DRAINAGE LETTER
for
LOT 5, FALCON MARKETPLACE

7575 Falcon Market Place
Falcon, Colorado

April 13, 2022

PCD File No: PPR-22002

Prepared for:

KMG RE Falcon, LLC
6050 Stetson Hills Blvd, #295
Colorado Springs, CO 80918
Contact: Kyle Gerstner
(719) 217-7279

Prepared by:

Drexel, Barrell & Co.
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APPENDICES

DRAINAGE LETTER
for
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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. Date
Katherine Varnum, P.E. #53459

Developer's Statement

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

_____

Authorized Signature Date
KMG RE Falcon, LLC
6050 Stetson Hills Blvd, #295
Colorado Springs, CO 80918

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. Date
County Engineer / ECM Administrator

Conditions:

DRAINAGE LETTER
for
LOT 5, 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 5 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 5 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 6th P.M. The property is bounded by an unnamed access drive, and then Lot 4 of Falcon Marketplace to the north, Lot 6 of Falcon Marketplace to the south, Meridian Road to the east and Falcon Market Place to the west.

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 5 is the construction of a fast-food restaurant, with associated parking and landscaping. The proposed disturbed area consists of 0.71 acres. The imperviousness of the site (C_5=0.66 and C_{100}=0.78) is very similar to that assumed in the approved Final Drainage Report (C_5=0.68 and C_{100}=0.79) 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), a hydrologic type A soil. 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), a portion of the site lies within Zone A for the Unnamed Tributary to Black Squirrel Creek.

A CLOMR to modify the effective floodplain was approved by FEMA, Case No. 17-08-0074R (May 26, 2017). The construction associated with the LOMR has been completed and the LOMR submitted to FEMA for approval.

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 B8 (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 detention facility Pond 2. An 18" RCP storm sewer stub has been provided to the lot for connection to the onsite storm sewer system in Falcon Market Place when development takes place.

6.0 DEVELOPED CONDITION

The proposed development consists of a fast-food restaurant and associated parking and landscaping. The proposed grading and storm system will route flows to the southwest where they will enter the existing 18" RCP storm sewer and be directed towards the existing detention facility Pond 2.

See below for basin/design point table and description:

BASIN	DP	AREA (AC)	Q5 (cfs)	Q100 (cfs)
A	1	0.27	0.9	1.8
B		0.40	1.5	2.9
	2	0.67	2.3	4.5
C	3	0.08	0.1	0.3
D	4	0.03	0.1	0.1

Basin A (DP-1) covers the northeastern portion of Lot 5, including the building and some parking. Flows generated by this basin will travel to the south and east and be captured

by a Type 16 combination inlet, located at a low point along the eastern curb line. Flows captured by this inlet and roof drain connections from the building will be directed via private 12" storm sewer to the west towards Design Point 2

Basin B covers the southwestern portion of the lot, final roadway grading will be coordinated with Lot 8 to the west, but based on early grading plans is anticipated to follow the same general direction to the west. Flows will culminate at a proposed low point in the parking lot curb line and Type 16 combination inlet. Additional inlets are located along the curb line to capture any nuisance flow. All flows will be captured onsite and directed to the existing 18" private storm sewer stub at DP-2.

Basin C (DP-3) covers the eastern portion of Lot 5 adjacent to Meridian Road. This area drains directly towards the roadway, but is captured downstream by a curb chase where is it directed towards the onsite Pond 2 for water quality treatment. This area, with the exception of the existing sidewalk will remain impervious.

Basin D (DP-4) covers the western portion of Lot 5 adjacent to Falcon Market Place. This area drains directly to the roadway and was accounted for in the onsite storm sewer design for the overall Falcon Marketplace development.

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 5 Falcon Marketplace will not adversely affect surrounding or downstream developments. The runoff coefficients established by Final Drainage Report for Falcon Marketplace for Basin B8 were C_5=0.68 and C_{100}=0.79, the combined runoff coefficients for Basins A-D for this development are slightly lower at C_5=0.66 and C_{100}=0.78, therefore, it is acceptable to state that the drainage design for Lot 5 is in conformance with the Final Drainage Report for the overall Falcon Marketplace development.

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. 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: 8/18/16	DWG. NO. VMAP
JOB NO: 20988-00	SHEET 1 OF 1

National Flood Hazard Layer FIRMette

FEMA

38°56'48.88"N

104°36'55.79"W

104°36'18.33"W

38°56'20.89"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

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

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

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 3/20/2019 at 12:31:27 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 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: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 13, Sep 22, 2015

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

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

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

Map Unit Legend

El Paso County Area, Colorado (CO625)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
8	Blakeland loamy sand, 1 to 9 percent slopes	1.2	3.2%
9	Blakeland-Fluvaquentic Haplaquolls	16.3	43.9%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	19.6	52.9%
Totals for Area of Interest		**37.1**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments

on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

El Paso County Area, Colorado

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: 85 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
Natural 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 in profile: 5 percent
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Sandy Foothill (R049BY210CO)

Minor Components

Other soils

Percent of map unit:

Pleasant

Percent of map unit:
Landform: Depressions

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: 30 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
Natural 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 in profile: 5 percent
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A
Ecological site: Sandy Foothill (R049BY210CO)

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

Properties and qualities
Slope: 1 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Interpretive groups
Land capability classification (irrigated): 6w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: D

Minor Components

Other soils
Percent of map unit:

Pleasant
Percent of map unit:
Landform: Depressions

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

Description of Columbine

Setting

Landform: Fans, flood plains, fan terraces
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
Natural 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 storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Gravelly Foothill (R049BY214CO)

Minor Components

Fluvaquentic haplaquolls

Percent of map unit:
Landform: Swales

Other soils

Percent of map unit:

Pleasant

Percent of map unit:
Landform: Depressions

PROJECT INFORMATION

PROJECT:	Lot 5 Falcon Marketplace
PROJECT NO:	20988-10
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	1/7/2022

Drexel, Barrell & Co.

Soil Type: A

	C2*	C5*	C10*	C100*	% IMPERV
Open Space		0.08		0.35	0
Commercial Development		0.81		0.88	90
Asphalt/Sidewalk/Roof		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	COMPOSITE RUNOFF COEFFICIENTS				% IMPERV
		ACRE	C2	C5	C10	C100	
A	Open Space	0.08		0.08		0.35	0
	Commercial Development	0.00		0.81		0.88	90
	Asphalt/Sidewalk/Roof	0.20		0.90		0.95	100
	WEIGHTED AVERAGE			0.67		0.78	72%
TOTAL A		0.27					
B	Open Space	0.07		0.08		0.35	0
	Commercial Development	0.00		0.81		0.88	90
	Asphalt/Sidewalk/Roof	0.33		0.90		0.95	100
	WEIGHTED AVERAGE			0.76		0.85	83%
TOTAL B		0.40					
C	Open Space	0.06		0.08		0.35	0
	Commercial Development	0.00		0.81		0.88	90
	Asphalt/Sidewalk/Roof	0.02		0.90		0.95	100
	WEIGHTED AVERAGE			0.28		0.49	24%
TOTAL C		0.08					
D	Open Space	0.02		0.08		0.35	0
	Commercial Development	0.00		0.81		0.88	90
	Asphalt/Sidewalk/Roof	0.01		0.90		0.95	100
	WEIGHTED AVERAGE			0.33		0.54	31%
TOTAL D		0.03					
Tributary impervious		0.78		0.66		0.78	0.71

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Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

PROPOSED TIME OF CONCENTRATION STANDARD FORM SF-2

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t_i)				TRAVEL TIME (t_t)					TIME OF CONC. t_c		FINAL t_c
BASIN	DESIGN PT:	C_5	C_{100}	AREA	LENGTH	HT	SLOPE	t_i	LENGTH	HT	SLOPE	VEL.	t_t	COMP.	MINIMUM	
				Ac	Ft	FT	%	Min	Ft	FT	%	FPS	Min	t_c	t_c	**Min**
A	1	0.67	0.78	0.27	50	1	2.0	4.5	200	1.5	0.8	5.9	0.6	5.1	5	**5.1**
B		0.76	0.85	0.40	50	1	2.0	3.6	150	1	0.7	4.7	0.5	4.1	5	**5.0**
A+B	2	0.72	0.82	0.67					340	3.4	1.0	5.9	1.0	6.1	5	**6.1**
C	3	0.28	0.49	0.08	50	1	2.0	8.6						8.6	5	**8.6**
D	4	0.33	0.54	0.03	20	0.2	1.0	6.4						6.4	5	**6.4**

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Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

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

			DIRECT RUNOFF				
BASIN (S)	**DESIGN POINT**	**AREA (AC)**	**RUNOFF COEFF**	**t_c (MIN)**	**C * A**	**I (IN/HR)**	**Q (CFS)**
A	1	0.27	0.67	5.1	0.18	5.08	**0.9**
B		0.40	0.76	5.0	0.30	5.10	**1.5**
	2	0.67	0.72	6.1	0.48	4.84	**2.3**
C	3	0.08	0.28	8.6	0.02	4.33	**0.1**
D	4	0.03	0.33	6.4	0.01	4.77	**0.1**

PROJECT INFORMATION

PROJECT:	Lot 5 Falcon Marketplace
PROJECT NO:	20988-10
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	1/7/2022

Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

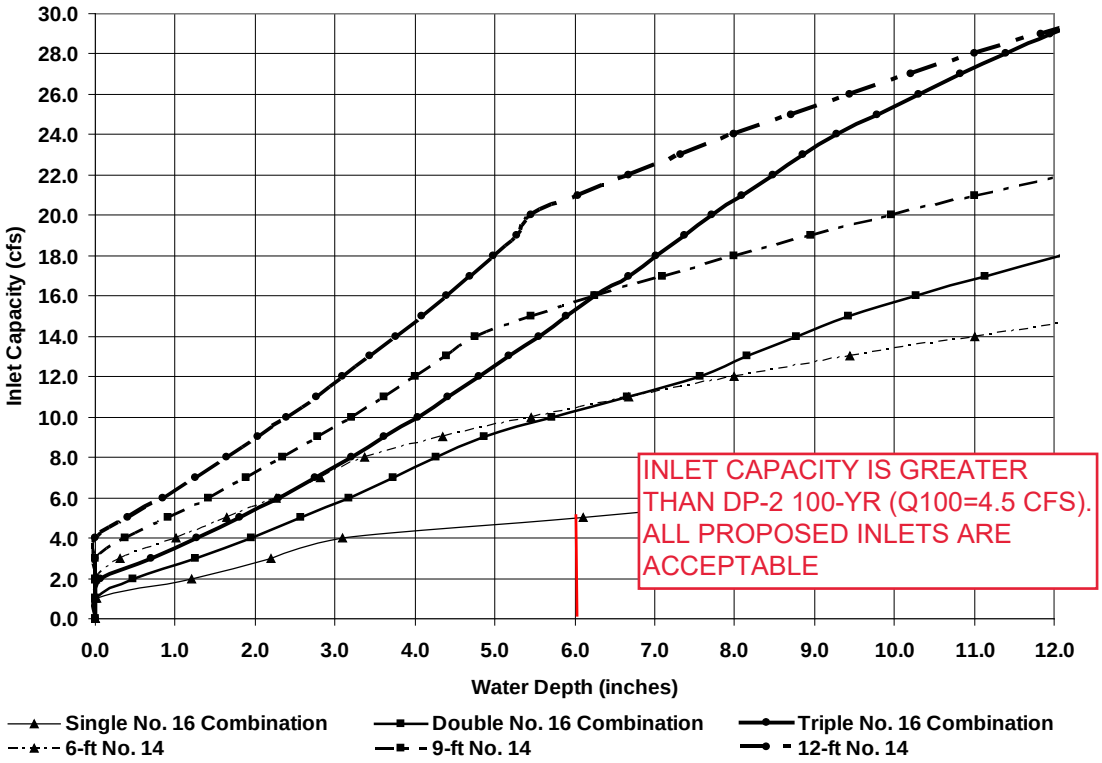
PROPOSED **RUNOFF** **100 YR STORM** **P1=** **2.52**

			DIRECT RUNOFF				
BASIN (S)	**DESIGN POINT**	**AREA (AC)**	**RUNOFF COEFF**	**t_c (MIN)**	**C * A**	**I (IN/HR)**	**Q (CFS)**
A	1	0.27	0.78	5.1	0.21	8.53	**1.8**
B		0.40	0.85	5.0	0.34	8.58	**2.9**
	2	0.67	0.82	6.1	0.55	8.14	**4.5**
C	3	0.08	0.49	8.6	0.04	7.27	**0.3**
D	4	0.03	0.54	6.4	0.02	8.01	**0.1**

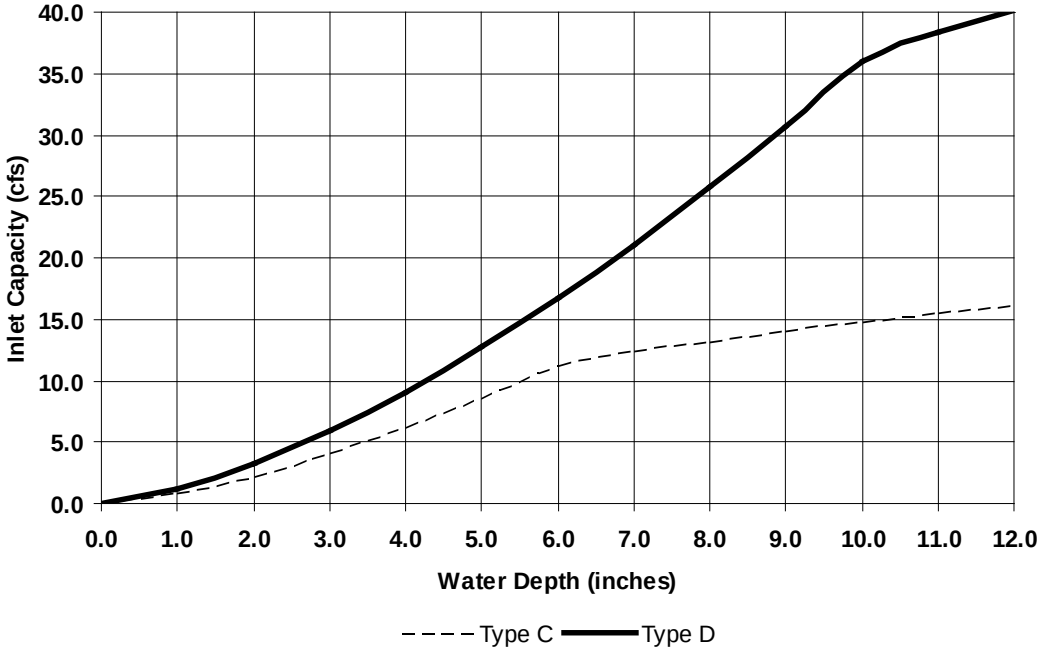
Figure 8.1. Allowable Inlet Capacity— Sump Conditions

Note: See Section 8.3.2 for assumptions.

Type 16 and Type 14 Inlets for Sump Conditions



Allowable Inlet Capacity for Type C and D Inlets for Sump Conditions



Worksheet
Worksheet for Circular Channel

Project Description	
Worksheet	Falcon Marketplace
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coeffic	0.010	
Slope	005000	ft/ft
Depth	0.90	ft
Diameter	12	in

Results		
Discharge	3.49	cfs
Flow Area	0.7	ft²
Wetted Perime	2.50	ft
Top Width	0.60	ft
Critical Depth	0.80	ft
Percent Full	90.0	%
Critical Slope	0.005965	ft/ft
Velocity	4.69	ft/s
Velocity Head	0.34	ft
Specific Energy	1.24	ft
Froude Numbe	0.74	
Maximum Disc	3.52	cfs
Discharge Full	3.27	cfs
Slope Full	0.005680	ft/ft
Flow Type	Subcritical	

FULL FLOW CAPACITY IS MORETHAN
BASIN A Q100=1.8 CFS
AND BASIN B Q100=2.9 CFS

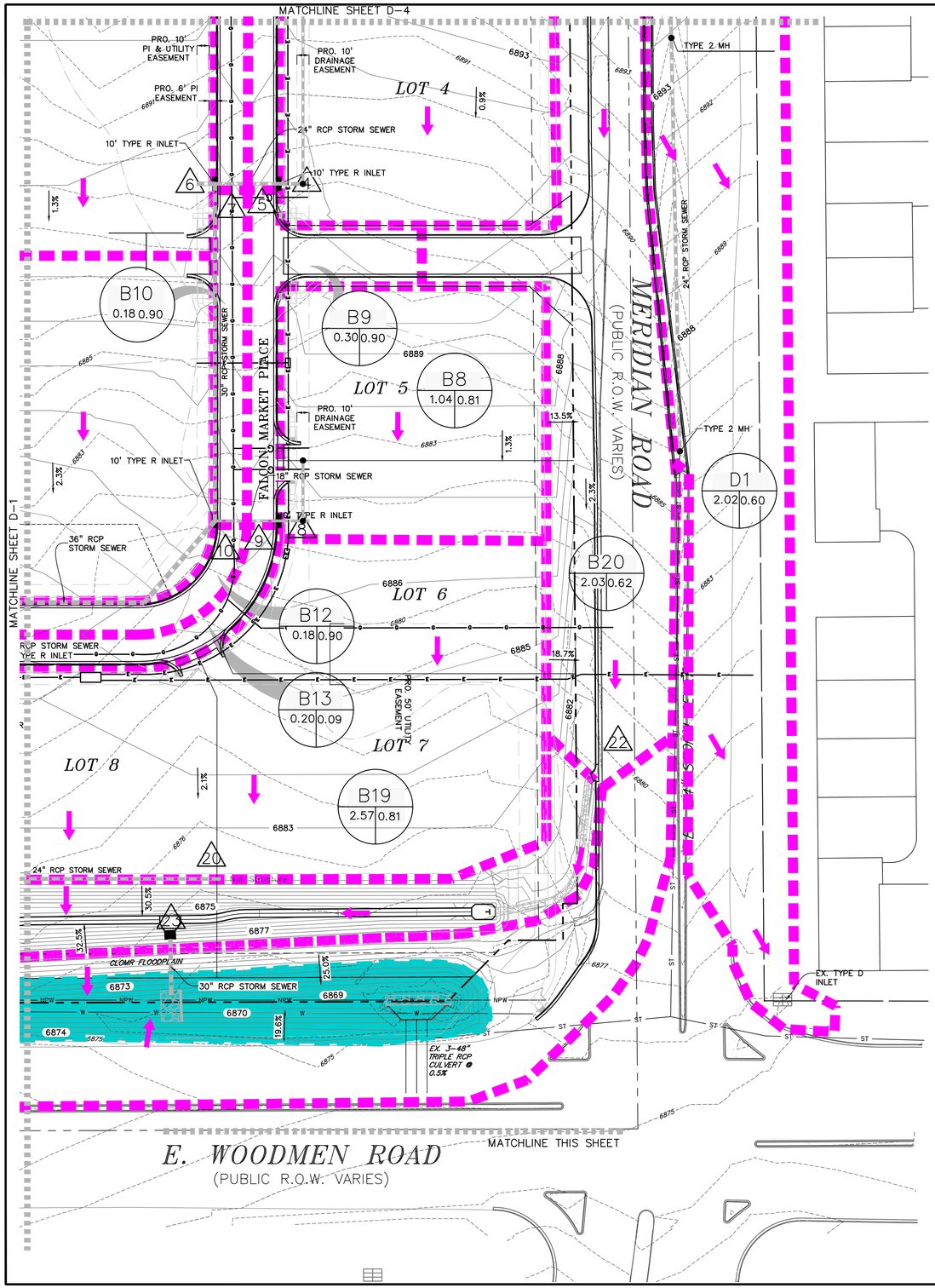
Worksheet
Worksheet for Circular Channel

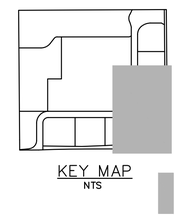
Project Description	
Worksheet	Falcon Marketplace
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

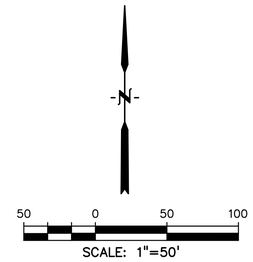
Input Data		
Mannings Coeffic	0.010	
Slope	010000	ft/ft
Depth	0.90	ft
Diameter	12	in

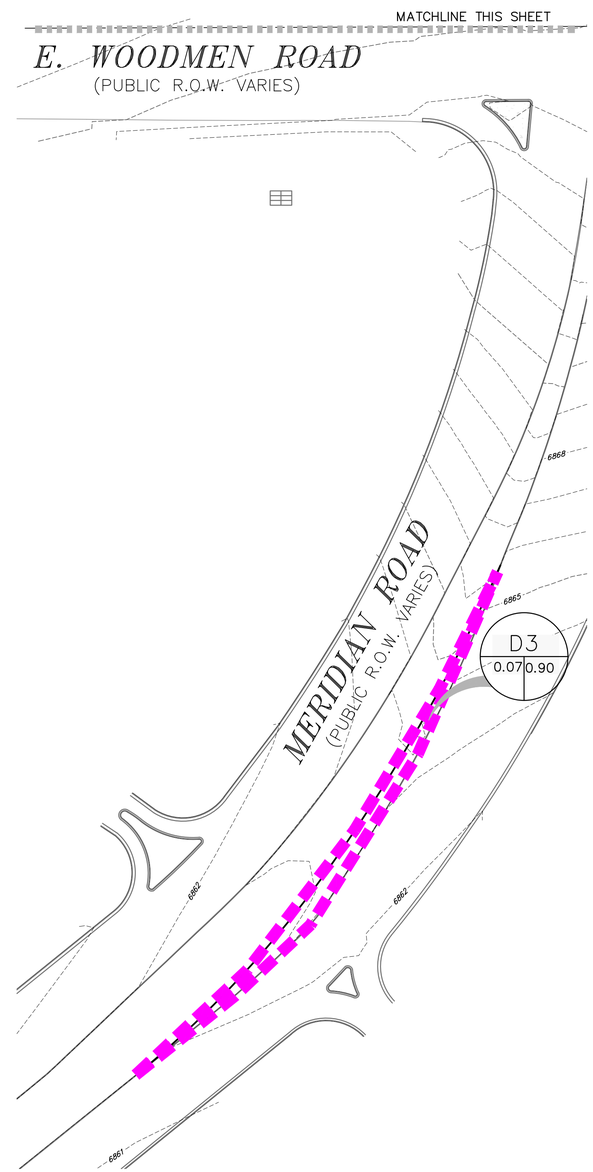
Results		
Discharge	4.94	cfs
Flow Area	0.7	ft²
Wetted Perime	2.50	ft
Top Width	0.60	ft
Critical Depth	0.91	ft
Percent Full	90.0	%
Critical Slope	0.009897	ft/ft
Velocity	6.63	ft/s
Velocity Head	0.68	ft
Specific Energy	1.58	ft
Froude Numbe	1.05	
Maximum Disc	4.98	cfs
Discharge Full	4.63	cfs
Slope Full	0.011359	ft/ft
Flow Type	Supercritical	

FULL FLOW CAPACITY IS MORE THAN DP-2 Q100=4.5 CFS









RUNOFF SUMMARY

BASIN	DP	Area (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
A1	DP1	1.81	3.4	7.7
	DP2	1.81	3.4	7.7
A2		4.82	1.4	10.2
	DP3	6.63	4.6	17.3
B4	DP4	2.35	7.5	14.6
B5		0.63	2.8	5.1
	DP5	2.99	10.0	19.3
B6	DP6	3.19	12.8	23.6
B7		0.46	2.0	3.7
	DP7	6.63	23.8	28.0
B8	DP8	1.04	3.5	6.9
B9		0.30	1.4	2.5
	DP9	1.35	4.9	9.3
B10		0.18	0.8	1.4
	DP10	8.16	29.2	38.1
B11	DP11	2.01	7.8	14.6
B12		0.18	0.8	1.5
	DP12	10.35	36.4	51.9
B13		0.20	0.9	1.6
	DP13	10.55	37.1	53.2
B14	DP14	2.49	9.1	17.0
B15	DP15	5.73	20.3	38.0
B16		0.35	1.6	2.9
	DP16	8.56	30.6	57.1
B17		0.33	1.5	2.7

BASIN	DP	Area (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
	DP17	8.89	31.9	59.3
	DP18	19.44	52.1	88.2
B18	DP19	2.18	7.8	15.0
B19	DP20	2.57	10.1	18.8
	DP21	24.19	67.6	117.5
B20	DP22	2.03	5.6	11.4
B21		1.62	0.5	4.0
	DP23	27.85	67.4	121.8
C1	DP24	0.35	1.3	2.6
C2		0.23	0.8	1.5
	DP25	0.59	2.0	3.8
C3		1.88	0.6	4.2
C4		2.19	6.9	13.8
	DP26	4.08	5.4	13.7
C5	DP27	0.64	0.5	1.9
C6		0.45	0.2	1.2
	DP28	5.31	7.4	18.3
C7	DP29	0.19	0.7	1.3
C8		1.14	2.5	5.5
	DP30	1.33	3.1	6.6
C9		3.43	7.3	16.2
D1		2.62	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.
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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	6-28-19
REVISED	7-19-19

DESIGNED BY:	TDM
DRAWN BY:	KGV
CHECKED BY:	TDM
FILE NAME:	

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

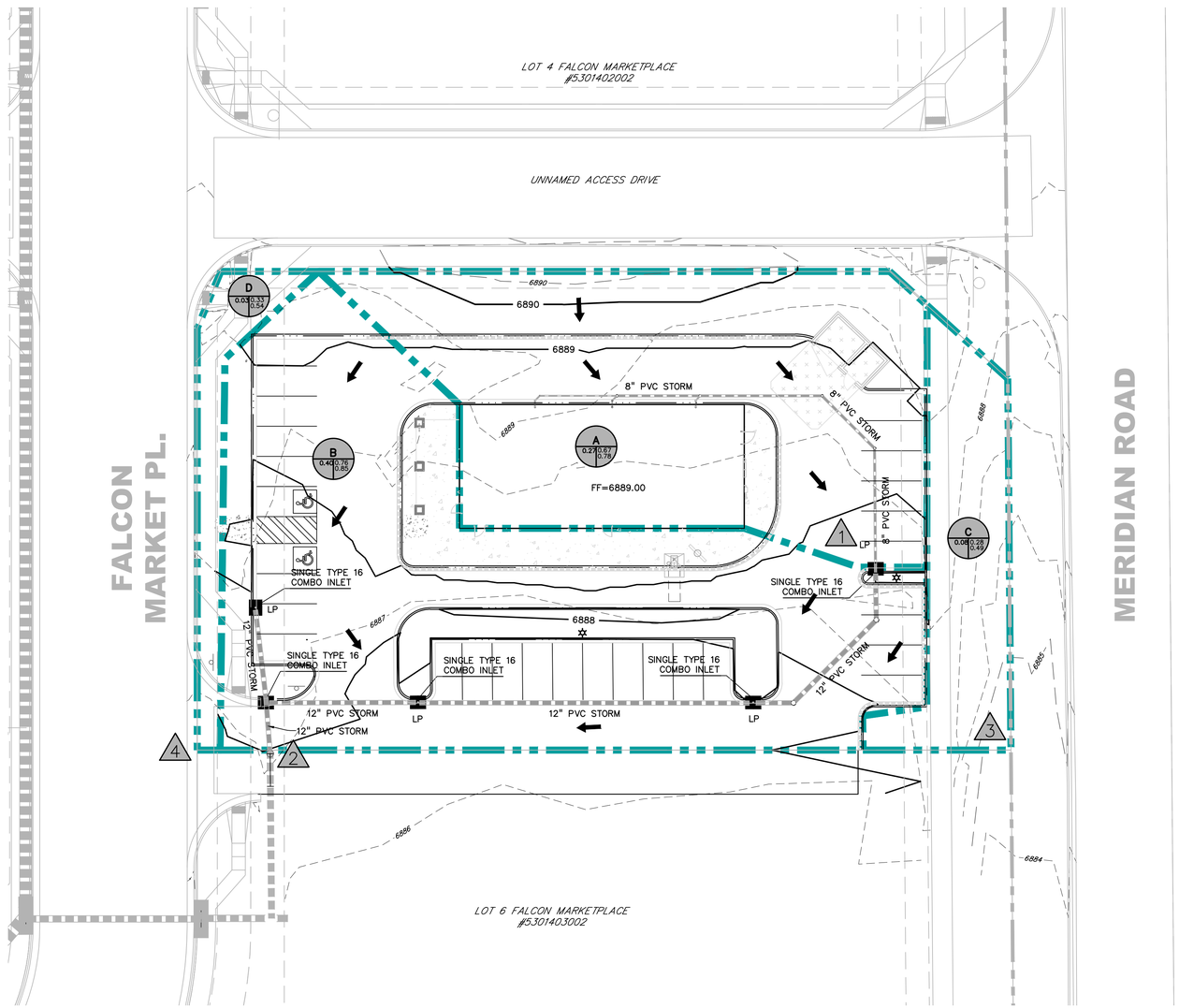
DRAWING SCALE:
HORIZONTAL: 1"=50'
VERTICAL: N/A

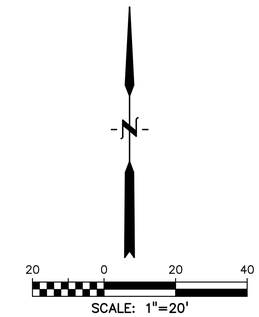
PROPOSED DRAINAGE CONDITIONS

PROJECT NO. 20988-00CSCV
DRAWING NO.

D-2

SHEET: 2 OF 5





LEGEND

PROPOSED INTERMEDIATE CONTOUR 5522
PROPOSED INDEX CONTOUR 5520
EX. INTERMEDIATE CONTOUR *5364*
EX. INDEX CONTOUR *5365*
DIRECTION OF FLOW .....
HIGH POINT ..... HP
LOW POINT ..... LP
PROPOSED INLET .....
PROPOSED MANHOLE .....
BASIN BOUNDARY
FLOW DIRECTION
DESIGN POINT

AREA (ACRE) — X — AREA C5 C100 — BASIN, C5, C100

BASIN	DP	AREA (AC)	Q5 (cfs)	Q100 (cfs)
A	1	0.27	0.9	1.8
B		0.40	1.5	2.9
	2	0.67	2.3	4.5
C	3	0.08	0.1	0.3
D	4	0.03	0.1	0.1

PREPARED BY:

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3 SOUTH 7TH STREET
COLORADO SPGS, COLORADO 80905
CONTACT: TIM D. McCONNELL, P.E.
(719)260-0887
BOULDER • COLORADO SPRINGS • GREELEY

CLIENT:

KMG RE FALCON, LLC
6050 STETSON HILLS BLVD #295
COLORADO SPRINGS, CO 80923

GRADING & EROSION CONTROL PLANS FOR:

LOT 5, FALCON MARKETPLACE

COLORADO SPRINGS, COLORADO

ISSUE	DATE
INITIAL ISSUE	1/7/22

DESIGNED BY:	TDM
DRAWN BY:	KGV
CHECKED BY:	TDM
FILE NAME:	20988-09-DRN

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

DRAWING SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: N/A

PROPOSED DRAINAGE PLAN

PROJECT NO. 20988-00CSCV

DRAWING NO.

DRN

SHEET: 1 OF 1