

**FINAL DRAINAGE LETTER  
FOR  
LOT 1, WOODMEN HILLS FIL NO. 7H**

December 2020

Prepared for:  
WD Construction  
Attention: Bill Tibbitt  
919 W. Cucharras Street, Ste 100  
Colorado Springs, CO 80905  
719-465-2519

Prepared By:



321 W. Henrietta Ave.  
SUITE 2A  
Woodland Park, CO 80863  
719-426-2124

**FINAL DRAINAGE LETTER for  
LOT 1, WOODMEN HILLS FIL NO. 7H**

**Engineer's Statement:**

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

**Certification Statement:**

This report and plan for the preliminary and final drainage design for the LOT 1, WOODMEN HILLS FIL NO. 7H was prepared by me (or under my direct supervision) in accordance with the provisions of City of Colorado Springs/El Paso County Drainage Criteria Manual Volumes 1 and 2 Drainage Design and Technical Criteria for the owners thereof. I understand that El Paso County does not and will not assume liability for drainage facilities designed by others.

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

\_\_\_\_\_  
Date

**Developer's Statement:**

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

WD Construction hereby certifies that the drainage facilities for LOT 1, WOODMEN HILLS FIL NO. 7H shall be constructed according to the design presented in this report. I understand that El Paso County does not and will not assume liability for the drainage facilities designed and or certified by my engineer and that the El Paso County reviews drainage plans pursuant to Colorado Revised Statues, Title 30, Article 28; but cannot, on behalf of LOT 1, WOODMEN HILLS FIL NO. 7H, guarantee that final drainage design review will absolve WD Construction and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

\_\_\_\_\_  
WD Construction  
Business Name

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_  
919 W. Cucharras Street, Ste 100  
\_\_\_\_\_  
Colorado Springs, CO 80905

**El Paso County:**

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

\_\_\_\_\_  
Jennifer Irvine, PE  
County Engineer/ECM Administrator

\_\_\_\_\_  
Date

Conditions:

## **DRAINAGE LETTER for LOT 1, WOODMEN HILLS FIL NO. 7H**

### **PURPOSE**

The purpose of this drainage letter is to confirm that the proposed development of the Falcon Eye Care Commercial building proposed on Lot 1, Woodmen Hills Filing No. 7H conforms to the concepts presented in the “Final Drainage Report for Falcon Eye Care, Woodmen Hills Filing 7. Lot 4” prepared by Kiowa Engineering Corporation. The site layout developed with the replat is being used in final site design and concepts presented in the final drainage report are being followed in final site design submittal.

### **GENERAL LOCATION AND DESCRIPTION**

The parcel is located within the southeast quarter of section 6, township 13S, range 64 west of the 6<sup>th</sup> principal meridian in El Paso County. The overall parcel previously platted as Lot 4, Woodmen Hills Filing No. 7 is being replatted into Lots 1 and 2, Woodmen Hills Filing No. 7H. Lot 1, Woodmen Hills Filing No. 7, proposed for development of Falcon Eye Care, contains 0.79 acres of the overall 1.63-acre replat.

The parcel is located within the Woodmen Hills commercial development and is located West of McLaughlin Road, North of Midnight Road, South of Greenough Road, and West of the existing Safeway grocery store. The subject 0.79 acres contains existing. The parcel was previously overlot graded with the development of the overall commercial center. The site has been revegetated and contains moderate cover of grasses and a small number of perimeter shrubs and small trees. The site drains overland to the southeast at approximately 1.5% slope to the existing commercial drive aisle. Underlying soils within the site consists of Columbine gravelly sandy loam and Blakeland loamy sand, Hydrologic Group A soils, as delineated by the USDA Web Soil Survey developed in the Final Drainage Report.

The development lies within the Falcon drainage basin and runoff from the developed Lot 4 was anticipated in and is tributary to detention pond 4 as defined in the “Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report for Woodmen Hills Subdivision”, prepared by URS Greiner Woodward Clyde, dated December 23, 1998.

### **EXISTING DRAINAGE BASINS**

Drainage patterns as detailed in previous reports will remain and outlet points maintained.

### **DEVELOPED DRAINAGE BASINS**

The final drainage report identifies Lots 1 and 2 of Woodmen Hills Filing No. 7H as basin D1 indicated as 1.63 acres of graded commercial land. Graded to approximately 1-2%. The “Area Drainage Summary” provided in the appendix of the FDR indicates composite C values of 0.9 for both the 5-year and 100-year recurrence events, a total time of concentration of 7.6 minutes, and anticipates total flows of  $Q_5=7$  cfs and  $Q_{100}=12$  cfs.

Show and label these parking lot inlet(s) that are applicable to this site on drainage map on the last page. Also describe them in more detail, in this text and show capacity calcs.

The Final Drainage Report indicates that the vicinity has existing storm drainpipes that collect surface flows and discharge to detention pond 4 as defined in the Final Drainage Report for Filing 7. The Phase III Preliminary and Filing 7 Final Drainage Report indicates that the subject parcel lies within sub basin 33b and are on-site within the Safeway Commercial Area. 5-year and 100-year anticipated flows from sub basin 33b are  $Q_5=11.55$  cfs and  $Q_{100}=20.67$  cfs and are tributary to parking lot inlets which capture and convey flows to the storm sewer trunk line designed with the filing. Flows generated within sub basin 33b are tributary to Detention Pond #4 installed with Filing No. 7 improvements. Detention pond #4 provides WQCV with 40 hour drain time and staged outlet structure to control peak outflows from the 2-year, 5-year, and 100-year recurrence storm events.

Lot 1, Woodmen Hills Filing No. 7H will sheetflow to the southeast into existing Filing No. 7 parking and drive aisle improvements. Developed commercial density flows were anticipated from basin 33b and are collected within inlet and pipe systems and conveyed to Detention Pond #4 which provides WQCV and storm detention for the parcel.

Flow for the northern half of the site is directed to and concentrated at a curb cut and riprap pad. Describe this in more detail. Is there an agreement with the adjacent property owner that allows this flow to be conveyed across their lot? Please elaborate.

### **FLOODPLAIN STATEMENT**

No portion of the parcel lies within a FEMA designated Floodplain per FIRM panel 08041C0553G, Effective Date 12/07/2018.

### **COST ESTIMATE**

No drainage improvements are proposed with the development of Lot 1, Woodmen Hills Filing No. 7H.

### **DRAINAGE FEE CALCULATION**

The proposed Lot 1, Woodmen Hills Filing No. 7H was previously platted as Lot4, Woodmen Hills Filing No. 7 and drainage fees were provided at original platting. There are no drainage fees associated with the replat.

### **SUMMARY**

The proposed development of Lot 1, Woodmen Hills Filing No. 7H was previously anticipated in infrastructure development of the Woodmen Hills commercial development. Water Quality and Detention was developed for anticipated commercial development on the parcel and the proposed development will not adversely affect downstream and surrounding developments.

The following note was made during the EA:

*Previously approved drainage report indicates runoff to be conveyed to regional pond #4 of woodmen hills. Study done by the county in 2011 indicated deficiencies in the pond. Water quality was possibly not included in this regional pond. Drainage letter to address water quality/detention and the condition of the existing regional pond and how they will mitigate their impacts if the regional pond is deficient.*

It appears that this note is mostly addressed at the top of this page. However, it would be helpful to discuss the 2011 deficiencies if they are known. Was the pond retro-fitted to fix deficiencies? Discuss.

The site was included in the following drainage studies:

“Final Drainage Report Falcon Eye Care, Woodmen Hills Filing 7, Lot 4, El Paso County, Colorado,” prepared by Kiowa Engineering Corporation, dated September 17, 2020.

“Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report for Woodmen Hills Subdivision”, prepared by URS Greiner Woodward Clyde, dated December 23, 1998

“Master Development Drainage Plan for Woodmen Hills Subdivision,” prepared by URS Greiner, dated October 7, 1998.

## APPENDIX

**PHASE III PRELIMINARY & FILING 7 FINAL  
DRAINAGE and EROSION CONTROL  
REPORT FOR WOODMEN HILLS SUBDIVISION,  
FALCON, COLORADO,  
EL PASO COUNTY**

**December 23, 1998**

Prepared for:

**FALCON PROPERTIES AND INVESTMENTS, LLP  
P.O. BOX 62039  
COLORADO SPRINGS, CO 80962**

Prepared by:

**URS GREINER WOODWARD CLYDE  
8415 EXPLORER DR, SUITE 110  
COLORADO SPRINGS, CO 80920**

**URSGWC Project No. 67-00042238.07**

east of Midnight result in a combined captured 100-year design flow of 50.4 cfs.

In the event of any or all of these inlets clogging, excess runoff will pond in the McLaughlin gutter before flowing into the Safeway parking lot. A swale will be graded in the parking lot to provide an emergency overland flow path to Detention Pond #4 following the proposed storm sewer route.

Subbasins 34a, 34c, and 33d drain to the low point in McLaughlin Road at the second access to the Safeway commercial area (Drain points 7 and 8). 5-year and 100-year design flows for subbasins 34a are 57.26 cfs and 98.07 cfs; for subbasin 34c, 2.72 cfs and 4.80 cfs; and for subbasin 33d, 2.63 cfs and 4.64 cfs. 15-ft. sump inlets will also be located at the low point at the second access to the Safeway area. With future commercial development, the storm sewer lateral will need to be extended upstream into the commercial area of sub-basin 34a in order to sufficiently capture runoff from this area. These parking lot inlets will be designed by the site engineer as part of the final grading and parking lot layout. They should be designed to capture a total of approximately 31.8 cfs for the 100-year Storm. Design flow at the 15-sump inlets is 84.0 cfs. These inlets will connect to storm sewer #1 via a 48" RCP to Design Point 4, ultimately discharging to Pond #4.

Subbasins 33b, 33c, 33e, and 33f are on-site within the Safeway commercial area. 5-year and 100-year design flows for subbasin 33b are 11.55 cfs and 20.67 cfs; for subbasin 33c, 22.10 cfs and 38.67 cfs; for subbasin 33e, 16.8 cfs and 30.39 cfs; for subbasin 33f, 29.41 cfs and 52.36 cfs. The site engineer has designed the parking lot inlets to capture and convey these flows to the storm sewer trunk line and their design has been submitted for your information under a separate cover.

Subbasins 34b and 35g are tributary to design point 9 on Woodmen Road. Subbasins 33g and 35f are tributary to Woodmen Road at design point 10. 5-year and 100-year design flows for subbasin 34b are 3.78 cfs and 6.68 cfs respectively; for subbasin 35g, 3.18 cfs and 5.61 cfs; for subbasin 33g, 7.06 cfs and 12.63; for subbasin 35f, 9.17 cfs and 16.17 cfs. Runoff from the Woodmen Road extension will be captured by four 15-ft. on grade inlets. Because only the southern portion of Woodmen Road will be constructed initially, only the two inlets on the south/west side of the street will be constructed at this time. Two, 15-ft. inlets will be constructed with the ultimate alignment of Woodmen Road on the northeast curb to capture the additional runoff. These four inlets will discharge to a swale at the toe of the slope of the roadway, ultimately draining to Detention Pond #4 via a grass-lined swale. The swale will cross the pond embankment through a single 36-inch CMP. The grass-lined swale will have a minimum slope 0.5%, a trapezoidal cross-section with a 5-ft bottom and 4-1 side slopes. A maximum depth of 2.25 ft. provides the necessary freeboard for a 100-year design flow of 36 cfs.

Bypass flow from the on-grade inlets in Woodmen Rd. will be discharged to the existing roadside ditch along U.S. Highway 24. Maximum bypass under ultimate conditions will be approximately 3.86 cfs. This is less than the existing condition runoff from this area to the ditch.

Subbasins 34d and 35h drain west towards Meridian Road. 5-year and 100-year design flows for subbasin 34d are 6.24 cfs and 11.01 cfs; for subbasin 35h design flows are 2.84 cfs and 5.02 cfs for the 5-year and 100-year storms respectively.



## Storm Sewer System #2

Subbasins 35a and 35b are tributary to design point 13 on McLaughlin Road. Subbasin 35c is tributary to design point 14. 5-year and 100-year design flows for subbasin 35a are 23.77 cfs and 42.33 cfs for subbasin 35b, 8.22 cfs and 14.51 cfs; for subbasin 35c, 8.87 and 15.65 cfs. Combined runoff at design point 13 is 30.38 cfs and 54.10 cfs for the 5-year and 100-year design storms respectively. Much of the runoff from subbasin 35a will be collected by inlets and storm sewer to be designed by the site engineer in conjunction with development of the commercial site. It was assumed that at least half of the 100-year runoff from basin 35a would be captured by the on-site system, i.e. 21.1 cfs would be captured within basin 35a and the new 100-year design flow at design point 13 is 35.7 cfs. 15 foot on grade inlets will be located on McLaughlin Road at design points 13 and 14.

A 42-inch RCP storm sewer will convey runoff from design points 13 and 14, though the commercial area subbasin 35d, to Detention Pond #5. Again, on-site inlets will be required to capture runoff from subbasin 35d and convey it to the storm or directly to pond #5. The on-site system will be designed by the site engineer for this commercial area. 5-year and 100-year design flows from subbasin 35d are 71.51 cfs and 125.15 cfs respectively.

### D. Detention Pond Design

Detention Ponds 1 and 2 (Filing Numbers 5 and 6) have 17.47 and 18.50 acre-feet of storage, respectively. They release the 5-year and 100-year storms to at or near existing condition peak flows.

Detention Pond 3 at Eastonville Rd. will have approximately 29 acre-feet of storage including the Water Quality Capture Volume, and is proposed to be a Regional Detention Pond. The pond will have multiple outlet riser pipes with trash racks to control peak discharges.

Detention Pond #4 at Hwy 24 will have 33 Ac-ft of storage to the emergency spillway crest. 4.65 Ac-ft of storage is required for the WQCV, to an elevation of approximately 6852.84 ft. The WQCV outlet structure consists of a single 18-inch CMP "riser" with 1 row of 2-inch orifice openings (10 openings per row) at elevation 6851.0. The outlet will be packed in 4-inch rock to help prevent clogging of the orifice openings. The design discharge rate from the WQCV outlet is 1.4 cfs, which will drain the WQCV in approximately 40 hours. The discharge pipe from the WQCV outlet will be a 12" CMP at 0.5%, discharging to the stilling basin. The remainder of the outlet structure consists of three 36-inch riser pipes with trash racks designed to control peak outflows from the 2-year, 5-year and 100-year storms. The risers are at elevations 6854.0, 6854.5 and 6855.0. The outlet pipes are at a minimum slope of 3.0%, discharging to the stilling basin. Detention Pond design calculations follow in Appendix E.

Downstream impacts should be minimal, comparable to existing conditions.

The emergency spillway for Pond #4 is at elevation 6857.5; the pond bottom is at 6850.5. The bottom slopes toward the outlet at a minimum slope of 0.5%. A 15-ft gravel access road to the emergency spillway along the top of the western portion of the pond embankment also serves as the connection to the El Paso County Trail. Access to the pond bottom can be achieved from an access

**Final Drainage Report  
Falcon Eye Care  
Woodmen Hills Filing 7, Lot 4  
El Paso County, Colorado**

Prepared for:  
T- Bone Construction  
Colorado Springs, Colorado 80911

Prepared by:

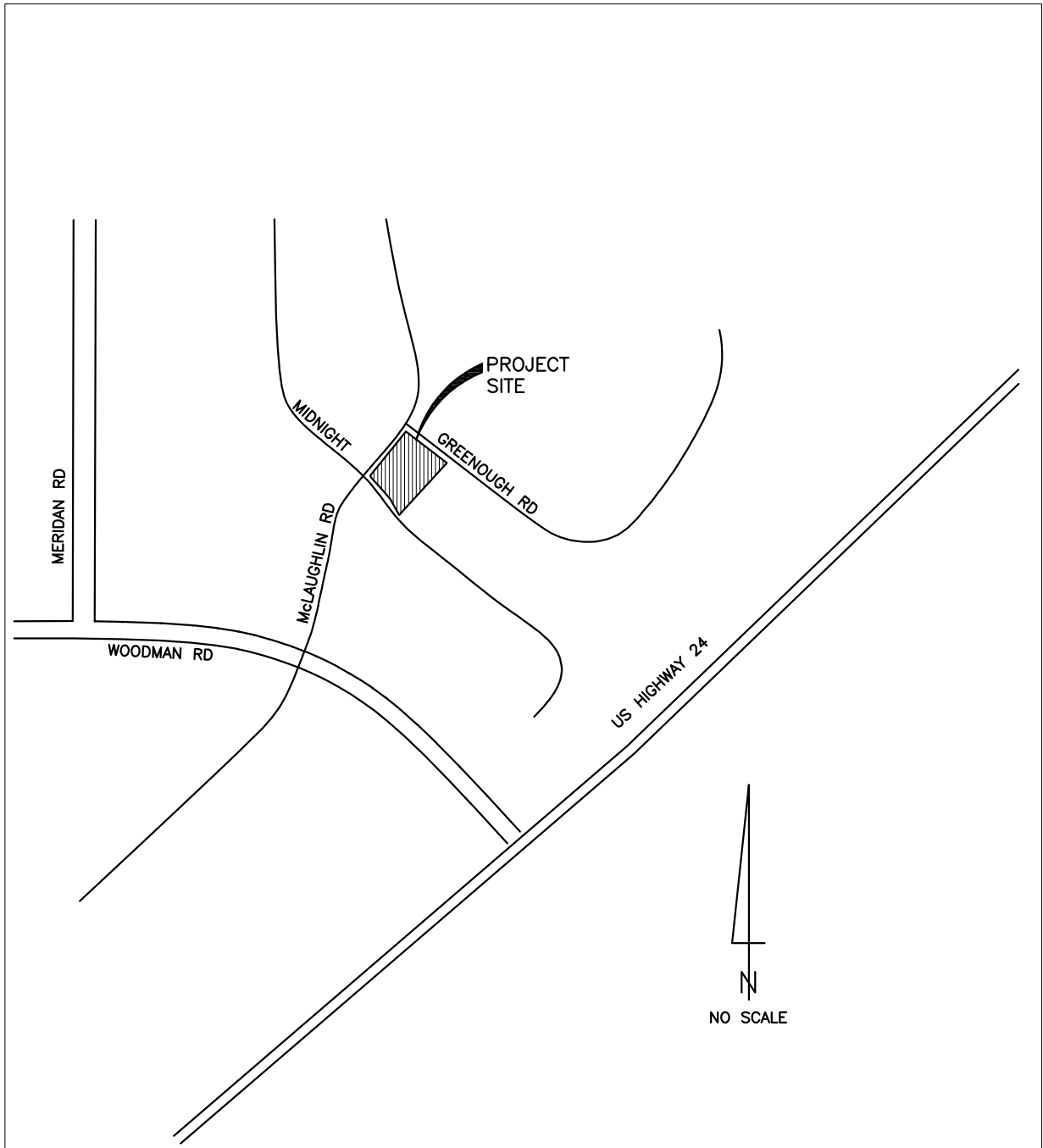
**Kiowa**  
Engineering Corporation

1604 South 21st Street  
Colorado Springs, Colorado 80904  
Ph: (719)630-7342

Kiowa Project No. 20034

Sept 17, 2020

PCD Project No. SF-XXXX



VICINITY MAP

Figure 1

**Falcon Eye Care - Woodmen Hills Filing 7, Lot 4**  
**Final Drairage Report**  
**Area Runoff Coefficient Summary - PROPOSED**

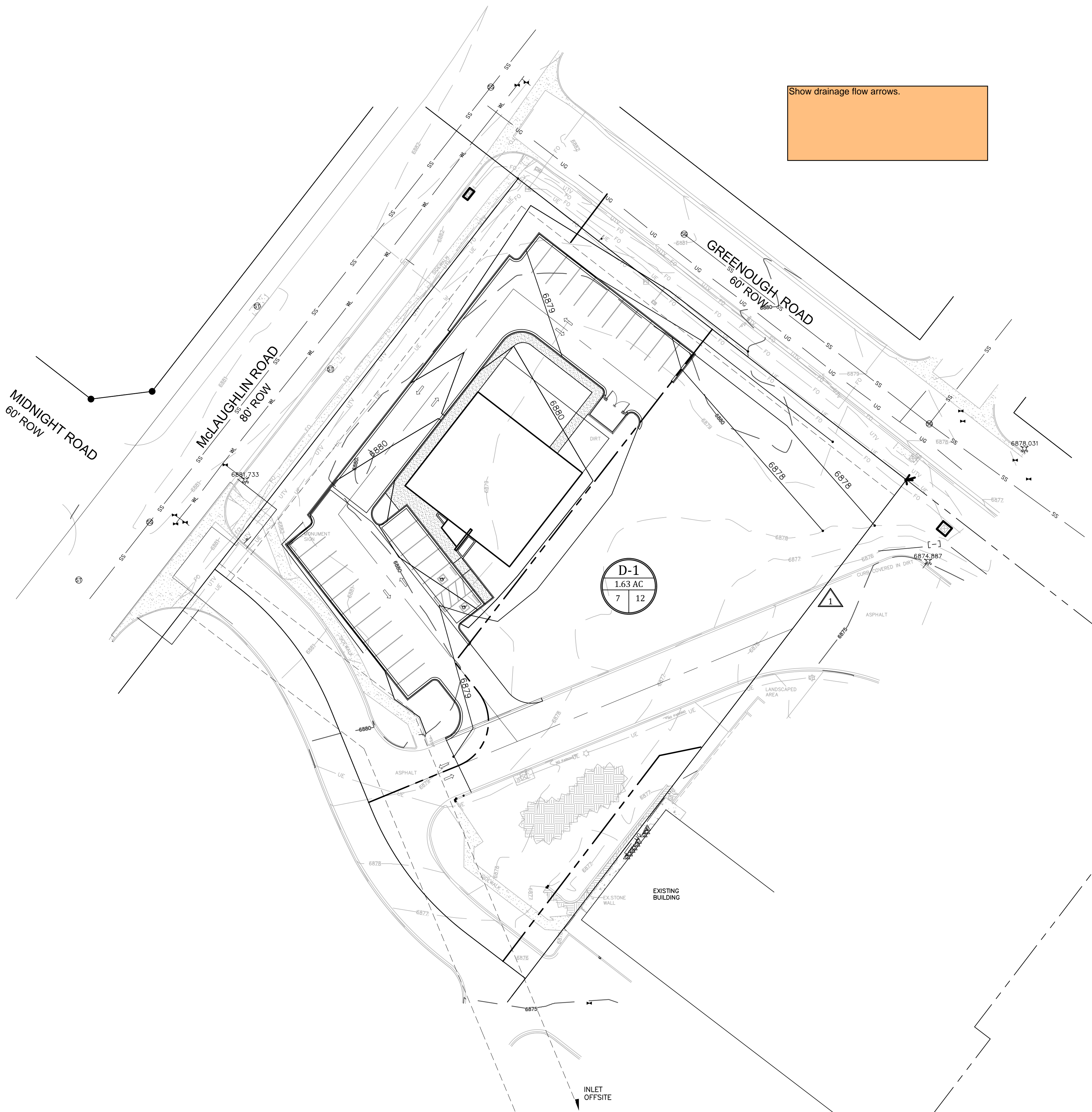
BASIN	TOTAL AREA		DEVELOPED			UNDEVELOPED			WEIGHTED	
	(SF)	(Acres)	AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	C <sub>100</sub>
D-1	71,334	1.6	1.6	0.90	0.90	0.0	0.15	0.20	0.90	0.90
				0.90	0.90	0.0	0.15	0.20	#DIV/0!	#DIV/0!

Calculated by: TAC  
Date: 9/15/2020  
Checked by: \_\_\_\_\_

**Falcon Eye Care - Woodmen Hills Filing 7, Lot 4**  
**Final Drainage Report**  
**Area Drainage Summary - PROPOSED**

BASIN	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				CA		INTENSITY		TOTAL FLOW				
	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Height (ft)	T <sub>c</sub> (min)	Grass/Paved	Length (ft)	Slope (%)	Velocity (fps)	T <sub>t</sub> (min)	T <sub>t</sub> TOTAL (min)	CA <sub>5</sub>	CA <sub>100</sub>	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (c.f.s.)	Q <sub>100</sub> (c.f.s.)
D-1	1.6	0.90	0.90	0.15	10	1	3.3	Paved	360	1.0%	1.4	4.3	7.6	1.47	1.47	4.5	7.9	7	12
				0.15			0.0					0.0	#DIV/0!			#DIV/0!	#DIV/0!		
							0.0					0.0	#DIV/0!						

Calculated by: TAC  
 Date: 9/15/2020  
 Checked by: \_\_\_\_\_



NOTES:  
 1) ALL ELEVATIONS ARE FLOW LINE UNLESS OTHERWISE INDICATED.  
 2) ADD 6800 TO SPOT ELEVATIONS.

LEGEND	
	DRAINAGE BASIN DESIGNATION DRAINAGE BASIN ACRES C100 RUNOFF
	5-YEAR RUNOFF 100-YEAR RUNOFF
	DIRECTIONAL FLOW ARROW
	DRAINAGE BASIN C BOUNDARY
	DRAINAGE BASIN D BOUNDARY
	INTERIM (FILING 10) 100-YR W.S.EL.
	ULTIMATE (FILINGS 10-12) 100-YR W.S.EL.
	DESIGN POINT
	TIME OF CONCENTRATION PATH
	HYDRAULIC STRUCTURE IDENTIFIER
	STORM SEWER IDENTIFIER
	PROPOSED STORM SEWER PIPE
	PROPOSED STORM SEWER MANHOLE
	PROPOSED STORM DRAINAGE CURB INLET
	EXISTING CONTOURS
	PROPOSED CONTOURS

Show drainage flow arrows.

Show and label ultimate inlet that site runoff is conveyed to.

**FALCON FAMILY EYE CARE  
 7615 McLAUGHLIN ROAD  
 DEVELOPED CONDITIONS MAP  
 PEYTON, COLORADO**

Project No.:	20034
Date:	8/27/2020
Design:	TAC
Drawn:	EAK
Check:	TAC
Revisions:	

