	7858.31	5724.67
55	0.00	0.00	0.00	0.00	87.53	87.53	7770.78	5724.58
54	0.06	0.00	2.56	0.00	86.51	89.07	7683.25	5724.50
53	0.19	0.02	8.54	0.14	84.06	92.74	7594.18	5724.42
52	0.29	0.04	12.93	0.23	82.27	95.43	7501.44	5724.33
51	0.40	0.05	17.76	0.31	80.31	98.38	7406.01	5724.25
50	0.69	0.07	30.24	0.41	75.28	105.92	7307.63	5724.17
49	1.03	0.09	45.25	0.53	69.22	115.00	7201.71	5724.08
48	1.25	0.11	54.98	0.64	65.28	120.91	7086.72	5724.00
47	1.42	0.13	62.58	0.76	62.20	125.54	6965.81	5723.92
46	1.57	0.14	69.22	0.87	59.50	129.58	6840.27	5723.83
45	1.71	0.16	75.11	0.98	57.10	133.19	6710.69	5723.75
44	1.83	0.18	80.45	1.09	54.92	136.46	6577.50	5723.67
43	1.94	0.20	85.26	1.20	52.95	139.41	6441.04	5723.58
42	2.04	0.22	89.80	1.31	51.09	142.20	6301.63	5723.50
41	2.13	0.23	93.93	1.41	49.40	144.74	6159.43	5723.42
40	2.22	0.25	97.87	1.50	47.79	147.15	6014.70	5723.33
39	2.31	0.27	101.50	1.59	46.30	149.39	5867.54	5723.25
38	2.38	0.28	104.93	1.68	44.89	151.50	5718.15	5723.17
37	2.46	0.29	108.20	1.76	43.55	153.51	5566.66	5723.08
36	2.53	0.31	111.24	1.85	42.30	155.39	5413.14	5723.00
35	2.59	0.32	114.12	1.93	41.11	157.16	5257.76	5722.92
34	2.66	0.33	116.87	2.01	39.98	158.86	5100.59	5722.83
33	2.72	0.35	119.46	2.08	38.91	160.46	4941.74	5722.75
32	2.77	0.36	121.94	2.16	37.89	161.99	4781.28	5722.67
31	2.82	0.37	124.28	2.23	36.93	163.44	4619.28	5722.58
30	2.88	0.38	126.52	2.31	36.00	164.83	4455.84	5722.50
29	2.92	0.40	128.66	2.38	35.12	166.16	4291.01	5722.42
28	2.97	0.41	130.68	2.45	34.29	167.41	4124.85	5722.33
27	3.01	0.42	132.55	2.51	33.51	168.57	3957.45	5722.25
26	3.05	0.43	134.34	2.58	32.76	169.69	3788.88	5722.17
25	3.09	0.44	136.15	2.64	32.02	170.81	3619.19	5722.08
24	3.13	0.45	137.74	2.70	31.35	171.80	3448.39	5722.00
23	3.17	0.46	139.29	2.77	30.71	172.77	3276.58	5721.92
22	3.20	0.47	140.78	2.82	30.09	173.69	3103.82	5721.83

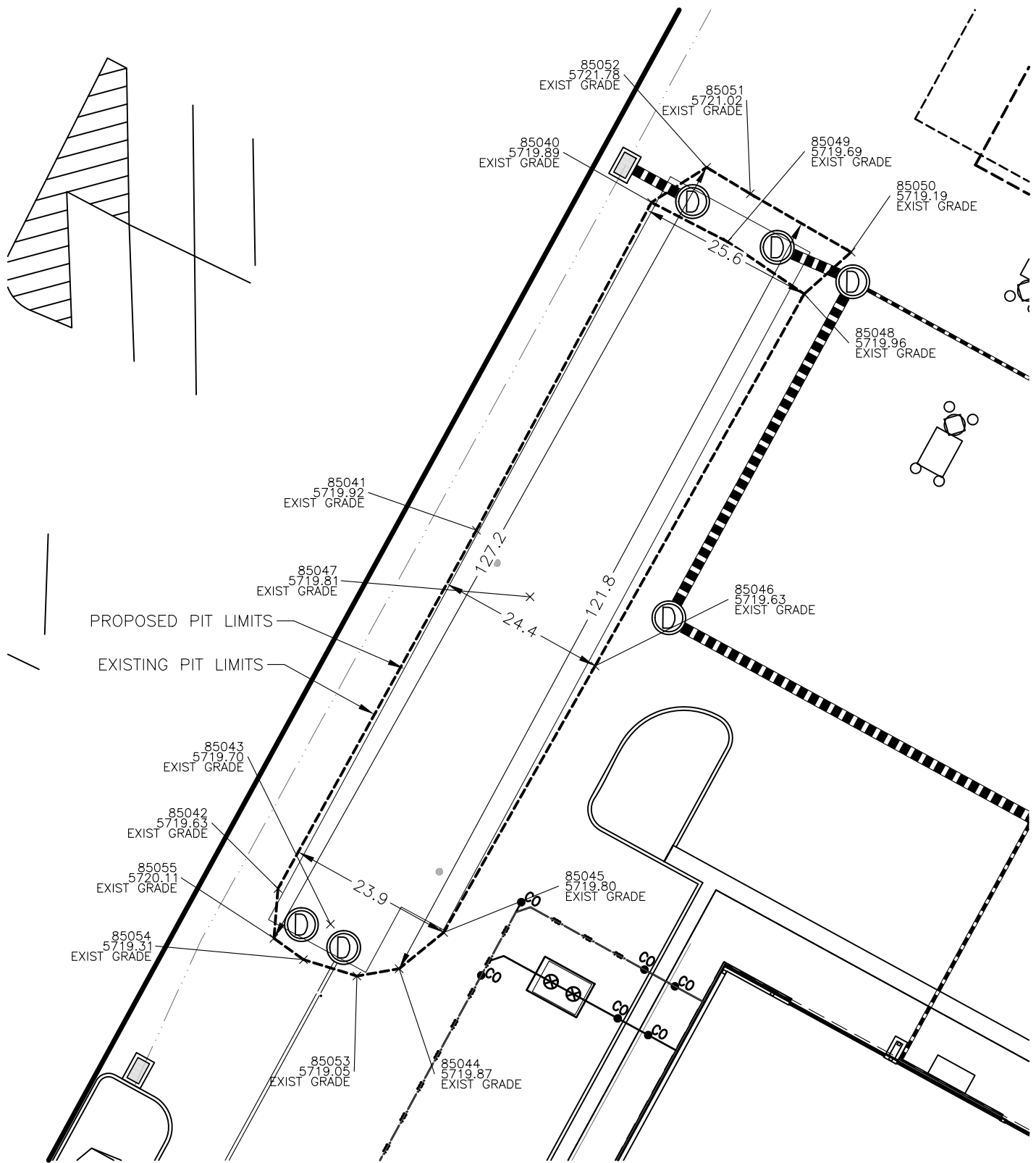
100-YR WSEL = 5725.02 FT

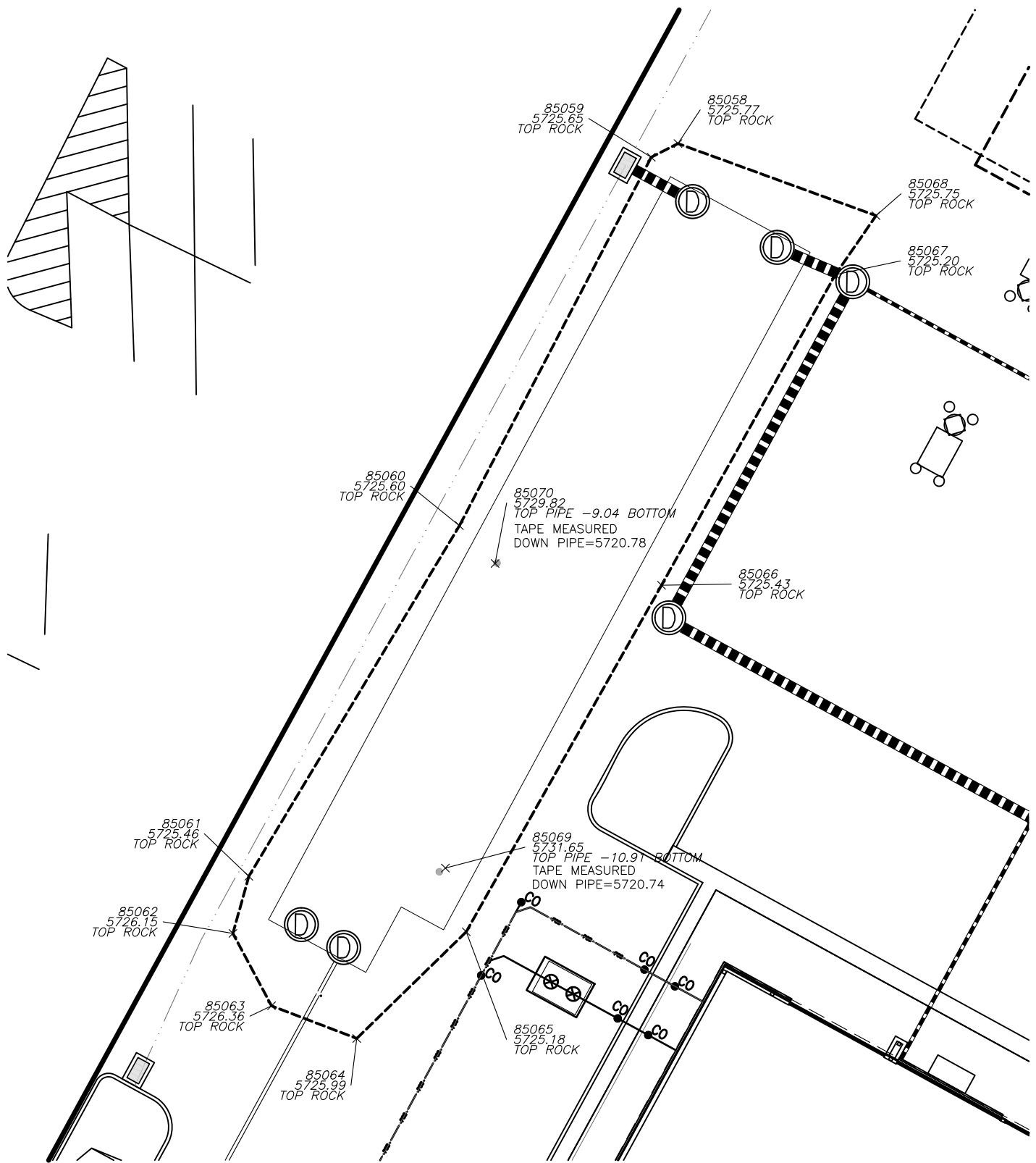
EURV WSEL = 5722.78 FT

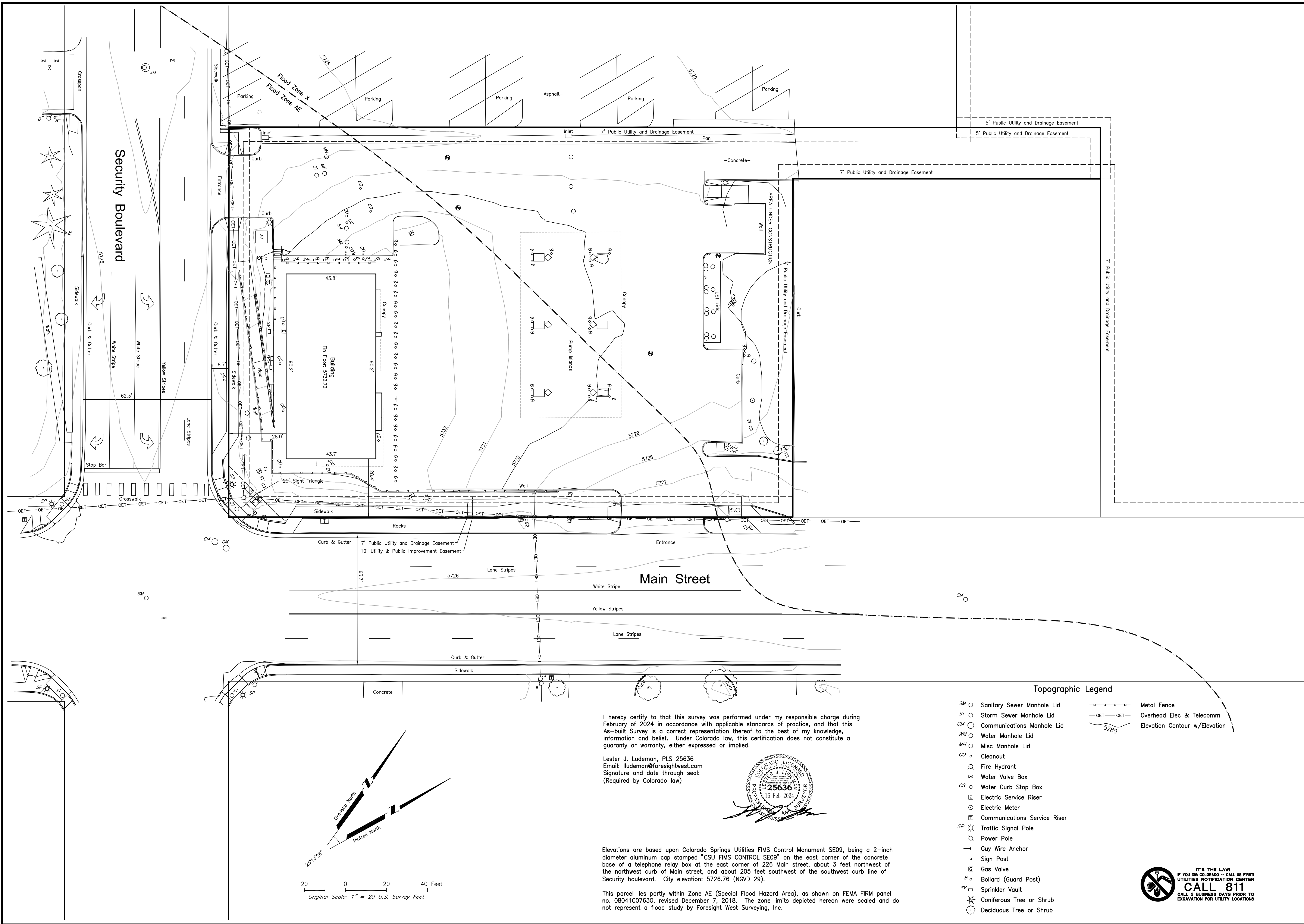
AS-BUILT

21	3.23	0.48	142.17	2.88	29.51	174.56	2930.12	5721.75
20	3.26	0.49	143.50	2.94	28.96	175.40	2755.56	5721.67
19	3.29	0.50	144.77	2.99	28.43	176.19	2580.17	5721.58
18	3.32	0.51	145.99	3.04	27.92	176.95	2403.98	5721.50
17	3.34	0.51	147.14	3.09	27.44	177.67	2227.03	5721.42
16	3.37	0.52	148.22	3.13	26.99	178.34	2049.36	5721.33
15	3.39	0.53	149.27	3.18	26.55	179.00	1871.01	5721.25
14	3.41	0.54	150.24	3.22	26.15	179.61	1692.01	5721.17
13	3.44	0.54	151.23	3.26	25.74	180.23	1512.40	5721.08
12	3.46	0.55	152.14	3.30	25.36	180.79	1332.17	5721.00
11	3.48	0.56	153.06	3.33	24.98	181.37	1151.38	5720.92
10	3.51	0.59	154.22	3.57	24.42	182.21	970.01	5720.83
9	0.00	0.00	0.00	0.00	87.53	87.53	787.80	5720.75
8	0.00	0.00	0.00	0.00	87.53	87.53	700.27	5720.67
7	0.00	0.00	0.00	0.00	87.53	87.53	612.73	5720.58
6	0.00	0.00	0.00	0.00	87.53	87.53	525.20	5720.50
5	0.00	0.00	0.00	0.00	87.53	87.53	437.67	5720.42
4	0.00	0.00	0.00	0.00	87.53	87.53	350.13	5720.33
3	0.00	0.00	0.00	0.00	87.53	87.53	262.60	5720.25
2	0.00	0.00	0.00	0.00	87.53	87.53	175.07	5720.17
1	0.00	0.00	0.00	0.00	87.53	87.53	87.53	5720.08

WQCV
WSEL =
5721.04
FT

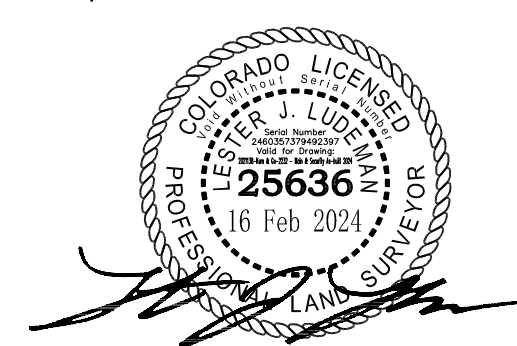






I hereby certify to that this survey was performed under my responsible charge during February of 2024 in accordance with applicable standards of practice, and that this As-built Survey is a correct representation thereof to the best of my knowledge, information and belief. Under Colorado law, this certification does not constitute a guaranty or warranty, either expressed or implied.

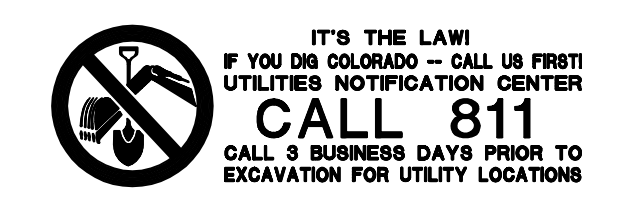
Lester J. Ludeman, PLS 25636
 Email: lludeman@foresightwest.com
 Signature and date through seal:
 (Required by Colorado law)



Elevations are based upon Colorado Springs Utilities FIMS Control Monument SE09, being a 2-inch diameter aluminum cap stamped "CSU FIMS CONTROL SE09" on the east corner of the concrete base of a telephone relay box at the east corner of 226 Main street, about 3 feet northwest of the northwest curb of Main street, and about 205 feet southwest of the southwest curb line of Security boulevard. City elevation: 5726.76 (NGVD 29).

This parcel lies partly within Zone AE (Special Flood Hazard Area), as shown on FEMA FIRM panel no. 08041C0763G, revised December 7, 2018. The zone limits depicted hereon were scaled and do not represent a flood study by Foresight West Surveying, Inc.

- Topographic Legend**
- SM ○ Sanitary Sewer Manhole Lid
 - ST ○ Storm Sewer Manhole Lid
 - CM ○ Communications Manhole Lid
 - WM ○ Water Manhole Lid
 - MH ○ Misc Manhole Lid
 - CO ○ Cleanout
 - ⊘ Fire Hydrant
 - ⊗ Water Valve Box
 - CS ○ Water Curb Stop Box
 - ⊞ Electric Service Riser
 - ⊕ Electric Meter
 - ⊞ Communications Service Riser
 - SP ⊙ Traffic Signal Pole
 - ⊙ Power Pole
 - Guy Wire Anchor
 - ⊞ Sign Post
 - ⊞ Gas Valve
 - B ○ Bollard (Guard Post)
 - SV □ Sprinkler Vault
 - ★ Coniferous Tree or Shrub
 - Deciduous Tree or Shrub
 - Metal Fence
 - OET— Overhead Elec & Telecomm
 - 5280 Elevation Contour w/Elevation



Project No. 2021138	Sheet 1
	of 1
Project Description 675 Security Boulevard	
Horizontal Scale: One inch = 20'	
Contour Interval: 1 Foot	
Surveyed By: GK	
Calculated: LUL	
Drawn: LUL	
This plan and seal is intended to be used only for the project and site covered and applies to all attached pages bearing the Foresight West logo	
By	
Revisions	
As-built Survey	
PART OF THE SOUTHEAST QUARTER OF SECTION 11, TOWNSHIP 15 SOUTH, RANGE 66 WEST OF THE 6th P.M., COUNTY OF EL PASO, STATE OF COLORADO	
EWS FORESIGHT WEST SURVEYING INC. 1309 S. Inco Street, Denver, CO 80223 303-594-4440 Boundary Control Construction Oil and Mineral Global Positioning	