DRAINAGE LETTER FOR ACADEMY GATEWAY SUBDIVISION FILING NO. 1 – LOT 1 – PROPOSED 7-ELEVEN

DRAINAGE LETTER STATEMENT

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 to the criteria established by the El Paso County 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.

_____ _____
Daniel L. Alonzo, Colorado P.E. #37550 Date

Please provide engineering firm name on this sheet.

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

Business Name: 7-Eleven, Inc.

By: Jim Schultz.

Title: Development Project Manager

Address: 5600 S. Quebec Street, Suite 200C

Greenwood Village, CO 80111

EL PASO COUNTY ONLY:
Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

_____ _____
Jennifer Irvine, P.E. Date
County Engineer / ECM Administrator

Conditions:

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518 17th Street
Suite 1575
Denver, CO 80202
www.ees.us.com
303-572-7997

January 18, 2018

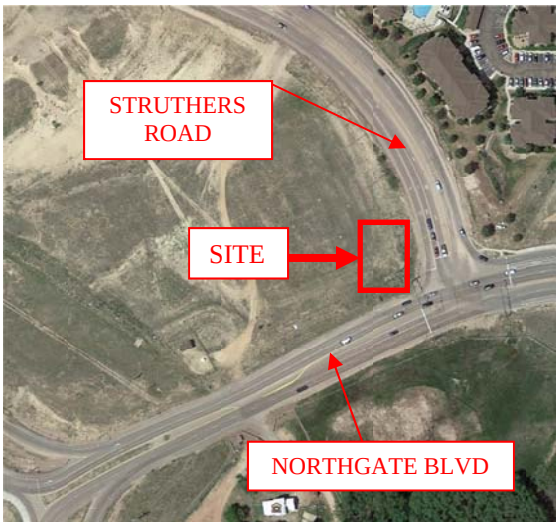
ATTN: El Paso County
Public Works Department
Jennifer Irvine, County Engineer
3275 Akers Drive
Colorado Springs, CO

Re: Lot 1 – Academy Gateway Subdivision Filing No. 1
Drainage Compliance Letter

Introduction

A. Location

EES is pleased to provide a drainage compliance letter for the proposed site layout for Lot 1 of the Academy Gateway Subdivision Filing No. 1. This commercial development is located at the northwest corner of Struthers Road and Northgate Boulevard that is in Section 1, Township 12 South, Range 67 West, and Section 6, Township 12 South, Range 66 West of the 6th Principal Meridian, City of Colorado Springs, County of El Paso, State of Colorado. Lot 1 is bound by Struthers Road to the east, Northgate Boulevard to the south, proposed commercial development to the north (Lot 2), and a regional pond to the west (Tract C).



AERIAL

VICINITY MAP

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B. Proposed Development

Lot 1, which is being developed and described herein, is at the hard northwest corner of Struthers Road and Northgate Boulevard. The project includes a new convenience store retail building with 6 MPD fuel canopy, as well as associated drives, walks, landscaping and lighting. The main access drives, storm sewer infrastructure, and detention pond with water quality servicing the subdivision and Lot 1 are being designed by Classic Consulting and currently under review with the El Paso County. Detention and water quality improvements are not required for this site as they will be provided with the overall development design facilities per Classic Consulting. Lot 1 will utilize storm sewer stub connections provided to the Lot as provided by the overall development design plans. These are identified as pipe runs 1 & 5 per the Drainage Map provided by Classic Consulting. The overall storm design will be referenced herein and is detailed further in the Preliminary/Final Drainage Report for Academy Gateway Subdivision Filing No.1, completed by Classic Consulting dated March 2017, herein referred to as the Master Study. Additionally a supplemental document titled Drainage Letter Addendum for Academy Gateway Subdivision No. 1 dated August 11, 2017 further details the storm system required for Lots 1 and 2. The development of Lot 1 includes a 1.31 acre parcel and encompasses 0.85 acres of disturbed area. The proposed developed site layout is 56.5% impervious and generally follows the existing drainage patterns that were described and analyzed in the Master Study, where flows are a directed in a southwesterly direction. The site known as Lot 1 as shown in the Drainage Map included in the supplemental Drainage Letter is predominately encompassed by Basin D, while site perimeter is included in Basins D2, D3, D4 and F. The proposed runoff from the overall site is less than the allowed runoff in the Master Study.

C. Variances

The redevelopment of Lot 1 does not require any variances associated with this project pertaining to drainage design.

Historic Drainage

A. Description of the Property

The project site is part of an overall commercial development. The Lot 1 development will include a new convenience store retail building with 6 MPD fuel canopy, as well as associated drives, walks, landscaping and lighting. The pervious area of the parcel will be equal or less than the allowable imperviousness design per the Master Study.

B. Overall Basin Description

Runoff from the site designed for the interim condition flows north to south to a proposed inlet in the shared drive aisle west of Lot 1. Per the Master Study, these flows are collected at multiple design points, and ultimately the majority of flows are directed to the detention facility west of the site, with the exception of the flows that fall within

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Master Study Basin F. These flows are directed southward and ultimately to an existing drainage channel southwest of the site. Refer to the Master Drainage Plan attached to this document.

This project does not accept any offsite runoff tributary to Lot 1.

According to the FEMA Flood Insurance Rate Map (FIRM) Community Panel Number 08041C0290F the project site is located in an "Area of Minimal Flood Hazard – Zone X." This FIRM panel is included with this document for reference and was included in the Master Study.

According to the National Resource Council Service (NRCS) web soil survey, the onsite soil is Blendon Sandy Loam, 0 to 3 percent slopes, which has Hydrologic Soil Group characteristics of B soils. A Geotechnical Evaluation Report date February 6, 2017 was completed by Vivid Engineering Group. Per their investigation it was determined that earth materials underlying the project site consist predominantly of poorly graded to silt and clayey soils. Existing fill comprised of poorly graded sand with silt and gravel, and silty sand was encountered within the upper 5 to 8-feet of all of the borings advanced during the investigation.

Drainage Design Criteria

A. References

Information and data was collected from the following reports of the current surrounding development:

1. Preliminary/Final Drainage Report For Academy Gateway Subdivision Filing No. 1, prepared by Classic Consulting Engineers and Surveyors, LLC, dated March 2017.
2. Drainage Letter Addendum For Academy Gateway Subdivision Filing No. 1, prepared by Classic Consulting Engineers and Surveyors, LLC, dated August 11, 2017.

This study has been prepared in conformance with the El Paso County Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code and the Urban Drainage Flood Control District (UDFCD) Urban Storm Drainage Criteria Manual (USDCM).

B. Hydrologic Criteria

Runoff was calculated per the El Paso County Drainage Criteria Manual. The rational method was used to calculate runoff from the proposed development, and the following formula was used to determine the runoff values:

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Q=CIA

Where:

Q = Storm Runoff, cubic feet per second (CFS)
C = Runoff coefficient
I = Storm Intensity, inches per hour
A = Drainage area, acres

C. Hydraulic Criteria

The pipe hydraulics will be sized for the major (100-year) storm .

There are no major drainageways passing through the site.

Drainage Plan

A. General Concept

Runoff from the proposed project generally will sheet flow southward to an existing 5' Type R Inlet located at the southwest corner of Lot 1 in the shared drive aisle. A portion of the northern and northeastern area of the proposed parking lot will drain in a northeasterly direction to a proposed 5' Type R inlet. Both basins and drainage patterns are consistent with the approved Master Study. Due to existing landscaped slopes per the Master Study and Overlot Design on the eastern and southern portion of Lot 1, some flows are directed off-site to adjacent roadway gutters and infrastructure. The southern flows are less than the Master Study and a corresponding basin, whereas the eastern flows are directed off-site in a manner that is consistent with the Master Study drainage patterns; however the flows are not explicitly addressed in the Master Study. All Basins will be discussed in greater detail below. As mentioned, water quality and detention will be addressed in the regional pond per the Master Study. The attached Drainage Map depicts these conditions and the location of the proposed Lot 1 storm infrastructure.

B. Basin Detail

The site consists of three on-site drainage basins, three off-site drainage basins that direct flows off-site and two basins within Lot 1 property limits that encompass the adjacent interior access roadways designed by others. The following is a description of the proposed onsite basins:

ON-SITE

Basin 1 – Basin 1 consists of 0.07 acres and is comprised of the convenience store roof drainage. Runoff will sheet flow towards Design Point 1 at a single roof drain location outletting a 6" PVC pipe on the northern face of the store. Basin 1 and has 10-year and

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100-year C-values of 0.90 and 0.95 respectfully; and anticipated 10-year runoff flows of 0.37 CFS and 100-year runoff flows of 0.56 CFS.

Basin 2 – Basin 2 consists of 0.14 acres and is primarily comprised of the northern parking area and drive aisle, a portion of landscaping islands, the trash corral and a portion of the sidewalk beside the convenience store. Runoff will sheet flow towards Design Point 2 containing a 5' Type R Inlet. Basin 2 is tributary to Design Point 2, and has 10-year and 100-year C-values of 0.85 and 0.90 respectfully; and anticipated 10-year runoff flows of 0.70 CFS and 100-year runoff flows of 1.07 CFS. This basin is comparable to Basin D-3 within the Master Study. In that Master Study Basin D-3 encompasses a larger basin area, 0.35 acres, and has a design flor of 3 CFS in the 100 year storm. As such, the proposed design provides less flow than accounted for in the Master Study design point and it will not adversely impact the existing infrastructure.

Basin 3 – Basin 3 consists of 0.45 acres and is primarily comprised of the majority of the parking area and drive aisles, portions of landscaping, the fuel canopy and a portion of the sidewalk in front convenience store. Runoff will sheet flow towards Design Point 3, which includes an existing 5' Type R Inlet in the interior access roadway proposed for the development designed and constructed by others. Basin 3 is tributary to Design Point 3, and has 10-year and 100-year C-values of 0.81 and 0.87 respectfully; and anticipated 10-year runoff flows of 2.23 CFS and 100-year runoff flows of 3.44 CFS. This basin is comparable to Basin D within the Master Study. In that Master Study Basin D encompasses a larger basin area, 0.77 acres, and has 6 CFS in the 100 year storm. As such, the proposed design provides less flow than accounted for in the Master Study. The remaining acreage in the Master Study Basin D is directed off-site per further detail below.

OFF-SITE

The three off-site drainage basins convey flows away from Lot 1 proposed storm infrastructure in a manner consistent with the Master Study. One of these basins directs flows to the overall development drive aisle where these flows were intended per the Master Study. The other basins will direct flows via landscaping towards North Gate Boulevard and Struthers Road right-of-way per existing perimeter slopes in accordance with the Master Study and design. The following is a description of the proposed off-site basins:

Basin OS-1 – Basin OS-1 is 0.22 acres and includes the eastern landscaped portion of the site surrounding the convenience store. These flows will be directed off-site towards Struthers Road flowline and then directed southward to existing infrastructure. Basin OS-1 is tributary to Design Point OS-1, and has 10- year and 100- year C-values of 0.31

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and 0.41 respectfully; and anticipated 10-year runoff flows of 0.41 CFS and 100-year runoff flows of 0.77 CFS.

Basin OS-2 – Basin OS-2 is 0.28 acres and includes the southern landscaped portion of the site. These proposed grades are consistent with and tie to the existing grades per the master design. This area is encompassed n Basin F of the Master Study. Per the Master Study, flows from Basin F were intended to by-pass the Pond and are intended to be directed off-site. Basin OS-2 is tributary to Design Point OS-2, and has 10-year and 100-year C-values of 0.26 and 0.36 respectfully; and anticipated 10-year runoff flows of 0.45 CFS and 100-year runoff flows of 0.88 CFS.

Basin OS-3 – Basin OS-3 is 0.03 acres and includes a portion of the northeastern landscaping and perimeter sidewalk. These flows will be directed easterly Design Point OS-3. These flow patterns are consistent with the Master Study and the proposed storm infrastructure. Basin OS-2 is tributary to Design Point OS-2, and has 10- year and 100-year C-values of 0.54 and 0.62 respectfully; and anticipated 10-year runoff flows of 0.11 CFS and 100-year runoff flows of 0.18 CFS. These flows will be tributary to Master Study Design Point DP-4A at the 5' Type R Inlet by others.

There exists two drainage basins within Lot 1 property limits that convey flows towards proposed storm infrastructure by others that are within the interior access drives north and west of Lot 1. These basins are consistent with the Master Study and are described below.

Basin RW-1 – Basin RW-1 is 0.07 acres and includes the southern half of the interior access drive north of Lot 1, within the property limits. This basin is generally consistent with Basin D2 of the Master Study. Basin RW-1 is tributary to Design Point RW-1, consistent with design point DP4A of the Master Study, and has 10-year and 100-year C-values of 0.90 and 0.95 respectfully; and anticipated 10-year runoff flows of 0.37 CFS and 100-year runoff flows of 0.57 CFS. The 100-yr flows per the Master Study for this Basin are 1 CFS, so the designed infrastructure by others will not be adversely impacted.

Basin RW-2 – Basin RW-2 is 0.05 acres and includes the eastern half of the interior access drive west of Lot 1, within the property limits. This basin is generally consistent with Basin D4 of the Master Study. Basin RW-2 is tributary to Design Point RW-2, consistent with design point DP4 of the Master Study, and has 10-year and 100-year C-values of 0.90 and 0.95 respectfully; and anticipated 10-year runoff flows of 0.28 CFS and 100-year runoff flows of 0.42 CFS. The 100-yr flows per the Master Study for this Basin are 1 CFS, so the designed infrastructure by others will not be adversely impacted.

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TABLE 1 - BASIN SUMMARY						
PROPOSED BASIN	**PROPOSED DESIGN POINT**	**CONTRIBUTING BASIN ACREAGE**	**10-YR C-VALUE**	**100-YR C-VALUE**	**10-YR RUNOFF (CFS)**	**100-YR RUNOFF (CFS)**
1	1	0.07	0.90	0.95	0.37	0.56
2	2	0.14	0.85	0.90	0.70	1.07
3	3	0.45	0.81	0.87	2.23	3.44
OS-1	OS-1	0.22	0.31	0.41	0.41	0.77
OS-2	OS-2	0.28	0.26	0.36	0.45	0.88
OS-3	OS-3	0.03	0.54	0.62	0.11	0.18
RW-1	RW-1	0.07	0.90	0.95	0.37	0.57
RW-2	RW-2	0.05	0.90	0.95	0.28	0.42

Stormwater Quality Control Plan (SWQCP)

Permanent water quality will be provided by a subdivision pond designed by others.

El Paso County Engineering Criteria Manual section I.7.2.A details the appropriate BMP selection based on a Four-Step Process.

Step 1: Employ Runoff Reduction Practices

The site layout was intentionally design to minimize hardscape, while still achieving site functionality. As such the limits of disturbance for earthwork are minimized and perimeter landscaping is maximized.

Step 2: Stabilized Drainageways

All stormwater control measures existing in hard-piped underground infrastructure due to site constraints and client preference. Therefore, there are not drainageways requiring stabilization measures

Step 3: Provide Water Quality Capture Volume (WQCV)

Please refer to the Final Drainage Report and Addendum by Classic Consulting Engineers & Surveyors dated August 11,2017 previously approved by El Paso County for further discussion as to detailed information regarding how the subdivision pond provides water quality satisfying El Paso County Engineering Criteria Manual section I.7.2.D.

Please state that permanent WQ and detention is provided in the full-spectrum detention pond in Tract C (per the report you cite) and that it has been designed for detention and EURV.

Step 4 is not for construction BMP's, it is for permanent BMP's please state that water quality will be provided in the Tract C pond that has been designed for FSD and is an acceptable permanent BMP for this site per appendix I of the ECM.

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Step 4: Consider Need for Industrial and Commercial BMPs

Due to the nature of the development, Step 4 is not applicable Suitable BMPs will be in place to ensure adequate water quality and erosion control measures are in place. Refer to the Erosion Control Plan and Details for further detail

The construction document plan set submittal accompanying this letter will include a Grading and Erosion Control Plan, as required for the ESQCP permit. Therefore, erosion control details will accompany the construction plans specifying the necessary procedures and measures to ensure water quality during the construction phase.

Conclusions

The proposed development on Lot 1 is in compliance with the El Paso County Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code. This drainage compliance letter shall be used in conjunction with the Master Study. No on-site detention or water quality is proposed as part of the Lot 1 improvements. It is requested that the County accept this drainage compliance letter and require that no additional changes be made to the Lot 1 – Academy Gateway Subdivision Filing No. 1 proposed storm drainage system.

Respectfully submitted,
Entitlement & Engineering Solutions, Inc.

Daniel Alonzo, P.E.
Senior Project Manager

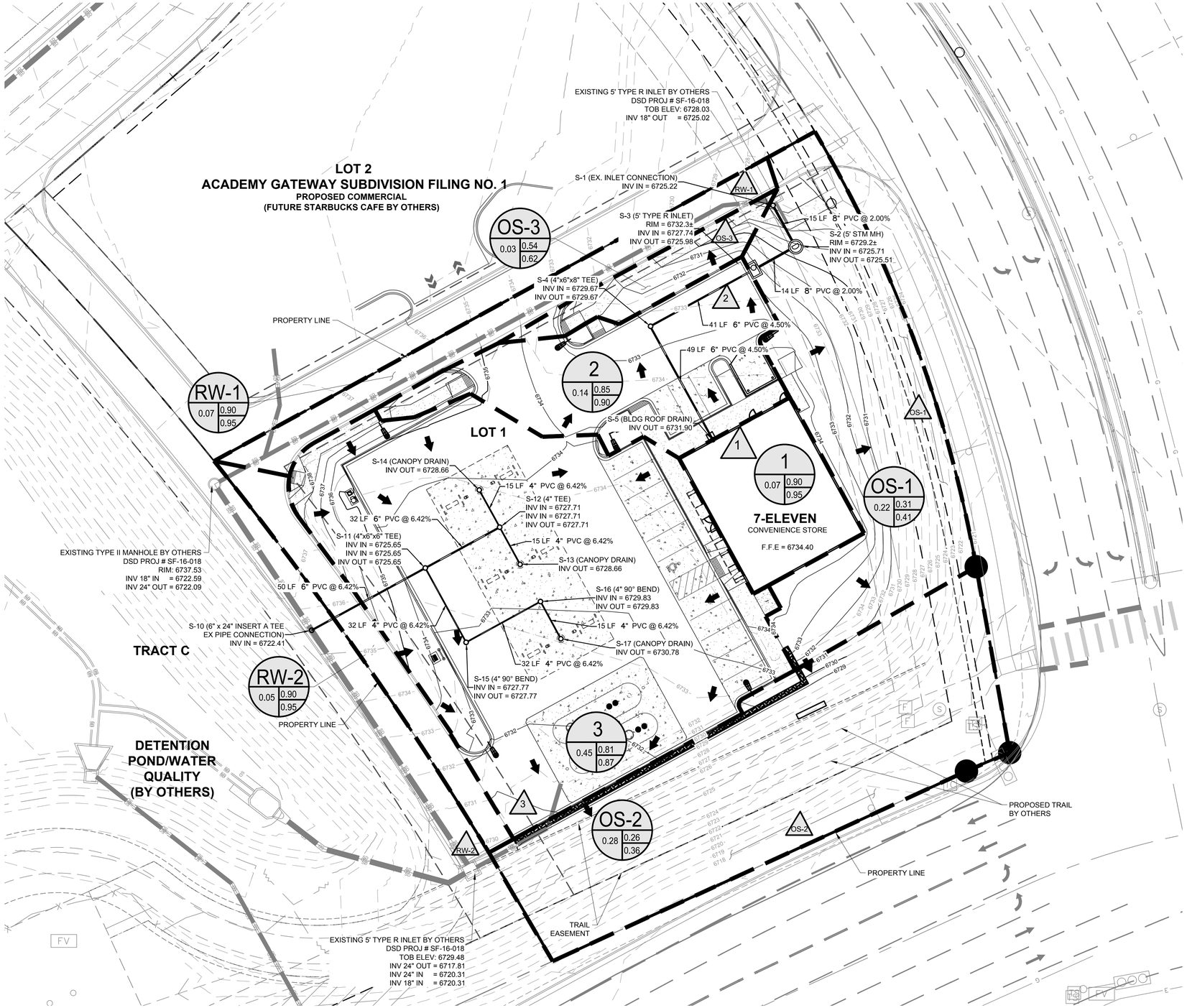
MAJOR SITE DEVELOPMENT PLAN

LOT 1 ACADEMY GATEWAY SUBDIVISION FILING NO. 1
A SUBDIVISION OF A PORTION OF THE SOUTHEAST QUARTER OF SECTION 1, TOWNSHIP 12 SOUTH, RANGE 67 AND THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 12 SOUTH, RANGE 66, ALL WEST OF THE SIXTH PRINCIPAL MERIDIAN, EL PASO COUNTY, STATE OF COLORADO

N

0 20 40

1 INCH = 20 FT.



LEGEND

- PROPOSED PROPERTY LINE
- EXISTING PROPERTY LINE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- MINOR CONTOUR
- MAJOR CONTOUR
- CURB AND GUTTER
- FLOW ARROW
- STORM INLET AND MANHOLE
- SANITARY SEWER CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING SANITARY/STORM MANHOLE
- PROPOSED 1" WATER METER
- PROPOSED TELEPHONE
- PROPOSED GAS
- PROPOSED ELECTRIC
- PROPOSED SANITARY
- PROPOSED STORM PIPE
- BASIN PERIMETER
- DESIGN POINT
- BASIN DESIGNATION
- 10-YEAR RUNOFF COEFFICIENT
- 100-YEAR RUNOFF COEFFICIENT
- BASIN AREA IN ACRES

NOTES:

1. ALL STORM SEWER IS PRIVATE AND IS SIZED FOR THE 100 YEAR EVENT, UNLESS OTHERWISE NOTED.

BASIN SUMMARY RUNOFF TABLE

BASIN	DESIGN POINT	CONTRIBUTING BASIN ACREAGE	10-YR C-VALUE	100-YR C-VALUE	10-YR RUNOFF (CFS)	100-YR RUNOFF (CFS)
1	1	0.07	0.90	0.95	0.37	0.56
2	2	0.14	0.85	0.90	0.70	1.07
3	3	0.45	0.81	0.87	2.23	3.44
OS-1	OS-1	0.22	0.31	0.41	0.41	0.77
OS-2	OS-2	0.28	0.26	0.36	0.45	0.88
OS-3	OS-3	0.03	0.54	0.62	0.11	0.18
RW-1	RW-1	0.07	0.90	0.95	0.37	0.57
RW-2	RW-2	0.05	0.90	0.95	0.28	0.42

COUNTY PROJECT NUMBER PPR-17-058

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987 or 811
CALL 3-BUSINESS DAYS (NOT INCLUDING INITIAL DAY OF CONTACT) IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.
Know what's below. Call before you dig.

No.	REVISION	BY	DATE
1	EL PASO COUNTY RESUBMITTAL	SPM	01/01/18

PRELIMINARY NOT FOR CONSTRUCTION

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DEVELOPMENT PLAN
7-ELEVEN
LOT 1 ACADEMY GATEWAY SUBDIVISION FILING NO. 1
DRAINAGE PLAN

PROJECT NO:	7EL024.01
DESIGNED BY:	SPM
DRAWN BY:	LER
DATE:	12/04/17

C2.2
SHEET 5 OF 16

Runoff Coefficients

Corridor / Design Package: 7-11 NORTHGATE AND STRUTHERS
System Name: Developed Condition

Computed: SPM Date: 10/20/2017
Checked: MK Date: 10/27/2017

Sub-Basin Data			Composite C			Sub Area (Pavement)				Sub Area (Roof)				Sub Area(Lawns B Group soils)			
Basin ID	Description	Total Area (ac)	C_{10}	C_{100}	i	C_{10}	C_{100}	i	Area (ac)	C_{10}	C_{100}	i	Area (ac)	C_{10}	C_{100}	i	Area (ac)
1	Convenience Store	0.068	0.90	0.95	90	0.90	0.95	100	0.00	0.90	0.95	90	0.07	0.25	0.35	0	0.000
2	Northern Parking	0.137	0.85	0.90	92	0.90	0.95	100	0.13	0.90	0.95	90	0.00	0.25	0.35	0	0.011
3	Majority of Parking and Fuel Canopy	0.454	0.81	0.87	85	0.90	0.95	100	0.32	0.90	0.95	90	0.07	0.25	0.35	0	0.060
OS-1	Off-site Existing Perimeter Slope East	0.218	0.31	0.41	10	0.90	0.95	100	0.02	0.90	0.95	90	0.00	0.25	0.35	0	0.197
OS-2	Off-site Existing Perimeter Slope South	0.280	0.26	0.36	2	0.90	0.95	100	0.01	0.90	0.95	90	0.00	0.25	0.35	0	0.274
OS-3	Off-site North	0.034	0.54	0.62	45	0.90	0.95	100	0.02	0.90	0.95	90	0.00	0.25	0.35	0	0.019
RW-1	Adjacent Roadway North	0.069	0.90	0.95	100	0.90	0.95	100	0.07	0.90	0.95	90	0.00	0.25	0.35	0	0.000
RW-2	Adjacent Roadway West	0.051	0.90	0.95	100	0.90	0.95	100	0.05	0.90	0.95	90	0.00	0.25	0.35	0	0.000
	Composite	1.310	0.62	0.69	56	0.90	0.95	100	0.61	0.90	0.95	90	0.14	0.25	0.35	0	0.560

Standard Form SF-1 . Time of Concentration

Corridor / Design Package: 7-11 NORTHGATE AND STRUTHERS
System Name: Developed Condition

Computed: SPM Date: 10/20/2017
Checked: MK Date: 10/27/2017

SUB-BASIN DATA				INITIAL/OVERLAND FLOW (t_i)			TRAVEL TIME (t_t)				Total	Tc CHECK (Urbanized basins)				FINAL Tc (min)
Basin ID	Description	C_{10}	Area (ac)	Length (ft)	Slope (ft/ft)	t_i (min)	Length (ft)	Slope (ft/ft)	V	t_t (min)	$t_c = t_i + t_t$ (min)	Urban (Yes /No)	Length (ft)	$T_{c\,max}$ (min)	$Tc_{max} > t_c$	
1	Convenience Store	0.90	0.07													5.00
2	Northern Parking	0.85	0.14													5.00
3	Majority of Parking and Fuel Canopy	0.81	0.45													5.00
OS-1	Off-site Existing Perimeter Slope East	0.31	0.22													5.00
OS-2	Off-site Existing Perimeter Slope South	0.26	0.28													5.00
OS-3	Off-site North	0.54	0.03													5.00
RW-1	Adjacent Roadway North	0.90	0.07													5.00
RW-2	Adjacent Roadway West	0.90	0.05													5.00

Standard Form SF-2 . Storm Drainage System Design (Rational Method Procedure)

Corridor / Design Package: 7-11 NORTHGATE AND STRUTHERS
System Name: Developed Condition

Computed: SPM Date: 10/20/2017
Checked: MK Date: 10/27/2017

Design Storm: Proposed 10-yr P = 1.78 in

	LOCATION	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
			AREA DESIGN	AREA (AC)	RUNOFF COEFF	t_c (MIN)	C.A. (AC)	IIN / HR	Q (CFS)	t_c (MIN)	SUM (C*A)(AC)	I(IN / HR)	Q(CFS)	SLOPE(%)	STREETFLOW (C	DESIGNFLOW (C	SLOPE(%)	PIPE SIZE(in)	LENGTH(FT)	VELOCITY(FPS)	t_t (MIN	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1	Convenience Store		1	0.07	0.90	5.00	0.061	6.04	0.37					--	--	--	--	--	--	--		
2	Northern Parking		2	0.14	0.85	5.00	0.116	6.04	0.70					--	--	--	--	--	--	--		
3	Majority of Parking and Fuel Canopy		3	0.45	0.81	5.00	0.370	6.04	2.23					--	--	--	--	--	--	--		
OS-1	Off-site Existing Perimeter Slope East		OS-1	0.22	0.31	5.00	0.068	6.04	0.41					--	--	--	--	--	--	--		
OS-2	Off-site Existing Perimeter Slope South		OS-2	0.28	0.26	5.00	0.074	6.04	0.45					--	--	--	--	--	--	--		
OS-3	Off-site North		OS-3	0.03	0.54	5.00	0.019	6.04	0.11					--	--	--	--	--	--	--		
RW-1	Adjacent Roadway North		RW-1	0.07	0.90	5.00	0.062	6.04	0.37					--	--	--	--	--	--	--		
RW-2	Adjacent Roadway West		RW-2	0.05	0.90	5.00	0.046	6.04	0.28					--	--	--	--	--	--	--		

Design Storm: Proposed 100-yr P = 2.56 in

	LOCATION	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
			AREA DESIGN	AREA (AC)	RUNOFF COEFF	t_c (MIN)	C.A. (AC)	IIN / HR	Q (CFS)	t_c (MIN)	SUM (C*A)(AC)	I(IN / HR)	Q(CFS)	SLOPE(%)	STREETFLOW (C	DESIGNFLOW (C	SLOPE(%)	PIPE SIZE(in)	LENGTH(FT)	VELOCITY(FPS)	t_t (MIN	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1	Convenience Store		1	0.07	0.95	5.00	0.06	8.68	0.56					--	--	--	--	--	--	--		
2	Northern Parking		2	0.14	0.90	5.00	0.12	8.68	1.07					--	--	--	--	--	--	--		
3	Majority of Parking and Fuel Canopy		3	0.45	0.87	5.00	0.40	8.68	3.44					--	--	--	--	--	--	--		
OS-1	Off-site Existing Perimeter Slope East		OS-1	0.22	0.41	5.00	0.09	8.68	0.77					--	--	--	--	--	--	--		
OS-2	Off-site Existing Perimeter Slope South		OS-2	0.28	0.36	5.00	0.10	8.68	0.88					--	--	--	--	--	--	--		
OS-3	Off-site North		OS-3	0.03	0.62	5.00	0.02	8.68	0.18					--	--	--	--	--	--	--		
RW-1	Adjacent Roadway North		RW-1	0.07	0.95	5.00	0.07	8.68	0.57					--	--	--	--	--	--	--		
RW-2	Adjacent Roadway West		RW-2	0.05	0.95	5.00	0.05	8.68	0.42					--	--	--	--	--	--	--		

(1) Basin Description linked to C-Value Sheet
(2) Basin Design Point
(3) Enter the Basin Name from C Value Sheet
(4) Basin Area linked to C-Value Sheet
(5) Composite C linked to C-Value Sheet
(6) Time of Concentration linked to C-Value Sheet
(7) =Column 4 x Column 5
(8) =28.5*P/(10+Column 6)^0.786
(9) =Column 7 x Column 8
(10) =Column 6 + Column 21
(11) Add the Basin Areas (7) to get the combined basin AC
(12) =28.5*P/(10+Column 10)^0.786
(13) Sum of Qs
(14) Additonal Street Overland Flow
(15) Additonal Street Overland Flow
(16) Design Pipe Flow
(17) Pipe Slope
(18) Pipe Size
(19) Additional Flow Length
(20) Velocity
(21) =Column 19 / Column 20 / 60

Channel Report

6 INCH CANOPY DRAINAGE

Circular

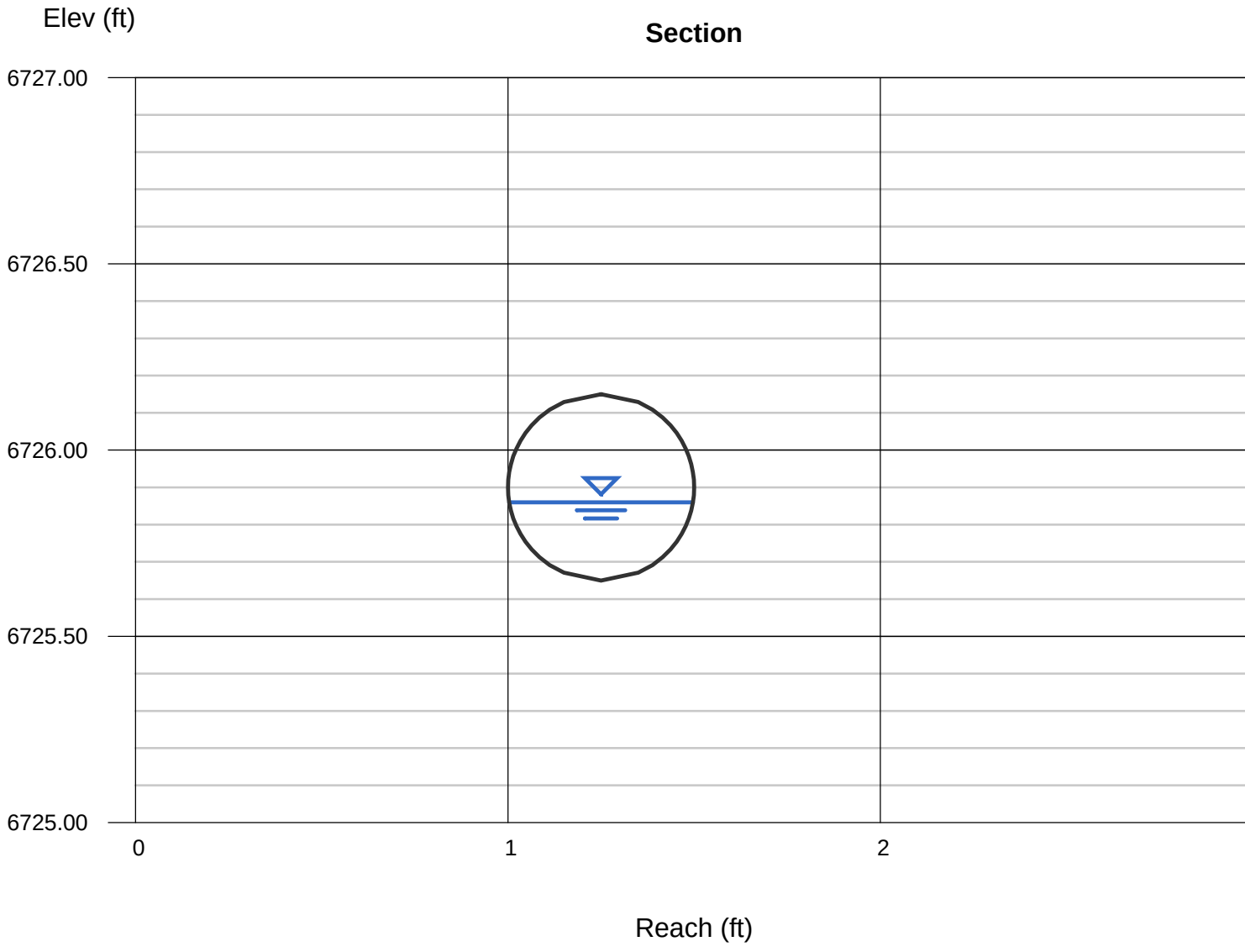
Diameter (ft)	= 0.50
Invert Elev (ft)	= 6725.65
Slope (%)	= 6.42
N-Value	= 0.011

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.58

Highlighted

Depth (ft)	= 0.21
Q (cfs)	= 0.580
Area (sqft)	= 0.08
Velocity (ft/s)	= 7.36
Wetted Perim (ft)	= 0.71
Crit Depth, Yc (ft)	= 0.39
Top Width (ft)	= 0.49
EGL (ft)	= 1.05



Channel Report

6 INCH ROOF DRAINAGE

Circular

Diameter (ft)	= 0.50
Invert Elev (ft)	= 6730.40
Slope (%)	= 4.50
N-Value	= 0.011

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.56

Highlighted

Depth (ft)	= 0.22
Q (cfs)	= 0.560
Area (sqft)	= 0.08
Velocity (ft/s)	= 6.69
Wetted Perim (ft)	= 0.73
Crit Depth, Yc (ft)	= 0.39
Top Width (ft)	= 0.50
EGL (ft)	= 0.91

Rea

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Oct 30 2017

8 INCH DP2 DRAINAGE

Circular

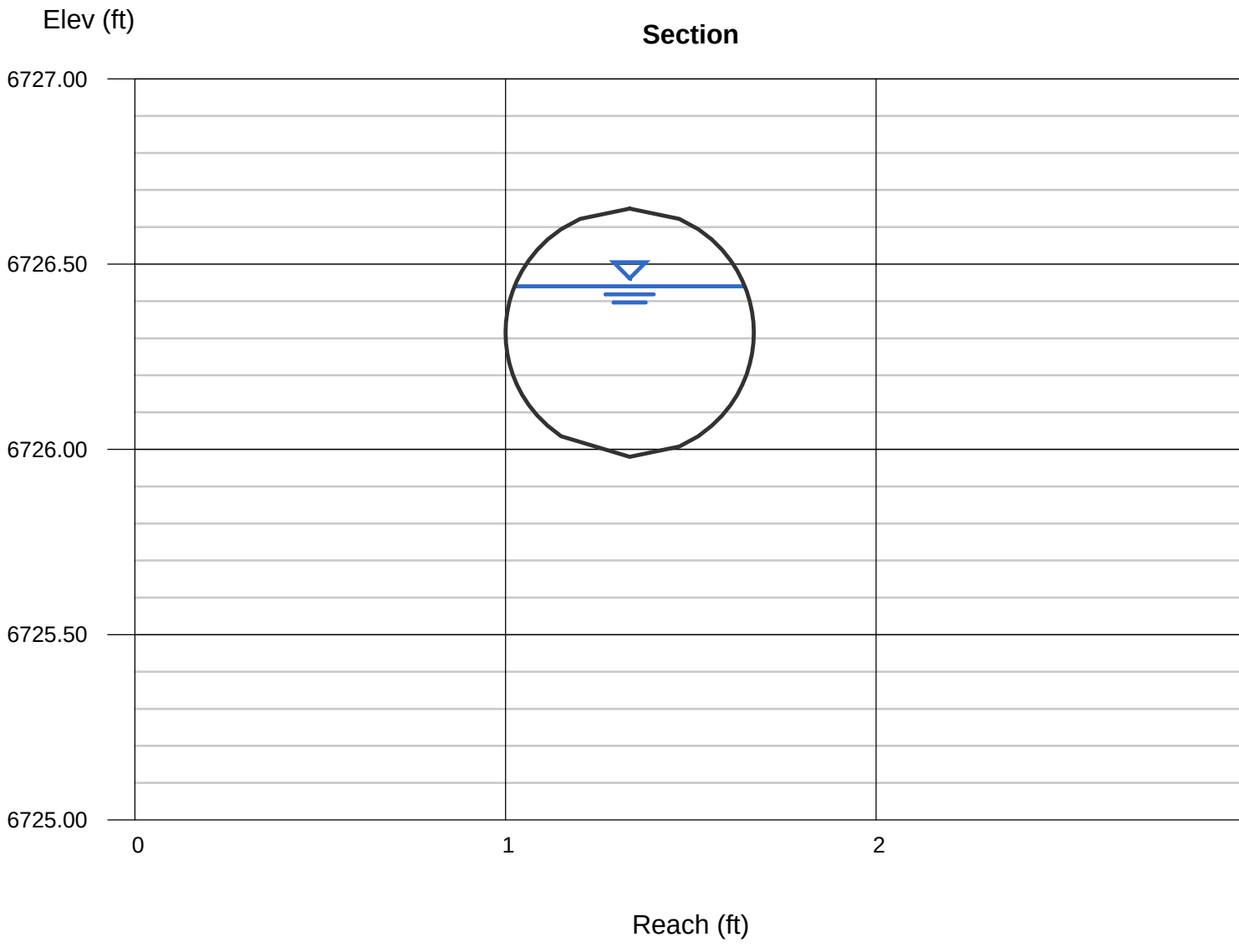
Diameter (ft)	= 0.67
Invert Elev (ft)	= 6725.98
Slope (%)	= 2.00
N-Value	= 0.011

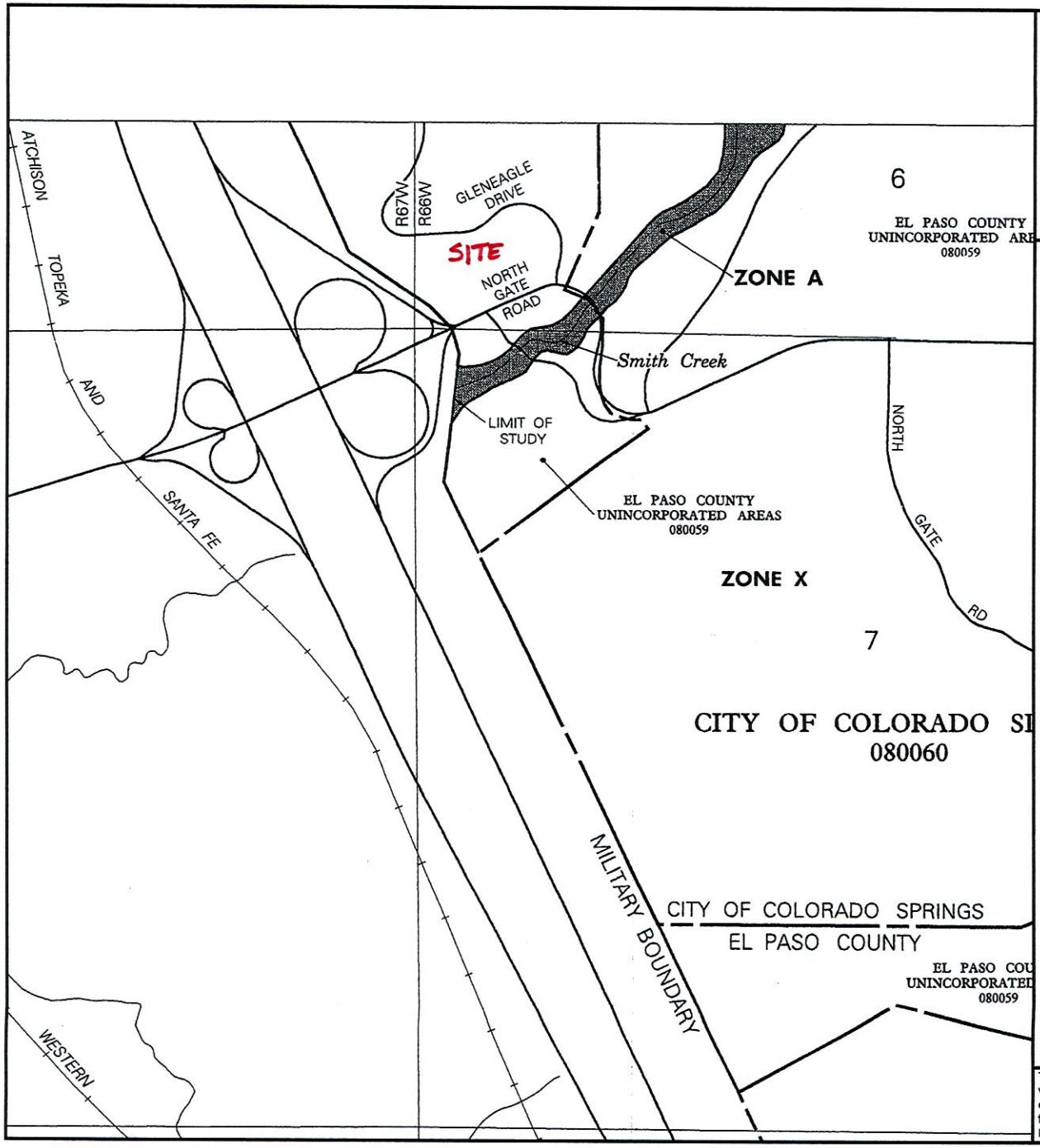
Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.63

Highlighted

Depth (ft)	= 0.46
Q (cfs)	= 1.630
Area (sqft)	= 0.26
Velocity (ft/s)	= 6.31
Wetted Perim (ft)	= 1.31
Crit Depth, Yc (ft)	= 0.60
Top Width (ft)	= 0.62
EGL (ft)	= 1.08





APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 290 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0290	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0290	F

MAP NUMBER
08041C0290 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY INTERIM

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)
1	A	1.60	2.84	10.5	4.06	6.81	6	19
2	B	0.89	0.95	5.0	5.17	8.68	5	8
3	C	0.55	2.41	13.0	3.74	6.27	2	15
4	D	1.94	2.07	5.0	5.17	8.68	10	18
5	OS-1	0.72	0.78	9.6	4.19	7.04	3	6
6	A, B, C, D, E AND OS-1	5.85	10.64	13.0	3.74	6.27	22	67
7	POND RELEASE	UD-DETENTION WORKSHEET PEAK REALEASE AT 53 MIN.					0.3	14
8	POND RELEASE PEAK TIME, BASIN F & BASIN OS-2	2.24	7.50	53.0	1.63	2.73	4	20
8A	POND RELEASE, BASIN F & BASIN OS-2 PEAK TIME	2.05	2.39	10.4	4.07	6.84	8	16

EXISTING DISCHARGE FLOW FROM LOT 1, ACADEMY VILLAGE FILING NO. 2 TO CONTINUE WEST PER CURRENT CONDITIONS

EXISTING PARKING LOT DISCHARGE

NO DEVELOPED FLOWS ALLOWED TO BE RELEASED ONTO USAFA

DEVELOPED FLOWS TO BE ROUTED TO STORM

UNITED STATES AIR FORCE ACADEMY PLAT BOOK O-2, PAGE 84

LOT 4 ACADEMY VILLAGE FILING NO. 2 RECEPTION NO. 099133453

GLENEAGLE DRIVE (66' ROW)

TRACT B 0.271 ACRES

20' PUBLIC UTILITY AND DRAINAGE EASEMENT (TYP.)

40' PUBLIC UTILITY, DRAINAGE AND ACCESS EASEMENT (TYP.)

LOT 3 1.441 ACRES

A 5.69

TRACT E 4.122 ACRES

STRUTHERS ROAD (120' ROW)

LOT 1 RIDGE POINT SUBDIVISION FILING NO. 1 RECEPTION NO. 089093593

GLENEAGLE GATE VIEW (50' PRIVATE ROW)

TRACT F 0.149 ACRES

OS-1 0.84 DP 5

20' PUBLIC UTILITY AND DRAINAGE EASEMENT (TYP.)

30' PUBLIC UTILITY EASEMENT RECEPTION NO. 200131248

TRACT D 6.040 ACRES

PROPOSED 15' A-I GRADE INLET

C 6.89

DP 1

LOT 2 0.985 ACRES

40' PUBLIC UTILITY EASEMENT RECEPTION NO. 200121472

40' PUBLIC UTILITY, DRAINAGE AND ACCESS EASEMENT (TYP.)

30' PUBLIC UTILITY, DRAINAGE AND ACCESS EASEMENT (TYP.)

PROPOSED 24" PRIVATE STORM MAIN

PROPOSED FUTURE EPC STORM PIPE (TO BE INSTALLED W/ SITE DEVELOPMENT)

D 2.15

LOT 1 1.310 ACRES

20' PUBLIC UTILITY, DRAINAGE AND ACCESS EASEMENT (TYP.)

TRACT A 1.705 ACRES

DP 3

TRACT C 2.221 ACRES

DETENTION FACILITY "A"

DP 2

DP 6

E 1.66

DP 4

PROPOSED 24" PRIVATE STORM MAIN

20' PUBLIC UTILITY AND DRAINAGE EASEMENT (TYP.)

TRACT B 0.149 ACRES

OS-2 2.29

NORTHGATE BOULEVARD (60' ROW)

B 0.99

PROPOSED 24" PRIVATE STORM MAIN

PROPOSED 5' SUMP INLETS

PROPOSED 36" PRIVATE STORM MAIN

40' PUBLIC UTILITY EASEMENT RECEPTION NO. 205035419

PUBLIC UTILITY EASEMENT RECEPTION NO. 200131246

F 0.69

DP 7

PROPOSED 18" PRIVATE STORM MAIN

FUTURE CONNECTION TO EPC OUTFALL STORM

DP 8 DP 8A

UNITED STATES AIR FORCE ACADEMY PLAT BOOK O-2, PAGE 84

PROPOSED DP 8
Q_5 = 4 CFS
Q_{100} = 20 CFS
(WITH DITCH FLOWS BASIN OS-2 AT PEAK RELEASE TIME OF POND AT 53 MINUTES)

PROPOSED DP 8A
Q_5 = 8 CFS
Q_{100} = 16 CFS
(WITH DITCH FLOWS BASIN OS-2 AT PEAK RELEASE TIME OF BASIN OS-2 AT 10.4 MINUTES

TO FUTURE REGIONAL DET/SWQ FACILITY

N

60 30' 0 60 120

SCALE: 1" = 60'

DRAINAGE MAP PRIOR TO ADDENDUM

LEGEND

- EXISTING GROUND CONTOUR 5910
- PROPOSED FINISHED CONTOUR 5910
- SUBDIVISION BOUNDARY
- LOT LINE
- PROPOSED BASIN BOUNDARY
- DIRECTION OF DRAINAGE
- EXISTING STORM SEWER
- PROPOSED PRIVATE STORM SEWER
- PROPOSED STORM INLET
- LOW POINT/HIGH POINT LP/HP
- BASIN IDENTIFIER D
- AREA IN ACRES 1.41
- PIPE RUN X
- DESIGN POINT DP 12

CLASSIC CONSULTING ENGINEERS & SURVEYORS SM
619 N. Cascade Avenue, Suite 200 (719)785-0790
Colorado Springs, Colorado 80903 (719)785-0799 (Fax)

ACADEMY GATEWAY SUBDIVISION
FILING NO. 1
DRAINAGE MAP
DEVELOPED CONDITIONS

CLASSIC CONSULTING ENGINEERS & SURVEYORS

DESIGNED BY	KRC	SCALE		DATE	2-24-17
DRAWN BY	JRH	(H) 1"= 60'	SHEET	1	OF 1
CHECKED BY		(V) 1"= N/A	JOB NO.	2507.00	

N:\2507\00_DRAWINGS\DEVELOPMENT\2507DD-FDR-REVISED.dwg, 5/9/2017 7:21:38 AM, 1:1

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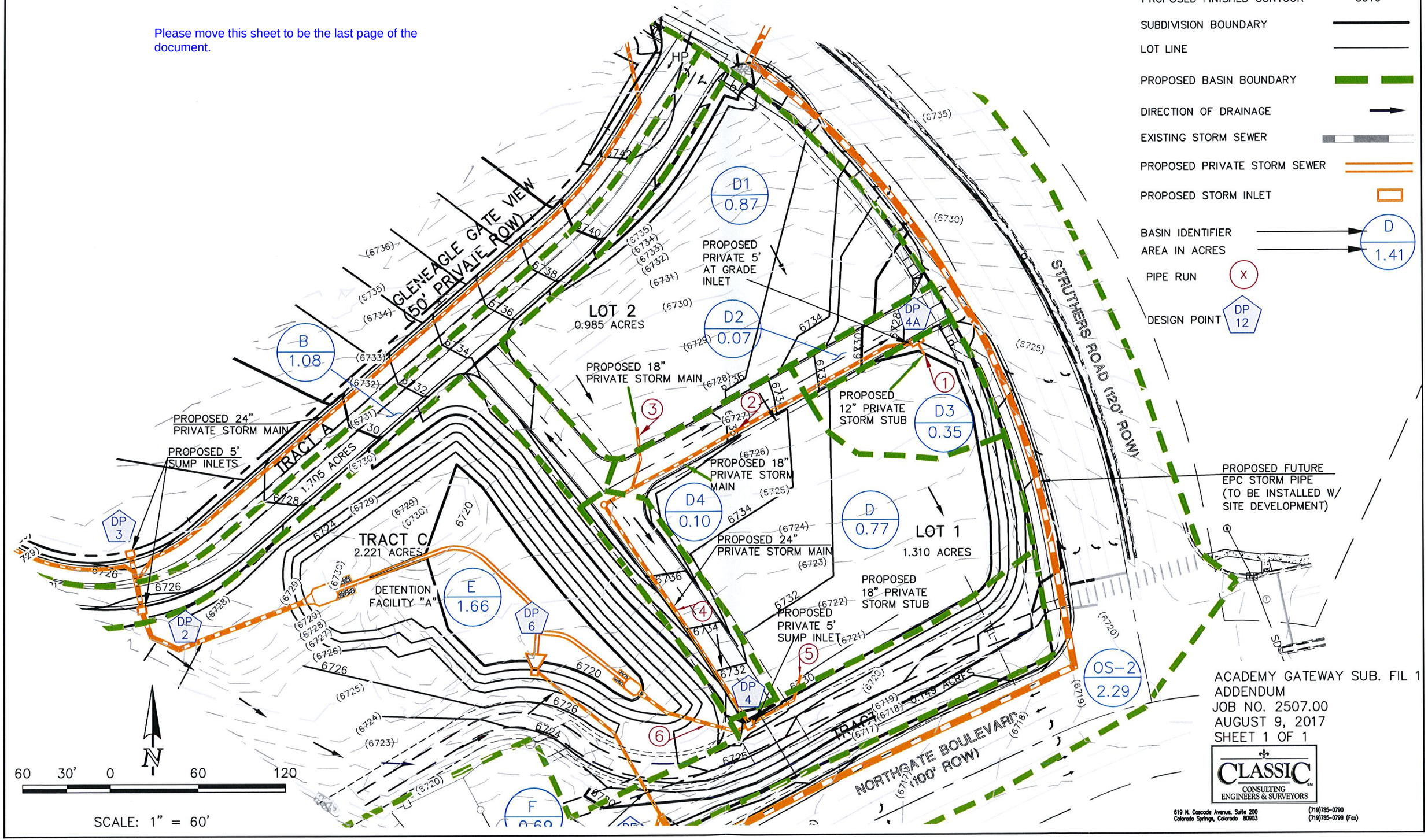

ACADEMY GATEWAY SUB. FIL 1
ADDENDUM
JOB NO. 2507.00
AUGUST 9, 2017
SHEET 1 OF 1

CLASSIC CONSULTING ENGINEERS & SURVEYORS
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799 (Fax)

JOB NAME: *Academy Gateway Subd. Fil. No. 1*
JOB NUMBER: *2507.00*
DATE: *08/11/17*
CALC'D BY: *KRC*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY - INTERIM

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
B	0.88	0.90	0.98	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	4	5	9
D	0.69	0.69	0.74	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	3	4	6
D1	0.77	0.78	0.84	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	3	4	7
D2	0.06	0.06	0.07	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	0	0	1
D3	0.31	0.32	0.34	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	1	2	3
D4	0.09	0.09	0.10	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	0	0	1

JOB NAME: *Academy Gateway Subd. Fil. No. 1*
JOB NUMBER: *2507.00*
DATE: *08/11/17*
CALC'D BY: *KRC*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY - ULTIMATE

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
B	0.88	0.89	0.95	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	4	5	8
D	0.69	0.69	0.74	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	3	4	6
D1	0.77	0.78	0.84	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	3	4	7
D2	0.06	0.06	0.07	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	0	0	1
D3	0.31	0.32	0.34	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	1	2	3
D4	0.09	0.09	0.10	0.08	0	0	5.0	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	0	0	1

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for El Paso County Area, Colorado

October 20, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:531 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 25 50 100 150

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

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:
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 14, Sep 23, 2016

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

Date(s) aerial images were photographed: Feb 22, 2014—Mar 9, 2017

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10	Blendon sandy loam, 0 to 3 percent slopes	0.8	100.0%
Totals for Area of Interest		**0.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

El Paso County Area, Colorado

10—Blendon sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3671
Elevation: 6,000 to 6,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Blendon and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blendon

Setting

Landform: Alluvial fans, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from arkose

Typical profile

A - 0 to 10 inches: sandy loam
Bw - 10 to 36 inches: sandy loam
C - 36 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Sandy Foothill (R049BY210CO)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes

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Markup Summary

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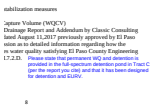

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Please state that permanent WQ and detention is provided in the full-spectrum detention pond in Tract C (per the report you cite) and that it has been designed for detention and EURV.

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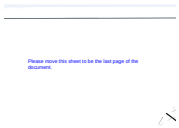
Step 4 is not for construction BMP's, it is for permanent BMP's please state that water quality will be provided in the Tract C pond that has been designed for FSD and is an acceptable permanent BMP for this site per appendix I of the ECM.



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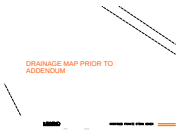

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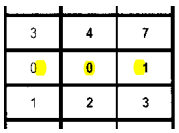
DRAINAGE MAP PRIOR TO ADDENDUM



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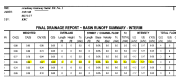

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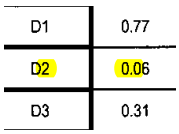

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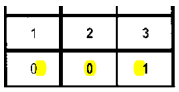

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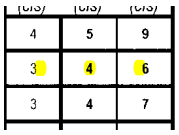

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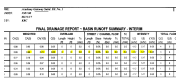

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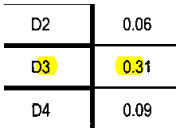

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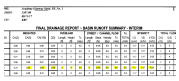

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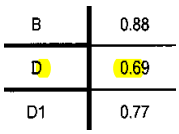

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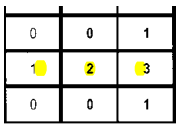

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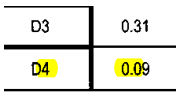

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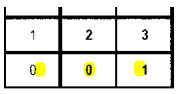

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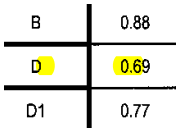

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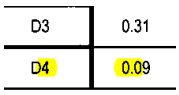

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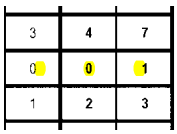

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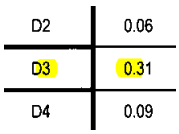

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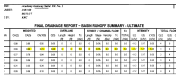

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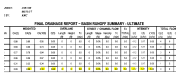

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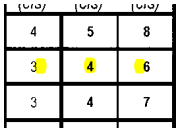

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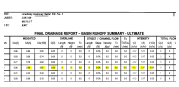

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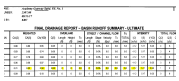

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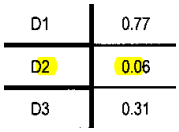

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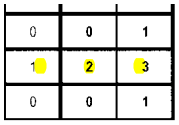

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