

**DRAINAGE LETTER REPORT**  
for  
**LOT 1A, FALCON MARKETPLACE**

7520 Falcon Market Place  
Falcon, Colorado

**December, 2023**

**PCD File No: PPR-236**

Prepared for:

**GOODWILL COLORADO**

1460 Garden of the Gods Road  
Colorado Springs, CO 80907  
Contact: Benjamin Booker

Prepared by:

**Drexel, Barrell & Co.**

101 S Sahwatch Street, #100  
Colorado Springs, CO 80903  
Contact: Tim McConnell, P.E.  
(719) 260-0887

## TABLE OF CONTENTS

1.0	CERTIFICATION STATEMENTS .....	1
2.0	PURPOSE.....	1
3.0	GENERAL SITE DESCRIPTION .....	1
4.0	DRAINAGE CRITERIA.....	2
5.0	EXISTING CONDITION.....	2
6.0	DEVELOPED CONDITION.....	2
7.0	DRAINAGE & BRIDGE FEES.....	5
8.0	SUMMARY.....	5
9.0	REFERENCES.....	5

### APPENDICES

VICINITY MAP  
SOILS MAP  
FLOODPLAIN MAP  
HYDROLOGY CALCULATIONS  
DRAINAGE MAP

**DRAINAGE LETTER REPORT**  
for  
**LOT 1A, FALCON MARKETPLACE**

**1.0 CERTIFICATION STATEMENTS**

**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 city/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.

SIGNATURE (Affix Seal):

  
For and on behalf of Drexel, Barrell & Co.  
Katherine Varnum, P.E. #53459

53459

Date

12/18/23



**Developer's Statement**

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



12/18/2023

Authorized Signature

Date

Goodwill Colorado  
1460 Garden of the Gods Road  
Colorado Springs, CO 80907

**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.

Joshua Palmer, P.E.  
County Engineer

Date

Conditions:

**DRAINAGE LETTER REPORT**  
for  
**LOT 1A, FALCON MARKETPLACE**

**2.0 PURPOSE**

The purpose of this letter is to supplement the Final Drainage Report for Falcon Marketplace (approved December 19, 2019) with regards to the development of Lot 1A in order to establish that the development is in conformance with the approved drainage design.

Runoff patterns, drainage facilities and the ability to safely pass developed runoff to historic downstream facilities shall be presented.

**3.0 GENERAL SITE DESCRIPTION**

Location

Lot 1A Falcon Marketplace is located in Falcon, El Paso County, Colorado, within the Southeast Quarter of Section 1, Township 13 South, Range 65 West of the 6<sup>th</sup> P.M. The property is bounded to the north by the sub-regional detention facility Pond SR4, Lot 2 of Falcon Marketplace to the east, Lot 11A of Falcon Marketplace to the south, and the Courtyards at Woodmen Hills development to the west. An inundation easement for the Pond SR4 emergency spillway is located on Lot 1A. The plat for the Falcon Marketplace subdivision did not place any restriction on structures within the inundation easement. Methods to accommodate the emergency spillway flow have been incorporated into the site design and are further described below.

An ALTA and topographical field survey was completed by Drexel, Barrell & Co. dated October 7, 2021 and is used as the basis of design for the drainage improvements.

Proposed Development

The proposed development of Lot 1A is the construction of a commercial retail store, with associated parking and landscaping. The proposed disturbed area consists of 3.67 acres. The imperviousness of the site ( $C_5=0.83$  and  $C_{100}=0.89$ ) is slightly greater than that assumed in the approved Final Drainage Report for a commercial development ( $C_5=0.81$  and  $C_{100}=0.88$ ) for the overall Falcon Marketplace development, as described above.

Soils

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the site is underlain by the Columbine gravelly sandy loam (Soil No. 19), Blakeland loamy sand (Soil No. 8) and Blakeland-Fluvaquentic Haplaquolls (Soil No. 9) all hydrologic type A soils. See appendix for Soils map.

Climate

This area of El Paso County can be described as the foothills, with total precipitation

amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall.

Thunderstorms are common during the summer months.

#### Floodplain Statement

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 08041CO553G (December 7, 2018), no portion of the site lies within a designated floodplain. A LOMR modifying the floodplain on the property was approved by FEMA, Case No. 21-08-0534P (February 22, 2022).

### **4.0 DRAINAGE CRITERIA**

The drainage analysis has been prepared in accordance with the current El Paso County Drainage Criteria Manual. Calculations were performed to determine runoff quantities during the 5-year and 100-year frequency storms for existing and developed conditions using the Rational Method as required for basins containing less than 100 acres.

### **5.0 EXISTING CONDITION**

The existing condition is as described in the aforementioned approved Final Drainage Report for the overall Falcon Marketplace development, as part of Basin B14 and C5 (see appendix for drainage map excerpt). Overlot grading has been completed and access roadway, detention facilities and utility infrastructure have been installed. The site generally follows a 1%-2% grade from north to south and currently drains directly to the south towards the existing water quality detention facility Pond 2.

### **6.0 DEVELOPED CONDITION**

The proposed development consists of a commercial retail store and associated parking and landscaping. The proposed grading and storm system will generally route all flows to the south where they will enter the existing public 30" RCP storm sewer via private storm sewer extension. Flows that do not enter the proposed storm system will be directed via sheet and curb and gutter flow towards the existing storm system installed with the overall development. See further basin and design point descriptions below.

**Basin OS1** is 0.21-acres located on the south side of the adjacent Pond SR4 embankment at the north of the lot. Flows travel overland towards basin A to the south.

**Basin A** is 0.42-acres located on the northeast side of the proposed commercial retail building. All of the flows within this basin will sheet flow over pavement towards the northerly curb and gutter and **Design Point 1**. The flows will be captured by an existing private Type 13 combo inlet to the east of the truck turnaround. Flow from this basin appears to have been accounted for in the design of the existing inlet. The existing downstream private 18" RCP is of sufficient capacity to account for the flows.

See below for basin/design point table and description:

BASIN	DP	AREA (AC)	Q5 (cfs)	Q100 (cfs)
OS1		0.21	0.1	0.6
A		0.42	1.9	3.4
	1	0.63	1.8	3.7
B	2	0.11	0.5	0.9
C		0.52	1.9	3.6
	3	0.63	2.4	4.4
D	4	0.34	1.3	2.4
OS2		1.06	0.4	2.9
E		1.41	6.3	11.3
	5	2.47	5.9	12.7
	6	3.44	9.1	18.7
F	7	0.47	2.0	3.6
	8	3.92	10.4	20.9
G		0.19	0.6	1.1

**Basin B**, is 0.11-acres, to be used as a truck dock on the northern side of the proposed building. A proposed trench drain and area inlet (**Design Point 2**) will capture all of the runoff and discharge to the north via proposed private 12" PVC storm sewer.

**Basin C** is entirely made up by the eastern portion of the proposed commercial retail building for Lot 1. Runoff captured by this basin will be directed via roof drains (represented by **Design Point 3**) and discharged directly into the adjacent proposed private 18" RCP storm sewer.

**Basin D** is entirely made up by the western portion of the proposed commercial retail building for Lot 1. All runoff captured within this basin will be captured by roof drains (represented by **Design Point 4**). and discharged directly into the adjacent proposed private 18" RCP storm sewer.

**Basin OS2** is 1.06-acres of open space located on the west side of the lot. Flows generated by this basin will travel overland into Basin G.

**Basin E** is 1.41-acres of parking lot, located directly south of the proposed building. The runoff generated by this basin will sheet flow across the parking lot to the south and east, where it will be captured by a proposed private 10' Type R sump inlet at **Design Point 5**. Flows will continue to the east via proposed 24" RCP storm sewer.

In the event of catastrophic failure of Pond SR4 to the north, the design intent of Basin E is to allow the spillway flows to pass around the proposed building. See appendix for cross-section detail and proposed flow depths along the east side of the building. A 2.5' maximum flow depth is anticipated at the easterly curb line for the full 1,016-cfs spillway design flow. The adjacent neighborhood to the west sits approximately 8-ft above the

proposed parking lot grade and as such will be unaffected by the spillway flows.

**Design Point 6** represents the piped flows from DP2, DP4 and DP5 combining at a proposed private storm manhole. Flows continue on to the south from this point via proposed private 24" RCP storm sewer. A connection to the existing 30" RCP storm sewer is proposed to the southeast of this point to ensure that onsite flows reach the existing WQ facility to the south as intended in the overall Falcon Marketplace Final Drainage Report. Piped flows of Q5=9.1 cfs and Q100=18.7 cfs reach the tie in point with the existing 30" RCP.

**Basin F**, is 0.47-acres, located on the east side of the proposed building. Flows will travel via curb and gutter to the east and south towards **Design Point 7** and the adjacent King Soopers parking lot. Flows from this parking lot are captured by the onsite storm system before being discharged into the existing WQ detention facility to the south.

**Design Point 8** represents all flows reaching the existing storm sewer system on the south end of the King Soopers parking lot. These flows (Q5=10.4 cfs and Q100=20.9) are close to those anticipated for the Design Point DP14 established by the Falcon Marketplace Final Drainage Report (Q5=9.1 cfs and Q100=17.0 cfs). The existing storm sewer system is sufficient to accommodate the minor increase in flows.

**Basin G**, is 0.19-acres, located on the south side of the proposed parking lot. Flows will sheet flow over pavement to the south towards Falcon Market Place, ultimately being captured by the existing curb inlet to the east before being discharged into the existing WQ facility to the south.

## 7.0 FOUR STEP PROCESS

This project conforms to the El Paso County Four Step Process. The process for this site focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls.

1. **Employ Runoff Reduction Practices:** Proposed impervious areas on this site (roofs, asphalt/sidewalk) will sheet flow across landscaped ground as much as possible to slow runoff and increase time of concentration prior to being conveyed to the proposed public streets and storm sewer system. This will minimize directly connected impervious areas within the project site.
2. **Implement BMP's that provide a Water Quality Capture Volume with slow release:** Runoff from this project will be routed through onsite storm sewer to an existing water quality basin located along the southern boundary of the Falcon Marketplace development. This will allow for the runoff to be treated for water quality before discharging into the offsite storm system.
3. **Stabilize Drainage Ways:** No drainage ways exist within the project boundaries. Runoff will enter the storm sewer system, and be directed towards the existing water quality basin along the southern boundary of the Falcon Marketplace development, this will allow for flow rate reduction and protection of downstream facilities.

4. **Implement Site Specific and Other Source Control BMP's:** Standard commercial source control will be utilized in order to minimize potential pollutants entering the storm system. Example source control measures consist of: indoor storage of household chemicals; and trash receptacles in common areas.

## **8.0 DRAINAGE & BRIDGE FEES**

Drainage and bridge fees are not required as the site has been previously platted.

## **9.0 SUMMARY**

Development of Lot 1A Falcon Marketplace will not adversely affect surrounding or downstream developments. The imperviousness of the site ( $C_5=0.83$  and  $C_{100}=0.89$ ) is slightly greater than that assumed in the approved Final Drainage Report ( $C_5=0.81$  and  $C_{100}=0.88$ ). Runoff values are slightly greater ( $Q_5=10.4$  cfs and  $Q_{100}=20.9$ ) than the anticipated amount ( $Q_5=9.1$  cfs and  $Q_{100}=17.0$  cfs), but are still within the capacity of the existing storm system, and therefore it is acceptable to state that the drainage design for Lot 1A is in conformance with the Final Drainage Report for the overall Falcon Marketplace development.

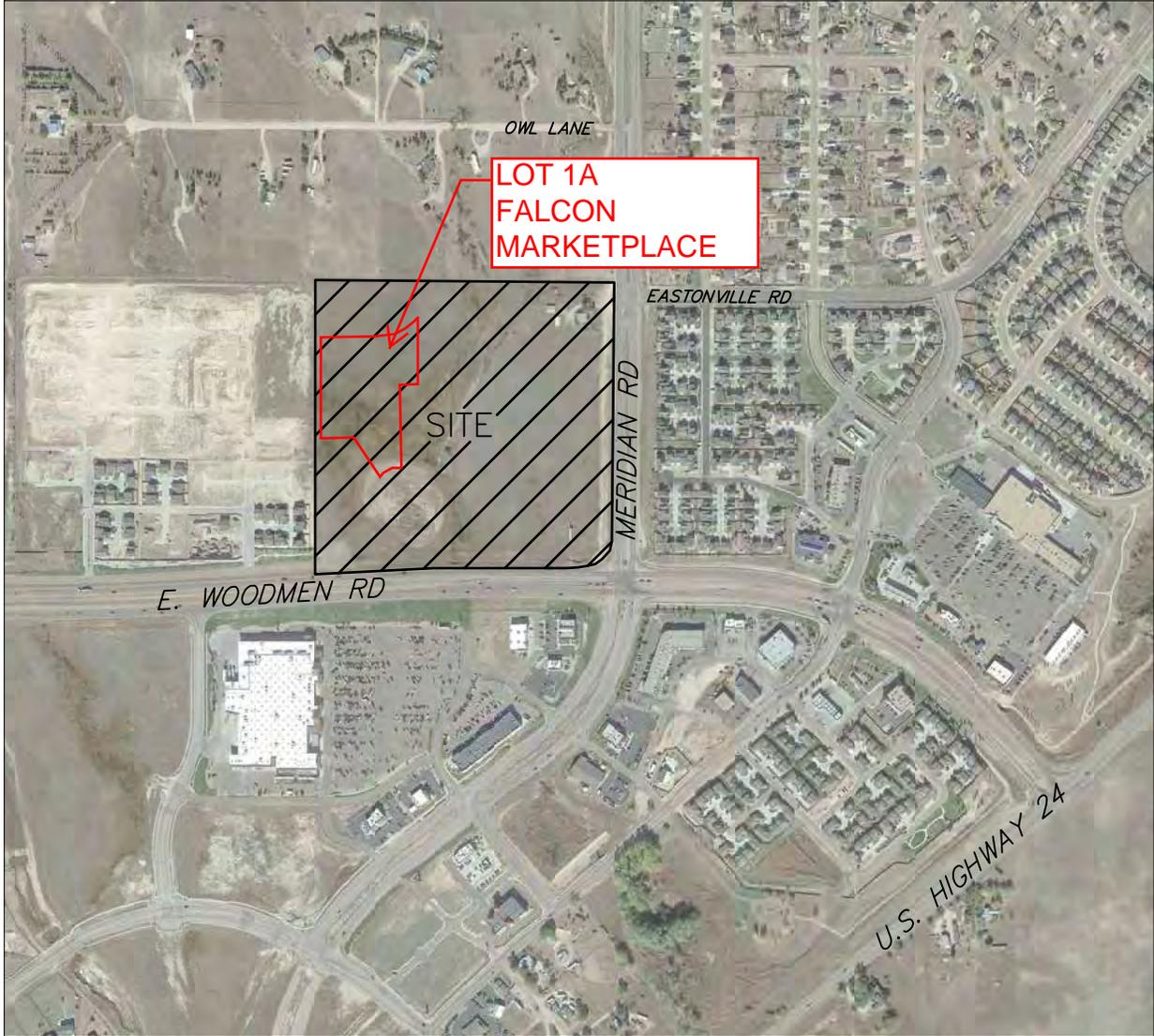
The downstream existing water quality facility is functioning as intended and was designed to treat flows generated by this property.

## **10.0 REFERENCES**

The sources of information used in the development of this study are listed below:

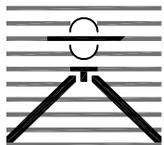
1. El Paso County Drainage Criteria Manual, 10-31-2018.
2. El Paso County Land Development Code, 5-25-2023.
3. Final Drainage Report for Falcon Marketplace (Drexel, Barrell & Co.) 12-19-2019.

## Appendix



# Vicinity Map

NTS



## FALCON MARKETPLACE VICINITY MAP

Drexel, Barrell & Co.  
Engineers • Surveyors

DATE:  
8/29/23

DWG. NO.

JOB NO:  
20988-13

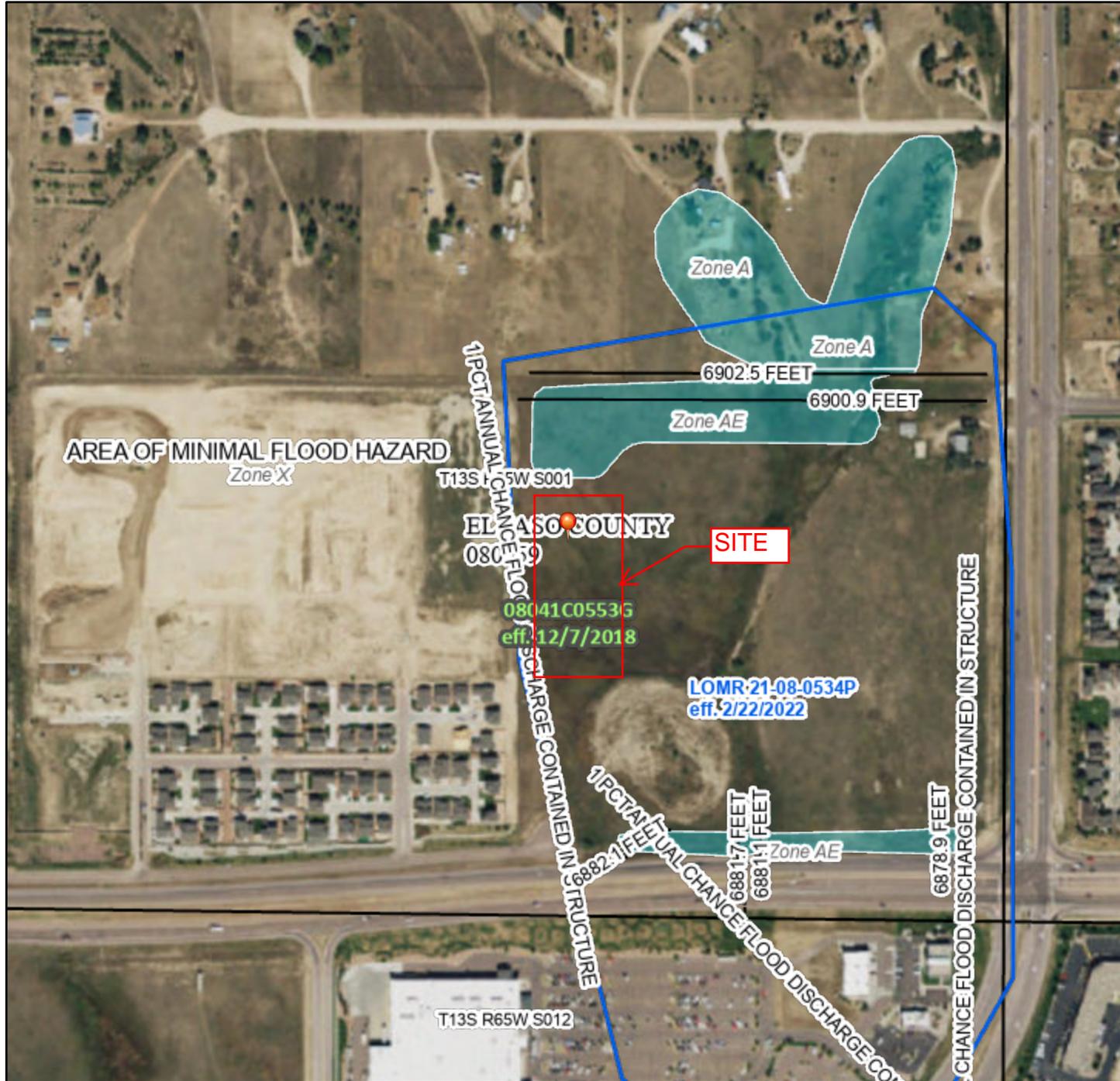
**VMAP**

SHEET 1 OF 1

# National Flood Hazard Layer FIRMette



104°37'2"W 38°56'49"N



## Legend

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

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

	20.2	Cross Sections with 1% Annual Chance Water Surface Elevation
	17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

N

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

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

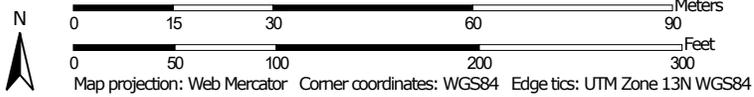
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/20/2023 at 6:16 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

# Custom Soil Resource Report Soil Map



Map Scale: 1:1,130 if printed on A portrait (8.5" x 11") sheet.



### 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 20, Sep 2, 2022

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

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

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
8	Blakeland loamy sand, 1 to 9 percent slopes	0.1	2.2%
9	Blakeland-Fluvaquentic Haplaquolls	1.7	51.1%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	1.6	46.7%
<b>Totals for Area of Interest</b>		<b>3.4</b>	<b>100.0%</b>

## 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

## Custom Soil Resource Report

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

### 8—Blakeland loamy sand, 1 to 9 percent slopes

#### Map Unit Setting

*National map unit symbol:* 369v  
*Elevation:* 4,600 to 5,800 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

*Blakeland and similar soils:* 98 percent  
*Minor components:* 2 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Blakeland

##### Setting

*Landform:* Flats, hills  
*Landform position (three-dimensional):* Side slope, talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from sedimentary rock and/or eolian deposits derived from sedimentary rock

##### Typical profile

*A - 0 to 11 inches:* loamy sand  
*AC - 11 to 27 inches:* loamy sand  
*C - 27 to 60 inches:* sand

##### Properties and qualities

*Slope:* 1 to 9 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 5 percent  
*Available water supply, 0 to 60 inches:* Low (about 4.5 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 3e  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* A  
*Ecological site:* R049XB210CO - Sandy Foothill  
*Hydric soil rating:* No

#### Minor Components

##### Other soils

*Percent of map unit:* 1 percent

*Hydric soil rating:* No

**Pleasant**

*Percent of map unit:* 1 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

**9—Blakeland-Fluvaquentic Haplaquolls**

**Map Unit Setting**

*National map unit symbol:* 36b6

*Elevation:* 3,500 to 5,800 feet

*Mean annual precipitation:* 13 to 17 inches

*Mean annual air temperature:* 46 to 55 degrees F

*Frost-free period:* 110 to 165 days

*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Blakeland and similar soils:* 60 percent

*Fluvaquentic haplaquolls and similar soils:* 38 percent

*Minor components:* 2 percent

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

**Description of Blakeland**

**Setting**

*Landform:* Flats, hills

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

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy alluvium derived from arkose and/or eolian deposits  
derived from arkose

**Typical profile**

*A - 0 to 11 inches:* loamy sand

*AC - 11 to 27 inches:* loamy sand

*C - 27 to 60 inches:* sand

**Properties and qualities**

*Slope:* 1 to 9 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95  
to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Available water supply, 0 to 60 inches:* Low (about 4.5 inches)

**Interpretive groups**

*Land capability classification (irrigated): 3e*  
*Land capability classification (nonirrigated): 6e*  
*Hydrologic Soil Group: A*  
*Ecological site: R049XB210CO - Sandy Foothill*  
*Hydric soil rating: No*

**Description of Fluvaquentic Haplaquolls**

**Setting**

*Landform: Swales*  
*Down-slope shape: Linear*  
*Across-slope shape: Linear*  
*Parent material: Alluvium*

**Typical profile**

*H1 - 0 to 12 inches: variable*  
*H2 - 12 to 60 inches: stratified very gravelly sand to loam*

**Properties and qualities**

*Slope: 1 to 2 percent*  
*Depth to restrictive feature: More than 80 inches*  
*Drainage class: Poorly drained*  
*Runoff class: Very high*  
*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high*  
*(0.20 to 6.00 in/hr)*  
*Depth to water table: About 0 to 24 inches*  
*Frequency of flooding: Occasional*  
*Frequency of ponding: None*  
*Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)*  
*Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)*

**Interpretive groups**

*Land capability classification (irrigated): 6w*  
*Land capability classification (nonirrigated): 6w*  
*Hydrologic Soil Group: D*  
*Ecological site: R048AY241CO - Mountain Meadow*  
*Hydric soil rating: Yes*

**Minor Components**

**Other soils**

*Percent of map unit: 1 percent*  
*Hydric soil rating: No*

**Pleasant**

*Percent of map unit: 1 percent*  
*Landform: Depressions*  
*Hydric soil rating: Yes*

## 19—Columbine gravelly sandy loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 367p  
*Elevation:* 6,500 to 7,300 feet  
*Mean annual precipitation:* 14 to 16 inches  
*Mean annual air temperature:* 46 to 50 degrees F  
*Frost-free period:* 125 to 145 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Columbine and similar soils:* 97 percent  
*Minor components:* 3 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Columbine

#### Setting

*Landform:* Fans, fan terraces, flood plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium

#### Typical profile

*A - 0 to 14 inches:* gravelly sandy loam  
*C - 14 to 60 inches:* very gravelly loamy sand

#### Properties and qualities

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Very low (about 2.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* A  
*Ecological site:* R049XY214CO - Gravelly Foothill  
*Hydric soil rating:* No

**Minor Components**

**Fluvaquentic haplaquolls**

*Percent of map unit: 1 percent*

*Landform: Swales*

*Hydric soil rating: Yes*

**Other soils**

*Percent of map unit: 1 percent*

*Hydric soil rating: No*

**Pleasant**

*Percent of map unit: 1 percent*

*Landform: Depressions*

*Hydric soil rating: Yes*

**PROJECT INFORMATION**

PROJECT: Lot 1A Falcon Marketplace  
 PROJECT NO: 20988-13  
 DESIGN BY: KGV  
 REV. BY: TDM  
 AGENCY: El Paso County  
 REPORT TYPE: Final  
 DATE: 11/15/2023  
 Soil Type: A



Drexel, Barrell & Co.

	C2*	C5*	C10*	C100*	% IMPERV
Landscape		0.08		0.35	0
Roofing		0.73		0.81	90
Paving		0.90		0.95	100

\*C-Values and Basin Imperviousness based on Table 5-1, El Paso County Drainage Criteria Manual Vol 1

**PROPOSED**

SUB-BASIN	SURFACE DESIGNATION	AREA ACRE	COMPOSITE RUNOFF COEFFICIENTS				% IMPERV
			C2	C5	C10	C100	
OS1	Landscape	0.21		0.08		0.35	0
	Roofing	0.00		0.73		0.81	90
	Paving	0.00		0.90		0.95	100
	WEIGHTED AVERAGE			0.08		0.35	0%
<b>TOTAL OS1</b>		0.21					
OS2	Landscape	1.06		0.08		0.35	0
	Roofing	0.00		0.73		0.81	90
	Paving	0.00		0.90		0.95	100
	WEIGHTED AVERAGE			0.08		0.35	0%
<b>TOTAL OS2</b>		1.06					
A	Landscape	0.00		0.08		0.35	0
	Roofing	0.00		0.73		0.81	90
	Paving	0.42		0.90		0.95	100
	WEIGHTED AVERAGE			0.90		0.95	100%
<b>TOTAL A</b>		0.42					
B	Landscape	0.00		0.08		0.35	0
	Roofing	0.00		0.73		0.81	90
	Paving	0.11		0.90		0.95	100
	WEIGHTED AVERAGE			0.90		0.95	100%
<b>TOTAL B</b>		0.11					
C	Landscape	0.00		0.08		0.35	0
	Roofing	0.52		0.73		0.81	90
	Paving	0.00		0.90		0.95	100
	WEIGHTED AVERAGE			0.73		0.81	90%
<b>TOTAL C</b>		0.52					
D	Landscape	0.00		0.08		0.35	0
	Roofing	0.34		0.73		0.81	90
	Paving	0.00		0.90		0.95	100
	WEIGHTED AVERAGE			0.73		0.81	90%
<b>TOTAL D</b>		0.34					
E	Landscape	0.04		0.08		0.35	0
	Roofing	0.00		0.73		0.81	90
	Paving	1.37		0.90		0.95	100
	WEIGHTED AVERAGE			0.88		0.93	97%
<b>TOTAL E</b>		1.41					
F	Landscape	0.05		0.08		0.35	0
	Roofing	0.00		0.73		0.81	90
	Paving	0.42		0.90		0.95	100
	WEIGHTED AVERAGE			0.81		0.89	89%
<b>TOTAL F</b>		0.47					
G	Landscape	0.03		0.08		0.35	0
	Roofing	0.00		0.73		0.81	90
	Paving	0.16		0.90		0.95	100
	WEIGHTED AVERAGE			0.78		0.86	85%
<b>TOTAL G</b>		0.19					

**PROJECT INFORMATION**

PROJECT: Lot 1A Falcon Marketplace  
 PROJECT NO: 20988-13  
 DESIGN BY: KGV  
 REV. BY: TDM  
 AGENCY: El Paso County  
 REPORT TYPE: Final  
 DATE: 12/17/2023



**RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF**

**PROPOSED TIME OF CONCENTRATION STANDARD FORM SF-2**

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t <sub>i</sub> )			TRAVEL TIME (t <sub>t</sub> )				TIME OF CONC. t <sub>c</sub>		FINAL t <sub>c</sub>
BASIN	DESIGN PT.	C <sub>5</sub>	C <sub>100</sub>	AREA	LENGTH	SLOPE	t <sub>i</sub>	LENGTH	SLOPE	VEL.	t <sub>t</sub>	COMP.	MINIMUM	Min
				Ac	Ft	%	Min	Ft	%	FPS	Min	t <sub>c</sub>	t <sub>c</sub>	Min
OS1		0.08	0.35	0.21	20	2.0	6.8	20	33.0	6.0	0.1	6.8	5	<b>6.8</b>
A		0.90	0.95	0.42	20	2.3	1.3	195	0.8	3.2	1.0	2.3	5	<b>5.0</b>
OS1+A	1	0.63	0.75	0.63	From OS1		6.8	50	0.5	3.0	0.3	7.1	5	<b>7.1</b>
B	2	0.90	0.95	0.11	20	0.5	2.1	1.5	5.0	6.2	0.0	2.1	5	<b>5.0</b>
C		0.73	0.81	0.52	5	0.5	1.9	168	0.5	3.0	0.9	2.9	5	<b>5.0</b>
DP2+BASIN C	3	0.76	0.83	0.63	From DP2		5.0	110	1.7	4.8	0.4	5.4	5	<b>5.4</b>
D	4	0.73	0.81	0.34	5	0.5	1.9	135	0.5	3.0	0.8	2.7	5	<b>5.0</b>
OS2		0.08	0.35	1.06	20	2.0	6.8	20	33.0	6.0	0.1	6.8	5	<b>6.8</b>
E		0.88	0.93	1.41	30	1.3	2.1	525	0.5	3.0	2.9	5.0	5	<b>5.0</b>
BASIN OS2+BASIN E	5	0.53	0.68	2.47	From OS2		6.8	175	0.5	3.0	1.0	7.8	5	<b>7.8</b>
DP3+DP4+DP5	6	0.60	0.72	3.44	From DP5		7.8	45	0.6	6.8	0.1	7.9	5	<b>7.9</b>
F	7	0.81	0.89	0.47	60	1.6	3.6	225	1.8	4.9	0.8	4.3	5	<b>5.0</b>
DP6+F	8	0.62	0.74	3.92	From DP6		7.9	225	1.0	3.5	1.1	9.0	5	<b>9.0</b>
G		0.78	0.86	0.19	60	0.5	5.9	783	0.9	3.4	3.8	9.7	5	<b>9.7</b>

## PROJECT INFORMATION

**PROJECT:** Lot 1A Falcon Marketplace  
**PROJECT NO:** 20988-13  
**DESIGN BY:** KGV  
**REV. BY:** TDM  
**AGENCY:** El Paso County  
**REPORT TYPE:** Final  
**DATE:** 12/17/2023



## RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

**PROPOSED**                      **RUNOFF**                      **5 YR STORM**                      **P1=**                      **1.50**

BASIN (S)	DESIGN POINT	AREA (AC)	DIRECT RUNOFF		C * A	I (IN/HR)	Q (CFS)
			RUNOFF COEFF	t <sub>c</sub> (MIN)			
OS1		0.21	0.08	6.8	0.02	4.68	0.1
A		0.42	0.90	5.0	0.38	5.10	1.9
OS1+A	1	0.63	0.63	7.1	0.40	4.62	1.8
B	2	0.11	0.90	5.0	0.10	5.10	0.5
C		0.52	0.73	5.0	0.38	5.10	1.9
DP2+BASIN C	3	0.63	0.76	5.4	0.48	5.01	2.4
D	4	0.34	0.73	5.0	0.25	5.10	1.3
OS2		1.06	0.08	6.8	0.08	4.68	0.4
E		1.41	0.88	5.0	1.24	5.10	6.3
BASIN OS2+BASIN E	5	2.47	0.53	7.8	1.32	4.48	5.9
DP3+DP4+DP5	6	3.44	0.60	7.9	2.05	4.46	9.1
F	7	0.47	0.81	5.0	0.39	5.10	2.0
DP6+F	8	3.92	0.62	9.0	2.43	4.27	10.4
G		0.19	0.78	9.7	0.15	4.15	0.6

## PROJECT INFORMATION

PROJECT: Lot 1A Falcon Marketplace  
 PROJECT NO: 20988-13  
 DESIGN BY: KGV  
 REV. BY: TDM  
 AGENCY: El Paso County  
 REPORT TYPE: Final  
 DATE: 12/17/2023



Drexel, Barrell & Co.

## RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

PROPOSED	RUNOFF	100 YR STORM			P1=	2.52	
BASIN (S)	DESIGN POINT	AREA (AC)	DIRECT RUNOFF		C * A	I (IN/HR)	Q (CFS)
			RUNOFF COEFF	t <sub>c</sub> (MIN)			
OS1		0.21	0.35	6.8	0.07	7.86	0.6
A		0.42	0.95	5.0	0.40	8.58	3.4
OS1+A	1	0.63	0.75	7.1	0.47	7.76	3.7
B	2	0.11	0.95	5.0	0.11	8.58	0.9
C		0.52	0.81	5.0	0.42	8.58	3.6
DP2+BASIN C	3	0.63	0.83	5.4	0.53	8.41	4.4
D	4	0.34	0.81	5.0	0.27	8.58	2.4
OS2		1.06	0.35	6.8	0.37	7.86	2.9
E		1.41	0.93	5.0	1.32	8.57	11.3
BASIN OS2+BASIN E	5	2.47	0.68	7.8	1.69	7.53	12.7
DP3+DP4+DP5	6	3.44	0.72	7.9	2.49	7.50	18.7
F	7	0.47	0.89	5.0	0.42	8.58	3.6
DP6+F	8	3.92	0.74	9.0	2.91	7.17	20.9
G		0.19	0.86	9.7	0.16	6.97	1.1

# Worksheet

## Worksheet for Irregular Channel

CROSS-SECTION ALONG WEST SIDE OF BUILDING INTENDED TO CARRY SPILLWAY FLOWS. THIS IS WORST CASE FOR FULL SPILLWAY OVERFLOW CAPACITY - 1,016-CFS

Project Description	
Worksheet	Irregular Channel
Flow Element	Irregular Channel
Method	Manning's Formu
Solve For	Channel Depth

Input Data	
Slope	005000 ft/ft
Discharge	1016.00 cfs

Options	
Current Roughness Method	Overlotter's Method
Open Channel Weighting	Overlotter's Method
Closed Channel Weighting	Horton's Method

Results	
Mannings Coefficient	0.016
Water Surface Elev.	93.20 ft
Elevation Range	91.69 to 95.00
Flow Area	106.0 ft <sup>2</sup>
Wetted Perimeter	59.96 ft
Top Width	57.67 ft
Actual Depth	2.51 ft
Critical Elevation	93.50 ft
Critical Slope	0.003100 ft/ft
Velocity	9.58 ft/s
Velocity Head	1.43 ft
Specific Energy	94.63 ft
Froude Number	1.25
Flow Type	Supercritical

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+11	0.035
0+11	0+63	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	95.00
0+11	91.29
0+16	91.19
0+16	90.69
0+58	91.63
0+58	92.13
0+63	92.23
0+63	95.00

# Cross Section

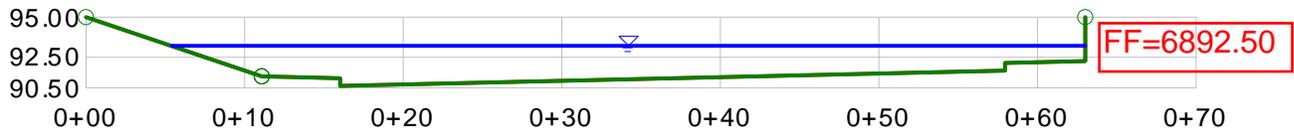
## Cross Section for Irregular Channel

CROSS-SECTION ALONG WEST SIDE  
OF BUILDING INTENDED TO CARRY  
SPILLWAY FLOWS. THIS IS WORST  
CASE FOR FULL SPILLWAY OVERFLOW  
CAPACITY - 1,016-CFS

Project Description	
Worksheet	Irregular Channel
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

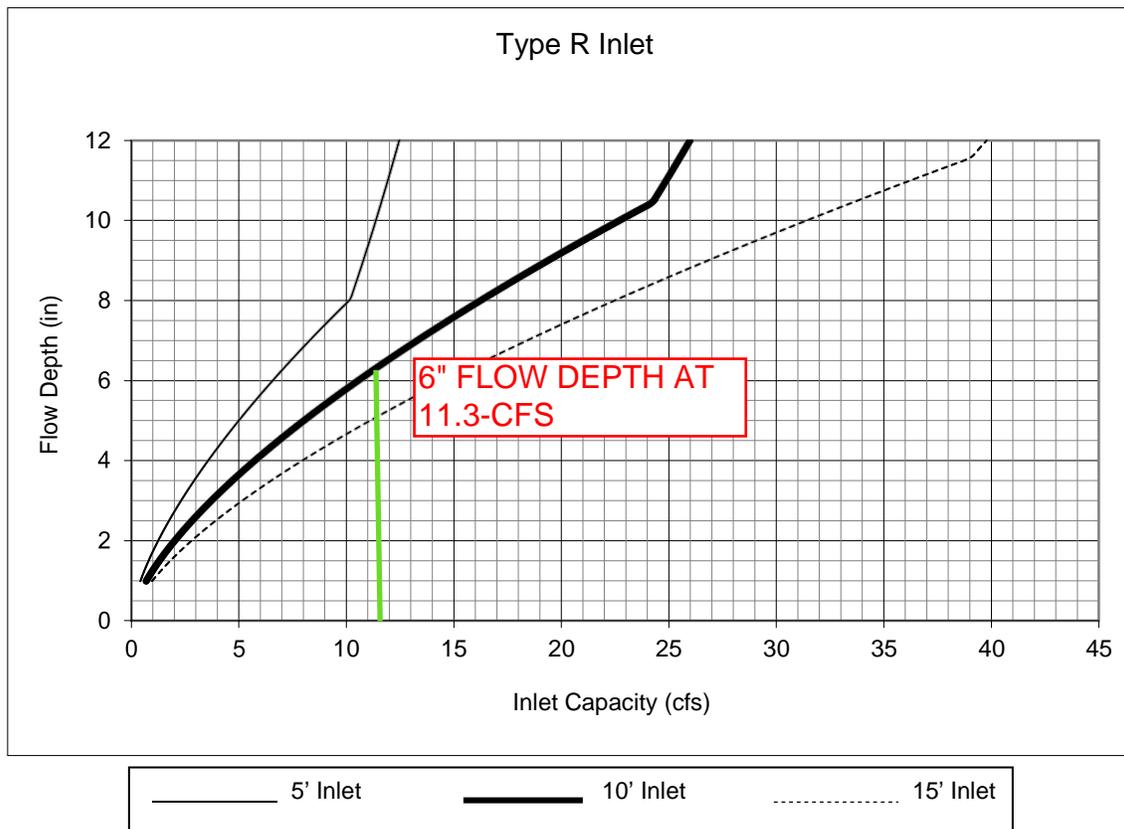
  

Section Data	
Mannings Coefficient	0.016
Slope	0.005000 ft/ft
Water Surface Elev.	93.20 ft
Elevation Range	91.69 to 95.00
Discharge	1,016.00 cfs



V:1  
H:1  
NTS

Figure 8-11. Inlet Capacity Chart Sump Conditions , Curb Opening (Type R) Inlet



Notes:

- 1. The standard inlet parameters must apply to use this chart.

Line No.	Line ID	Flow Rate (cfs)	Line Size (in)	Line Type	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Up (ft)	HGL Dn (ft)	Minor Loss (ft)	HGL Jnct (ft)	Vel Ave (ft/s)	Line No.	Energy Loss (ft)
1	1	10.00	24	Cir	183.940	6880.93	6881.85	0.50	6883.02	6882.47	0.32	6883.34	4.56	1	0.742
2	2	10.00	24	Cir	36.939	6881.85	6882.04	0.51	6883.40	6883.34	0.22	6883.63	4.19	2	0.115
3	3	10.00	24	Cir	79.738	6882.04	6882.43	0.49	6883.78	6883.63	0.31	6884.09	4.09	3	0.239
4	4	3.70	24	Cir	171.534	6882.43	6883.29	0.50	6884.18	6884.09	0.12	6884.30	2.03	4	0.184
5	5	2.40	18	Cir	109.355	6883.29	6883.84	0.50	6884.47	6884.30	0.18	6884.65	2.65	5	0.297
6	6	0.50	18	Cir	231.473	6883.84	6885.00	0.50	6885.26	6884.65	0.09	6885.35	1.45	6	0.674
7	7	0.50	12	Cir	149.791	6885.00	6885.75	0.50	6886.05	6885.35	0.10	6886.15	2.30	7	0.716
8	8	0.50	12	Cir	89.067	6885.75	6886.20	0.51	6886.50	6886.15	0.10	6886.60	2.14	8	0.373
9	9	1.30	18	Cir	176.182	6883.29	6884.17	0.50	6884.62	6884.30	0.13	6884.75	1.97	9	0.432
10	10	6.30	24	Cir	41.163	6882.43	6882.64	0.51	6884.10	6884.09	0.10	6884.21	2.41	10	0.042

Project File <span style="border: 1px solid red; padding: 2px;">5YR.stm</span>	Number of lines: 10	Date: 11/15/2023
--	---------------------	------------------

NOTES: \*\* Critical depth

# Hydraulic Grade Line Computations

Line (1)	Size (in) (2)	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)		
1	24	10.00	6880.93	6882.47	1.54	2.60	3.85	0.23	6882.70	0.257	183.94	6881.85	6883.02	1.17	1.90	5.26	0.43	6883.45	0.550	0.403	0.742	0.75	0.32
2	24	10.00	6881.85	6883.34	1.49	2.51	3.99	0.25	6883.59	0.278	36.939	6882.04	6883.40	1.36	2.28	4.39	0.30	6883.70	0.348	0.313	0.115	0.75	0.22
3	24	10.00	6882.04	6883.63	1.59	2.67	3.74	0.22	6883.85	0.241	79.738	6882.43	6883.78	1.35	2.25	4.44	0.31	6884.09	0.357	0.299	0.239	1.00	0.31
4	24	3.70	6882.43	6884.09	1.65	2.78	1.33	0.03	6884.11	0.031	171.534	6883.29	6884.18	0.89	1.36	2.73	0.12	6884.30	0.184	0.107	0.184	1.00	0.12
5	18	2.40	6883.29	6884.30	1.01	1.26	1.90	0.06	6884.35	0.096	109.355	6883.84	6884.47	0.63	0.70	3.41	0.18	6884.65	0.447	0.272	0.297	1.00	0.18
6	18	0.50	6883.84	6884.65	0.81	0.21	0.51	0.00	6884.65	0.008	231.473	6885.00	6885.26	0.26**	0.21	2.38	0.09	6885.35	0.574	0.291	0.674	1.00	0.09
7	12	0.50	6885.00	6885.35	0.35	0.19	2.02	0.06	6885.42	0.322	149.791	6885.75	6886.05	0.30**	0.19	2.58	0.10	6886.15	0.634	0.478	0.716	1.00	0.10
8	12	0.50	6885.75	6886.15	0.40	0.19	1.71	0.05	6886.19	0.203	89.067	6886.20	6886.50	0.30**	0.19	2.58	0.10	6886.60	0.634	0.419	0.373	1.00	0.10
9	18	1.30	6883.29	6884.30	1.01	1.26	1.03	0.02	6884.32	0.028	176.182	6884.17	6884.62	0.45	0.45	2.91	0.13	6884.75	0.462	0.245	0.432	1.00	0.13
10	24	6.30	6882.43	6884.09	1.65	2.78	2.27	0.08	6884.17	0.088	41.163	6882.64	6884.10	1.46	2.46	2.56	0.10	6884.21	0.115	0.102	0.042	1.00	0.10

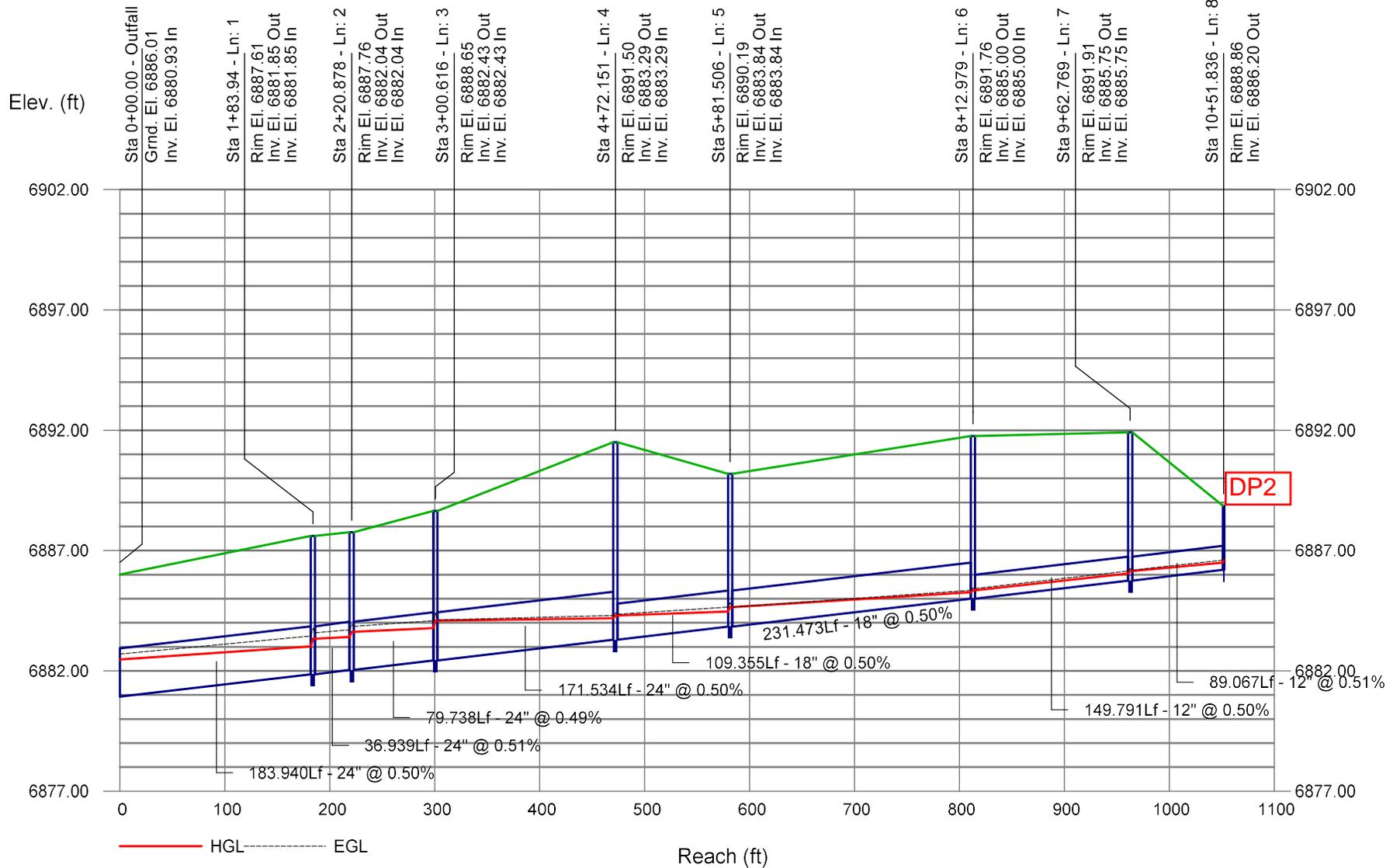
Project File 5YR.stm

Number of lines: 10

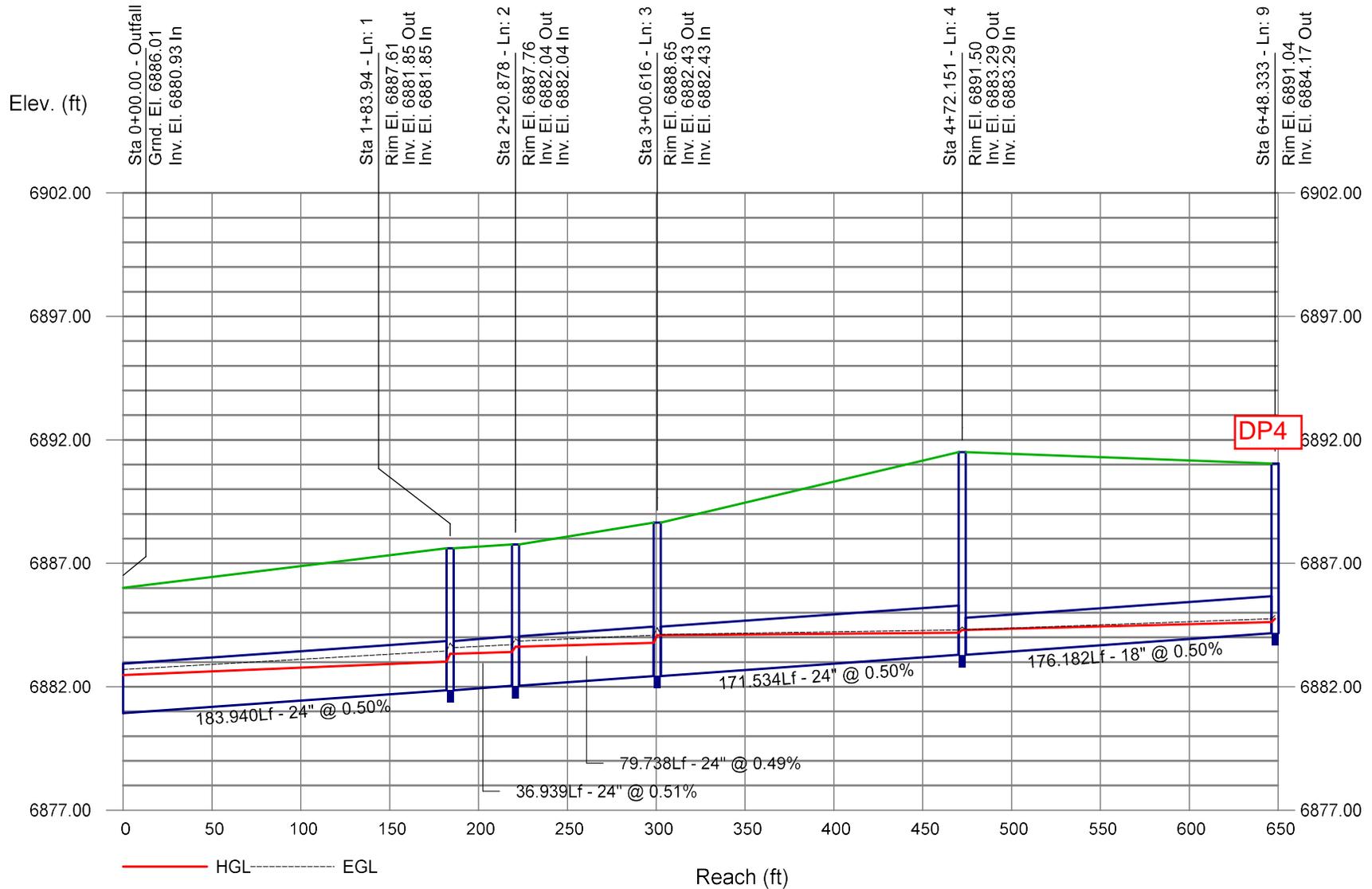
Run Date: 11/15/2023

Notes: ; \*\* Critical depth. ; c = cir e = ellip b = box

# Storm Sewer Profile

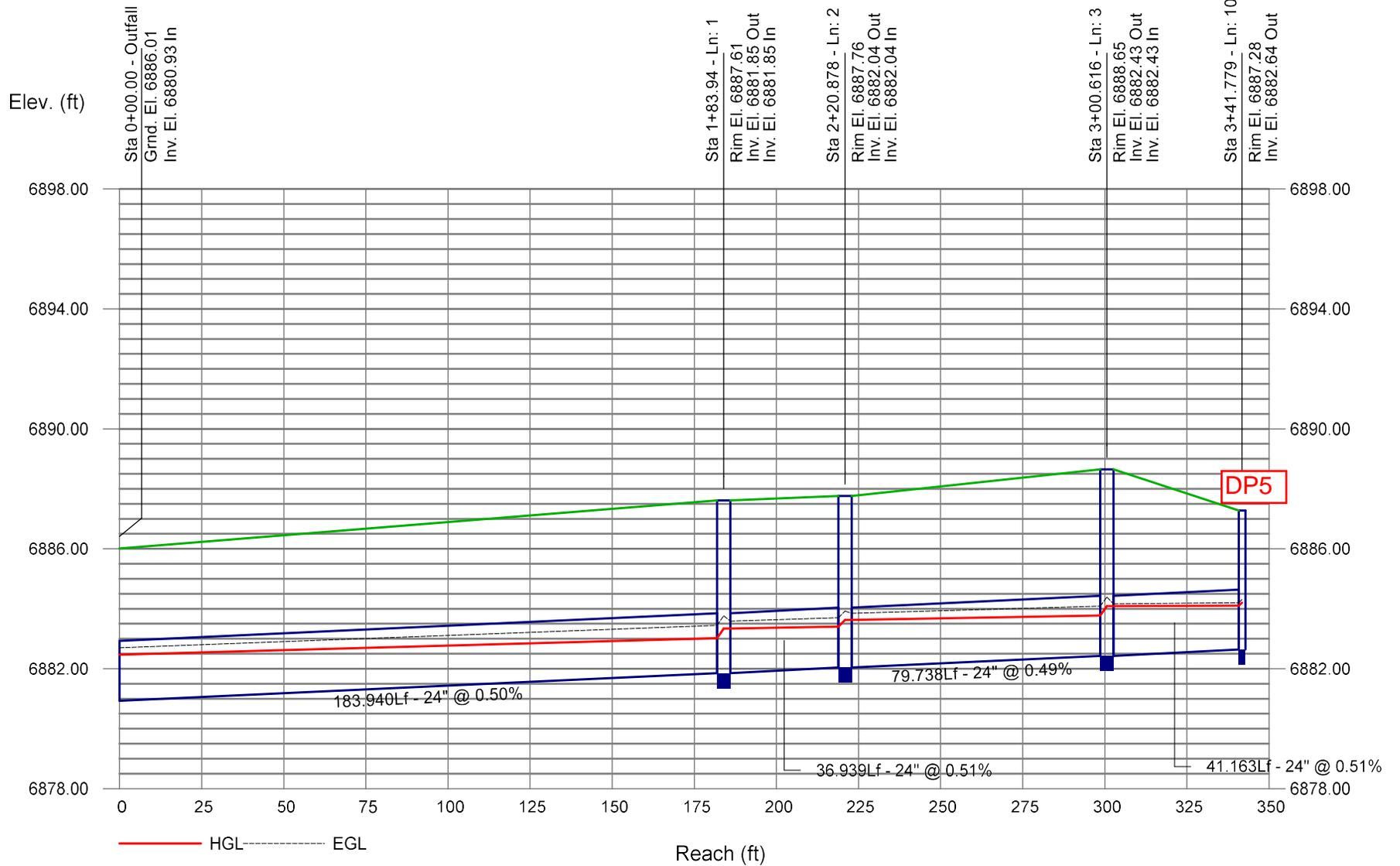


# Storm Sewer Profile



DP4

# Storm Sewer Profile



DP5

Line No.	Line ID	Flow Rate (cfs)	Line Size (in)	Line Type	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Up (ft)	HGL Dn (ft)	Minor Loss (ft)	HGL Jnct (ft)	Vel Ave (ft/s)	Line No.	Energy Loss (ft)
1	1	18.20	24	Cir	183.940	6880.93	6881.85	0.50	6884.19	6882.47	0.39	6884.58	6.40	1	1.473
2	2	18.20	24	Cir	36.939	6881.85	6882.04	0.51	6884.85	6884.58	0.39	6885.25	5.79	2	0.277
3	3	18.20	24	Cir	79.738	6882.04	6882.43	0.49	6885.84	6885.25	0.52	6886.37	5.79	3	0.599
4	4	6.90	24	Cir	171.534	6882.43	6883.29	0.50	6886.55	6886.37	0.07	6886.63	2.20	4	0.185
5	5	4.50	18	Cir	109.355	6883.29	6883.84	0.50	6886.86	6886.63	0.10	6886.96	2.55	5	0.233
6	6	0.90	18	Cir	231.473	6883.84	6885.00	0.50	6886.98	6886.96	0.00	6886.98	0.51	6	0.020
7	7	0.90	12	Cir	149.791	6885.00	6885.75	0.50	6887.10	6886.98	0.02	6887.12	1.15	7	0.111
8	8	0.90	12	Cir	89.067	6885.75	6886.20	0.51	6887.18	6887.12	0.02	6887.20	1.15	8	0.062
9	9	2.40	18	Cir	176.182	6883.29	6884.17	0.50	6886.73	6886.63	0.03	6886.76	1.36	9	0.107
10	10	11.30	24	Cir	41.163	6882.43	6882.64	0.51	6886.49	6886.37	0.20	6886.69	3.60	10	0.119

Project File: 100YR.stm	Number of lines: 10	Date: 11/15/2023
-------------------------	---------------------	------------------

NOTES: \*\* Critical depth

# Hydraulic Grade Line Computations

Line (1)	Size (in) (2)	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)		
1	24	18.20	6880.93	6882.47	1.54	2.60	7.01	0.76	6883.23	0.851	183.94	6881.85	6884.19	2.00	3.14	5.79	0.52	6884.71	0.751	0.801	1.473	0.75	0.39
2	24	18.20	6881.85	6884.58	2.00	3.14	5.79	0.52	6885.10	0.751	36.939	6882.04	6884.85	2.00	3.14	5.79	0.52	6885.38	0.751	0.751	0.277	0.75	0.39
3	24	18.20	6882.04	6885.25	2.00	3.14	5.79	0.52	6885.77	0.751	79.738	6882.43	6885.84	2.00	3.14	5.79	0.52	6886.37	0.751	0.751	0.599	1.00	0.52
4	24	6.90	6882.43	6886.37	2.00	3.14	2.20	0.08	6886.44	0.108	171.534	6883.29	6886.55	2.00	3.14	2.20	0.07	6886.63	0.108	0.108	0.185	1.00	0.07
5	18	4.50	6883.29	6886.63	1.50	1.77	2.55	0.10	6886.73	0.213	109.355	6883.84	6886.86	1.50	1.77	2.55	0.10	6886.96	0.213	0.213	0.233	1.00	0.10
6	18	0.90	6883.84	6886.96	1.50	1.77	0.51	0.00	6886.96	0.009	231.473	6885.00	6886.98	1.50	1.77	0.51	0.00	6886.98	0.009	0.009	0.020	1.00	0.00
7	12	0.90	6885.00	6886.98	1.00	0.79	1.15	0.02	6887.00	0.074	149.791	6885.75	6887.10	1.00	0.79	1.15	0.02	6887.12	0.074	0.074	0.111	1.00	0.02
8	12	0.90	6885.75	6887.12	1.00	0.79	1.15	0.02	6887.14	0.074	89.067	6886.20	6887.18	0.98	0.78	1.15	0.02	6887.20	0.066	0.070	0.062	1.00	0.02
9	18	2.40	6883.29	6886.63	1.50	1.77	1.36	0.03	6886.66	0.061	176.182	6884.17	6886.73	1.50	1.77	1.36	0.03	6886.76	0.061	0.061	0.107	1.00	0.03
10	24	11.30	6882.43	6886.37	2.00	3.14	3.60	0.20	6886.57	0.290	41.163	6882.64	6886.49	2.00	3.14	3.60	0.20	6886.69	0.290	0.290	0.119	1.00	0.20

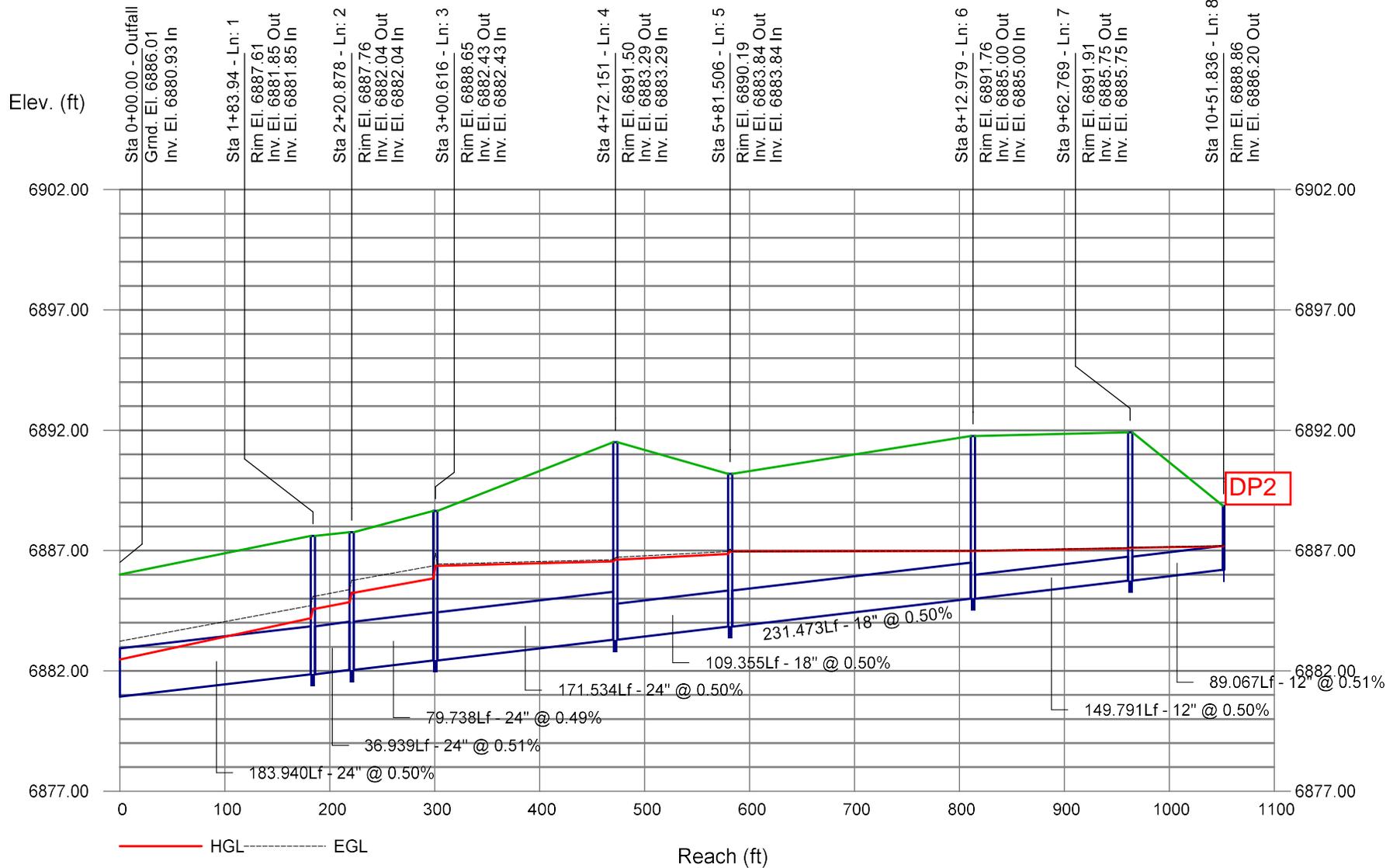
Project File: 100YR.stm

Number of lines: 10

Run Date: 11/15/2023

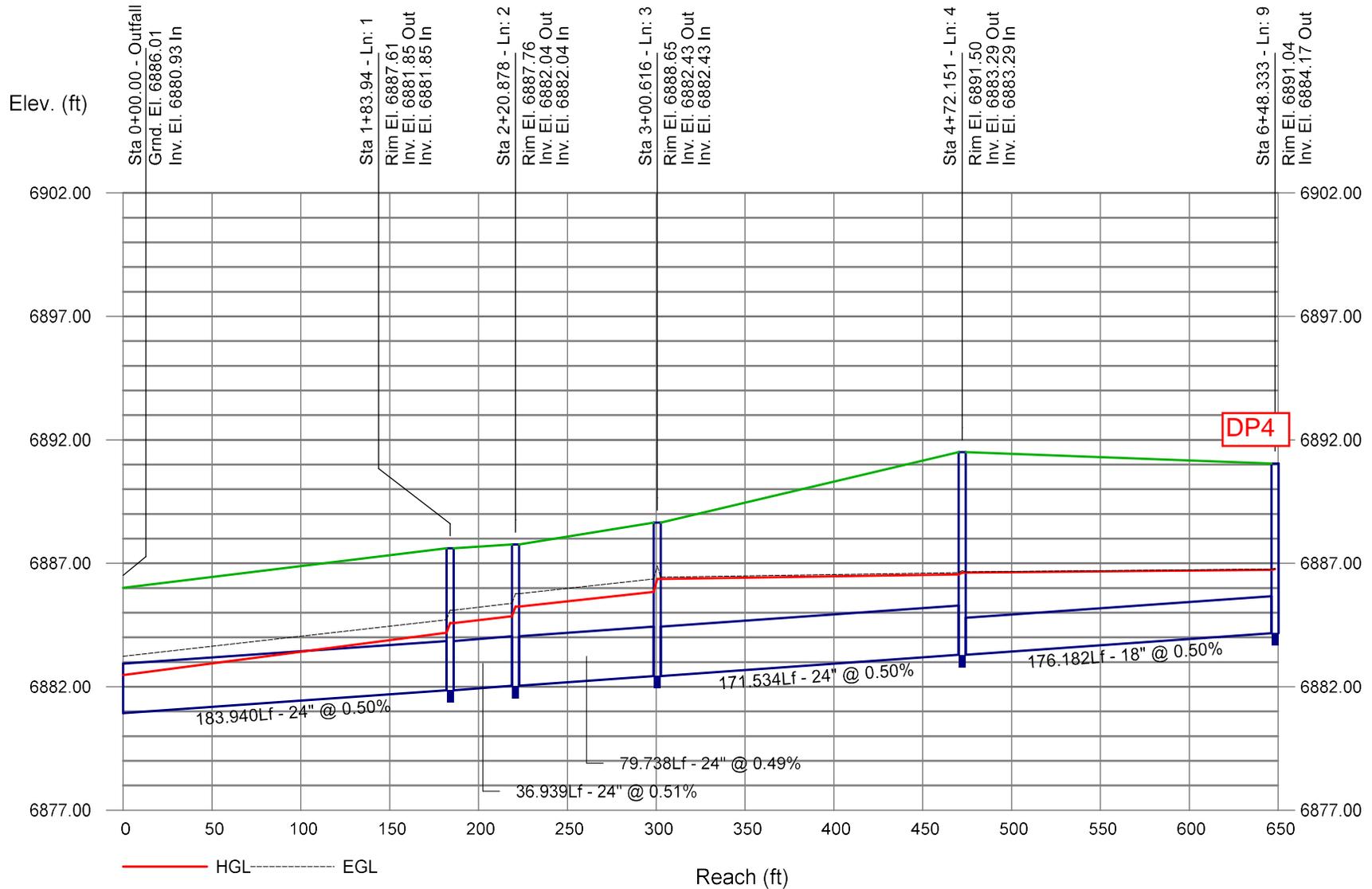
; c = cir e = ellip b = box

# Storm Sewer Profile



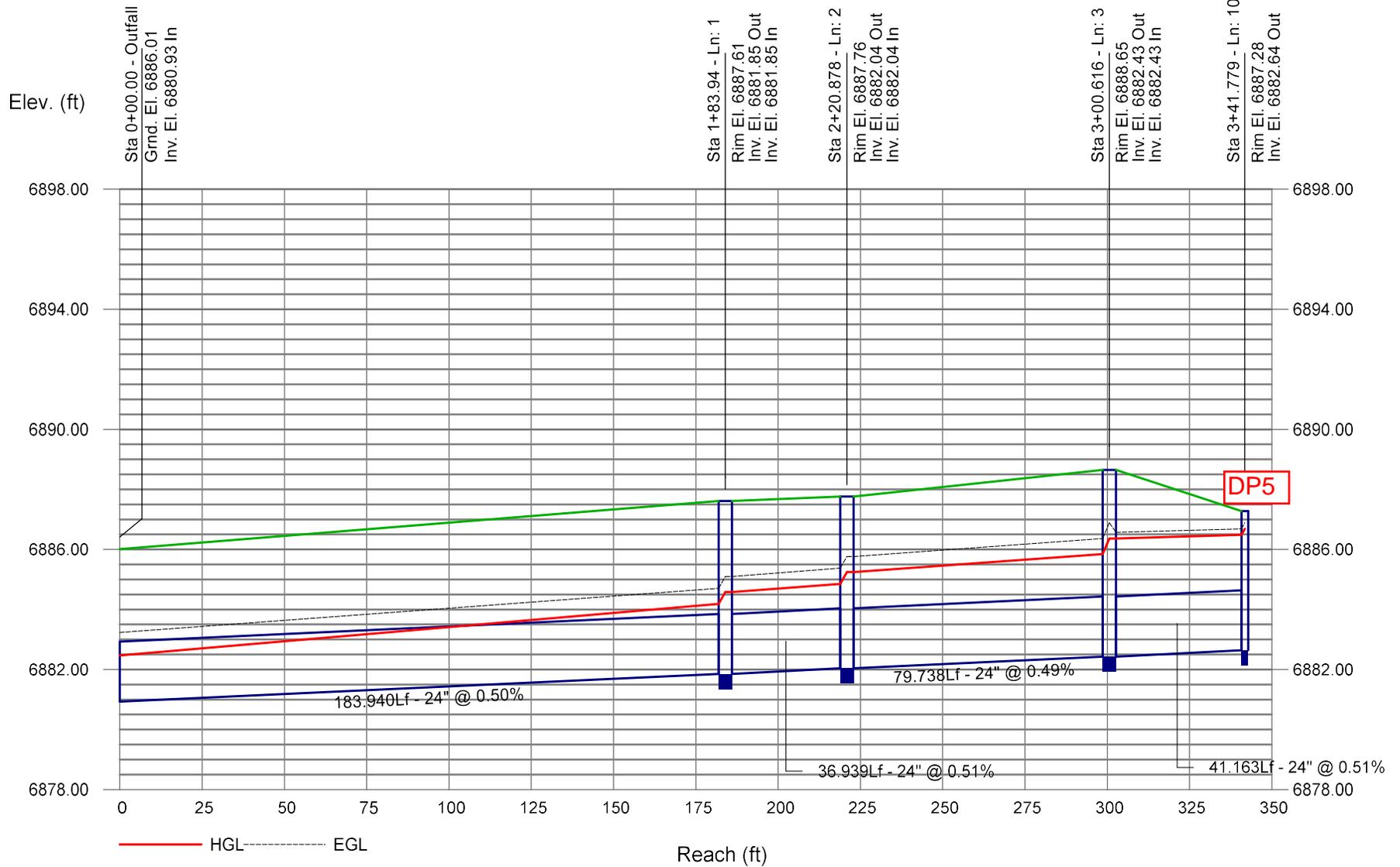
DP2

# Storm Sewer Profile



DP4

# Storm Sewer Profile



**COPYRIGHT**  
THESE PLANS ARE AN INSTRUMENT OF SERVICE AND ARE THE PROPERTY OF GALLOWAY, AND MAY NOT BE DUPLICATED, DISCLOSED, OR REPRODUCED WITHOUT THE WRITTEN CONSENT OF GALLOWAY. COPYRIGHTS AND INFRINGEMENTS WILL BE ENFORCED AND PROSECUTED.



King Soopers / Petroleum  
Supermarket  
65 Tejon Street  
Denver, CO 80223  
Phone (303) 778-3053  
Fax (303) 871-9262

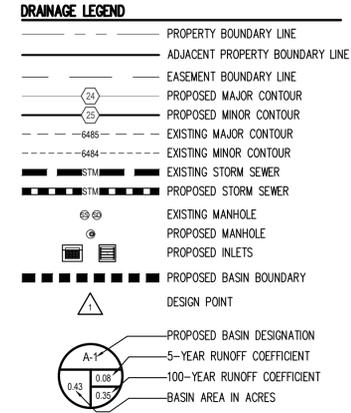
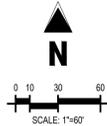
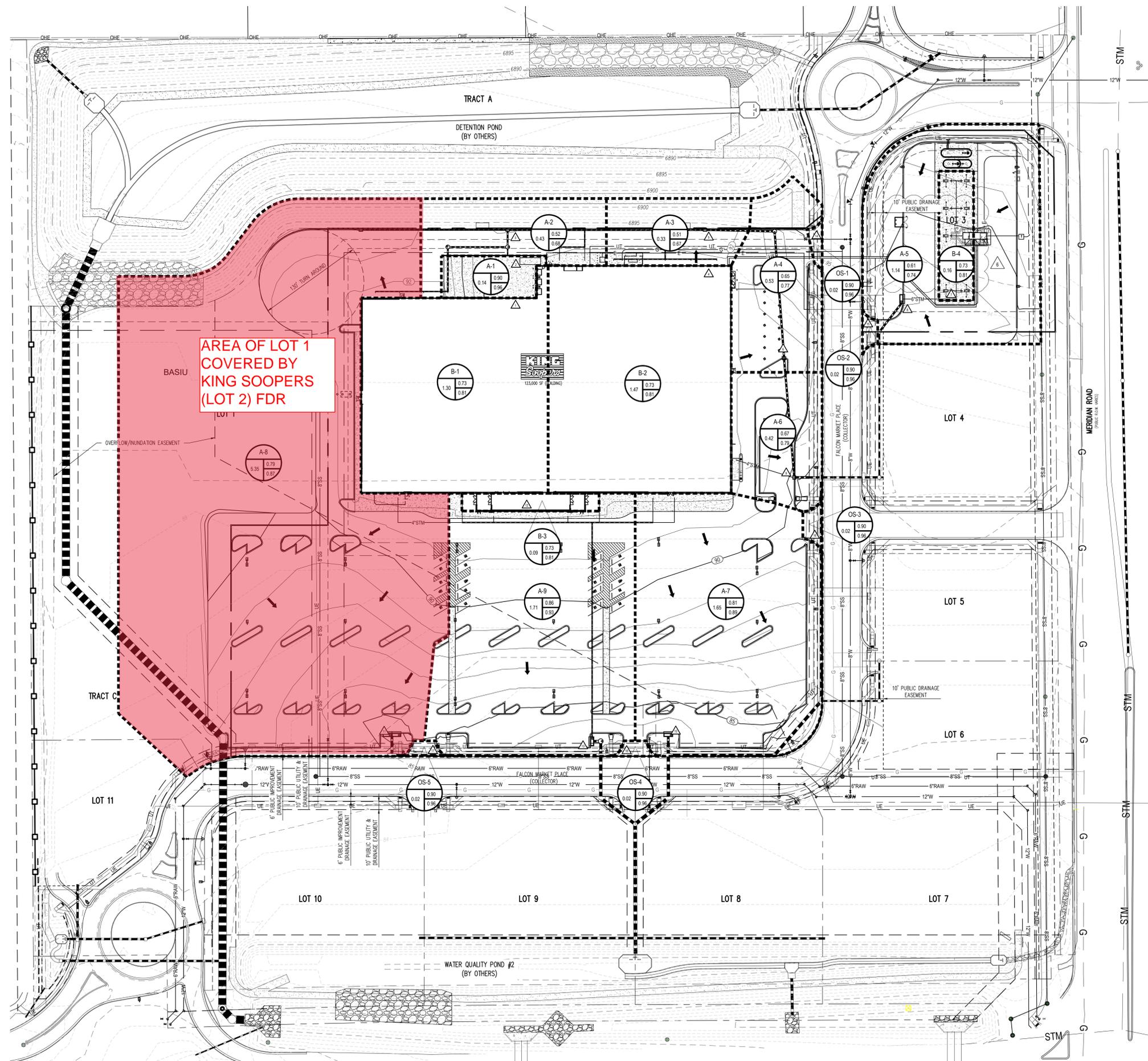
**KING SOOPERS #147**  
**FALCON MARKETPLACE**  
**LOTS 2 & 3, BLOCK 1**  
  
7530 & 7595 FALCON MARKET PL.  
FALCON, CO

#	Date	Issue / Description	Init.
1	12/16/19	2ND SDP Sub.	ACJ
2	03/30/20	3RD SDP Sub.	ACJ
3	05/29/20	4TH SDP Sub.	ACJ
4	10/02/20	5TH SDP Sub.	ACJ
5	09/24/21	6TH SDP Sub.	ACJ
6	02/11/2022	SDP Amd. #1	ACJ

Project No: KSS000147  
Drawn By:  
Checked By:  
Date: 8/29/19

**DRAINAGE PLAN**

**DR1**



**NOTE**  
CITY/COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH CITY/COUNTY DESIGN CRITERIA. THE CITY/COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AN ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE CITY/COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

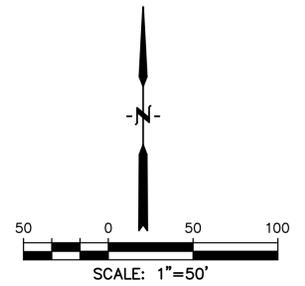
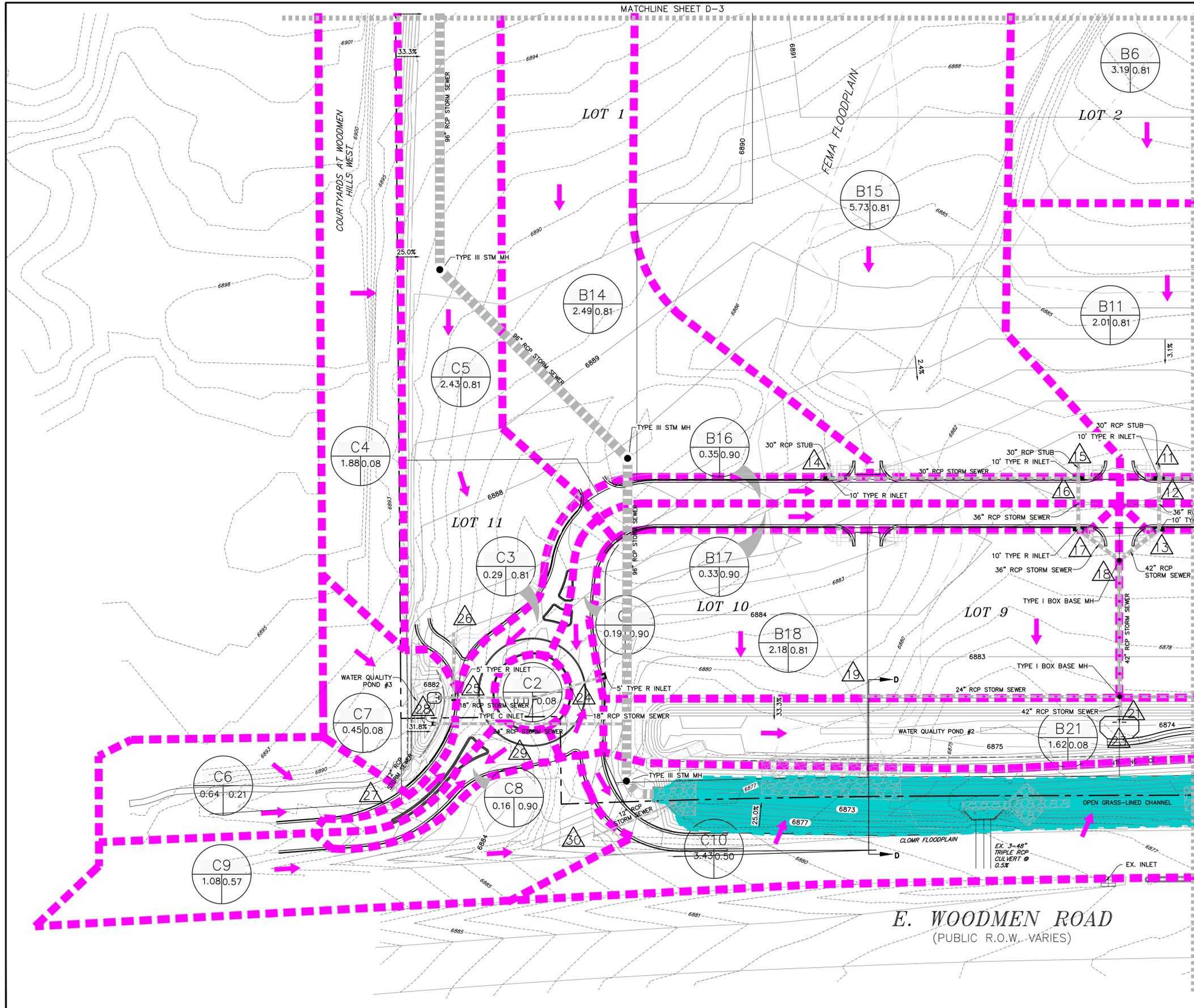
**BASIN SUMMARY TABLE**

Tributary Sub-basin	Area (acres)	C <sub>s</sub>	C <sub>100</sub>	t <sub>c</sub> (min)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)
A-1	0.14	0.90	0.96	5.00	0.7	1.3
A-2	0.43	0.52	0.68	11.04	0.9	2.0
A-3	0.33	0.51	0.67	8.55	0.7	1.7
A-4	0.53	0.65	0.77	5.78	1.7	3.8
A-5	1.14	0.61	0.74	8.19	3.0	6.6
A-6	0.42	0.67	0.79	9.22	1.2	2.5
A-7	1.65	0.81	0.89	6.54	6.3	12.4
A-8	5.35	0.79	0.87	5.94	20.6	40.5
A-9	1.71	0.86	0.93	5.09	7.5	14.4
B-1	1.30	0.73	0.81	5.00	4.9	9.6
B-2	1.47	0.73	0.81	5.00	5.5	10.8
B-3	0.09	0.73	0.81	5.00	0.3	0.6
B-4	0.16	0.73	0.81	5.00	0.6	1.2
OS-1	0.02	0.90	0.96	5.00	0.1	0.1
OS-2	0.02	0.90	0.96	5.00	0.1	0.1
OS-3	0.02	0.90	0.96	5.00	0.1	0.2
OS-4	0.02	0.90	0.96	5.00	0.1	0.1
OS-5	0.02	0.90	0.96	5.00	0.1	0.1

**RUNOFF COEFFICIENT TABLE**

COMPOSITE COEFFICIENT	EXISTING COEFFICIENTS		PROPOSED COEFFICIENTS	
	5-YEAR	100-YEAR	5-YEAR	100-YEAR
	0.75	0.84	0.75	0.84

**AREA OF LOT 1 COVERED BY KING SOOPERS (LOT 2) FDR**



**RUNOFF SUMMARY**

BASIN	DP	Area (Ac.)	Q <sub>s</sub> (CFS)	Q <sub>100</sub> (CFS)
A1	DP1	1.79	3.4	7.7
A2		0.06	0.0	0.2
	DP2	1.85	3.4	7.7
A3		4.82	1.4	10.2
	DP3	6.67	4.6	17.4
B4	DP4	2.35	9.7	17.7
B5		0.61	2.8	5.0
	DP5	2.96	12.4	22.6
B6	DP6	3.19	13.1	24.0
B7		0.44	2.0	3.6
	DP7	6.59	27.4	30.3
B8	DP8	1.04	4.3	7.8
B9		0.30	1.4	2.5
	DP9	1.35	5.7	10.3
B10		0.18	0.8	1.4
	DP10	8.11	33.8	41.9
B11	DP11	2.01	8.3	15.1
B12		0.18	0.8	1.5
	DP12	10.30	41.9	57.1
B13		0.20	0.9	1.6
	DP13	10.50	42.6	58.4
B14	DP14	2.49	9.9	18.0
B15	DP15	5.73	22.2	40.5
B16		0.35	1.6	2.9
	DP16	8.56	33.2	60.6
B17		0.33	1.5	2.7

BASIN	DP	Area (Ac.)	Q <sub>s</sub> (CFS)	Q <sub>100</sub> (CFS)
	DP17	8.89	34.5	62.8
B18	DP18	19.40	56.7	93.2
B19	DP19	2.18	9.0	16.4
	DP20	2.57	10.6	19.4
	DP21	24.15	73.9	124.7
B20	DP22	2.03	5.6	11.4
B21		1.62	0.5	4.0
	DP23	27.80	72.1	126.6
C1	DP24	0.19	0.9	1.6
C2		0.11	0.0	0.3
C3		0.29	1.3	2.4
	DP25	0.59	1.9	3.6
C4		1.88	0.6	4.2
C5		2.43	10.0	18.3
	DP26	4.31	7.6	16.7
C6	DP27	0.64	0.5	1.9
C7		0.45	0.2	1.2
	DP28	5.54	9.5	21.2
C8	DP29	0.16	0.7	1.3
C9		1.08	2.6	5.4
	DP30	1.24	3.2	6.5
C10		3.43	7.3	16.2
D1		2.52	4.1	8.8
D2		0.07	0.3	0.6
D3		0.07	0.3	0.6
DPO1		32.50	10.3	30.2

PREPARED BY:  
  
**DREXEL, BARRELL & CO.**  
 Engineers • Surveyors  
 3 SOUTH 7TH STREET  
 COLORADO SPGS, COLORADO 80905  
 CONTACT: TIM D. McCONNELL, P.E.  
 (719)260-0887  
 BOULDER • COLORADO SPRINGS

CLIENT:  
**HUMMEL INVESTMENTS, LLC**  
 8117 PRESTON ROAD, SUITE 120  
 DALLAS, TEXAS 75225  
 (214) 416-9820

DRAINAGE PLAN FOR  
**FALCON MARKETPLACE**  
 FALCON, COLORADO

ISSUE	DATE
INITIAL ISSUE	4-17-19
DESIGNED BY:	TDM
DRAWN BY:	KGV
CHECKED BY:	TDM
FILE NAME:	

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF DREXEL, BARRELL & CO.

DRAWING SCALE:  
 HORIZONTAL: 1"=50'  
 VERTICAL: N/A

**PROPOSED DRAINAGE CONDITIONS**

PROJECT NO. 20988-00CSCV  
 DRAWING NO.

**D-1**

SHEET: 1 OF 5



