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**FINAL DRAINAGE REPORT  
ADDENDUM NO. 1  
“PRELIMINARY DRAINAGE REPORT FOR FLYING HORSE  
NORTH PRELIMINARY PLAN AND FINAL DRAINAGE REPORT  
FOR FLYING HORSE NORTH FILING NO. 1”  
(PCD file No. SP-17-012 and SF-18-001)**

**TRACT K, FLYING HORSE NORTH FILING NO. 1  
(GOLF COURSE TEMPORARY CLUBHOUSE / EVENT LAWN)**

**JANUARY 2021**

Prepared for:  
**FLYING HORSE COUNTRY CLUB, LLC**  
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COLORADO SPRINGS, CO 80921  
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PCD File No. PPR-20-043



**FINAL DRAINAGE REPORT ADDENDUM NO. 1 - FLYING HORSE NORTH FILING NO. 1  
FOR FLYING HORSE NORTH GOLF COURSE TEMPORARY CLUBHOUSE / EVENT LAWN**

**DRAINAGE REPORT 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 County for drainage reports and said report is in conformity with the applicable 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.

  
\_\_\_\_\_  
Marc A. Whorton, Colorado P.E. #37155

3/11/2021

\_\_\_\_\_  
Date

**OWNER'S/DEVELOPER'S STATEMENT:**

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

Business Name: Flying Horse Country Club, LLC

  
\_\_\_\_\_

Title: Vice President

Address: 2138 Flying Horse Club Drive

Colorado Springs, CO 80921

**EL PASO COUNTY:**

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.  
County Engineer, / ECM Administrator

\_\_\_\_\_  
Date

Conditions:



**FINAL DRAINAGE REPORT ADDENDUM NO. 1 - FLYING HORSE NORTH FILING NO. 1  
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**TABLE OF CONTENTS:**

PURPOSE	Page 1
GENERAL DESCRIPTION	Page 1
EXISTING/DEVELOPED DRAINAGE CONDITIONS	Page 1
HYDROLOGIC CALCULATIONS	Page 4
FLOODPLAIN STATEMENT	Page 6
DRAINAGE/BRIDGE FEES	Page 6
SUMMARY	Page 6
REFERENCES	Page 7

**APPENDICES**

VICINITY MAP  
SOILS MAP (S.C.S. SURVEY)  
F.E.M.A. MAP  
CALCULATIONS  
DRAINAGE MAP

# **FINAL DRAINAGE REPORT ADDENDUM NO. 1 - FLYING HORSE NORTH FILING NO. 1 FOR FLYING HORSE NORTH GOLF COURSE TEMPORARY CLUBHOUSE / EVENT LAWN**

## **PURPOSE**

This portion of the Flying Horse North development was previously platted as Tract K within Flying Horse North Filing No. 1. It was also previously analyzed from a drainage standpoint and included in the Flying Horse North Filing No. 1 Final Drainage Report, approved August 2018. As found in that report, the previous drainage basin CC-4C encompasses the proposed development within Tract K. The purpose of this report is to allow for the submittal of a Site Development for the golf course temporary clubhouse and event lawn and better define the temporary drainage patterns for this development.

## **GENERAL DESCRIPTION**

Tract K, Flying Horse North Filing No. 1 contains a total acreage of 65.023 ac., located in the county of El Paso within Section 36, Township 11 South, Range 66 West of the Sixth Principal Meridian, El Paso County, Colorado. The portion of the site proposed for development is bounded on the north by rural residential lots 32 and 33, Flying Horse North Filing No. 1, on the east by Allen Ranch Road, on the west and south by Flying Horse North Golf Course within the remaining portion of Tract K, Flying Horse North Filing No. 1.

The average soil condition reflects Hydrologic Group "B" (Peyton sandy loam), as determined by the "Soil Survey of El Paso County Area," prepared by the Soil Conservation Service. (See Appendix) For the purposes of the hydrologic calculations within this report, the soil type B was utilized.

## **EXISTING/DEVELOPED DRAINAGE CONDITIONS**

The entire proposed development area was previously overlotted graded along with the golf course and Filing 1. The revegetation consists of native grasses with slopes of 2%-4%. The entire property sheet flows in an easterly direction towards the side road ditch along the west side of Allen Ranch Road. The pre-developed flows for this area were described in the approved drainage report as Basin CC-4C ( $Q_5 = 1.8$  cfs and  $Q_{100} = 11.2$  cfs). The designed outfall





Revise to  
"west"

for these flows are into the side road ditch along the west side of Allen Ranch Road and then east within the side road ditch along the south side of Stagecoach Road. The flows will then cross Stagecoach Road at a low point via a 36" RCP culvert and then head northeast within a natural channel towards the existing constructed Detention Pond 12. (Reference previous drainage map in Appendix along with ditch and culvert capacity calculations)

The proposed development plans to construct a temporary clubhouse (three trailers), an event lawn, paved parking lot and a golf cart barn. All of these facilities are temporary in nature as a permanent clubhouse development is ultimately planned for this area. Timing of this ultimate development is unknown at this point but will require a separate formal site plan submittal. Vehicular access to the parking lot will be taken directly from Allen Ranch Road. The event lawn area will sheet flow towards the private golf course while the remaining portion of the site (Basin B) will continue to drain in an easterly direction towards a temporary sediment basin adjacent to Allen Ranch Road. These developed flows will sheet flow across the remaining native areas and the proposed parking lot with portions being routed via asphalt curbing adjacent to the parking lot and ditches that will be created to help route all flows towards the sediment basin. This facility will help control the sediment runoff from this temporary development and remain in place until a permanent facility is constructed along with the ultimate development. Stormwater quality for this development will continue to be handled in the off-site detention pond 12 as described and approved in the previously mentioned Final Drainage Report for Flying Horse North Filing No. 1.

**Basin A ( $Q_5 = 0.2$  cfs and  $Q_{100} = 1.0$  cfs)** represents developed flows from Basin A. This basin continues to sheet flow towards the private Golf Course. The Golf Course will maintain the existing natural slope to prevent any erosion. No further improvements are proposed for this basin.

**Basin B ( $Q_5 = 5.5$  cfs and  $Q_{100} = 11.8$  cfs)** represents developed flows from Basin B. This basin is the major portion of the temporary development and includes the trailers, paved parking lot

and cart barn. The cart barn downspouts will be routed to the east towards the ditch created to route the flows towards the sediment basin. This compares to the pre-developed flows of ( $Q_5 = 1.8$  cfs and  $Q_{100} = 11.2$  cfs) as presented in the original final drainage report. The downstream side road ditches can adequately handle these flows. (See Appendix for ditch calculation) This minor increase in flows is handled by the proposed sediment basin along with two planned permanent rock check dams downstream within the side road ditch along Allen Ranch Road. These two structures will help control erosion from the release of the sediment basin.

**Basin C ( $Q_5 = 0.5$  cfs and  $Q_{100} = 2.5$  cfs)** represents developed flows from Basin C. This basin will remain undisturbed other than the construction of the proposed concrete golf cart path. The minimal developed flows from this basin will sheet flow across the native ground towards the side road ditch along the west side of Allen Ranch Road. Given the existing highpoint in the roadway, these flows will travel in a southerly direction where a proposed 18" culvert will be installed at the golf cart crossing. These ditch flows eventually sheet flow into the golf course area just west of the existing temporary roadway turn-around.

Given the temporary nature of this development and as mentioned previously, the off-site detention/stormwater quality pond 12 is currently handling the stormwater quality for the site, a temporary sediment basin is planned for this development. This facility will handle sediment control for all the developed portion of the site prior to release. Upon the ultimate clubhouse site being planned and constructed, a separate site specific Final Drainage Report with associated detention and stormwater quality will be required.

The following are the parameters for the temporary facility:

### Temporary Sediment Basin

Design criteria per Urban Storm Drainage Criteria Manual Vol. 3 (SC-7)

Undisturbed area (0% imp.)                      1.4 ac.

Disturbed area (100% imp.)                      1.8 ac.

Basin Storage Volume Required:	1.4 ac. X 500 cu. ft.	=	700 cu. ft.
	1.8 ac. X 3,600 cu. ft.	=	6,480 cu. ft.
		=	<b><u>7,180 cu. ft.</u></b>

Spillway Crest Length:                      5.0' wide rip-rap outfall

Hole Diameter:                      1/2 in. (single row of 5 holes – total area = 0.98 sq-in.)

Basin Outlet:                      6" PVC Riser pipe and outfall

This facility will be constructed on-site within a drainage easement with ownership and maintenance by the property owner.

### HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014. Individual on-site developed basin design was calculated using the Rational Method. BMP design was calculated using the Urban Storm Drainage Criteria Manual for a Sediment Basin (SC-7).

The City of Colorado Springs/El Paso County DCM requires the Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls. The Four Step Process pertains to management of smaller, frequently occurring storm events, as opposed to larger storms for which drainage and flood control infrastructure are sized.



Implementation of these four steps helps to achieve storm water permit requirements. This site adheres to this **Four Step Process** as follows:

1. **Employ Runoff Reduction Practices:** Development of this site is proposing two temporary buildings, paved parking lot and an event lawn area. Proposed impervious areas (roof tops, sidewalks and parking lot) will sheet flow across revegetated ground within the property to slow runoff and increase time of concentration prior to entering the on-site sediment pond and then being conveyed to the sideroad ditch along the public road. This will minimize directly connected impervious areas within the project site.
2. **Stabilize Drainageways:** This site will utilize an on-site sediment basin to control sediment and erosion and then install permanent rock check dams to help stabilize the downstream drainageway. With the use of these multiple BMPs, there will be no significant change from the pre-developed flows and thus no impact to downstream drainageways is anticipated.
3. **Provide Water Quality Capture Volume (WQCV):** Per the approved Final Drainage Report for Flying Horse North Filing No. 1, the downstream detention/stormwater quality pond 12, currently constructed, provides the required WQCV for this development. Upon the future ultimate clubhouse development, a separate permanent on-site facility will be required.
4. **Consider need for Industrial and Commercial BMPs:** No industrial or commercial uses are proposed within this development. However, a site specific storm water quality and erosion control plan addendum is being submitted concurrently with this report and development. Details such as site specific construction BMP's as well as permanent sediment control BMP's are detailed in this plan to protect receiving waters. Roadside ditch stabilization, in the form of permanent rock check dams (as specified on the plans)

are also proposed. The described BMP's will be constructed by the developer upon approval by El Paso County Staff.

### **FLOODPLAIN STATEMENT**

No portion of this site is located within a FEMA floodplain as determined by the Flood Insurance Rate Map (F.I.R.M.) Map Number 08041C0315G, with effective date of December, 7 2018. (See Appendix)

### **DRAINAGE AND BRIDGE FEES**

This site lies entirely within the East Cherry Creek Drainage Basin boundaries and was platted as Tract K within the Flying Horse North Filing No. 1 Final Plat. This basin currently does not have any basin fees and thus, no fees are due at this time.

### **SUMMARY**

The proposed temporary development, grading plan, drainage patterns and quantities remain consistent with the previously approved final drainage report for Flying Horse North Filing No. 1. The proposed development will not adversely impact surrounding properties.

PREPARED BY:

**Classic Consulting Engineers & Surveyors, LLC**



Marc A. Whorton, P.E.  
Project Manager

mw/109615/Reports/109615FDR Addendum.doc



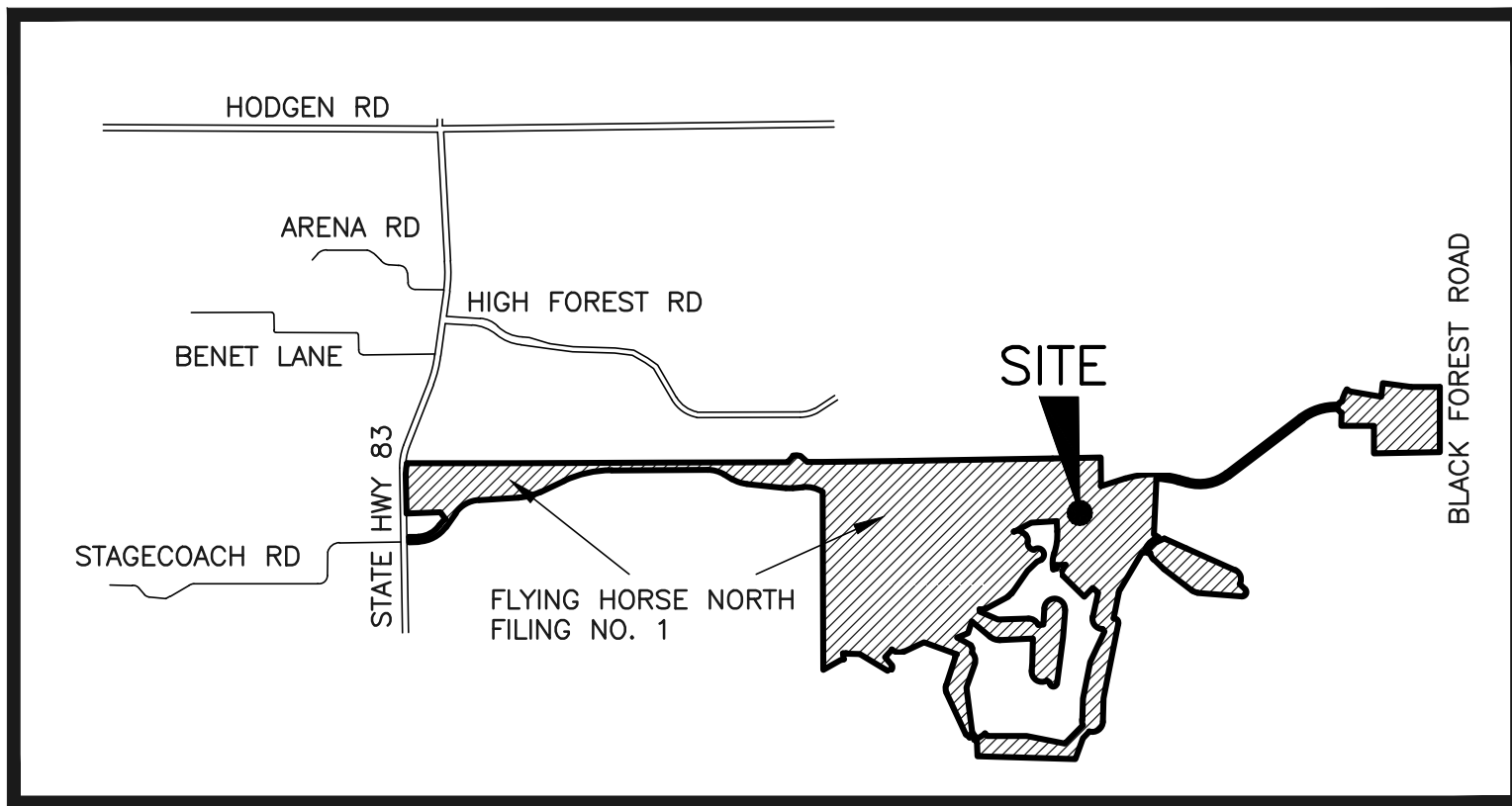


## REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual, as revised in November 1991 and 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014.
2. "Master Development Drainage Plan for Flying Horse North", Classic Consulting, dated September 2016.
3. "Preliminary Drainage Report for Flying Horse North (Golf Course Grading and Private Access Roads)", Classic Consulting, dated September 2016.
4. "Final Drainage Report Flying Horse North Filing No. 1" Classic Consulting, dated September 2018.
5. "Urban Storm Drainage Criteria Manual Volume 1, 2 & 3" Urban Drainage and Flood Control District, dated January 2016.

## APPENDIX

## VICINITY MAP



## **SOILS MAP (S.C.S. SURVEY)**



# Soil Map—El Paso County Area, Colorado



## 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 18, Jun 5, 2020

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

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

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
26	Elbeth sandy loam, 8 to 15 percent slopes	6.6	14.5%
66	Peyton sandy loam, 1 to 5 percent slopes	17.0	37.5%
67	Peyton sandy loam, 5 to 9 percent slopes	21.7	48.0%
<b>Totals for Area of Interest</b>		<b>45.2</b>	<b>100.0%</b>

## El Paso County Area, Colorado

### 66—Peyton sandy loam, 1 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 369c

*Elevation:* 6,800 to 7,600 feet

*Farmland classification:* Prime farmland if irrigated and the product of  
I (soil erodibility) x C (climate factor) does not exceed 60

#### Map Unit Composition

*Peyton and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of  
the mapunit.*

#### Description of Peyton

##### Setting

*Landform:* Flats, hills

*Landform position (three-dimensional):* Side slope, tal

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Arkosic alluvium derived from sedimentary rock  
and/or arkosic residuum weathered from sedimentary rock

##### Typical profile

*A - 0 to 12 inches:* sandy loam

*Bt - 12 to 25 inches:* sandy clay loam

*BC - 25 to 35 inches:* sandy loam

*C - 35 to 60 inches:* sandy loam

##### Properties and qualities

*Slope:* 1 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately high (0.20 to 0.60 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Moderate (about 7.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4c

*Hydrologic Soil Group:* B

*Ecological site:* R049XB216CO - Sandy Divide

*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

## **Data Source Information**

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 18, Jun 5, 2020



**F.E.M.A MAP**







## CALCULATIONS

ALL LAND ASSUMED 2 ACRE RESIDENTIAL LOTS, UNDEVELOPED WOODS OR  
GOOD CONDITION OPEN SPACE (LAWNS, PARKS GOLF COURSES, CEMETARIES ETC.)

### C<sub>N</sub> VALUES - DEVELOPED CONDITIONS

BASIN (label)	BASIN AREA (Ac)	GOLF COURSE / WOODS (B)		2 AC. RESIDENTIAL (B)		COMPOSITE C <sub>N</sub>
		CN	AREA (Ac.)	CN	AREA (Ac.)	
CC-1A	9.8	61	0.0	65	9.8	65.0
CC-1B	12.6	61	0.5	65	12.1	64.8
CC-2A	11.0	61	0.0	65	11.0	65.0
CC-2B	20.8	61	0.0	65	20.8	65.0
CC-2C	6.4	61	0.0	65	6.4	65.0
CC-3	52.5	61	25.0	65	27.5	63.1
CC-4A	108.7	61	65.0	65	43.7	62.6
CC-4B	8.1	85	4.5	65	3.6	76.1
CC-4C (Pre-Dev.)	7.4	61	7.4	65	0.0	61.0
CC-5	22.4	61	0.0	65	22.4	65.0
CC-6	27.8	61	0.0	65	27.8	65.0
CC-7	18.4	61	0.0	65	18.4	65.0
CC-8	7.7	61	0.0	65	7.7	65.0
CC-9	5.6	61	0.0	65	5.6	65.0
CC-10	85.6	61	51.0	65	34.6	62.6
CC-11	18.6	61	9.0	65	9.6	63.1
CC-12	12.2	61	0.0	65	12.2	65.0
CC-13A	19.3	61	0.0	65	19.3	65.0
CC-13B	25.5	61	0.0	65	25.5	65.0
CC-13C	9.9	61	0.0	65	9.9	65.0
CC-13D	18.8	61	0.0	65	18.8	65.0
CC-14	4.6	61	0.0	65	4.6	65.0
CC-15	12.8	61	0.0	65	12.8	65.0
CC-16	16.3	61	0.0	65	16.3	65.0
CC-17	25.0	61	0.0	65	25.0	65.0
CC-18	6.2	65	5.8	89	0.4	66.5
CC-19	3.7	61	0.0	65	3.7	65.0
CC-20	39.3	61	0.0	65	39.3	65.0
CC-21	6.2	61	6.2	65	0.0	61.0
CC-22	13.8	61	0.0	65	13.8	65.0
CC-23	5.7	61	0.4	65	5.3	64.7
CC-24	39.6	61	0.0	65	39.6	65.0
CC-25	3.5	61	0.0	65	3.5	65.0
CC-26	16.7	61	0.0	65	16.7	65.0
CC-27	18.9	61	3.0	65	15.9	64.4
CC-28	154.8	61	23.0	65	131.8	64.4

## TIME OF CONCENTRATION - DEVELOPED

BASIN	COMPOSITE Cn	C(5)	Length (ft)	OVERLAND Height (ft)	Tc (min)	STREET / CHANNEL FLOW (DCM Vol. 1 Fig. 6-25)				Tc TOTAL (min)	Tc LAG (0.6tc) (min)	Tc LAG (0.6tc) (hr)
						Length (ft)	Slope (%)	Velocity (fps)	Tc (min)			
CC-1A	65.0	0.08	300	16	18.4	500	5.0%	1.7	4.9	23.3	14.0	0.23
CC-1B	64.8	0.08	300	14	19.2	700	4.0%	2.0	5.8	25.0	15.0	0.25
CC-2A	65.0	0.08	300	14	19.2	250	3.0%	1.5	2.8	22.0	13.2	0.22
CC-2B	65.0	0.08	300	14	19.2	280	3.0%	1.5	3.1	22.3	13.4	0.22
CC-2C	65.0	0.08	300	18	17.7					17.7	10.6	0.18
CC-3	63.1	0.08	300	18	17.7	2300	3.0%	1.5	25.6	43.2	25.9	0.43
CC-4A	62.6	0.08	300	14	19.2	2700	2.0%	1.8	25.0	44.2	26.5	0.44
CC-4B	76.1	0.08	300	12	20.2	600	3.0%	1.6	6.3	26.4	15.9	0.26
CC-4C (Pre-Dev.)	61.0	0.08	40	0.8	9.3	350	3.0%	1.5	3.9	13.2	7.9	0.13
CC-5	65.0	0.08	300	18	17.7	1000	4.0%	2.0	8.3	26.0	15.6	0.26
CC-6	65.0	0.08	300	14	19.2	550	2.5%	1.6	5.7	24.9	14.9	0.25
CC-7	65.0	0.08	300	16	18.4	1000	3.0%	1.6	10.4	28.8	17.3	0.29
CC-8	65.0	0.08	300	10	21.4	250	2.0%	1.2	3.5	24.9	14.9	0.25
CC-9	65.0	0.08	300	18	17.7	100	2.0%	1.2	1.4	19.0	11.4	0.19
CC-10	62.6	0.08	300	22	16.5	2400	3.0%	1.8	22.2	38.7	23.2	0.39
CC-11	63.1	0.08	300	18	17.7	450	5.0%	2.1	3.6	21.2	12.7	0.21
CC-12	65.0	0.08	300	11	20.8	650	4.0%	2.0	5.4	26.2	15.7	0.26
CC-13A	65.0	0.08	300	14	19.2	1400	4.0%	2.0	11.7	30.9	18.5	0.31
CC-13B	65.0	0.08	300	18	17.7	1300	3.0%	1.6	13.5	31.2	18.7	0.31
CC-13C	65.0	0.08	300	14	19.2	350	4.0%	2.0	2.9	22.1	13.3	0.22
CC-13D	65.0	0.08	300	20	17.1	900	4.0%	2.0	7.5	24.6	14.7	0.25
CC-14	65.0	0.08	300	10	21.4					21.4	12.9	0.21
CC-15	65.0	0.08	300	14	19.2	550	3.0%	1.8	5.1	24.3	14.6	0.24
CC-16	65.0	0.08	300	10	21.4	650	2.5%	1.3	8.3	29.8	17.9	0.30
CC-17	65.0	0.08	300	9	22.2	950	2.0%	1.2	13.2	35.4	21.2	0.35
CC-18	66.5	0.08	300	7	24.1	400	2.0%	1.2	5.6	29.7	17.8	0.30
CC-19	65.0	0.08	300	8	23.1	100	2.0%	1.0	1.7	24.7	14.8	0.25
CC-20	65.0	0.08	300	9	22.2	350	6.0%	2.2	2.7	24.8	14.9	0.25
CC-21	61.0	0.08	300	18	17.7	200	3.0%	1.8	1.9	19.5	11.7	0.20
CC-22	65.0	0.08	300	14	19.2	700	4.0%	2.0	5.8	25.0	15.0	0.25
CC-23	64.7	0.08	300	10	21.4	850	2.0%	1.2	11.8	33.2	19.9	0.33
CC-24	65.0	0.08	300	20	17.1	900	4.0%	1.9	7.9	25.0	15.0	0.25
CC-25	65.0	0.08	300	16	18.4	500	3.0%	1.8	4.6	23.0	13.8	0.23
CC-26	65.0	0.08	300	14	19.2	900	5.0%	2.1	7.1	26.3	15.8	0.26
CC-27	64.4	0.08	300	14	19.2	1300	3.0%	1.8	12.0	31.2	18.7	0.31
CC-28	64.4	0.08	300	14	19.2	4700	3.0%	1.8	43.5	62.7	37.6	0.63



## BASIN SUMMARY - DEVELOPED CONDITIONS

BASIN (label)	AREA (acres)	COMPOSITE CN	TOTAL LAG TIME (hours)	Q 2 Yr. (cfs)	Q 5 Yr. (cfs)	Q 100 Yr. (cfs)
CC-1A	9.80	65.0	0.23	0.8	3.3	16.0
CC-1B	12.60	64.8	0.25	1.0	4.0	19.4
CC-2A	11.00	65.0	0.22	1.0	3.8	18.3
CC-2B	20.80	65.0	0.22	1.9	7.1	34.6
CC-2C	6.40	65.0	0.18	0.7	2.5	11.5
CC-3	52.50	63.1	0.43	1.8	8.8	54.5
CC-4A	108.70	62.6	0.44	15.4	39.0	156.0
CC-4B	8.10	76.1	0.26	4.0	7.3	20.6
CC-4C (Pre-Dev.)	7.40	61.0	0.13	0.2	1.8	11.2
CC-5	22.40	65.0	0.26	1.8	7.1	34.3
CC-6	27.80	65.0	0.25	2.3	9.1	43.2
CC-7	18.40	65.0	0.29	1.4	5.4	27.0
CC-8	7.70	65.0	0.25	0.6	2.5	12.0
CC-9	5.60	65.0	0.19	0.6	2.1	9.8
CC-10	85.60	62.6	0.39	2.6	14.1	91.9
CC-11	18.60	63.1	0.21	0.9	5.0	28.1
CC-12	12.20	65.0	0.26	1.0	3.9	18.7
CC-13A	19.30	65.0	0.31	1.4	5.4	27.3
CC-13B	25.50	65.0	0.31	1.8	7.2	36.1
CC-13C	9.90	65.0	0.22	0.9	3.4	16.5
CC-13D	18.80	65.0	0.25	1.5	6.2	29.2
CC-14	4.60	65.0	0.21	0.4	1.6	7.8
CC-15	12.80	65.0	0.24	1.1	4.3	20.4
CC-16	16.30	65.0	0.30	1.2	4.6	23.6
CC-17	25.00	65.0	0.35	1.7	6.5	32.8
CC-18	6.20	66.5	0.30	0.7	2.2	9.7
CC-19	3.70	65.0	0.25	0.3	1.2	5.8
CC-20	39.30	65.0	0.25	3.2	12.9	61.0
CC-21	6.20	61.0	0.20	0.1	1.2	8.5
CC-22	13.80	65.0	0.25	1.1	4.5	21.4
CC-23	5.70	64.7	0.33	0.4	1.5	7.7
CC-24	39.60	65.0	0.25	3.3	13.0	61.5
CC-25	3.50	65.0	0.23	0.3	1.2	5.7
CC-26	16.70	65.0	0.26	1.4	5.3	25.6
CC-27	18.90	64.4	0.31	1.2	4.9	25.8
CC-28	154.80	64.4	0.63	6.5	24.7	136.3

JOB NAME: FLYING HORSE NORTH EVENT LAWN  
 JOB NUMBER: 1096.15  
 DATE: 03/10/21  
 CALCULATED BY: MAW

### FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / DRIVEWAYS				LANDSCAPE/UNDEVELOPED AREAS				WEIGHTED			WEIGHTED CA		
		AREA (AC)	C(2)	C(5)	C(100)	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)
A	0.4	0.04	0.89	0.90	0.96	0.36	0.02	0.08	0.35	0.11	0.16	0.41	0.04	0.06	0.16
B	3.2	1.80	0.89	0.90	0.96	1.40	0.02	0.08	0.35	0.51	0.54	0.69	1.63	1.73	2.22
C	1.1	0.08	0.89	0.90	0.96	1.02	0.02	0.08	0.35	0.08	0.14	0.39	0.09	0.15	0.43

JOB NAME: FLYING HORSE NORTH EVENT LAWN  
 JOB NUMBER: 1096.15  
 DATE: 03/10/21  
 CALC'D BY: MAW

Table 6-7. Conveyance Coefficient,  $C_v$

Type of Land Surface	$C_v$
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)* $t_c = \frac{L}{180} + 10$	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

\*For buried riprap, select  $C_v$  value based on type of vegetative cover.

$$t_i = \frac{0.395(1.1 - C_s)\sqrt{L}}{S^{0.33}} \quad V = C_v S_w^{0.5} \quad T_c = L/V$$

### FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	TOTAL AREA (AC)	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc TOTAL (min)	INTENSITY			TOTAL FLOWS		
		CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)		I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
A	0.4	0.04	0.06	0.16	0.08	120	3	14.9					14.9	2.82	3.53	5.93	0.1	0.2	1.0
B	3.2	1.63	1.73	2.22	0.08	100	2	14.7	250	4.0%	1.0	4.2	18.8	2.54	3.18	5.34	4.1	5.5	11.8
C	1.1	0.09	0.15	0.43	0.08	230	12	16.2					16.2	2.72	3.41	5.72	0.2	0.5	2.5

## Side road Ditch along Allen Ranch Rd.

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	0.040 ft/ft
Left Side Slope	5.000 H:V
Right Side Slope	3.000 H:V
Discharge	12.00 cfs
Results	
Normal Depth	9.7 in
Flow Area	2.6 ft <sup>2</sup>
Wetted Perimeter	6.7 ft
Hydraulic Radius	4.7 in
Top Width	6.49 ft
Critical Depth	10.7 in
Critical Slope	0.024 ft/ft
Velocity	4.55 ft/s
Velocity Head	0.32 ft
Specific Energy	1.13 ft
Froude Number	1.260
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.7 in
Critical Depth	10.7 in
Channel Slope	0.040 ft/ft
Critical Slope	0.024 ft/ft

# Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Thursday, Nov 30 2017

## DP 24 CULVERT

Invert Elev Dn (ft) = 7562.87  
Pipe Length (ft) = 89.81  
Slope (%) = 3.49  
Invert Elev Up (ft) = 7566.00  
Rise (in) = 36.0  
Shape = Circular  
Span (in) = 36.0  
No. Barrels = 1  
n-Value = 0.012  
Culvert Type = Circular Concrete  
Culvert Entrance = Square edge w/headwall (C)  
Coeff. K,M,c,Y,k = 0.0098, 2, 0.0398, 0.67, 0.5

### Embankment

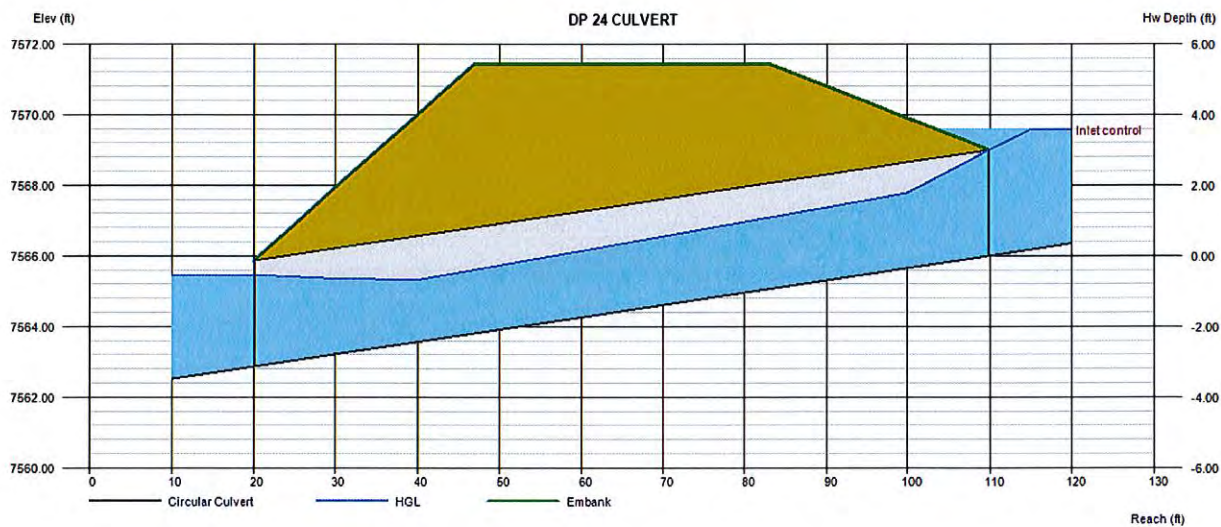
Top Elevation (ft) = 7571.44  
Top Width (ft) = 36.00  
Crest Width (ft) = 40.00

### Calculations

Qmin (cfs) = 0.00  
Qmax (cfs) = 45.00  
Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 45.00  
Qpipe (cfs) = 45.00  
Qovertop (cfs) = 0.00  
Veloc Dn (ft/s) = 6.93  
Veloc Up (ft/s) = 8.16  
HGL Dn (ft) = 7565.46  
HGL Up (ft) = 7568.18  
Hw Elev (ft) = 7569.57  
Hw/D (ft) = 1.19  
Flow Regime = Inlet Control



## Description

A sediment basin is a temporary pond built on a construction site to capture eroded or disturbed soil transported in storm runoff prior to discharge from the site. Sediment basins are designed to capture site runoff and slowly release it to allow time for settling of sediment prior to discharge. Sediment basins are often constructed in locations that will later be modified to serve as post-construction stormwater basins.



**Photograph SB-1.** Sediment basin at the toe of a slope. Photo courtesy of WWE.

## Appropriate Uses

Most large construction sites (typically greater than 2 acres) will require one or more sediment basins for effective management of construction site runoff. On linear construction projects, sediment basins may be impractical; instead, sediment traps or other combinations of BMPs may be more appropriate.

Sediment basins should not be used as stand-alone sediment controls. Erosion and other sediment controls should also be implemented upstream.

When feasible, the sediment basin should be installed in the same location where a permanent post-construction detention pond will be located.

## Design and Installation

The design procedure for a sediment basin includes these steps:

- **Basin Storage Volume:** Provide a storage volume of at least 3,600 cubic feet per acre of drainage area. To the extent practical, undisturbed and/or off-site areas should be diverted around sediment basins to prevent “clean” runoff from mixing with runoff from disturbed areas. For undisturbed areas (both on-site and off-site) that cannot be diverted around the sediment basin, provide a minimum of 500 ft<sup>3</sup>/acre of storage for undeveloped (but stable) off-site areas in addition to the 3,600 ft<sup>3</sup>/acre for disturbed areas. For stable, developed areas that cannot be diverted around the sediment basin, storage volume requirements are summarized in Table SB-1.
- **Basin Geometry:** Design basin with a minimum length-to-width ratio of 2:1 (L:W). If this cannot be achieved because of site space constraints, baffling may be required to extend the effective distance between the inflow point(s) and the outlet to minimize short-circuiting.
- **Dam Embankment:** It is recommended that embankment slopes be 4:1 (H:V) or flatter and no steeper than 3:1 (H:V) in any location.

Sediment Basins	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

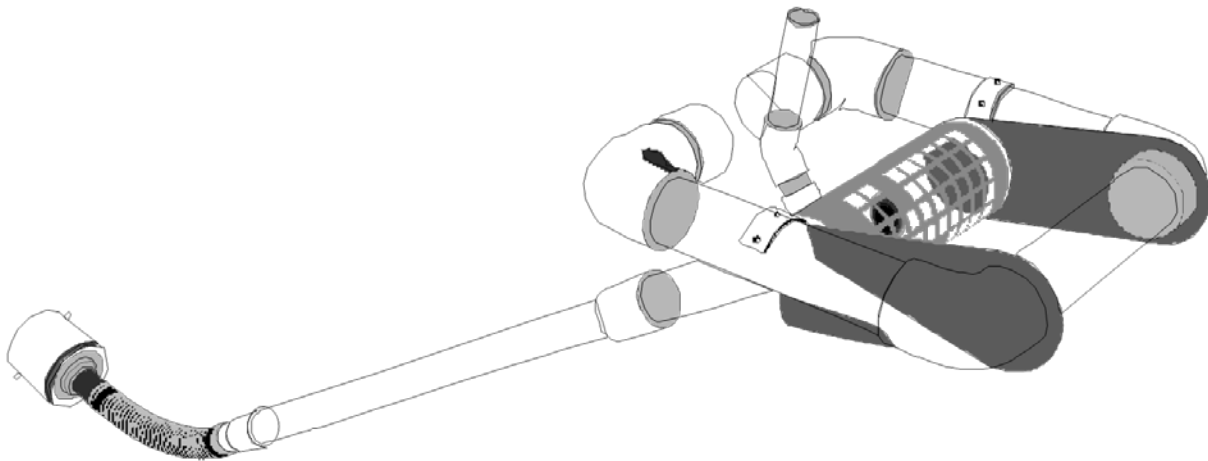


- **Inflow Structure:** For concentrated flow entering the basin, provide energy dissipation at the point of inflow.

**Table SB-1. Additional Volume Requirements for Undisturbed and Developed Tributary Areas Draining through Sediment Basins**

<b>Imperviousness (%)</b>	<b>Additional Storage Volume (ft<sup>3</sup>) Per Acre of Tributary Area</b>
Undeveloped	500
10	800
20	1230
30	1600
40	2030
50	2470
60	2980
70	3560
80	4360
90	5300
100	6460

- **Outlet Works:** The outlet pipe shall extend through the embankment at a minimum slope of 0.5 percent. Outlet works can be designed using one of the following approaches:
  - **Riser Pipe (Simplified Detail):** Detail SB-1 provides a simplified design for basins treating no more than 15 acres.
  - **Orifice Plate or Riser Pipe:** Follow the design criteria for Full Spectrum Detention outlets in the EDB Fact Sheet provided in Chapter 4 of this manual for sizing of outlet perforations with an emptying time of approximately 72 hours. In lieu of the trash rack, pack uniformly sized 1½ - to 2-inch gravel in front of the plate or surrounding the riser pipe. This gravel will need to be cleaned out frequently during the construction period as sediment accumulates within it. The gravel pack will need to be removed and disposed of following construction to reclaim the basin for use as a permanent detention facility. If the basin will be used as a permanent extended detention basin for the site, a trash rack will need to be installed once contributing drainage areas have been stabilized and the gravel pack and accumulated sediment have been removed.
  - **Floating Skimmer:** If a floating skimmer is used, install it using manufacturer's recommendations. Illustration SB-1 provides an illustration of a Faircloth Skimmer Floating Outlet™, one of the more commonly used floating skimmer outlets. A skimmer should be designed to release the design volume in no less than 48 hours. The use of a floating skimmer outlet can increase the sediment capture efficiency of a basin significantly. A floating outlet continually decants cleanest water off the surface of the pond and releases cleaner water than would discharge from a perforated riser pipe or plate.



**Illustration SB-1.** Outlet structure for a temporary sediment basin - Faircloth Skimmer Floating Outlet. Illustration courtesy of J. W. Faircloth & Sons, Inc., FairclothSkimmer.com.

- **Outlet Protection and Spillway:** Consider all flow paths for runoff leaving the basin, including protection at the typical point of discharge as well as overtopping.
  - **Outlet Protection:** Outlet protection should be provided where the velocity of flow will exceed the maximum permissible velocity of the material of the waterway into which discharge occurs. This may require the use of a riprap apron at the outlet location and/or other measures to keep the waterway from eroding.
  - **Emergency Spillway:** Provide a stabilized emergency overflow spillway for rainstorms that exceed the capacity of the sediment basin volume and its outlet. Protect basin embankments from erosion and overtopping. If the sediment basin will be converted to a permanent detention basin, design and construct the emergency spillway(s) as required for the permanent facility. If the sediment basin will not become a permanent detention basin, it may be possible to substitute a heavy polyvinyl membrane or properly bedded rock cover to line the spillway and downstream embankment, depending on the height, slope, and width of the embankments.



## **Maintenance and Removal**

Maintenance activities include the following:

- Dredge sediment from the basin, as needed to maintain BMP effectiveness, typically when the design storage volume is no more than one-third filled with sediment.
- Inspect the sediment basin embankments for stability and seepage.
- Inspect the inlet and outlet of the basin, repair damage, and remove debris. Remove, clean and replace the gravel around the outlet on a regular basis to remove the accumulated sediment within it and keep the outlet functioning.
- Be aware that removal of a sediment basin may require dewatering and associated permit requirements.
- Do not remove a sediment basin until the upstream area has been stabilized with vegetation.

Final disposition of the sediment basin depends on whether the basin will be converted to a permanent post-construction stormwater basin or whether the basin area will be returned to grade. For basins being converted to permanent detention basins, remove accumulated sediment and reconfigure the basin and outlet to meet the requirements of the final design for the detention facility. If the sediment basin is not to be used as a permanent detention facility, fill the excavated area with soil and stabilize with vegetation.

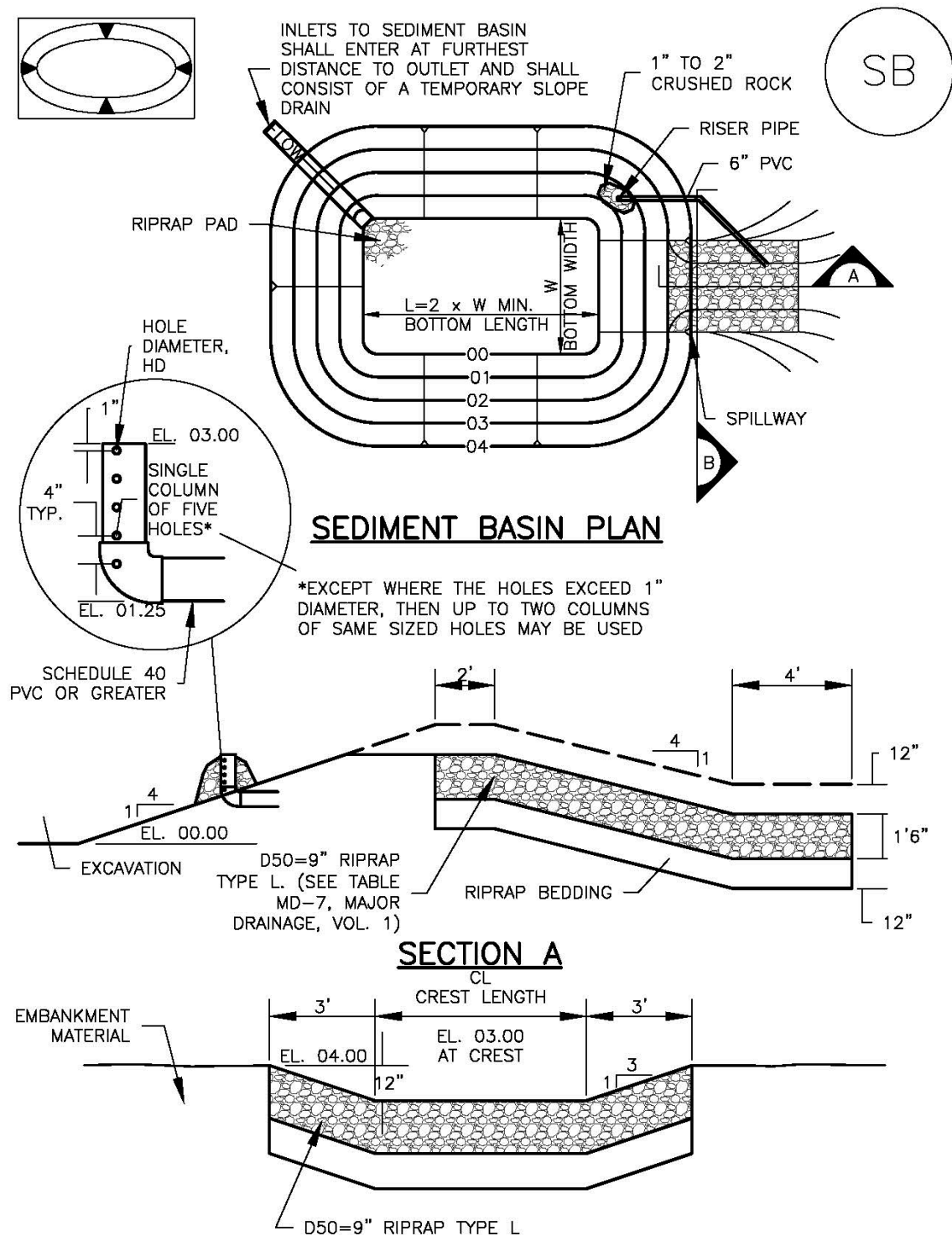


TABLE SB-1. SIZING INFORMATION FOR STANDARD SEDIMENT BASIN			
Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 1/2	2	9/32
2	21	3	13/16
3	28	5	1/2
4	33 1/2	6	9/8
5	38 1/2	8	2 1/32
6	43	9	2 1/32
7	47 1/4	11	2 5/32
8	51	12	2 7/32
9	55	13	7/8
10	58 1/4	15	1 5/16
11	61	16	3 1/32
12	64	18	1
13	67 1/2	19	1 1/16
14	70 1/2	21	1 1/8
15	73 1/4	22	1 3/16

#### SEDIMENT BASIN INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF SEDIMENT BASIN.
  - TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN).
  - FOR STANDARD BASIN, BOTTOM WIDTH W, CREST LENGTH CL, AND HOLE DIAMETER, HD.
  - FOR NONSTANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT H, NUMBER OF COLUMNS N, HOLE DIAMETER HD AND PIPE DIAMETER D.
- FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.
- SEDIMENT BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER LAND-DISTURBING ACTIVITY THAT RELIES ON ON BASINS AS AS A STORMWATER CONTROL.
- EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
- EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
- PIPE SCH 40 OR GREATER SHALL BE USED.
- THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

## SEDIMENT BASIN MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E., TWO FEET BELOW THE SPILLWAY CREST).
5. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE LOCAL JURISDICTION.
6. WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

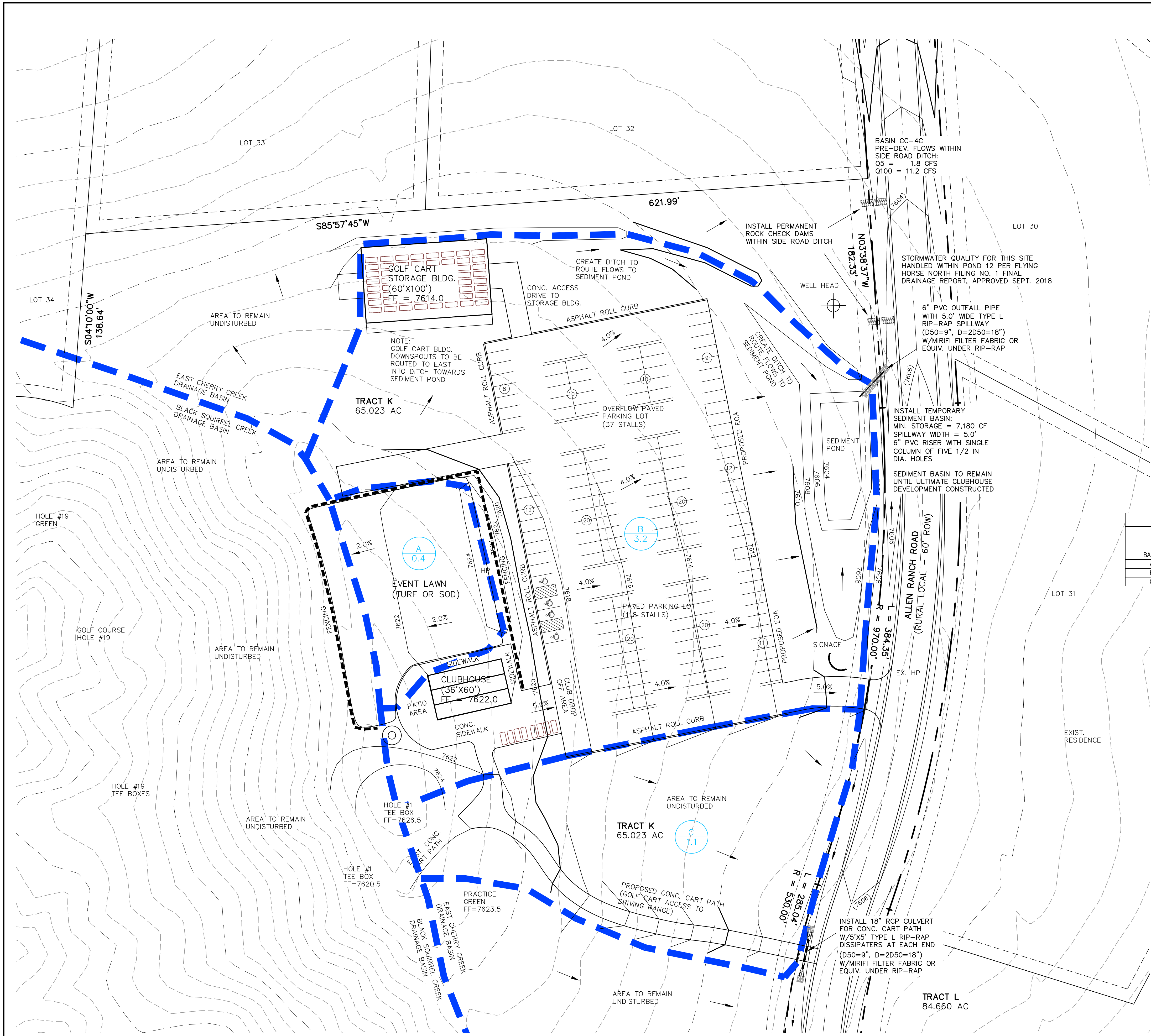
(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

## **DRAINAGE MAP**



N:\109615\REPORTS\DRAINAGE MAP.dwg, 3/11/2021 8:17:12 AM, 1:1



TIME OF CONCENTRATION - DEVELOPED												
BASIN	COMPOSITE Cn	C(5)	Length (ft)	OVERLAND Height (ft)	Tc (min)	STREET / CHANNEL FLOW (DCM Vol 1 Fig. 6-25) Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	Tc LAG (0.6tc) (min)	Tc LAG (0.6tc) (hr)
CC-4C (Pre-Dev.)	61.0	0.08	40	0.8	9.3	350	3.0%	1.5	3.9	13.2	7.9	0.13

BASIN SUMMARY - DEVELOPED CONDITIONS

BASIN (label)	AREA (acres)	COMPOSITE CN	TOTAL LAG TIME (hours)	Q 2 Yr. (cfs)	Q 5 Yr. (cfs)	Q 100 Yr. (cfs)
CC-4C (Pre-Dev.)	7.40	61.0	0.13	0.2	1.8	11.2

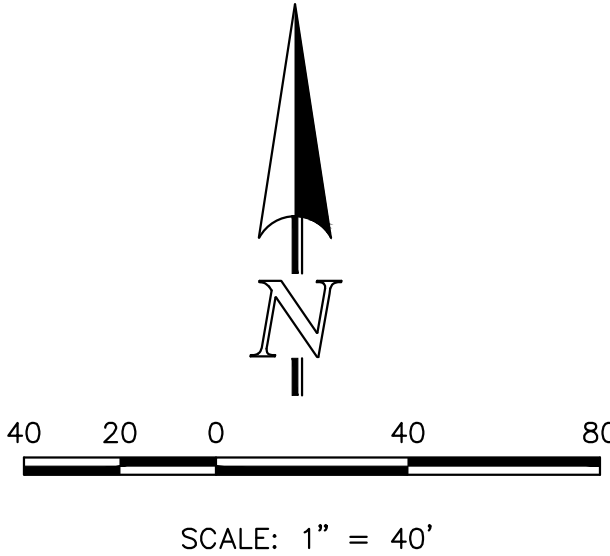
REFERENCE TAKEN FROM PRELIMINARY DRAINAGE REPORT FOR FLYING HORSE NORTH PRELIMINARY PLAN AND FINAL DRAINAGE REPORT FOR FLYING HORSE NORTH FILING NO. 1, APPROVED 9/25/18.

SEE APPENDIX FOR PREVIOUS DRAINAGE MAP FOR BASIN CC-4C

FINAL DRAINAGE REPORT - BASIN RUNOFF COEFFICIENT SUMMARY															
BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / DRIVEWAYS				LANDSCAPE/UNDEVELOPED AREAS				WEIGHTED			WEIGHTED CA		
		AREA (AC)	C(2)	C(5)	C(100)	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)
A	0.4	0.04	0.89	0.90	0.96	0.36	0.02	0.08	0.35	0.11	0.16	0.41	0.04	0.06	0.16
B	3.2	1.80	0.89	0.90	0.96	1.40	0.02	0.08	0.35	0.51	0.54	0.69	1.63	1.73	2.22
C	1.1	0.08	0.89	0.90	0.96	1.02	0.02	0.08	0.35	0.08	0.14	0.39	0.09	0.15	0.43

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY																			
BASIN	TOTAL AREA(AC)	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)
A	0.4	0.04	0.06	0.16	0.08	120	3	14.9					14.9	2.82	3.53	5.93	0.1	0.2	1.0
B	3.2	1.63	1.73	2.22	0.08	100	2	14.7	250	4.0%	1.0	4.2	18.8	2.54	3.18	5.34	4.1	5.5	11.8
C	1.1	0.09	0.15	0.43	0.08	230	12	16.2					16.2	2.72	3.41	5.72	0.2	0.5	2.5

LEGEND		
DESCRIPTION	SYMBOL	
EXISTING GROUND CONTOUR	6910	
BASIN BOUNDARY	Blue dashed line	
PROPERTY BOUNDARY	Black solid line	
PROPOSED LOT LINE	Black solid line	
BASIN IDENTIFIER	H-1	
AREA IN ACRES	10.0	



48 HOURS BEFORE YOU DIG,  
CALL UTILITY LOCATORS  
**811**  
UTILITY NOTIFICATION CENTER OF COLORADO  
IT'S THE LAW

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NO.	REVISION	DATE

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF  
CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

MARC A. WHORTON, COLORADO P.E. #37155      DATE

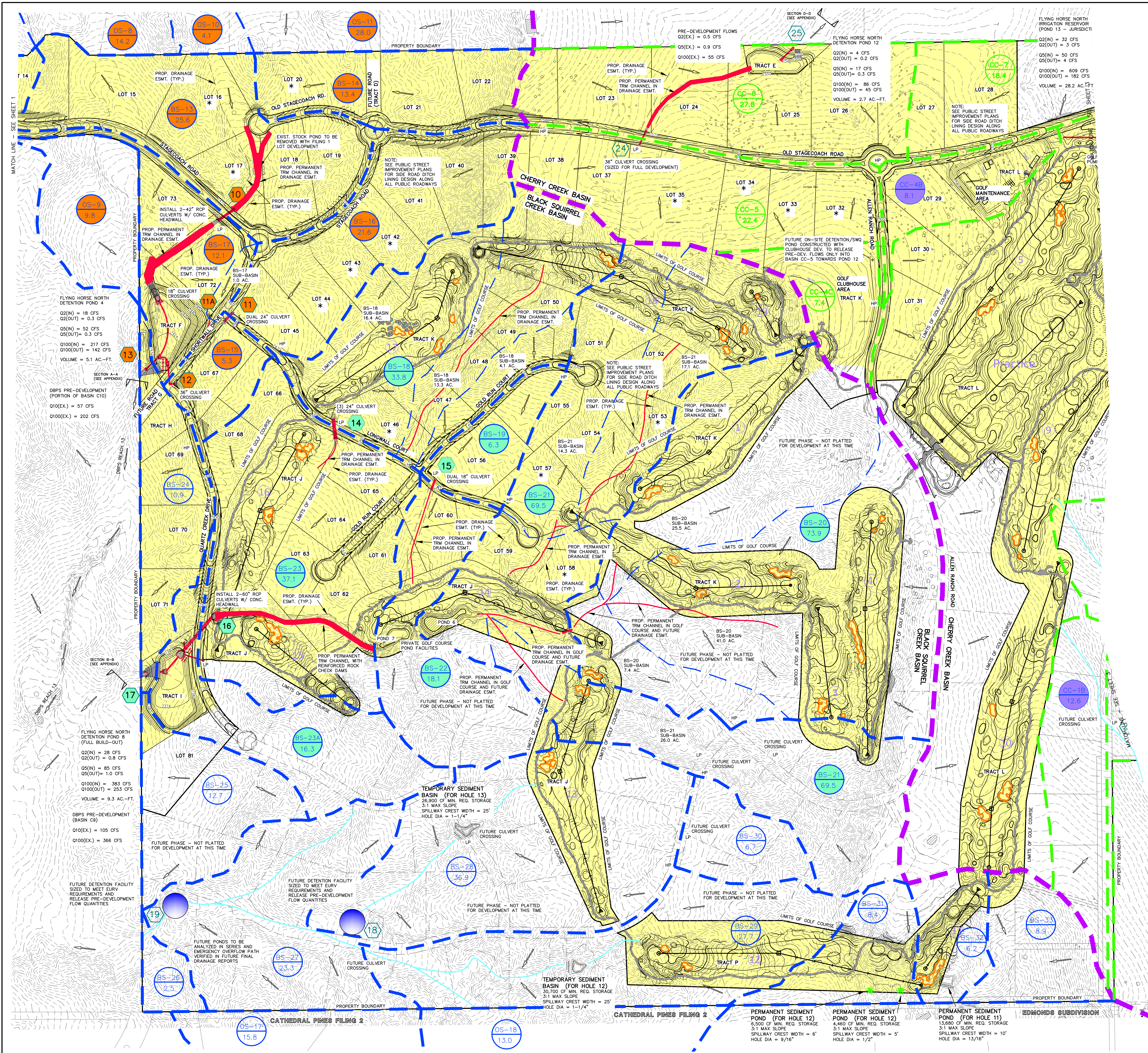
619 N. Cascade Avenue, Suite 200  
Colorado Springs, Colorado 80903

(719) 785-0790  
(719) 785-0799 (Fax)

FLYING HORSE NORTH GOLF COURSE  
TEMPORARY CLUBHOUSE / EVENT LAWN  
DRAINAGE MAP

DESIGNED BY	MAW	SCALE	DATE
DRAWN BY	MAW	(H) 1"= 40'	1/15/21
CHECKED BY	(V) 1"= N/A	SHEET 1 OF 3	JOB NO. 1096.15





BASIN SUMMARY - DEVELOPED CONDITIONS							
BASIN (label)	AREA (acres)	COMPOSITE CN	TOTAL LAG TIME (hours)	Q 2 Yr. (cfs)	Q 5 Yr. (cfs)	Q 100 Yr. (cfs)	Q (cfs)
OS-8	14.20	65.0	0.27	2.1	6.2	24.7	
OS-9	9.80	60.0	0.37	0.1	1.0	9.1	
OS-10	4.10	65.0	0.17	0.7	2.1	8.2	
OS-11	28.00	65.0	0.35	2.4	8.2	38.7	
OS-12	68.10	62.7	0.37	2.2	11.9	75.8	
OS-13	38.90	63.0	0.33	1.4	7.4	45.0	
OS-14	28.40	62.0	0.31	0.7	4.6	31.0	
OS-15	70.80	63.9	0.38	3.3	14.8	84.2	
OS-16	4.50	65.0	0.24	0.4	1.5	7.2	
OS-17	15.80	65.0	0.19	1.6	5.9	27.7	
OS-18	13.00	65.0	0.20	1.3	4.7	22.6	
BS-13	25.60	65.0	0.23	3.7	10.2	40.7	
BS-14	13.40	65.0	0.23	2.6	6.8	26.5	
BS-15	5.30	65.0	0.16	1.6	3.7	12.2	
BS-16	21.50	65.0	0.34	4.6	11.8	44.1	
BS-17	12.10	65.0	0.21	3.1	7.7	26.7	
BS-18	33.80	63.6	0.41	3.5	12.4	56.0	
BS-19	6.30	65.0	0.18	2.1	4.6	15.0	
BS-20	73.90	63.4	0.31	7.4	24.6	112.4	
BS-21	69.50	64.3	0.35	7.8	23.9	103.0	
BS-22	18.10	64.4	0.22	3.7	9.6	36.5	
BS-23	37.10	63.3	0.33	4.5	13.6	58.2	
BS-24	16.30	64.4	0.29	5.5	12.0	36.3	
BS-25	10.90	63.0	0.17	0.6	3.3	17.6	
EX-24 (Pre-Dev)	13.20	60.0	0.17	0.2	2.2	17.8	
BS-25	12.70	63.0	0.23	0.4	2.7	17.3	
BS-26	2.90	60.0	0.18	0.0	0.4	3.4	
BS-27	23.30	65.0	0.27	2.1	8.0	38.8	
BS-28	36.90	64.4	0.32	2.2	9.3	49.4	
BS-29	27.70	64.0	0.33	1.4	6.5	35.9	
BS-30	6.70	65.0	0.20	0.7	2.4	11.7	
BS-31	8.40	63.5	0.23	0.3	1.9	11.8	
BS-32	6.20	62.6	0.20	0.3	1.6	9.4	
BS-33	8.90	64.7	0.19	0.8	3.2	15.3	
CC-1A	9.80	65.0	0.23	0.8	3.3	16.0	
CC-1B	12.60	64.8	0.25	1.0	4.0	19.4	
CC-2A	11.00	65.0	0.22	1.0	3.8	18.3	
CC-2B	20.80	65.0	0.22	1.9	7.1	34.6	
CC-2C	6.40	65.0	0.18	0.7	2.5	11.5	
CC-3	52.50	63.1	0.43	1.8	8.8	54.5	
CC-4A	108.70	62.6	0.44	15.4	39.0	156.0	
CC-4B	8.10	76.1	0.26	4.0	7.3	20.6	
CC-4C (Pre-Dev)	7.40	61.0	0.13	0.2	1.8	11.2	
CC-5	22.40	65.0	0.26	1.8	7.1	34.3	
CC-6	27.80	65.0	0.25	2.3	9.1	43.2	
CC-7	18.40	65.0	0.29	1.4	5.4	27.0	

DESIGN POINTS SURFACE ROUTING SUMMARY - DEVELOPED CONDITIONS

Design Point (label)	Contributing Basins	Q 2 Yr. (cfs)	Q 5 Yr. (cfs)	Q 100 Yr. (cfs)
DP-10 DEV	OS-8, OS-10, OS-11, BS-13, BS-14	10.7	32.0	143
DP-11 DEV	BS-16	4.6	11.8	36
DP-12 DEV	DP-11, 1.0 AC. Portion of BS-17 and BS-15	4.2	11.8	46
TOTAL INFLOW TO POND 4 (UD Detention hydrograph)	DP-10, DP-12, BS-17, OS-9	10	16	217
DP-13 DEV	Release from FHN Pond 4	0.3	0.3	142
DP-14 DEV	BS-18	3.5	12.4	56
DP-15 DEV	BS-19	2.1	4.6	15
DP-16 DEV	DP-14, DP-15, BS-20, BS-21, BS-22, BS-23	25.0	78.0	362
TOTAL INFLOW TO FHN POND 8 (Full Build-out) (UD Detention hydrograph)	DP-10, DP-12, BS-17, OS-9	24	37	390
DP-17 DEV (Full Build-out)	Release from FHN Pond 8	0.8	1.0	253
TOTAL INFLOW TO FHN POND 8 (Filing 1 Only) (UD Detention hydrograph)	DP-10, DP-12, BS-17, OS-9	9	14	301
DP-17 DEV (Filing 1 Only)	Release from FHN Pond 8	0.4	0.5	219
DP-18 DEV	BS-28, BS-29, BS-30, OS-18	5.0	21.6	115
DP-19 DEV	BS-27, OS-17, Release from DP-18	3.8	16.8	126
DP-20 DEV	CC-1A, OS-12	3.2	14.3	88
DP-21 DEV	CC-2A, OS-13	2.1	10.5	62
DP-22 DEV	CC-2B, Release from DP-21	3.7	16.6	92
DP-23 DEV	CC-3, OS-14	2.5	13.0	84
DP-24 DEV	CC-4C (Pre-Dev), CC-5	1.9	8.4	45
TOTAL INFLOW TO POND 12 (UD Detention hydrograph)	CC-4C, CC-5, CC-6	6	9	85
DP-25 DEV	Release from FHN Pond 12	0.2	0.3	45

LEGEND

DESCRIPTION SYMBOL

EXISTING GROUND CONTOUR 6910

PROPOSED FINISHED CONTOUR 6910

BASIN BOUNDARY EAST CHERRY CREEK

MAJOR BASIN BOUNDARY

BASIN BOUNDARY BLACK SQUIRREL

DESIGN POINT

LOTS WITH NON-STANDARD CULVERT SIZE

BASIN IDENTIFIER

AREA IN ACRES

EXISTING DIRECTION OF FLOW

PROPOSED DIRECTION OF FLOW

STORM SEWER

FILING NO. 1 PLAT AREA