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 El Paso County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

Richard L. Schindler, P.E. #33997 Date
For and on Behalf of Core Engineering Group, LLC

OWNER'S STATEMENT

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

Lorson, LLC Date

By
Jeff Mark

Title
Manager

Address
212 N. Wahsatch Avenue, Suite 301, Colorado Springs, CO 80903

FLOODPLAIN STATEMENT

To the best of my knowledge and belief, this development is not located within a designated floodplain as shown on Flood Insurance Rate Map Panel No. and 08041C0957 G, dated December 7, 2018. (See Appendix A, FEMA FIRM Exhibit)

Richard L. Schindler, #33997 Date

EL PASO COUNTY

Filed in accordance with the requirements of the El Paso County Land Development Code, Drainage Criteria Manual, Volume 1 and 2, and Engineering Criteria Manual, As Amended.

Joshua Palmer, P.E. Date
Interim County Engineer/ECM Administrator

Conditions: _____

Remove Interim

Summary of Comments on PDR Redlines.pdf

Page: 3

Author: CDurham Subject: Callout Date: 8/17/2022 6:20:20 PM
Remove Interim

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 8:24:57 AM
removed

Design Point 3

Design Point 3 is located at the west side of Akela Lane at a low point and accepts flows from Akela Lane (Basin E1.2).

(5-year storm)

Tributary Basins: E1.2 **Inlet/MH Number:** Inlet DP3
Upstream flowby: **Total Street Flow:** 2.1cfs

Flow Intercepted: 2.1cfs **Flow Bypassed:** 0
Inlet Size: 5' type R, sump

Street Capacity: Street slope = 0.6%, capacity = 6.9cfs, okay

(100-year storm)

Tributary Basins: E1.2 **Inlet/MH Number:** Inlet DP3
Upstream flowby: **Total Street Flow:** 4.7cfs

Flow Intercepted: 4.7cfs **Flow Bypassed:**
Inlet Size: 5' type R, sump

Street Capacity: Street slope = 0.6%, capacity = 28.9cfs (half street) is okay

The overflow path on this sump inlet is west directly to Existing Pond E2

Design Point 4

Design Point 4 is the storm sewer pipe flow in Akela Lane from Design Pt's 2 and 3. The total pipe flow is 6.2cfs/13.8cfs in the 5/100-year storm events in the 24" storm sewer. The proposed storm sewer flows south and connects to an existing manhole constructed as part of Lorson Ranch East Filing No. 4. The existing type 1 storm manhole was constructed in LRE4 to accommodate a pipe size increase from 48" to 54" RCP and to accommodate flows from the future Akela Lane. The existing manhole was also constructed with a bulkheaded opening for a future 24" storm sewer (to the north) which will be connected to for this project. Included in this report is a hydraulic model of the storm sewer system including the existing 54" storm sewer draining to Pond E2. Per the hydraulic model, the HGL's meet criteria for the 5/100 year storm sewer events and not headwaters extend into the proposed 24" storm sewer.

Overflow Swale from Trappe Drive to Des. Pt. 4

There are two existing sump inlets on Trappe Drive located east of Des. Pt. 4 that need an overflow path between lots 8 and 9 to reach Pond E2. The design flow can be taken from the Lorson Ranch East Filing No. 4 final drainage report and is the total flow in the existing 48" storm sewer pipe. The total design flow is 211.5cfs in the 100-yr storm event. A trapezoid swale with a 16' bottom, 3:1 side slopes and a 1.5' depth will convey the overflow between the lots directly to Pond E2. Hydraulic calculations for the swale can be found in the appendix. Note that the swale will be lined.

6.0 DETENTION AND WATER QUALITY PONDS

Detention and Storm Water Quality for Creekside at Lorson Ranch Filing No. 2 is required per El Paso County criteria. There are two existing permanent full spectrum ponds including water quality that were designed/constructed to accommodate developed runoff from this development to be in compliance with the Lorson Ranch East MDDP. The ponds have been constructed and include access roads, outlet pipes, overflow structures, and low flow channels. Existing Pond D2 treats/detains runoff for the "D" basins (Lorson Ranch East Filing No. 1) and Existing Pond E2 treats/detains runoff for the "E"

8 I don't see how Basin E1.5 is conveyed to Pond E2. Please convey this flow to the pond or discuss the applicable WQ exclusion(s)

Page: 10

Author: CDurham Subject: Text Box Date: 8/18/2022 2:01:54 PM
Note that the swale will be lined.

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 8:29:22 AM
text added.

Author: Glenn Reese - EPC Stormwater Subject: SW - Textbox with Arrow Date: 8/22/2022 9:21:11 AM
I don't see how Basin E1.5 is conveyed to Pond E2. Please convey this flow to the pond or discuss the applicable WQ exclusion(s)

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 8:32:19 AM
added ECM section for undeveloped land.

basins (Creekside South Filing No. 1). The pond spreadsheets from the full spectrum design MHFD spreadsheets are included in the appendix of this report. Both existing ponds function as designed.

Water Quality

All developed areas within this project are directed to Existing Pond D2 or Existing Pond E2 and both existing ponds are full spectrum WQ/Detention ponds owned/maintained by Lorson Ranch Metro District. Runoff from Basin E1.5 (Tract A) which is an open space tract adjacent to the East Tributary of Jimmy Camp Creek is allowed to drain west directly to the creek.

7.0 DRAINAGE AND BRIDGE FEES

Creekside South at Lorson Ranch Filing No. 2 is located within the Jimmy Camp Creek drainage basin which is currently a fee basin in El Paso County. Current El Paso County regulations require drainage and bridge fees to be paid for platting of land as part of the plat recordation process.

Table 7.1: Public Drainage Facility Costs (non-reimbursable)

Item	Quantity	Unit	Unit Cost	Item Total
Inlets/Manholes	4	EA	$3000/EA	$12,000
18" Storm	155 160	LF	$35	$5,425
24" Storm	83 96	LF	$40	$3,320
			Subtotal	$20,745
			Eng/Cont (10%)	$2,075
			Total Est. Cost	$22,820

Creekside South at Lorson Ranch Filing No. 2 contains 6.009acres and is in the JCC drainage basin. The 2022 drainage fees are $21,134, bridge fees are $989 and Drainage Surety fees are $7,285 per impervious acre per Resolution 21-468 . The drainage and bridge fees are calculated when the final plat is submitted and are due at plat recordation. Lorson Ranch intends to use the Bridge Fee credits for the bridge fees and pay drainage/surety fees unless the Jimmy Camp Creek DBPS drainage fee structure is updated by El Paso County. The following table details the drainage fees for this filing:

Table 7.2: 2022 Drainage/Bridge Fees

Type of Land Use	Total Area (ac)	Imperviousness	Drainage Fee	Bridge Fee	Surety Fee
JCC Residential Area	4.79	62%	$62,763	$2,937	$21,634
Open Space, Landscape Tracts	1.22	2%	$515	$24	$177
		Total	$63,278	$2,961	$21,811

Include calculation to
was obtained, when u
in Appendix B it show
imperviousness.

Page: 11

Author: CDurham Subject: Text Box Date: 8/18/2022 3:39:42 PM
160

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 8:34:04 AM
added

Author: CDurham Subject: Text Box Date: 8/18/2022 3:39:44 PM
96

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 8:34:08 AM
added

Author: CDurham Subject: Callout Date: 8/18/2022 2:26:54 PM
Include calculation to show how this imperviousness was obtained, when under "C" calculation spreadsheet in Appendix B it shows all basins with 65% imperviousness.

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 8:42:08 AM
fees updated

Page: 29

Author: CDurham Subject: Text Box Date: 8/18/2022 9:47:05 AM

Include Basins EX-E3 to EX-E5

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 8:55:02 AM

added

CORE
ENGINEERING GROUP
15004 1st Avenue South
Burnsville, MN 55306

PROJECT NAME: *Creekside South at Lorson Ranch Filing No. 2*
PROJECT NUMBER: *100.069*
ENGINEER: *LAB*
DATE: *Feb. 3, 2022*

Preliminary Drainage Plan
CURRENT CONDITIONS COEFFICIENT "C" CALCULATIONS

BASIN	Soil No.	Hydro Group	Area	Cover (%)	C5	Wtd. C5	C100	Wtd. C100	Impervious	Type of Cover
EX-E1	108	B	3.64	97.85%	0.09	0.09	0.36	0.35	100%	Undeveloped
	52	C	0.08	2.15%	0.16	0.00	0.51	0.01	80%	Undeveloped
			3.72	100.00%		0.09		0.36		
EX-E2	108	B	0.38	36.54%	0.09	0.03	0.36	0.13	10%	Undeveloped
	52	C	0.66	63.46%	0.16	0.10	0.51	0.32	10%	Undeveloped
			1.04	100.00%		0.13		0.46		

Include Basins EX-E3 to EX-E5

Page: 31

Author: CDurham Subject: Text Box Date: 8/18/2022 2:22:57 PM

Include Basins E1.4 & E1.5 in spreadsheet

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 9:38:30 AM

ADDED

2 10 10 15 15 15 15 15 15 28

CORE ENGINEERING GROUP

15004 1st Avenue South
Burnsville, MN 55306

PROJECT NAME: *Creekside South at Lorson Ranch 2*
PROJECT NUMBER: *100.069*
ENGINEER: *LAB*
DATE: *Nov. 23, 2021*

Preliminary Drainage Plan
PROPOSED CONDITIONS COEFFICIENT "C" CALCULATIONS

BASIN	Soil No.	Hydro Group	Area	Cover (%)	C5	Wtd. C5	C100	Wtd. C100	Impervious	Type of Cover
D1.1	108	B	0.09	15.79%	0.45	0.07	0.59	0.09	65%	1/8 ac. Single Family
	52	C	0.48	84.21%	0.49	0.41	0.65	0.55	65%	1/8 ac. Single Family
			0.57	100.00%		0.48		0.64		
D1.2	108	B	0.53	96.36%	0.45	0.43	0.59	0.57	65%	1/8 ac. Single Family
	52	C	0.02	3.64%	0.49	0.02	0.65	0.02	65%	1/8 ac. Single Family
			0.55	100.00%		0.45		0.59		
D1.3	108	B	0.00	0.00%	0.45	0.00	0.59	0.00	65%	1/8 ac. Single Family
	52	C	0.61	100.00%	0.49	0.49	0.65	0.65	65%	1/8 ac. Single Family
			0.61	100.00%		0.49		0.65		
E1.1	108	B	2.32	99.57%	0.45	0.45	0.59	0.59	65%	1/8 ac. Single Family
	52	C	0.01	0.43%	0.49	0.00	0.65	0.00	65%	1/8 ac. Single Family
			2.33	100.00%		0.45		0.59		
E1.2	108	B	1.19	93.70%	0.45	0.42	0.59	0.55	65%	1/8 ac. Single Family
	52	C	0.08	6.30%	0.49	0.03	0.65	0.04	65%	1/8 ac. Single Family
			1.27	100.00%		0.45		0.59		
E1.3	108	B	0.06	18.75%	0.45	0.08	0.59	0.11	65%	1/8 ac. Single Family
	52	C	0.26	81.25%	0.49	0.40	0.65	0.53	65%	1/8 ac. Single Family
			0.32	100.00%		0.48		0.64		

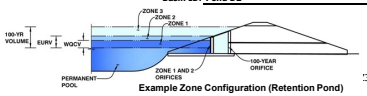
Include Basins E1.4 & E1.5 in spreadsheet

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: Creekside South Filing No. 2

Basin ID: Pond D2



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.74	1.552	Orifice Plate
Zone 2 (EURV)	4.74	3.454	Rectangular Orifice
Zone 3 (100+1/2WQCV)	6.94	4.248	Weir&Pipe (Restrict)
Total (all zones)		9.254	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

			Calculated Parameters for Plate		
Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	3.194E-02	ft^2
Depth at top of Zone using Orifice Plate =	2.74	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	9.00	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	4.60	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.80	1.60	2.40				
Orifice Area (sq. inches)	4.60	4.60	4.60	4.60				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Rectangular	Not Selected			Calculated Parameters for Vertical Orifi: Zone 2 Rectangular	Not Selected
Invert of Vertical Orifice =	2.80	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.14	N/A
Depth at top of Zone using Vertical Orifice =	4.88	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.42	N/A
Vertical Orifice Height =	10.00	N/A	inches			
Vertical Orifice Width =	2.00		inches			

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Calculated Parameters for Overflow We: Zone 3 Weir	Not Selected
Overflow Weir Front Edge Height, Ho =	5.00	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.00	N/A
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	20.02	N/A
Overflow Weir Grate Slope =	20.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	5.81	N/A
Horiz. Length of Weir Sides =	20.00	N/A	feet	Overflow Grate Open Area w/o Debris =	63.36	N/A
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	31.68	N/A
Debris Clogging % =	50%	N/A	%			

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Calculated Parameters for Outlet Pipe w/ Flow Restriction Pla: Zone 3 Restrictor	Not Selected
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	10.91	N/A
Outlet Pipe Diameter =	54.00	N/A	inches	Outlet Orifice Centroid =	1.64	N/A
Restrictor Plate Height Above Pipe Invert =	35.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.87	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway		
Spillway Invert Stage=	7.02	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	1.87	feet
Spillway Crest Length =	30.00	feet	Stage at Top of Freeboard =	11.89	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.34	acres
Freeboard above Max Water Surface =	3.00	feet	Basin Volume at Top of Freeboard =	15.93	acre-ft

Routed Hydrograph Results — *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AA*

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	1.552	5.006	4.691	6.579	8.219	10.357	12.122	14.334
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	4.691	6.579	8.219	10.357	12.122	14.334
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	11.2	31.0	47.0	81.8	103.0	129.7
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.13	0.37	0.56	0.97	1.22	1.54
Peak Inflow Q (cfs) =	N/A	N/A	89.3	127.5	155.1	199.5	233.7	277.7
Peak Outflow Q (cfs) =	0.7	2.0	1.8	5.2	17.1	47.2	73.5	114.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.4	0.6	0.7	0.9
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.0	0.2	0.7	1.1	1.8
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	37	66	65	72	71	69	68	66
Time to Drain 99% of Inflow Volume (hours) =	39	70	69	78	78	77	76	75
Maximum Ponding Depth (ft) =	2.74	4.74	4.41	5.34	5.71	6.16	6.44	6.80
Area at Maximum Ponding Depth (acres) =	1.53	1.82	1.80	1.88	1.91	1.95	1.98	2.01
Maximum Volume Stored (acre-ft) =	1.566	5.023	4.426	6.116	6.836	7.686	8.237	8.956

Pond is not meeting 40-hour drain time requirement

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Author: CDurham Subject: Callout Date: 8/18/2022 2:32:03 PM

Pond is not meeting 40-hour drain time requirement

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 10:15:28 AM

file updated.

Page: 58

Author: CDurham Subject: Callout Date: 8/18/2022 3:29:02 PM

Include "line" across channel for BFE location

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 9:07:21 AM

added

Author: CDurham Subject: Line Date: 8/18/2022 3:28:11 PM

Author: CDurham Subject: Line Date: 8/18/2022 3:28:20 PM

Author: CDurham Subject: Callout Date: 8/18/2022 3:27:12 PM

This area needs to be included as a basin

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 9:07:34 AM

added to ex-e1

Page: 59

Author: Glenn Reese - EPC Stormwater Subject: SW - Textbox with Arrow Date: 8/22/2022 9:21:17 AM

Add in which WQ exclusion (with ECM chapter reference) applies to this basin.

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 9:13:14 AM

ADDED

Author: CDurham Subject: Text Box Date: 8/18/2022 3:26:14 PM

Label BFE's

Author: RSchindler Subject: Sticky Note Date: 8/24/2022 9:10:52 AM

labels added