

AMENDMENT TO THE DRAINAGE LETTER FOR WIDFIELD COMMUNITY BIBLE CHURCH ADDITION

JUNE 2025

Prepared for:
Casco Construction Corp.
6380 Corporate Centre Cir, Ste 210
Colorado Springs, CO 80919

Prepared By:



ADDENDUM TO THE DRAINAGE LETTER WIDEFIELD COMMUNITY BIBLE CHURCH ADDITION

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according the criteria established for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

Certification Statement:

This report and plan for the final drainage design for Widefield Community Bible Church Addition was prepared by me (or under my direct supervision) in accordance with the provisions of El Paso County/City of Colorado Springs Drainage Criteria Manual Drainage Design and Technical Criteria for the owners thereof. I understand that El Paso County does not and will not assume liability for drainage facilities designed by others.

David L. Mijares, Colorado PE #40510
For and on behalf of Catamount Engineering

Date 6/19/25

Developer's Statement:

I, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

Widefield Community Bible Church hereby certifies that the drainage facilities for Widefield Community Bible Church Addition shall be constructed according to the design presented in this report. I understand that El Paso County does not and will not assume liability for the drainage facilities designed and or certified by my engineer and that El Paso County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of Widefield Community Bible Church, guarantee that final drainage design review will absolve Widefield Community Bible Church, and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

SAMUEL KOLKOW

Widefield Community Bible Church

By: Samuel Kolkow

Title: Deacon

Address: WCBC; 702 Quebec St. Colorado Springs, CO

El Paso County:

Filed in accordance with the requirements of the El Paso County land Development Code and the Drainage Criteria manual Volumes 1 and 2, and the El Paso County Engineering Criteria Manual, latest revision.

Josh Palmer, PE
County Engineer/ECM Administrator

Date 6/26/2025

Conditions:

ADDENDUM TO THE DRAINAGE LETTER WIDEFIELD COMMUNITY BIBLE CHURCH ADDITION

PURPOSE

The purpose of this drainage report is to identify and analyze design revisions to the approved final drainage letter for the Widefield Community Church property. The revisions consist of revisions to the proposed parking lot layout intended to utilize more extensive portions of the existing parking lot. The parcel will still outfall directly to the adjacent sub-regional detention facility constructed with Mesa Ridge Self Storage. The sub-regional facility outfalls directly to the Detention Area A developed in the “Powers Boulevard/Peaceful Valley Road Storm Drainage Detention Study,” prepared by Wilson & Company and “Plan and Details of proposed peaceful Valley Road Detention Basin,” prepared by El Paso County Department of Transportation.

This addendum solely addresses revisions resulting in a smaller parking lot field and elimination of interior chase resulting in absorption of previous basin A1 into current basin A2.

GENERAL LOCATION AND DESCRIPTION

The parcel is located within the southwest 1/4 of Section 19, Township 15 South, Range 65 West of the 6th principal within unincorporated El Paso County. The parcel is bounded to the north by existing Webster Elementary School, to the east by Quebec Street, to the South by the sub-regional detention pond, and to the west by Blue Sky Self Storage.

The site has been platted as a portion of Tract B Wilsons Widefield Addition No. 6. Existing soils on the site consist of Fort Collins loam, hydrologic soil group B (30) and Nunn Clay loam, hydrologic soils group C (59) as determined by the Natural Resources Conservation Service Web Soil Survey. Hydrologic Group ‘C’ soils were utilized in calculations. The site is located within the East Big Johnson Basin and ultimately drains to Fountain Creek.

FLOODPLAIN STATEMENT

No portion of the site lies within an F.E.M.A. designated floodplain per FIRM 08041C0952 G, effective December 07, 2018. The F.E.M.A. Flood Insurance Rate Map has been provided.

EXISTING DRAINAGE CONDITIONS

No Revisions were proposed to the existing conditions analysis prepared in the approved final drainage letter for the Widefield Community Church addition as approved.

PROPOSED DRAINAGE IMPROVEMENTS

Proposed drainage improvements are separated into 'A' designated basins captured predominantly within proposed parking lot improvements and conveyed southeasterly to extended detention basin; and 'B' designated basins conveying flows southwesterly as sheet flow to existing storage site improvements conveying flows to the detention basin.

Basin A1: 0.44 Acres , $Q_5=1.7$ cfs, $Q_{100}=3.3$ cfs

Basin A1 consists of the northwesterly portion of the parking area, tributary landscape areas, proposed walkways, and tributary portions of proposed building conveyed within the parking to the 2.0' wide curb chase located at DP-1 ($Q_5=1.7$ cfs, $Q_{100}=3.3$). Runoff conveyed within the 2.0' curb cut are conveyed directly to a 12" private HDPE pipe flared end section and is conveyed in a private 12" HDPE pipe at 2.08% directly to the existing sub-regional pond at Design Point 3. The private 12" HDPE pipe An 5' wide by 5' long rip rap energy dissipation pad is proposed at the bottom of the pond embankment.

Basin A2: 0.39 Acres , $Q_5=1.6$ cfs, $Q_{100}=3.0$ cfs

Basin A2 consists of the southeasterly portion of the parking area, tributary landscape areas, proposed walkways, and tributary portions of existing and proposed buildings conveyed within the parking to the 2.0' wide curb chase located at DP-2 ($Q_5=1.6$ cfs, $Q_{100}=3.0$). Previous drainage letter indicated ($Q_5=3.5$ cfs, $Q_{100}=6.9$) at DP-2. Runoff conveyed within the 2.0' curb cut are conveyed through a 5' wide 1.5' deep riprap swale to the bottom of the existing detention pond. A 5' wide by 5' long rip rap energy dissipation pad is proposed at the bottom of the pond embankment.

Basin A3: 0.17 Acres , $Q_5=0.1$ cfs, $Q_{100}=0.7$ cfs

Basin A3 consists of the southeast portion of landscaped area not captured within the proposed parking lot and sheet flows southeast directly to the existing detention basin.

Basin B: 0.87 Acres , $Q_5=0.9$ cfs, $Q_{100}=3.4$ cfs

Basin B consists of the southeasterly portion of the parcel parallel to the southwest property line containing existing and proposed buildings, and landscaped area which sheet flows to the southwest and is conveyed in storage site improvements directly to the detention basin.

Anticipated runoff from basin B of $Q_5=0.9$ cfs, $Q_{100}=3.4$ cfs is consistent with existing condition basin EX-B contribution to adjacent ministorage site of $Q_5=0.8$ cfs, $Q_{100}=3.4$ cfs.

Combined developed runoff from the proposed site at DP-3 (detention pond) is $Q_5=3.7$ cfs, $Q_{100}=9.0$ cfs exceeds historic runoff at existing design point EX-1 of $Q_5=2.6$ cfs, $Q_{100}=7.3$ cfs. The subregional pond constructed with adjacent Mesa Ridge Self Storage Site was designed with excess capacity and excerpts of the report are included in the appendix.

DRAINAGE FEE CALCULATION

There are no Drainage, Bridge, or Pond Fees associated with the East Big Johnson Drainage Basin.

DRAINAGE METHODOLOGY

This drainage report was prepared in accordance to the criteria established in the El Paso County CDM Vol 1 and 2 with Vol 1 updates.

The rational method for drainage basin study areas of less than 100 acres was utilized in the analysis. For the Rational Method, flows were calculated for the 2, 5, 10, 25, 50, and 100-year recurrence intervals. The average runoff coefficients, 'C' values, are taken from Table 6-6 and the Intensity-Duration-Frequency curves are taken from Figure 6-5 of the City Drainage Criteria Manual. Time of concentration for overland flow and storm drain or gutter flow are calculated per Chapter 6 Section 3.2 of the City Drainage Criteria Manual. Calculations for the Rational Method are shown in the Appendix of this report.

Mile High Flood District methodology was utilized for determination of street capacity and inlet sizing. Calculations are shown in the appendix of this report. Hydraulic Grade Line Calculations have been provided within this report.

The analysis, presented in the appendix, provides more detailed calculations for the system in accordance with the requirements of the El Paso County DCM criteria. The storm sewer plan and profile drawings have been submitted concurrently with this analysis.

WATER QUALITY/4-STEP PROCESS

No Revisions were proposed to the 4-STEP PROCESS prepared in the approved final drainage letter for the Widefield Community Church addition as approved.

SUMMARY

Improvements proposed in this revision to the drainage letter for Widefield Community Bible Church Addition are consistent with drainage patterns anticipated in the Final Drainage Letter for Widefield Community Bible Church Addition previously approved and the Final Drainage Report for Mesa Ridge Self Storage preliminary/Final Drainage Report prepared by M&S Engineering. Development of the parcel is in conformance with current El Paso County criteria and will not adversely affect downstream properties or drainage facilities.

REFERENCES:

City of Colorado Springs Engineering Division Drainage Criteria Manual Volumes 1 and 2, revised May 2014

“Drainage Letter for the Widefield Community Bible Church Addition,” prepared by Catamount Engineering, dated October 2024.

Amendment to the Mesa Ridge Self Storage Preliminary/Final Drainage Report,” prepared by Catamount Engineering, dated February 2017.

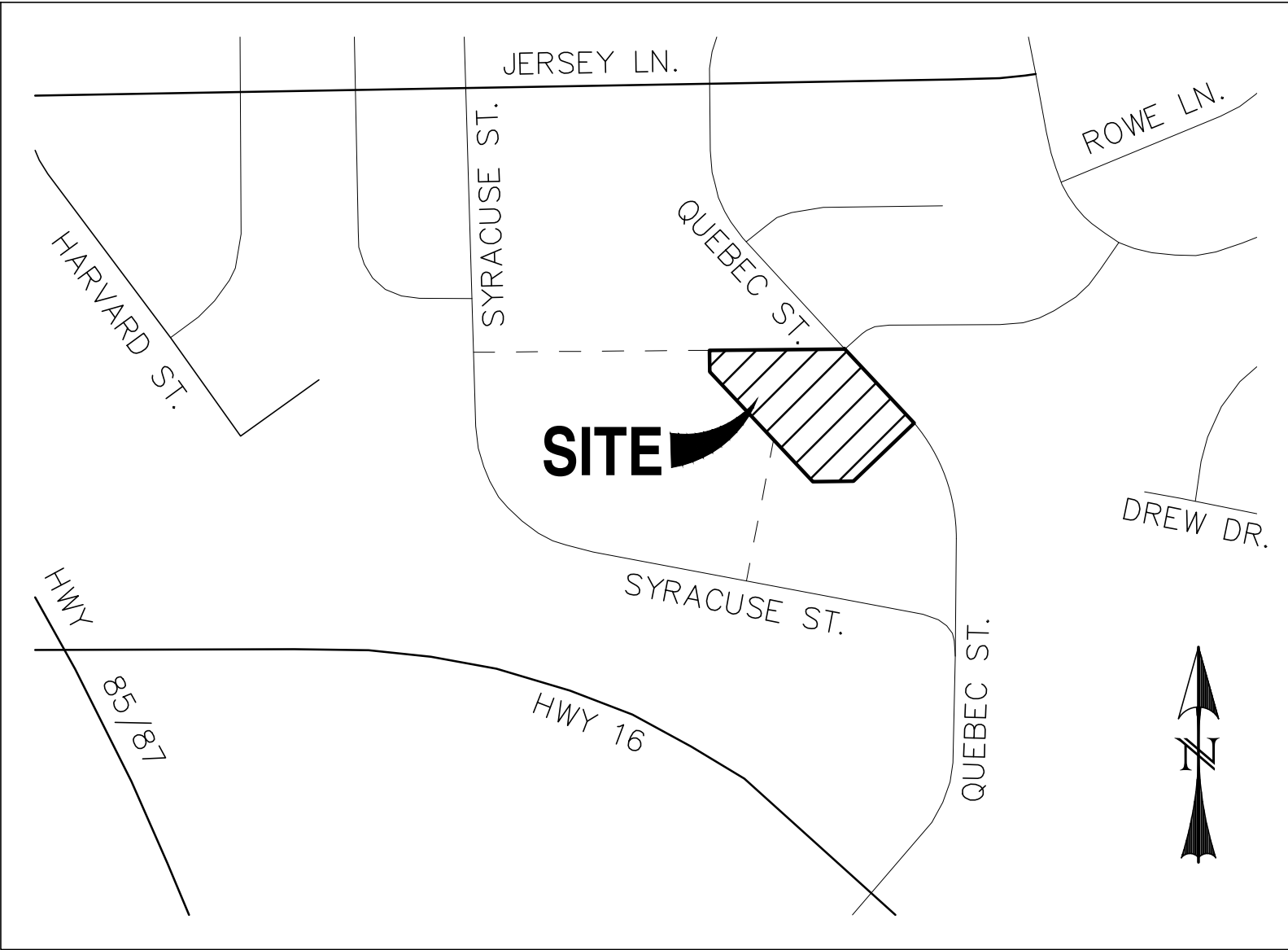
Mesa Ridge Self Storage Preliminary/Final Drainage Report,” prepared by M&S Engineering, dated September 20, 2014.

“Plan and Details of Proposed Peaceful Valley Road Detention Basin” prepared by El Paso County Department of Transportation.

Flood Insurance Rate Map Number 08041C0952 F, effective date march 17, 1997

Soil Map-El Paso County Area, Colorado, generated from Natural Resources Conservation Service Web Soil Survey, generated 9/01/2016

APPENDIX



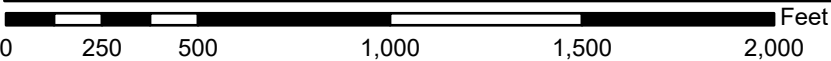
VICINITY MAP

SCALE: N.T.S.

National Flood Hazard Layer FIRMette



104°43'2"W 38°43'40"N



1:6,000

104°42'24"W 38°43'12"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



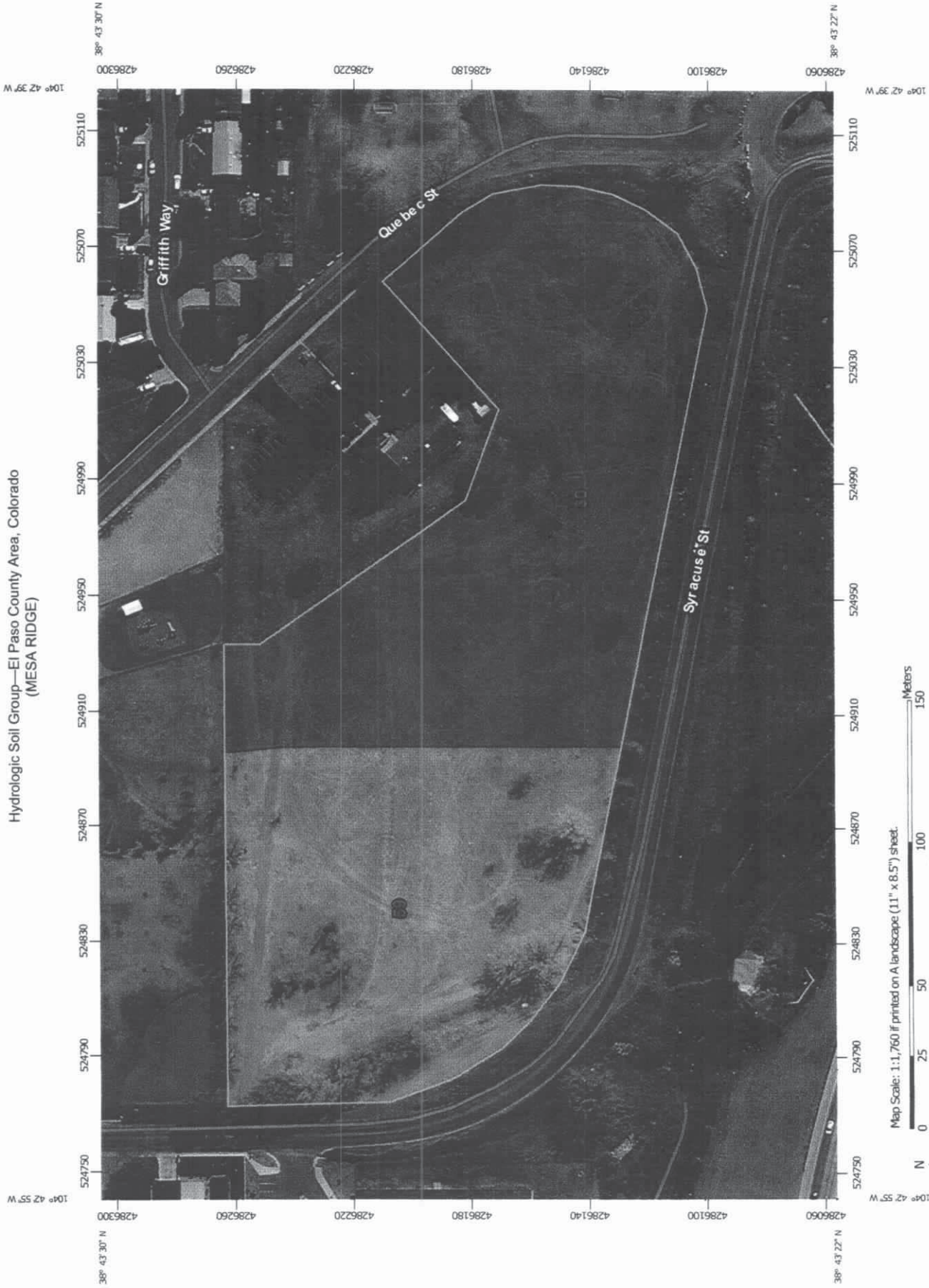
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

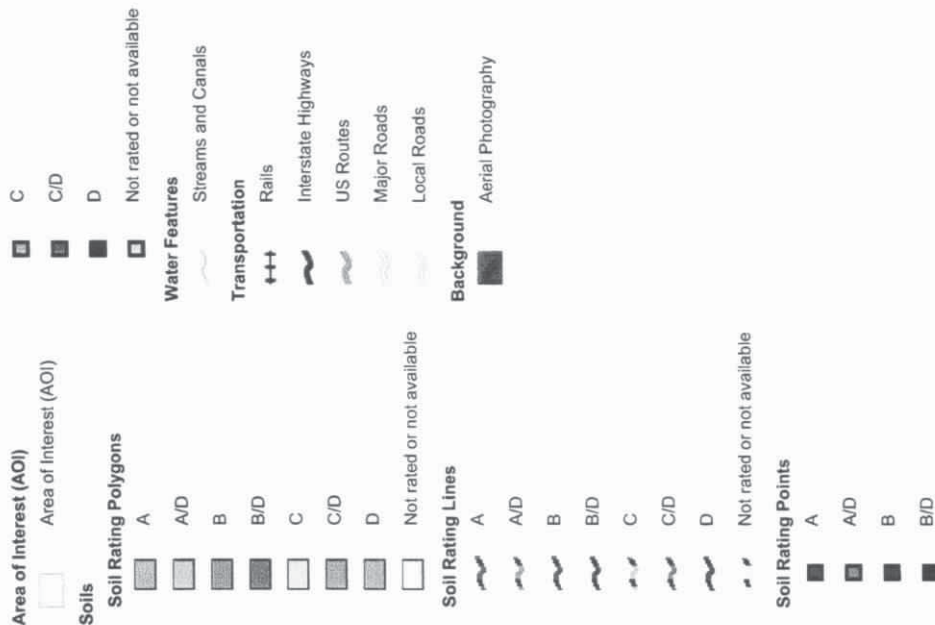
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **8/2/2024 at 2:44 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Hydrologic Soil Group—El Paso County Area, Colorado (MESA RIDGE)



MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 10, Dec 23, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 15, 2011—Sep 22, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — El Paso County Area, Colorado (CO625)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
30	Fort Collins loam, 0 to 3 percent slopes	B	4.5	56.3%
59	Nunn clay loam, 0 to 3 percent slopes	C	3.5	43.7%
Totals for Area of Interest			8.1	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

HYDROLOGIC CALCULATIONS

[illegible]

Calculated by: DLM
Date: 10/1/2024

											CONVEYANCE TC						TT	INTENSITY						TOTAL FLOWS					
BASIN	AREA TOTAL (Acres)	C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀	C ₁₀₀	Length	Height	TI	Length	Height	C _V	Slope	Velocity	TC	TOTAL	I ₂	I ₅	I ₁₀	I ₂₅	I ₅₀	I ₁₀₀	Q ₂	Q ₅	Q ₁₀	Q ₂₅	Q ₅₀	Q ₁₀₀
								(ft)	(ft)	(min)	(ft)	(ft)		(%)	(fps)	(min)	(min)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)
A1	0.44	0.72	0.75	0.79	0.82	0.84	0.86	40	1	2.9	90	2.5	20	2.8%	3.3	0.5	5.0	4.1	5.2	6.0	6.9	7.8	8.7	1.3	1.7	2.1	2.5	2.9	3.3
ROOF	0.06	0.73	0.75	0.77	0.80	0.82	0.83										MIN												
PAVEMENT	0.30	0.89	0.90	0.92	0.94	0.95	0.96																						
LANDSCAPE	0.08	0.09	0.19	0.29	0.40	0.46	0.52																						
A2	0.39	0.75	0.78	0.81	0.84	0.86	0.88	67	1.25	3.9	125	2.1	20	1.7%	2.6	0.8	5.0	4.1	5.2	6.0	6.9	7.8	8.7	1.2	1.6	1.9	2.3	2.6	3.0
ROOF	0.04	0.73	0.75	0.77	0.80	0.82	0.83										MIN												
PAVEMENT	0.29	0.89	0.90	0.92	0.94	0.95	0.96																						
LANDSCAPE	0.06	0.09	0.19	0.29	0.40	0.46	0.52																						
A3	0.17	0.09	0.19	0.29	0.40	0.46	0.52	45	2.5	6.3	30	1	7	3.3%	1.3	0.4	6.6	3.8	4.7	5.5	6.3	7.1	8.0	0.1	0.2	0.3	0.4	0.6	0.7
ROOF	0.00	0.73	0.75	0.77	0.80	0.82	0.83																						
PAVEMENT	0.00	0.89	0.90	0.92	0.94	0.95	0.96																						
LANDSCAPE	0.17	0.09	0.19	0.29	0.40	0.46	0.52																						
B	0.87	0.17	0.26	0.35	0.45	0.50	0.56	64	2	8.4	95	2	7	2.1%	1.0	1.6	9.9	3.3	4.1	4.8	5.5	6.2	7.0	0.5	0.9	1.5	2.1	2.7	3.4
ROOF	0.09	0.73	0.75	0.77	0.80	0.82	0.83																						
PAVEMENT	0.01	0.89	0.90	0.92	0.94	0.95	0.96																						
LANDSCAPE	0.77	0.09	0.19	0.29	0.40	0.46	0.52																						

Calculated by: DLM

Date: 6/19/2025

DESIGN POINT	AREA TOTAL (Acres)	WEIGHTED						TT	INTENSITY						TOTAL FLOWS					
		C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀	C ₁₀₀	TOTAL	I ₂	I ₅	I ₁₀	I ₂₅	I ₅₀	I ₁₀₀	Q ₂	Q ₅	Q ₁₀	Q ₂₅	Q ₅₀	Q ₁₀₀
								(min)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)
EX-1	1.88	0.30	0.38	0.46	0.54	0.59	0.64	13.7	2.9	3.7	4.3	4.9	5.5	6.1	1.7	2.6	3.7	5.0	6.1	7.3
BASIN EX A	0.92	0.49	0.55	0.61	0.67	0.70	0.74	8.5												
BASIN EX B	0.96	0.13	0.22	0.32	0.42	0.48	0.54	13.7												

Calculated by: DLM

Date: 10/1/2024

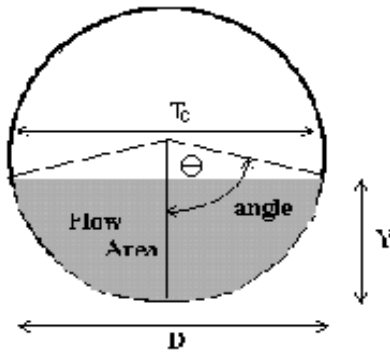
		WEIGHTED						TT	INTENSITY						TOTAL FLOWS					
DESIGN POINT	AREA TOTAL (Acres)	C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀	C ₁₀₀	TOTAL	I ₂	I ₅	I ₁₀	I ₂₅	I ₅₀	I ₁₀₀	Q ₂	Q ₅	Q ₁₀	Q ₂₅	Q ₅₀	Q ₁₀₀
								(min)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)
DP-1 BASIN A1	0.44	0.72	0.75	0.79	0.82	0.84	0.86	5.0	4.1	5.2	6.0	6.9	7.8	8.7	1.3	1.7	2.1	2.5	2.9	3.3
	0.44	0.72	0.75	0.79	0.82	0.84	0.86	5.0												
DP-2 BASIN A2	0.39	0.75	0.78	0.81	0.84	0.86	0.88	5.0	4.1	5.2	6.0	6.9	7.8	8.7	1.2	1.6	1.9	2.3	2.6	3.0
	0.39	0.75	0.78	0.81	0.84	0.86	0.88	5.0												
DP-3	1.87	0.41	0.47	0.54	0.61	0.65	0.69	9.9	3.3	4.1	4.8	5.5	6.2	7.0	2.5	3.7	4.9	6.3	7.6	9.0
DP-1	0.44	0.72	0.75	0.79	0.82	0.84	0.86	5.0												
DP-2	0.39	0.75	0.78	0.81	0.84	0.86	0.88	5.0												
BASIN A3	0.17	0.09	0.19	0.29	0.40	0.46	0.52	6.6												
BASIN B	0.87	0.17	0.26	0.35	0.45	0.50	0.56	9.9												

Calculated by: DLM
Date: 6/19/2025

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: **Widefield Community Bible Church**

Pipe ID: **DP-1 12" HDPE**



Design Information (Input)

Pipe Invert Slope	So =	0.0208	ft/ft
Pipe Manning's n-value	n =	0.0120	
Pipe Diameter	D =	12.00	inches
Design discharge	Q =	3.30	cfs

Full-flow Capacity (Calculated)

Full-flow area	Af =	0.79	sq ft
Full-flow wetted perimeter	Pf =	3.14	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	5.58	cfs

Calculation of Normal Flow Condition

Half Central Angle ($0 < \text{Theta} < 3.14$)	Theta =	1.68	radians
Flow area	An =	0.45	sq ft
Top width	Tn =	0.99	ft
Wetted perimeter	Pn =	1.68	ft
Flow depth	Yn =	0.55	ft
Flow velocity	Vn =	7.40	fps
Discharge	Qn =	3.30	cfs
Percent Full Flow	Flow =	59.1%	of full flow
Normal Depth Froude Number	Fr _n =	1.95	supercritical

Calculation of Critical Flow Condition

Half Central Angle ($0 < \text{Theta-c} < 3.14$)	Theta-c =	2.16	radians
Critical flow area	Ac =	0.66	sq ft
Critical top width	Tc =	0.83	ft
Critical flow depth	Yc =	0.78	ft
Critical flow velocity	Vc =	5.04	fps
Critical Depth Froude Number	Fr _c =	1.00	

Channel Report

RIPRAP V Swale Design Point 3

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 1.00

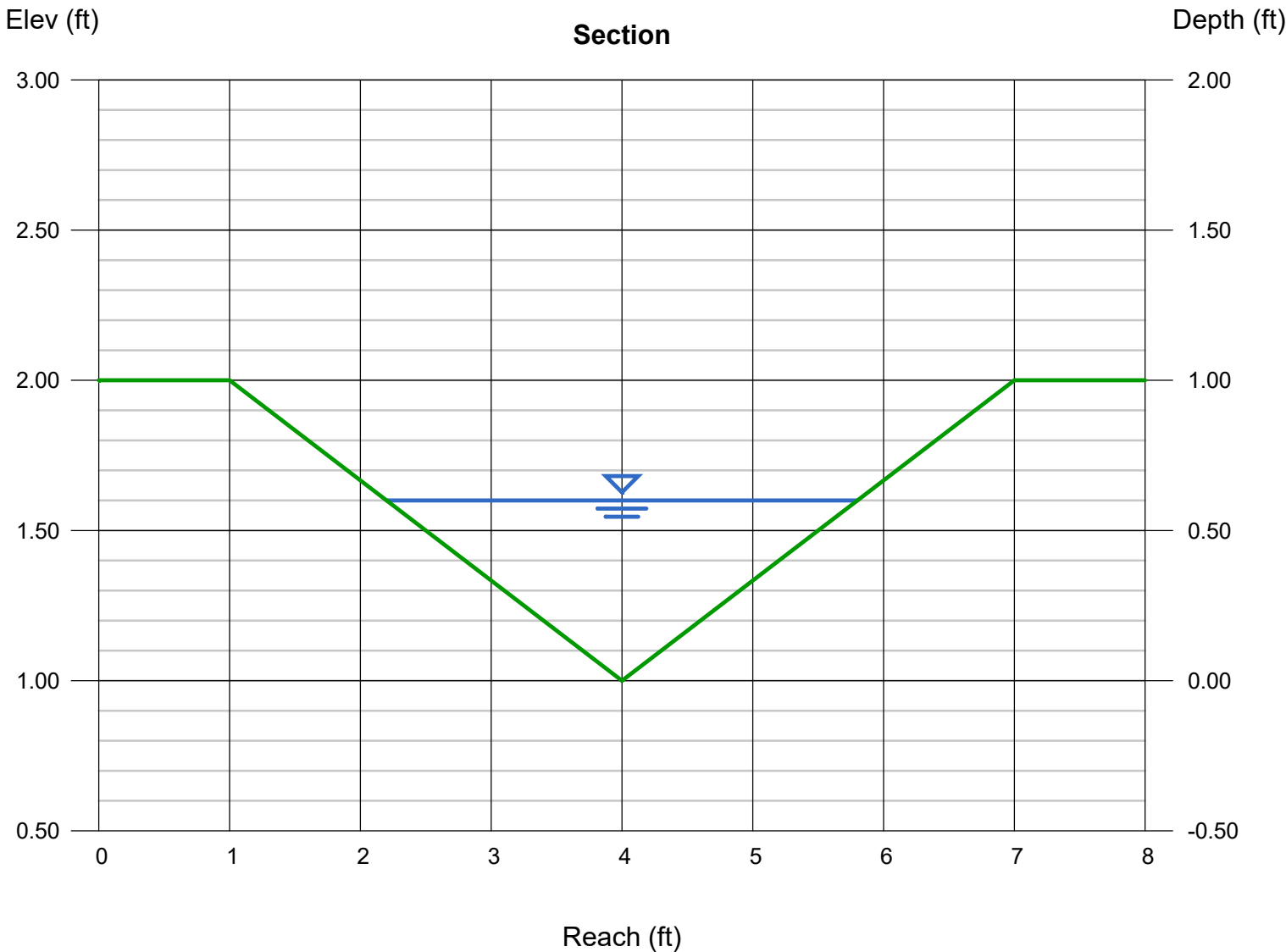
Invert Elev (ft) = 1.00
Slope (%) = 25.00
N-Value = 0.033

Calculations

Compute by: Q vs Depth
No. Increments = 20

Highlighted

Depth (ft) = 0.60
Q (cfs) = 10.52
Area (sqft) = 1.08
Velocity (ft/s) = 9.74
Wetted Perim (ft) = 3.79
Crit Depth, Yc (ft) = 0.95
Top Width (ft) = 3.60
EGL (ft) = 2.07



HYDRAULIC CALCULATIONS

DRAINAGE LETTER ADDENDUM TO MESA RIDGE SELF STORAGE PRELIMINARY/FINAL DRAINAGE REPORT

April 2017

Prepared for:
Mesa Ridge Self Storage LLC
791 Copper Center Parkway
Colorado Springs, CO 80921

Prepared By:



321 W. Henrietta Ave, Suite A
Woodland Park, CO 80863
719-426-2124

DRAINAGE LETTER ADDENDUM TO MESA RIDGE SELF STORAGE PRELIMINARY/FINAL DRAINAGE REPORT

PURPOSE

The purpose of this drainage report is to identify and analyze interim condition revisions to proposed drainage patterns for the Mesa Ridge development. El Paso County Board of County Commissioner's action allows development of Lot 1 Mesa Ridge Self Storage Filing 1 without pursuing infrastructure associated with Quebec Street and Syracuse frontage of Tract A. Future development action within Tract A will require replatting of the tract and development of Quebec Street, Syracuse Frontage, and drainage conveyance of tributary offsite flows to the existing regional detention facility located south of Syracuse Street.

The interim condition is proposed to replace the dual 54" culverts exhibited in the M&S engineering FDR. The proposed improvements will convey flows historically carried by the existing 48" culvert crossing of Syracuse Street and releasing to the regional detention facility. The interim condition will remain until ultimate improvements are constructed with development of Tract A.

This report will accept hydrology for offsite basins developed in the approved "Mesa Ridge Self Storage Preliminary/Final Drainage Report," by M&S Engineering and size drainage facilities for conveyance of offsite basin runoff to regional Detention Area A developed in the "Powers Boulevard/Peaceful Valley Road Storm Drainage Detention Study," prepared by Wilson & Company and "Plan and Details of proposed peaceful Valley Road Detention Basin," prepared by El Paso County Department of Transportation.. This addendum solely addresses development of replacement conveyance for offsite flows crossing Syracuse within Tract 'A'.

GENERAL LOCATION AND DESCRIPTION

The parcel is located within the southwest 1/4 of Section 19, Township 15 South, Range 65 West of the 6th principal within unincorporated El Paso County. The parcel is bounded to the north by existing Webster Elementary School and Widefield Community Bible Church, to the east by undeveloped Quebec Street, to the south and west by existing Syracuse Street.

The site has been platted as Mesa Ridge Self Storage Filing 1 and remains undeveloped. Undetained runoff from upstream development is conveyed in a roadside ditch along the northern limits of Syracuse Street to an existing culvert crossing which outfalls into the existing regional detention pond. Lot 1 and Tract A drain to the culvert crossing at the southwest corner of the development.

Existing soils on the site consist of Fort Collins loam, hydrologic soil group B (30) and Nunn Clay loam, hydrologic soils group C (59) as determined by the Natural Resources Conservation Service Web Soil Survey. The site is located within the East Big Johnson Basin and ultimately drains to Fountain Creek.

EXISTING DRAINAGE CONDITIONS

From “Mesa Ridge Self Storage Preliminary/Final Drainage Report” by M&S Engineering-

The overall site consists of 7.95 acres, and is currently undeveloped. Runoff from the site sheet flows into drainage swales located along the perimeter of the site on the; west, east, and south to an existing 48” concrete pipe which conveys flows under Syracuse Street. Existing developed flows northwest of the site are routed via Syracuse Street into an existing drainage swale that runs the perimeter of the site along the west and south to the existing 48” concrete pipe. Existing developed flows from the northeast and east of the site are routed via a drainage swale that runs the perimeter of our site along the east and south to the existing 48” concrete pipe. The existing 48” concrete pipe conveys flows underneath Syracuse Street to Detention Area A (PPVDDS).

The site is tributary to Detention Area A (PPVDDS) and the 5-year and 100-year storm water infrastructure from this site has already been incorporated and constructed. However, WQCV will be provided onsite for the proposed run off.

The site was originally studied in the “Powers Boulevard/Peaceful Valley Road Storm Drainage Detention Study” (PPVDDS), prepared by Wilson & Company dated September 1996.

PROPOSED DRAINAGE AMENDMENT

Development of the mini storage site on Lot 1 will remove historic basins OS-3, OS-A2, and B from historic outfall at the 48” RCP at Design Point 13. The approved drainage report proposed to convey undetained off-site flows from Basins OS-3 and OS-A2 in a dual 54” RCP crossing of Syracuse to existing El Paso County Detention Area A (Design Point 12 M&S report). A portion of the 100-Year design flows was proposed to overtop existing Syracuse at the crossing.

From “Mesa Ridge Self Storage Preliminary/Final Drainage Report” by M&S Engineering-

Flows from both Basins OS-3 and OS-A2 are intended to end up in Pond A. The dual 54” culverts will convey 355 CFS of the $Q_{100}=397$ CFS. Overtopping of Syracuse to Pond A at a depth of approximately 0.4’ is less than the maximum allowable.

The existing design exhibits 42 CFS not contained within the proposed culvert crossing and being conveyed to Syracuse Right-of-Way in the major storm event.

The proposed redesign proposes a detention facility within tract ‘A’ to attenuate the major storm event. The proposed detention facility within tract ‘A’ will capture runoff from Basins OS-3, OS-A2, and B and release flows through a 48” RCP across Syracuse Road to existing regional Pond A.

The pond contains approximately 7.67 acre-feet of storage below the emergency overflow. Total 100-YR peak volume while the overflow is in operation is 9.05 acre-ft. The emergency overflow consists of a soil riprap weir 50’ long with a minimum depth of 1.55’ and is sized to convey the

100 year storm in the event of fully plugged primary outlet. The pond was designed with a minimum berm width of 10' and minimum elevation of 5658.75

The 100-YR maximum release from the pond will convey 145 CFS in the 48" RCP and 38 CFS in the overflow spillway. Release from the overflow spillway will overtop Syracuse to Pond A.

Drainage Concept Comparison-

	M&S report	Letter Addendum
Concept	Dual 54" RCP	Pond with Single 48" RCP
100-YR Inflow	397 CFS	399 CFS
100-YR peak outflow	397 CFS	183 CFS
100-YR peak pipe flow	355 CFS	146 CFS
100-YR overtopping	42 CFS	38 CFS

SUMMARY

The pond is private and will be owned and maintained by the property owner.

Revisions proposed in the addendum will not adversely affect the surrounding development and improve conveyance of existing drainage to existing Detention Area A. This report is in conformance with previous drainage studies, and the construction drawings for Peaceful Valley Road Detention Basin.

FLOODPLAIN STATEMENT

No portion of the site lies within an F.E.M.A. designated floodplain per FIRM 08041C0952 F, effective March 17, 1997. The F.E.M.A. Flood Insurance Rate Map has been provided.

COST ESTIMATE

Public Improvements-Non reimbursable

Item	Quantity	Unit Cost	Cost
48" RCP Outfall	127 LF	\$ 178/LF	\$22,606
48" FES	2 EA	\$2,000/EA	\$ 4,000
Outlet Cutoff Wall	1.74CY	\$ 550/CY	\$ 957
Soil Riprap	54/CY	\$ 98/CY	\$ 5,292
	Total Public Improvements		\$32,855

Private Improvements-Non reimbursable

Item	Quantity	Unit Cost	Cost
Emergency Spillway	1 EA	\$ 2,500/EA	\$ 2,500
Soil Riprap	100 CY	\$ 98/CY	\$ 9,800
	Total Private Improvements		\$12,300

DRAINAGE FEE CALCULATION

There are no Drainage, Bridge, or Pond Fees associated with the East Big Johnson Drainage Basin.

DRAINAGE METHODOLOGY

This drainage report was prepared in accordance to the criteria established in the El Paso County/City of Colorado Springs Drainage Criteria Manual Volumes 1 and 2, as revised May 2014.

Hydrology used in the analysis was taken directly from the “Mesa Ridge Self Storage Preliminary/Final Drainage Report”, prepared by M&S Engineering, dated September 20, 2014.

REFERENCES:

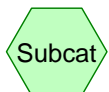
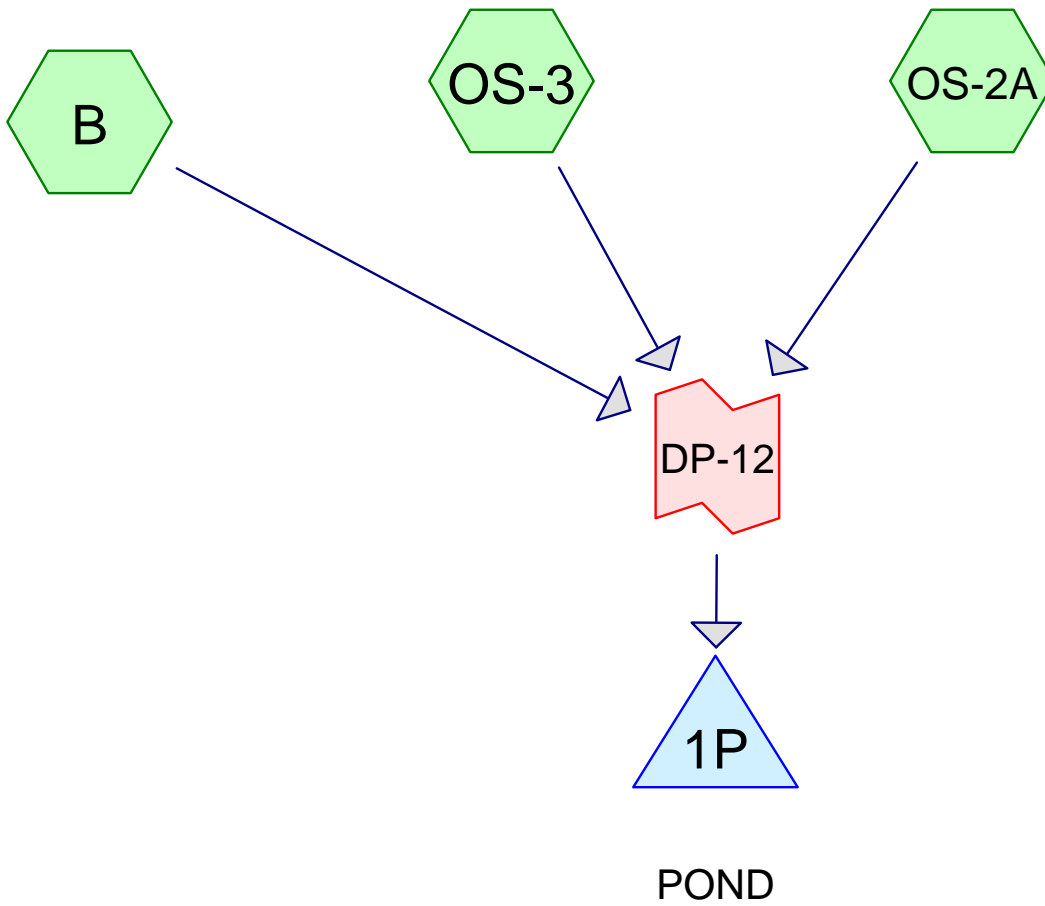
City of Colorado Springs Engineering Division Drainage Criteria Manual Volumes 1 and 2, revised May 2014

Mesa Ridge Self Storage Preliminary/Final Drainage Report”, prepared by M&S Engineering, dated September 20, 2014.

“Plan and Details of Proposed Peaceful Valley Road Detention Basin” prepared by El Paso County Department of Transportation.

Flood Insurance Rate Map Number 08041C0952 F, effective date march 17, 1997

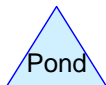
Soil Map-El Paso County Area, Colorado, generated from Natural Resources Conservation Service Web Soil Survey, generated 9/01/2016



Subcat



Reach



Pond



Link

Drainage Diagram for POND.100

Prepared by {enter your company name here} 4/18/2017
HydroCAD® 7.00 s/n 002053 © 1986-2003 Applied Microcomputer Systems

```
// HydroCAD Rainfall table
// Copyright (c) 1990-2001 Applied Microcomputer Systems
// For details see Rainfall.txt
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name=Type IIA 24-hr
```

```
timeunits=hours
```

```
duration=24
```

```
comment=SCS Type IIA Colorado Springs Modified
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```
smoothing=false
```

depth=	0.000	0.001	0.002	0.003	0.005	0.006	0.008	0.010	0.012	0.014
depth=	0.017	0.019	0.021	0.023	0.026	0.028	0.032	0.039	0.046	0.053
depth=	0.060	0.075	0.100	0.400	0.700	0.725	0.750	0.765	0.780	0.790
depth=	0.800	0.810	0.820	0.825	0.830	0.835	0.840	0.845	0.850	0.855
depth=	0.860	0.864	0.868	0.871	0.875	0.879	0.883	0.886	0.890	0.894
depth=	0.898	0.901	0.905	0.908	0.912	0.915	0.918	0.921	0.924	0.927
depth=	0.930	0.933	0.935	0.938	0.940	0.943	0.945	0.948	0.950	0.953
depth=	0.955	0.958	0.960	0.963	0.965	0.968	0.970	0.973	0.975	0.978
depth=	0.980	0.981	0.983	0.984	0.985	0.986	0.988	0.989	0.990	0.991
depth=	0.993	0.994	0.995	0.996	0.998	0.999	1.000			

POND.100*Type IIA 24-hr Rainfall=4.50"*

Prepared by {enter your company name here}

Page 2

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment B:

Runoff Area=3.100 ac Runoff Depth=1.83"

Tc=8.1 min CN=73 Runoff=9.31 cfs 0.472 af

Subcatchment OS-2A:

Runoff Area=79.500 ac Runoff Depth=2.05"

Tc=25.0 min CN=76 Runoff=186.29 cfs 13.557 af

Subcatchment OS-3:

Runoff Area=82.700 ac Runoff Depth=2.21"

Tc=24.7 min CN=78 Runoff=210.47 cfs 15.207 af

Pond 1P: POND

Peak Elev=5,657.71' Storage=394,192 cf Inflow=399.15 cfs 29.236 af

Primary=144.58 cfs 28.503 af Secondary=38.48 cfs 0.712 af Outflow=183.06 cfs 29.215 af

Link DP-12:

Inflow=399.15 cfs 29.236 af

Primary=399.15 cfs 29.236 af

POND.100

Type IIA 24-hr Rainfall=4.50"

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Page 3

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Subcatchment B:

Runoff = 9.31 cfs @ 6.03 hrs, Volume= 0.472 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type IIA 24-hr Rainfall=4.50"

Area (ac)	CN	Description
3.100	73	Pasture/grassland/range, Poor, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1					Direct Entry,

Subcatchment OS-2A:

Runoff = 186.29 cfs @ 6.18 hrs, Volume= 13.557 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type IIA 24-hr Rainfall=4.50"

Area (ac)	CN	Description
79.500	76	M&S REPORT

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					Direct Entry, M&S REPORT

Subcatchment OS-3:

Runoff = 210.47 cfs @ 6.17 hrs, Volume= 15.207 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type IIA 24-hr Rainfall=4.50"

Area (ac)	CN	Description
82.700	78	MS Final Report

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7					Direct Entry, M&S REPORT

Pond 1P: POND

Inflow Area = 165.300 ac, Inflow Depth = 2.12"

Inflow = 399.15 cfs @ 6.18 hrs, Volume= 29.236 af

Outflow = 183.06 cfs @ 6.45 hrs, Volume= 29.215 af, Atten= 54%, Lag= 16.4 min

Primary = 144.58 cfs @ 6.45 hrs, Volume= 28.503 af

Secondary = 38.48 cfs @ 6.45 hrs, Volume= 0.712 af

POND.100

Type IIA 24-hr Rainfall=4.50"

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Page 4

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Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,657.71' @ 6.45 hrs Surf.Area= 88,794 sf Storage= 394,192 cf
 Plug-Flow detention time= 23.1 min calculated for 29.215 af (100% of inflow)
 Center-of-Mass det. time= 22.6 min (518.3 - 495.7)

#	Invert	Avail.Storage	Storage Description
1	5,650.00'	419,360 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,650.00	10	0	0
5,651.00	2,144	1,077	1,077
5,652.00	18,582	10,363	11,440
5,653.00	54,705	36,644	48,084
5,654.00	67,609	61,157	109,241
5,655.00	72,146	69,878	179,118
5,656.00	76,777	74,462	253,580
5,657.00	81,502	79,140	332,719
5,658.00	91,780	86,641	419,360

#	Routing	Invert	Outlet Devices
1	Primary	5,650.00'	48.0" x 126.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 5,641.29' S= 0.0691 '/' n= 0.013 Cc= 0.900
2	Secondary	5,657.20'	40.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=144.57 cfs @ 6.45 hrs HW=5,657.71' (Free Discharge)↑ **1=Culvert** (Inlet Controls 144.57 cfs @ 11.5 fps)**Secondary OutFlow** Max=38.27 cfs @ 6.45 hrs HW=5,657.71' (Free Discharge)↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 38.27 cfs @ 1.9 fps)**Link DP-12:**

Inflow Area = 165.300 ac, Inflow Depth = 2.12"
 Inflow = 399.15 cfs @ 6.18 hrs, Volume= 29.236 af
 Primary = 399.15 cfs @ 6.18 hrs, Volume= 29.236 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

POND.100

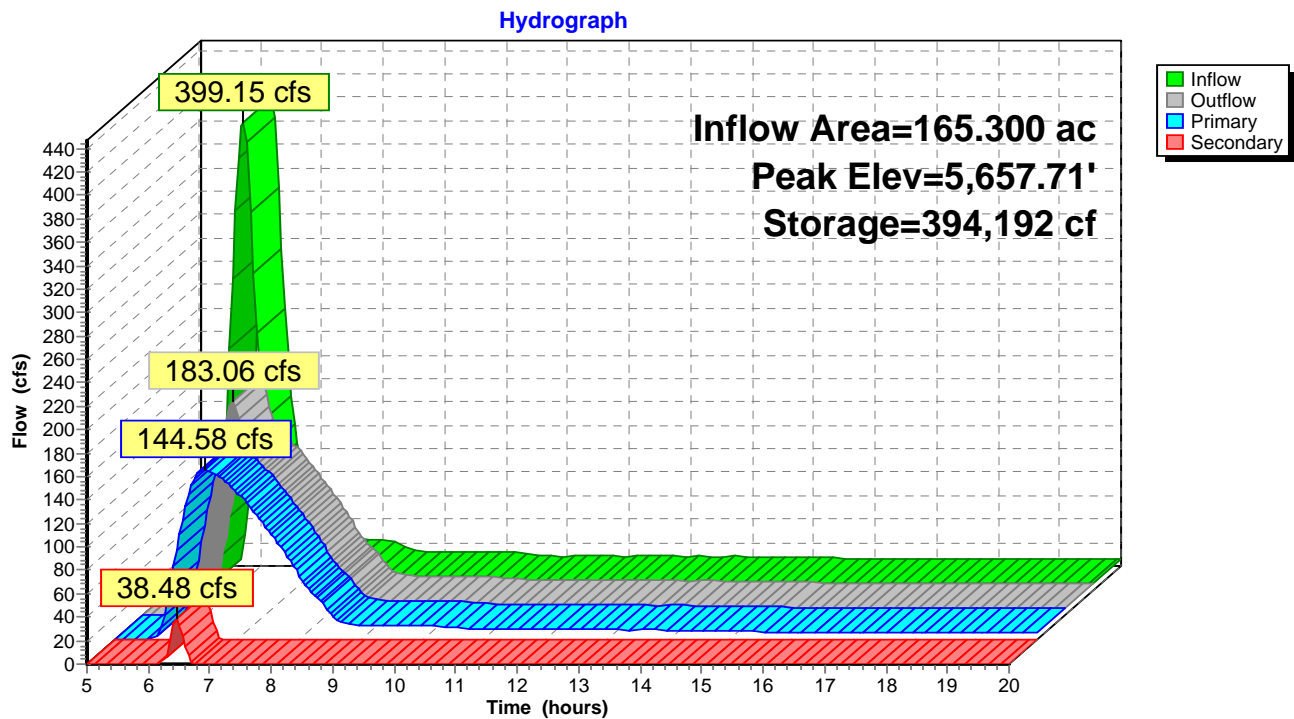
Type IIA 24-hr Rainfall=4.50"

Prepared by {enter your company name here}

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4/18/2017

Pond 1P: POND

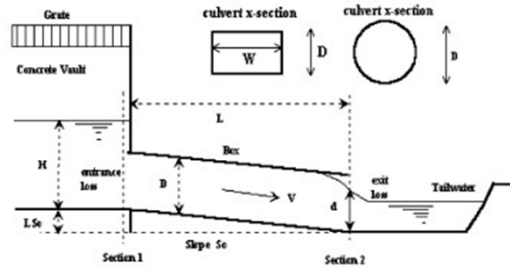


CULVERT STAGE-DISCHARGE SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

Project: **Mesa Ridge Self Storage**

Basin ID: **Existing 48" RCP CROSSING OF SYRACUSE**

Status:



Design Information (Input):

Circular Culvert: Barrel Diameter in Inches

Inlet Edge Type (choose from pull-down list)

D = 48 inches

Square End Projection

OR:

Box Culvert: Barrel Height (Rise) in Feet

Barrel Width (Span) in Feet

Inlet Edge Type (choose from pull-down list)

Height (Rise) = ft.

Width (Span) = ft.

Square Edge w/ 30-78 deg. Flared Wingwall

Number of Barrels

Inlet Elevation at Culvert Invert

Outlet Elevation at Culvert Invert **OR** Slope of Culvert (ft v./ft h.)

Culvert Length in Feet

Manning's Roughness

Bend Loss Coefficient

Exit Loss Coefficient

No = 1

Inlet Elev = 5650 ft. elev.

Outlet Elev = 5641.29 ft. elev.

L = 134.42 ft.

n = 0.013

K_b = 0

K_x = 1

Design Information (calculated):

Entrance Loss Coefficient

Friction Loss Coefficient

Sum of All Loss Coefficients

Orifice Inlet Condition Coefficient

Minimum Energy Condition Coefficient

K_e = 0.50

K_f = 0.66

K_s = 2.16

C_d = 0.85

KE_{low} = -0.0968

Calculations of Culvert Capacity (output):

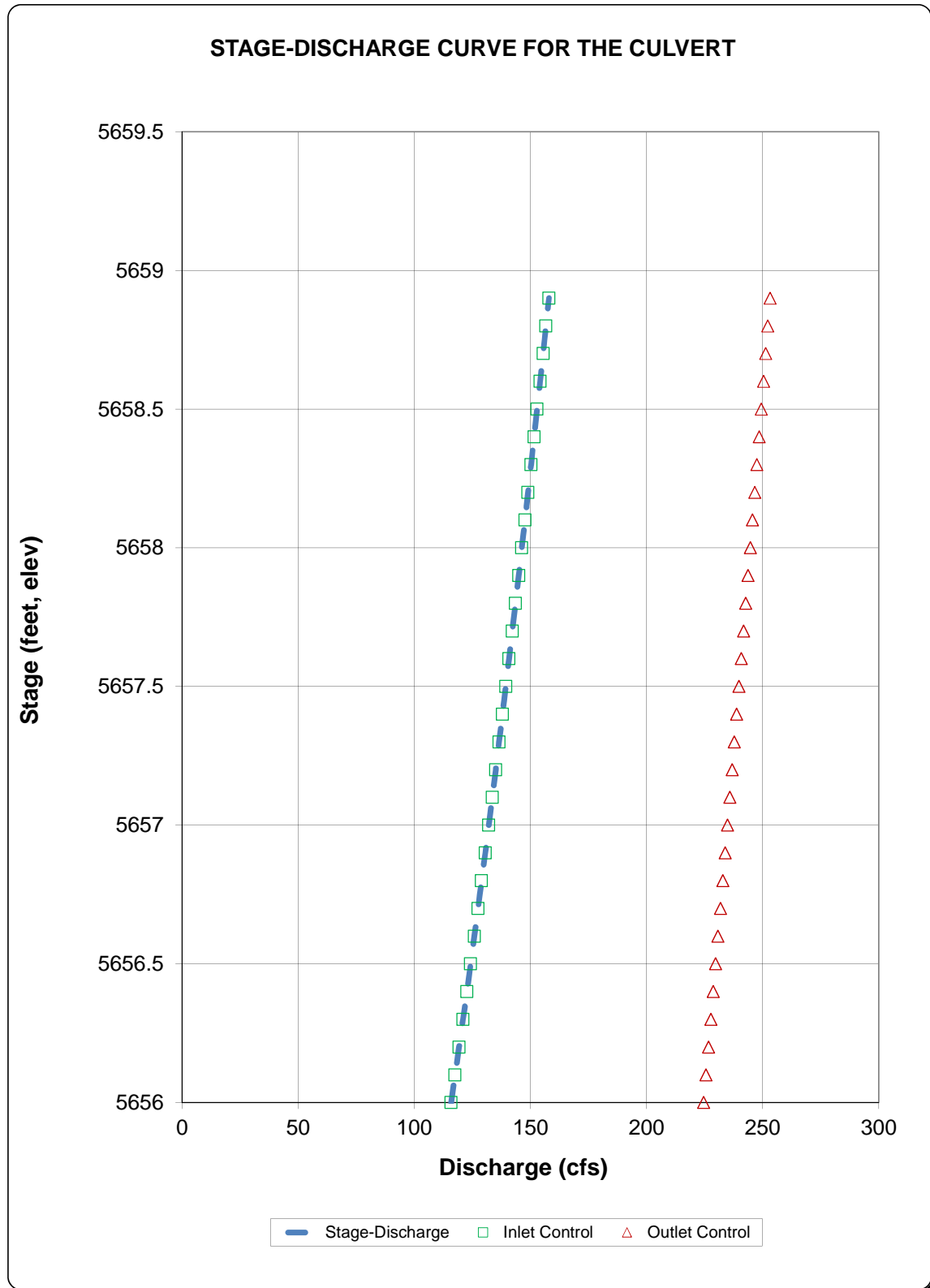
Water Surface Elevation (ft., linked)	Tailwater Surface Elevation ft	Culvert Inlet-Control Flowrate cfs	Culvert Outlet-Control Flowrate cfs	Controlling Culvert Flowrate cfs (output)	Inlet Equation Used:	Flow Control Used
5656.00	95.00	115.90	224.64	115.90	Regression Eqn.	INLET
5656.10		117.60	225.68	117.60	Regression Eqn.	INLET
5656.20		119.30	226.72	119.30	Regression Eqn.	INLET
5656.30		121.00	227.76	121.00	Regression Eqn.	INLET
5656.40		122.70	228.79	122.70	Regression Eqn.	INLET
5656.50		124.30	229.81	124.30	Regression Eqn.	INLET
5656.60		125.90	230.83	125.90	Regression Eqn.	INLET
5656.70		127.50	231.86	127.50	Regression Eqn.	INLET
5656.80		129.00	232.86	129.00	Regression Eqn.	INLET
5656.90		130.60	233.89	130.60	Regression Eqn.	INLET
5657.00		132.10	234.89	132.10	Regression Eqn.	INLET
5657.10		133.60	235.88	133.60	Regression Eqn.	INLET
5657.20		135.10	236.88	135.10	Regression Eqn.	INLET
5657.30		136.50	237.87	136.50	Regression Eqn.	INLET
5657.40		138.00	238.86	138.00	Regression Eqn.	INLET
5657.50		139.40	239.85	139.40	Regression Eqn.	INLET
5657.60		140.80	240.83	140.80	Regression Eqn.	INLET
5657.70		142.20	241.80	142.20	Regression Eqn.	INLET
5657.80		143.60	242.77	143.60	Regression Eqn.	INLET
5657.90		145.00	243.74	145.00	Regression Eqn.	INLET
5658.00		146.30	244.71	146.30	Regression Eqn.	INLET
5658.10		147.70	245.68	147.70	Regression Eqn.	INLET
5658.20		149.00	246.63	149.00	Regression Eqn.	INLET
5658.30		150.30	247.58	150.30	Regression Eqn.	INLET
5658.40		151.60	248.53	151.60	Regression Eqn.	INLET
5658.50		152.90	249.48	152.90	Regression Eqn.	INLET
5658.60		154.20	250.41	154.20	Regression Eqn.	INLET
5658.70		155.50	251.36	155.50	Regression Eqn.	INLET
5658.80		156.70	252.30	156.70	Regression Eqn.	INLET
5658.90		158.00	253.23	158.00	Regression Eqn.	INLET

Processing Time: 00.21 Seconds

CULVERT STAGE-DISCHARGE SIZING (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

Project: Mesa Ridge Self Storage

Basin ID: Existing 48" RCP CROSSING OF SYRACUSE



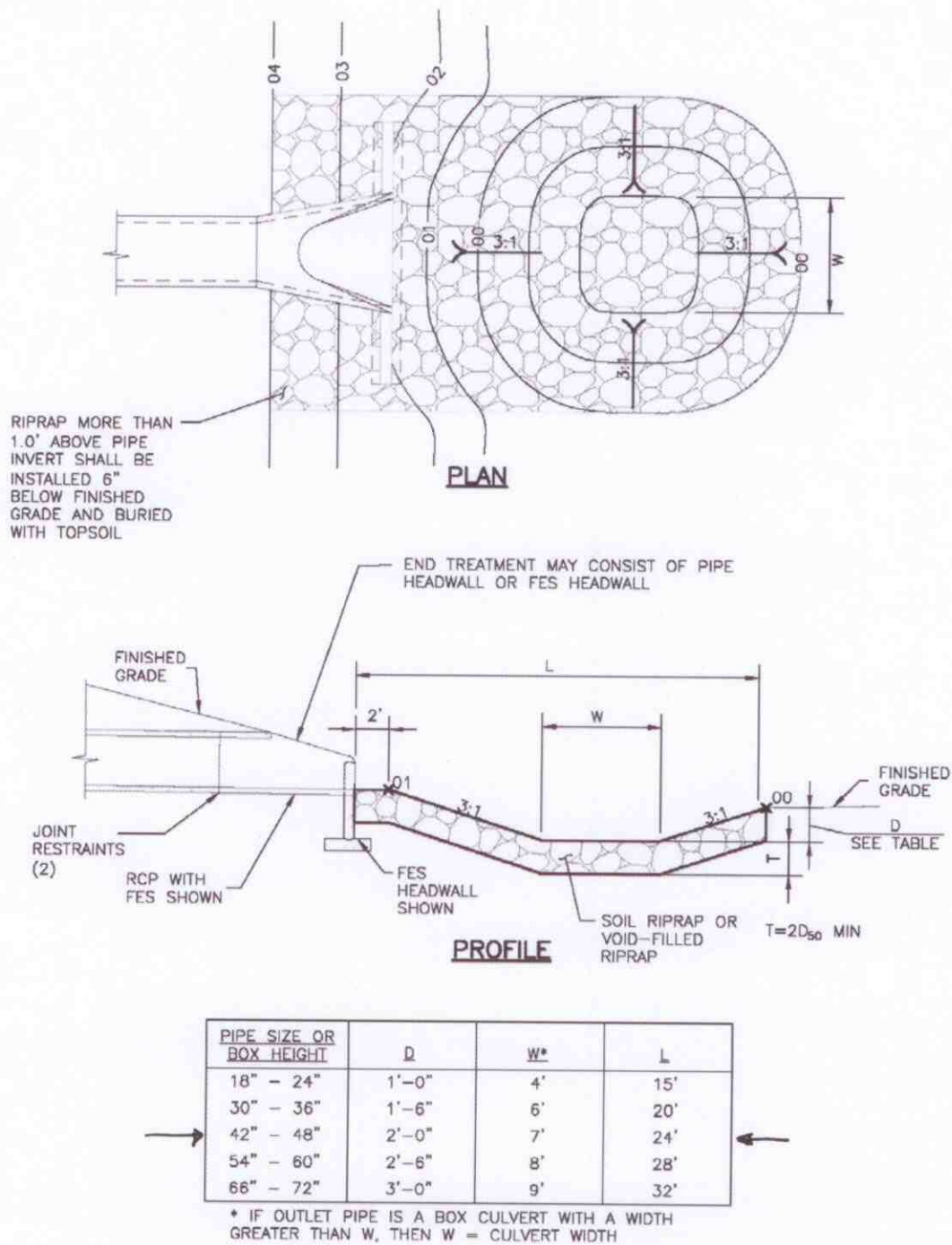
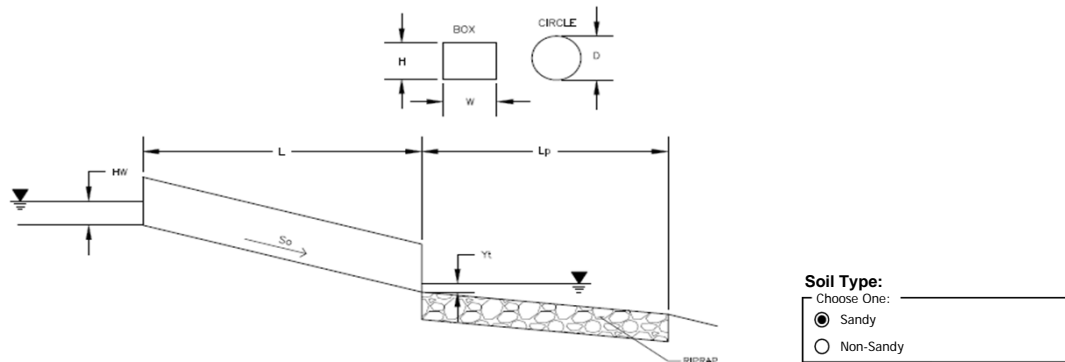


Figure 9-37. Low tailwater riprap basin

Determination of Culvert Headwater and Outlet Protection

Project: **Mesa Ridge Self Storage Filing No. 1**

Basin ID: **Proposed 48" Pond Outfall**



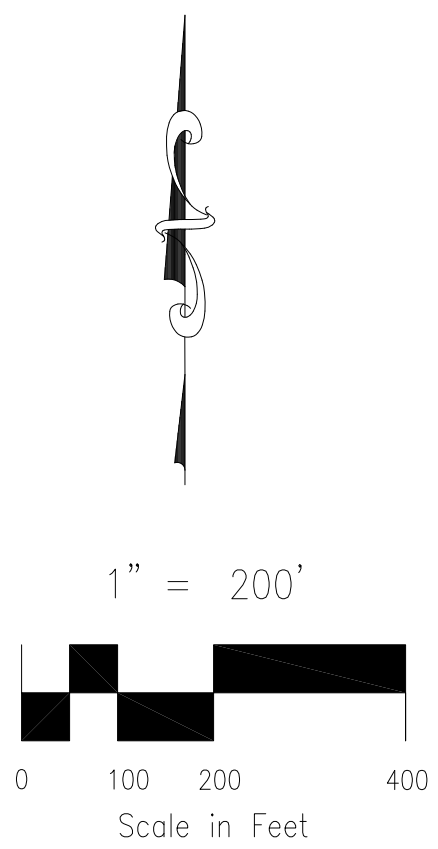
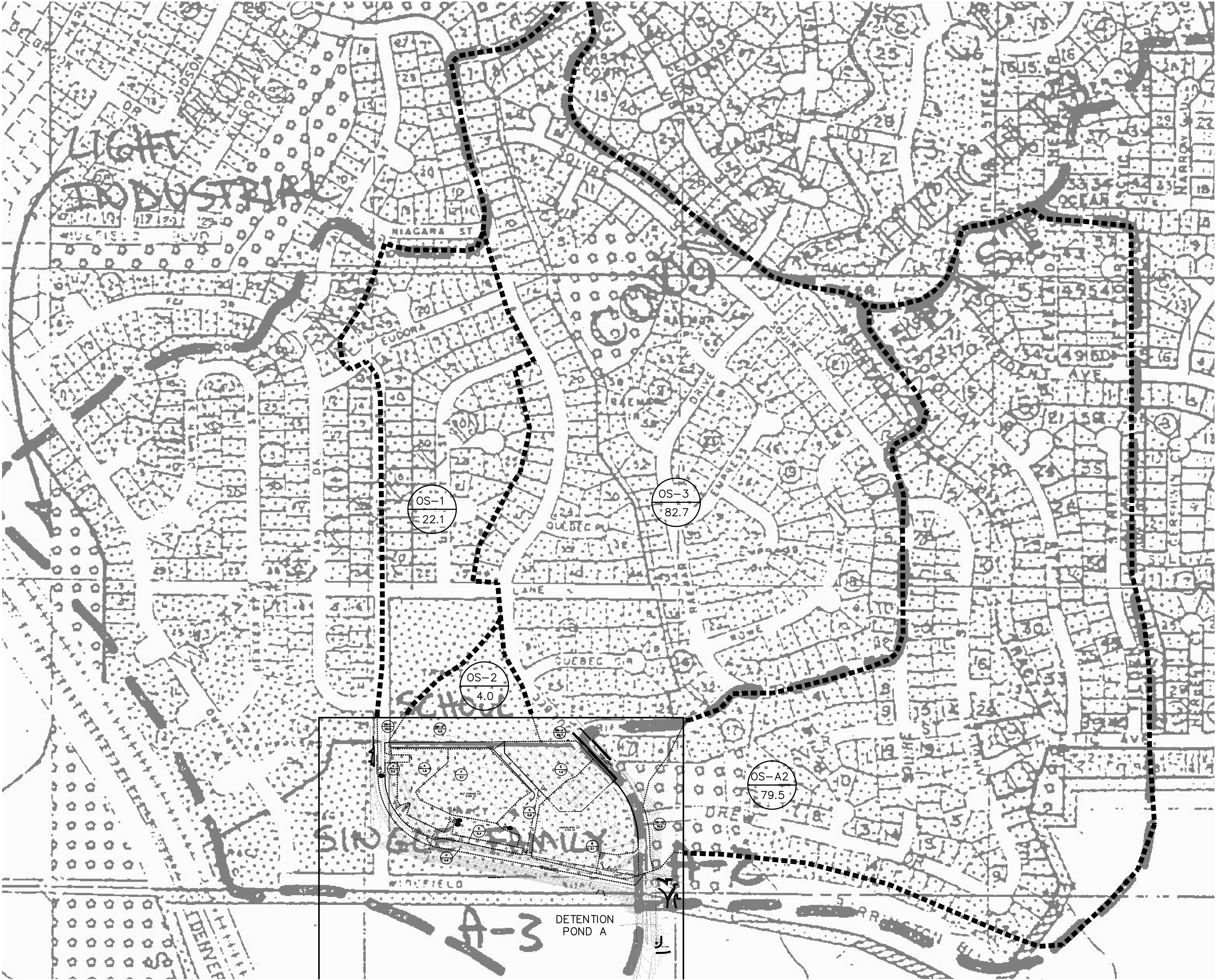
Supercritical Flow! Using Da to calculate protection type.

Design Information (Input):	
Design Discharge	Q = <input type="text" value="136"/> cfs
Circular Culvert:	
Barrel Diameter in Inches	D = <input type="text" value="48"/> inches
Inlet Edge Type (Choose from pull-down list)	Square End Projection <input type="text" value="OR"/>
Box Culvert:	
Barrel Height (Rise) in Feet	Height (Rise) = <input type="text" value=""/>
Barrel Width (Span) in Feet	Width (Span) = <input type="text" value=""/>
Inlet Edge Type (Choose from pull-down list)	<input type="text" value=""/>
Number of Barrels	No = <input type="text" value="1"/>
Inlet Elevation	Elev IN = <input type="text" value="5650"/> ft
Outlet Elevation <u>OR</u> Slope	Elev OUT = <input type="text" value="5641.29"/> ft
Culvert Length	L = <input type="text" value="134.42"/> ft
Manning's Roughness	n = <input type="text" value="0.012"/>
Bend Loss Coefficient	k _b = <input type="text" value="0"/>
Exit Loss Coefficient	k _x = <input type="text" value="1"/>
Tailwater Surface Elevation	Elev Y _t = <input type="text" value=""/> ft
Max Allowable Channel Velocity	V = <input type="text" value="5"/> ft/s
Required Protection (Output):	
Tailwater Surface Height	Y _t = <input type="text" value="1.60"/> ft
Flow Area at Max Channel Velocity	A _t = <input type="text" value="27.20"/> ft ²
Culvert Cross Sectional Area Available	A = <input type="text" value="12.57"/> ft ²
Entrance Loss Coefficient	k _e = <input type="text" value="0.50"/>
Friction Loss Coefficient	k _f = <input type="text" value="0.56"/>
Sum of All Losses Coefficients	k _s = <input type="text" value="2.06"/> ft
Culvert Normal Depth	Y _n = <input type="text" value="1.61"/> ft
Culvert Critical Depth	Y _c = <input type="text" value="3.47"/> ft
Tailwater Depth for Design	d = <input type="text" value="3.74"/> ft
Adjusted Diameter <u>OR</u> Adjusted Rise	D _a = <input type="text" value="2.81"/> ft
Expansion Factor	1/(2*tan(θ)) = <input type="text" value="5.32"/>
Flow/Diameter ^{2.5} <u>OR</u> Flow/(Span * Rise ^{1.5})	Q/D ^{2.5} = <input type="text" value="4.25"/> ft ^{0.5} /s
Froude Number	Fr = <input type="text" value="4.59"/> Supercritical!
Tailwater/Adjusted Diameter <u>OR</u> Tailwater/Adjusted Rise	Y _t /D = <input type="text" value="0.57"/>
Inlet Control Headwater	HW _i = <input type="text" value="7.27"/> ft
Outlet Control Headwater	HW _o = <input type="text" value="-1.22"/> ft
Design Headwater Elevation	HW = <input type="text" value="5,657.27"/> ft
Headwater/Diameter <u>OR</u> Headwater/Rise Ratio	HW/D = <input type="text" value="1.82"/> HW/D > 1.5!
Minimum Theoretical Riprap Size	d ₅₀ = <input type="text" value="16"/> in
Nominal Riprap Size	d ₅₀ = <input type="text" value="18"/> in
UDFCD Riprap Type	Type = <input type="text" value="H"/>
Length of Protection	L _p = <input type="text" value="40"/> ft
Width of Protection	T = <input type="text" value="12"/> ft

DRAINAGE MAPS

MESA RIDGE SELF STORAGE

EL PASO COUNTY, STATE OF COLORADO
DRAINAGE PLAN - OFF-SITE BASIN MAP



LEGEND

- BASIN DESCRIPTION
- BASIN AREA, ACRES
- SURFACE ROUTING DESIGN POINT
- EX MAJ CONT
- EX MIN CONT
- PROP MAJ CONT
- PROP MIN CONT
- LOW POINT
- HIGH POINT
- CONCRETE DRIVEWAY
- DRAINAGE FLOW ARROW

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CALL 811**
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ELECTRIC, WATER & TELEPHONE LINES
WATER EMERGENCIES 520-0300

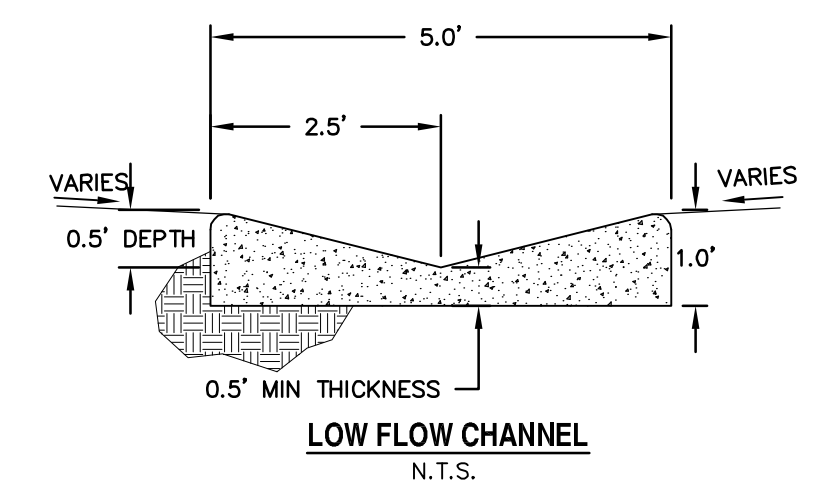
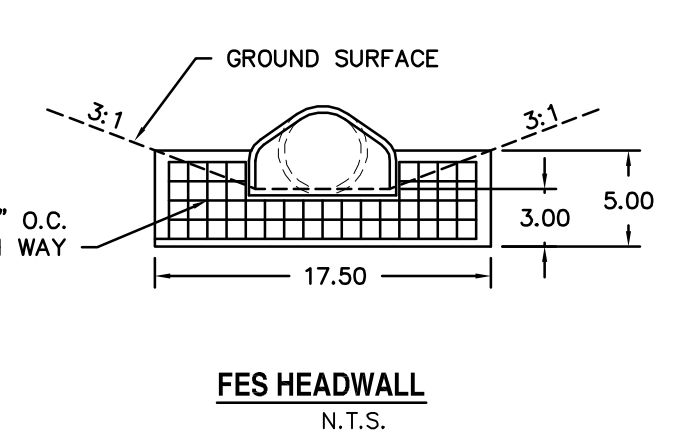
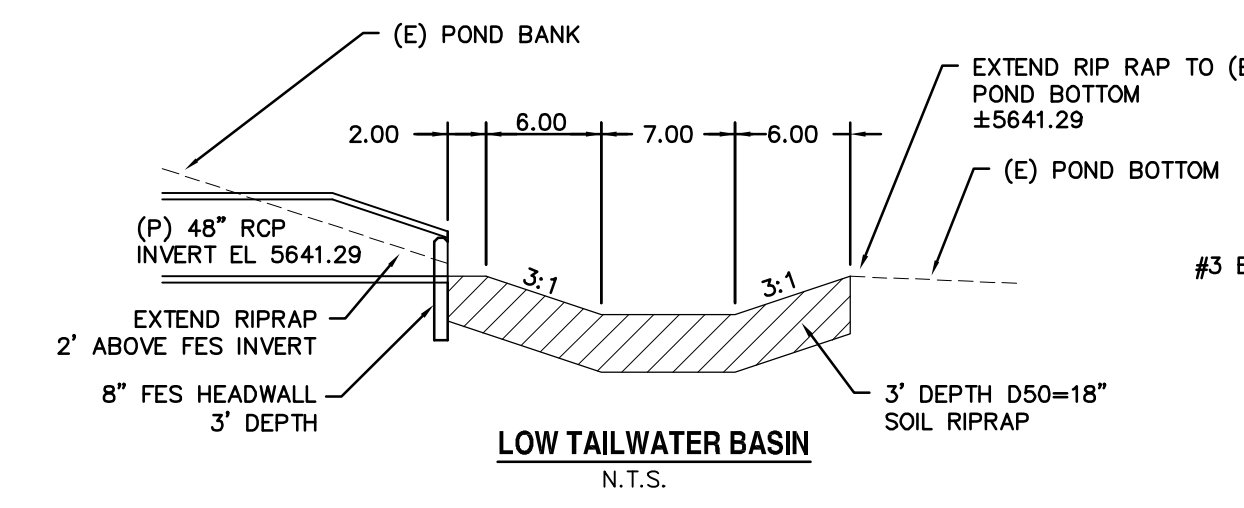
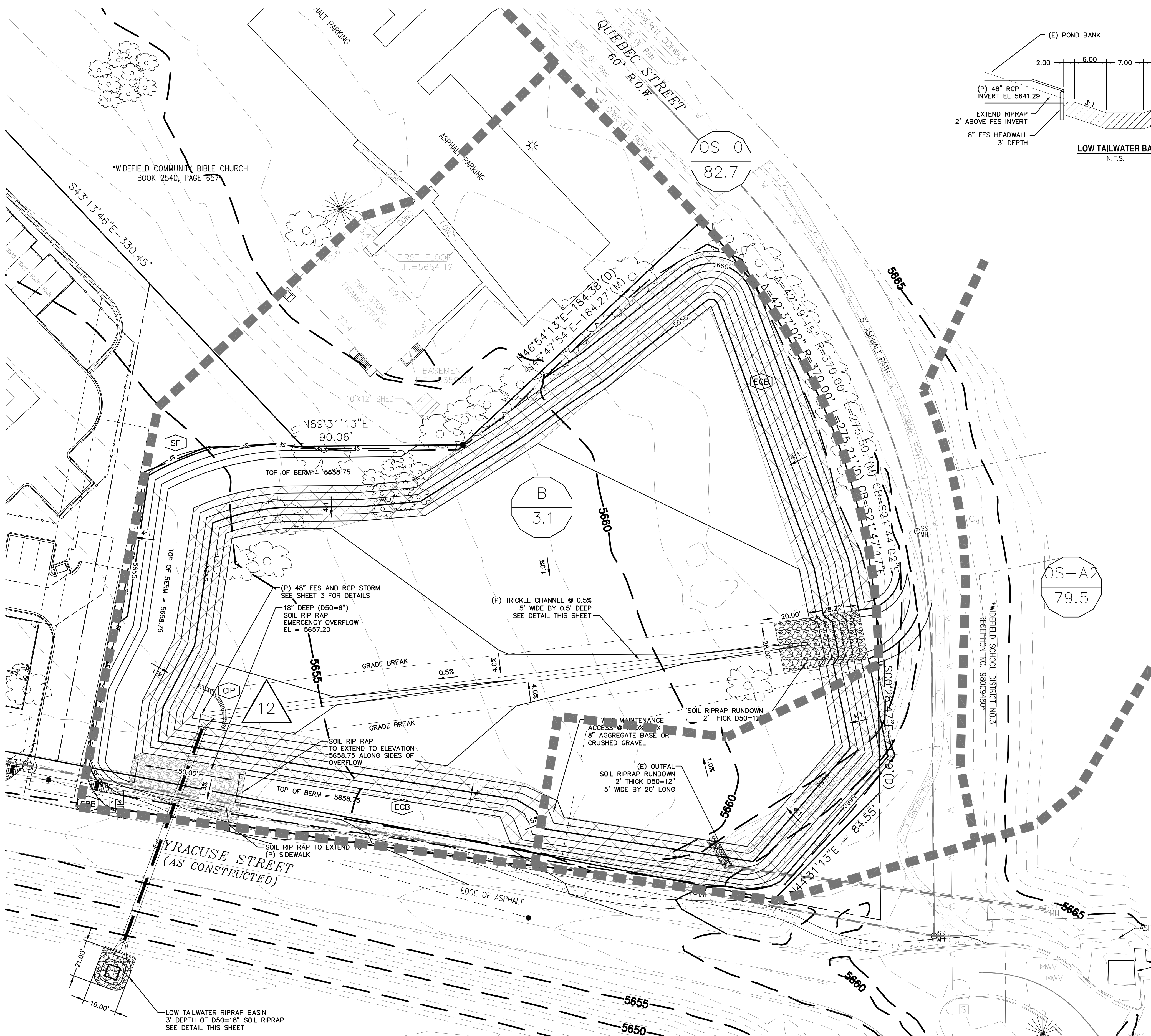
MESA RIDGE SELF STORAGE

JOB NO. 10-004
DATE PREPARED: MARCH 2014
DATE REVISED: JULY 2014



102 E. PIKES PEAK AVE. STE 304
COLORADO SPRINGS,
COLORADO 80903

v 719.955.5485
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SEEDING GUIDELINES:

- SEEDBED PREPARATION**
THE SEEDBED SHOULD BE WELL-SETTLED AND FIRM, BUT FRILABLE ENOUGH THAT THE SEED CAN BE PLACED AT THE SPECIFIED DEPTHS. COMPETITIVE STANDS OF WEEDS THAT ARE PRESENT BEFORE SEEDING MUST BE CONTROLLED BY SHALLOW TILLAGE OR BY APPLICATION OF HERBICIDES. SOILS THAT HAVE BEEN OVER-COMPACTED BY TRAFFIC OR EQUIPMENT, ESPECIALLY WHEN WET, SHOULD BE TILLED TO BREAK UP ROOTING-RESTRICTIVE LAYERS, THEN HARROWED, ROLLED, OR PACKED TO PREPARE THE REQUIRED FIRM SEEDBED.
- FERTILIZER**
FERTILIZER SHOULD BE APPLIED AT A RATE OF 50 POUNDS OF AVAILABLE NITROGEN PER ACRE AND 40 POUNDS OF AVAILABLE PHOSPHATE PER ACRE. THE TIME OF APPLICATION SHOULD BE IMMEDIATELY PRIOR TO SEEDING, AT THE TIME OF SEEDING, OR IMMEDIATELY FOLLOWING SEEDING, DEPENDING ON THE KIND OF FERTILIZER AND TYPE OF EQUIPMENT USED.
- SEEDING**
SEED SHOULD BE PLANTED WITH A GRASS DRILL ON ALL SLOPES OF 33% (3:1) OR FLATTER. SEED MAY BE BROADCAST BY HAND, BY MECHANICAL SPREADER, OR BY HYDRAULIC EQUIPMENT ON AREAS THAT ARE SMALL, TOO STEEP, OR NOT ACCESSIBLE FOR SEED DRILL OPERATIONS. PLS RATES SHOULD BE DOUBLED IF BROADCAST BY HAND. SEED PLANTED WITH A DRILL SHOULD BE COVERED WITH SOIL TO A DEPTH OF 1/4 TO 3/4 INCH. SEED PLANTED BY THE BROADCAST METHOD SHALL BE INCORPORATED INTO THE SOIL SURFACE, NOT TO EXCEED A DEPTH OF 3/4 INCH, BY RAKING, HARROWING, OR OTHER PROVEN METHOD.
THE TIME OF SEEDING IS FROM OCTOBER 15TH - MAY 31ST. SEED PLANTED IN THE LATE FALL WILL REMAIN DORMANT UNTIL SPRING, WHEN IT WILL GERMINATE.
- MULCHING**
SEEDING AREAS SHOULD BE MULCHED TO CONSERVE MOISTURE; PREVENT SURFACE COMPACTION OR CRUSTING; REDUCE RUNOFF AND EROSION; CONTROL INSECTS; AND HELP ESTABLISH PLANT COVER.
NATIVE HAY OR STRAW SHOULD BE APPLIED AT A RATE OF 4,000 POUNDS PER ACRE AND CRIMPED INTO THE GROUND. ON SLOPES GREATER THAN 3:1, AN AGRONOMY BLANKET SHOULD BE USED.
- SUPPLEMENTAL WATER**
IN LOW RAINFALL AREAS, WHERE WATER IS AVAILABLE AND WHERE RAPID ESTABLISHMENT IS NEEDED, IRRIGATION OF NEW SEEDING SHOULD BE PERFORMED DURING THE FIRST GROWING SEASON. WATER SHOULD BE APPLIED AT APPROXIMATELY ONE WEEK INTERVALS, AT A RATE OF 3/4 TO 1 INCH PER APPLICATION, WHEN RAINFALL IS DEFICIENT FOR PLANT DEVELOPMENT.

EROSION PROTECTION & REVEGETATION REQUIREMENTS
PER U.S.D.A. SOIL CONSERVATION SERVICE GUIDELINES

1 PRACTICE NO. & NAME	342 - CRITICAL AREA TREATMENT
RANGE SITE	SANDY FOOTHILLS
2 PLANNED SEEDING PREP:	
A METHOD	SEEDING OPERATION:
B DATES OCT. 15 - MAY 31	A METHOD: DRILL - XX
C CLEAN TILLED: XX	INTERSEED: XX
FIRM SEEDBED: XX	BROADCAST: XX
STUBBLE COVER: XX	B DRILL SPACING: 6-12"
INTERSEED: XX	TYPE GRASS: W. AGITATOR
OTHER: XX	C DATE OCT. 15 - MAY 31
	D PLANTING DEPTH: 1/4 - 1/2"
FERTILIZER:	WEED CONTROL: N/A
POUNDS ACTUAL PER ACRE N2: 40	MOWING: XX
(AVAILABLE): 40	CHEMICAL: XX
P205: 40	DATES: XX
K: N/A	SEE S.C.S. FOR SPECIFIC RECOMMENDATIONS AT HERBICIDE APPLICATION TIME

MULCH:	LONG - STEM NATIVE HAY
KIND:	4,000
AMOUNT:	N/A POUNDS/ACRE
HOW-APPLIED:	CRIMPED
HOW-ANCHORED:	4"
ANCHORAGE DEPTH:	

SEED:		REQUIRED PLS. RATES
VARIETY	SPECIES	PER ACRES (1002)
EL RENO	SIDEHATS GRAMA	3.0
BARTON	WESTERN WHEATGRASS	2.5
NATIVE	SLENDER WHEAT GRASS	2.0
PASTURA	LITTLE BLUESTEM	2.0
NATIVE	SAND DROPSEED	0.5
NEBRASKA 28	SWITCH GRASS	3.0
MORPHA	WEeping LOVE GRASS	1.0
(2) % OF SPECIES IN MIXTURE	(3) PLS SEEDING RATE PER SPECIES/ACRE (1) x (2)	(4) PLANNED ACRE (3) x (4)
20	0.60	2.4
20	0.50	2.4
15	0.30	2.4
15	0.30	2.4
5	0.03	2.4
20	0.60	2.4
5	0.05	2.4

EXISTING DRAINAGE BASINS							
BASIN	AREA (ACRES)	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
EX-A	0.92	1.6	2.2	2.8	3.6	4.3	5.0
EX-B	0.96	0.4	0.8	1.3	2.0	2.5	3.2

EXISTING DESIGN POINTS						
DESIGN POINT	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
EX1	1.7	2.6	3.7	5.0	6.1	7.3

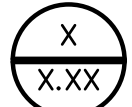
DRAINAGE LEGEND

BASIN IDENTIFIER

BASIN AREA [AC]

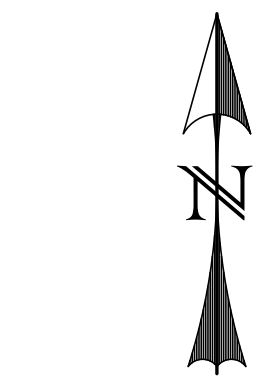
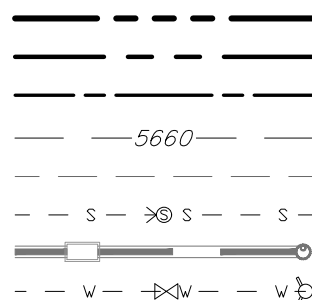
DESIGN POINT IDENTIFIERS

DRAINAGE BASIN BOUNDARY

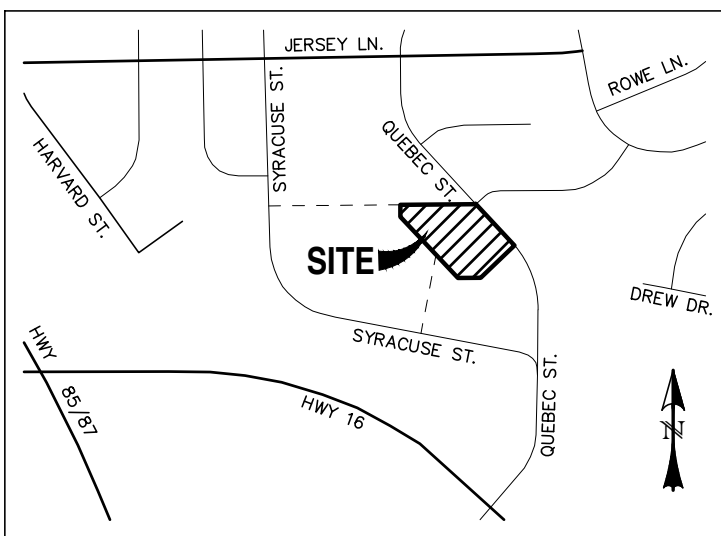


- LEGEND**
- EXISTING
 - PROPOSED
 - CURB AND GUTTER
 - EASEMENT
 - PUBLIC
 - PRIVATE
 - PROPERTY BOUNDARY
 - RIGHT-OF-WAY
 - LOT LINE
 - (E) CONTOUR, INDEX
 - (E) CONTOUR
 - (E) SANITARY MAIN, MH
 - (E) STORM SEWER, INLET, MH
 - (E) WATER MAIN, VALVE, FH
 - (E) DIRECTION OF OVERLAND FLOW

- (E) EXISTING
- (P) PROPOSED
- C&G CURB AND GUTTER
- ESMT EASEMENT
- PUB PUBLIC
- PVT PRIVATE



0 20 40
SCALE: 1" = 20'



VICINITY MAP
SCALE: N.T.S.

REV.	DESCRIPTION	DATE

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(719) 484-0450



**WIDEFIELD COMMUNITY
BIBLE CHURCH**
EXISTING DRAINAGE MAP

DESIGNED BY: DLM	DRAWN BY: MGP
SCALE: 1" = 20'	DATE: 10/02/24
JOB NUMBER: 24-416	SHEET: 1 OF 1

PROPOSED DRAINAGE BASINS							
BASIN	AREA (ACRES)	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
A1	0.44	1.3	1.7	2.1	2.5	2.9	3.3
A2	0.39	1.2	1.6	1.9	2.3	2.6	3.0
A3	0.17	0.1	0.2	0.3	0.4	0.6	0.7
B	0.87	0.5	0.9	1.5	2.1	2.7	3.4

PROPOSED DESIGN POINTS						
DESIGN POINT	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
DP-1	1.3	1.7	2.1	2.5	2.9	3.3
DP-2	1.2	1.6	1.9	2.3	2.6	3.0
DP-3	2.5	3.7	4.9	6.3	7.6	9.0

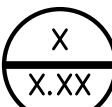
DRAINAGE LEGEND

BASIN IDENTIFIER

BASIN AREA [AC]

DESIGN POINT IDENTIFIERS

DRAINAGE BASIN BOUNDARY

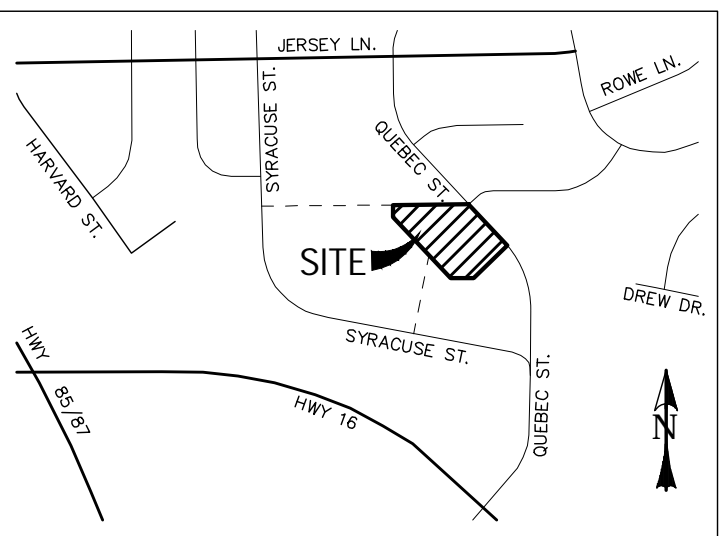


PROPOSED FEATURES LEGEND

- BUILDING
- BOUNDARY
- CL
- DRIVEWAY
- ELECTRIC SERVICE
- FL
- LIP
- TBC
- PARKING
- POND - FL
- POND - LIP
- POND - TBC
- ROW
- SANITARY
- SAN SERVICE
- WATER MAIN
- WATER SERVICE, CORP STOP, CURB STOP

EXISTING FEATURES LEGEND

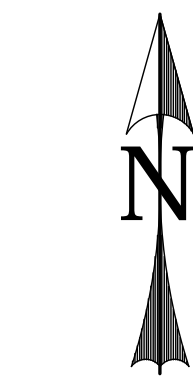
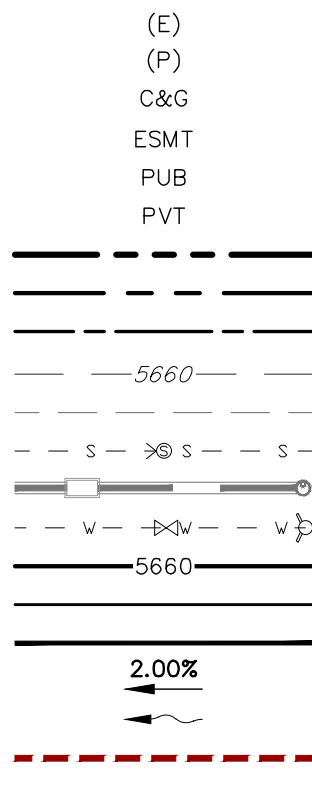
- BOUNDARY
- CL
- CONCRETE
- FL
- LIP
- TBC
- ELECTRIC SERVICE
- SANITARY
- SANITARY SERVICE
- WATER MAIN
- WATER SERVICE



VICINITY MAP
SCALE: N.T.S.

DRAINAGE FEATURES LEGEND

- EXISTING
- PROPOSED
- CURB AND GUTTER
- EASEMENT
- PUBLIC
- PRIVATE
- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- LOT LINE
- (E) CONTOUR, INDEX
- (E) CONTOUR
- (E) SANITARY MAIN, MH
- (E) STORM SEWER, INLET, MH
- (E) WATER MAIN, VALVE, FH
- (P) CONTOUR, INDEX
- (P) CONTOUR
- (P) RETAINING WALL
- DIRECTION OF FLOW
- (E) DIRECTION OF OVERLAND FLOW
- LIMITS OF DISTURBANCE & CONSTRUCTION LIMITS



SCALE: 1" = 20'

REV.	DESCRIPTION	DATE



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PROPOSED DRAINAGE MAP

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SCALE:	1" = 20'	DATE:	10/02/24
JOB NUMBER	24-416	SHEET	1 OF 1