
Ryan Johnson
Town of Eagle
1050 Chambers Avenue
Eagle, Colorado 81631
Ryan.Johnson@TownOfEagle.org

Subject: 629 Sawatch Road
Drainage Letter

Ryan:

Yarnell Consulting and Civil Design LLC (YCCD) has been retained as the professional civil engineer-of-record for the redevelopment of the approximately one-acre subject property. The purpose of this letter is to summarize the existing and proposed drainage patterns for the site, and confirm the redevelopment is in conformance with the master drainage study for the subdivision.

Existing Conditions

Presently, the subject property is primarily covered with gravel pavement. The structures on the site include two (2) mobile office units connected by a walkway, and a shed. Boulder walls define the west and north limits of the property. There are a few shipping containers and storage trailers on the site.

There is an existing stub to receive subsurface drainage near the west corner of the property. It is presently not being utilized. Alternatively, drainage flows overland from north to south across the property. Some run-on is received from the property toward the northeast. Surface water leaves the site near the south corner and enters an ill-defined ditch along the north side of Sawatch Road. From there, it is conveyed southwesterly approximately 410 linear feet to an existing inlet. From there, drainage is conveyed into an existing regional detention and water quality pond on Lot 2A within the subdivision. This pond was evaluated and design changes proposed by YCCD in the *700 Chambers Avenue Subdivision Regional Detention Pond Drainage Report* dated 25 January 2022. The analysis assumed each site within the tributary basin was developed to 80% impervious. Therefore, any redevelopment must ensure it does not exceed 80% imperviousness on the site, or else modifications to the pond are required.

The property was evaluated as a single drainage basin (EX1) as shown on *Drainage Plan (Existing)* sheet D1. The accompanying Rational Method analysis indicates the site discharges approximately 2.5 CFS during a 100-year storm event.

Proposed Conditions

It is proposed to redevelop the site with a single building intended to serve both warehouse and industrial purposes. Additionally, concrete driveways and walkways, an asphalt parking lot (including stalls and a drive aisle), and a trash enclosure will be constructed. Some landscaping will be built around the perimeter of the site.

As shown on the attached *Drainage Plan (Proposed)* sheet D2, the redeveloped site has been evaluated as two (2) sub-basins. The first (PR1) is approximately 0.61 acres in area and 91% impervious. Run-off generated within this sub-basin is captured and tributary to the proposed, on-site, private storm drainage system for conveyance to the existing stub located near the west corner of the property. The second (PR2) is approximately 1.00 acres in area and 21% impervious. Run-off generated within this sub-basin flows overland and is tributary to the ditch along Sawatch Road. The run-on received from the property to the southeast will continue to be received on-site and conveyed to Sawatch Road.

The accompanying Rational Method analysis indicates two (2) important items relative to the project. First, it confirms the composite imperviousness of the site is approximately 48% -- well below the 80% maximum required to be in conformance with the master drainage study for the subdivision. Second, the analysis estimates the drainage flow rates from the redevelopment. This information is included in the table below.

Sub-Basin	Area (acres)	Imperviousness	25-year Run-off Rate (CFS)	100-year Run-off Rate (CFS)
PR1	0.61	91%	1.7	2.2
PR2	1.00	21%	1.3	2.2

Given that sub-basin PR1 is tributary to the on-site, 12-inch stub, it is critical to confirm the stub has capacity for the anticipated flow rate of 2.2 CFS. Per the attached Hydraflow Express analysis, we estimate the pipe to be approximately 50% full under the anticipated flow rate.

Since sub-basin PR2 is tributary to the ditch along Sawatch Road, it is imperative that the flow rate not exceed that which is existing (2.5 CFS) so as not to worsen the downstream drainage conditions within the right-of-way. Given that we estimate a run-off rate of 2.2 CFS during the 100-year storm event, the result is a reduction relative to the present-day condition of 2.5 CFS. Therefore, the redevelopment is in conformance with applicable town drainage standards.

Summary

In summary, the proposed redevelopment of the subject property is in conformance with the master drainage report for the subdivision, as well as town standards. The composite imperviousness of the redeveloped site is less than 80% which means the regional detention and water quality pond can serve this site without needing modifications. Plus, there is not anticipated to be an increase in run-off leaving the site and entering the Sawatch Road right-of-way.

Do let me know if you have any questions.

P.O. Box 3901
Eagle, Colorado 81631

**YARNELL CONSULTING &
CIVIL DESIGN, LLC**
(970) 323-7008 • 2/10/2025

229 Midland Ave.
Basalt, Colorado 81621

Sincerely,

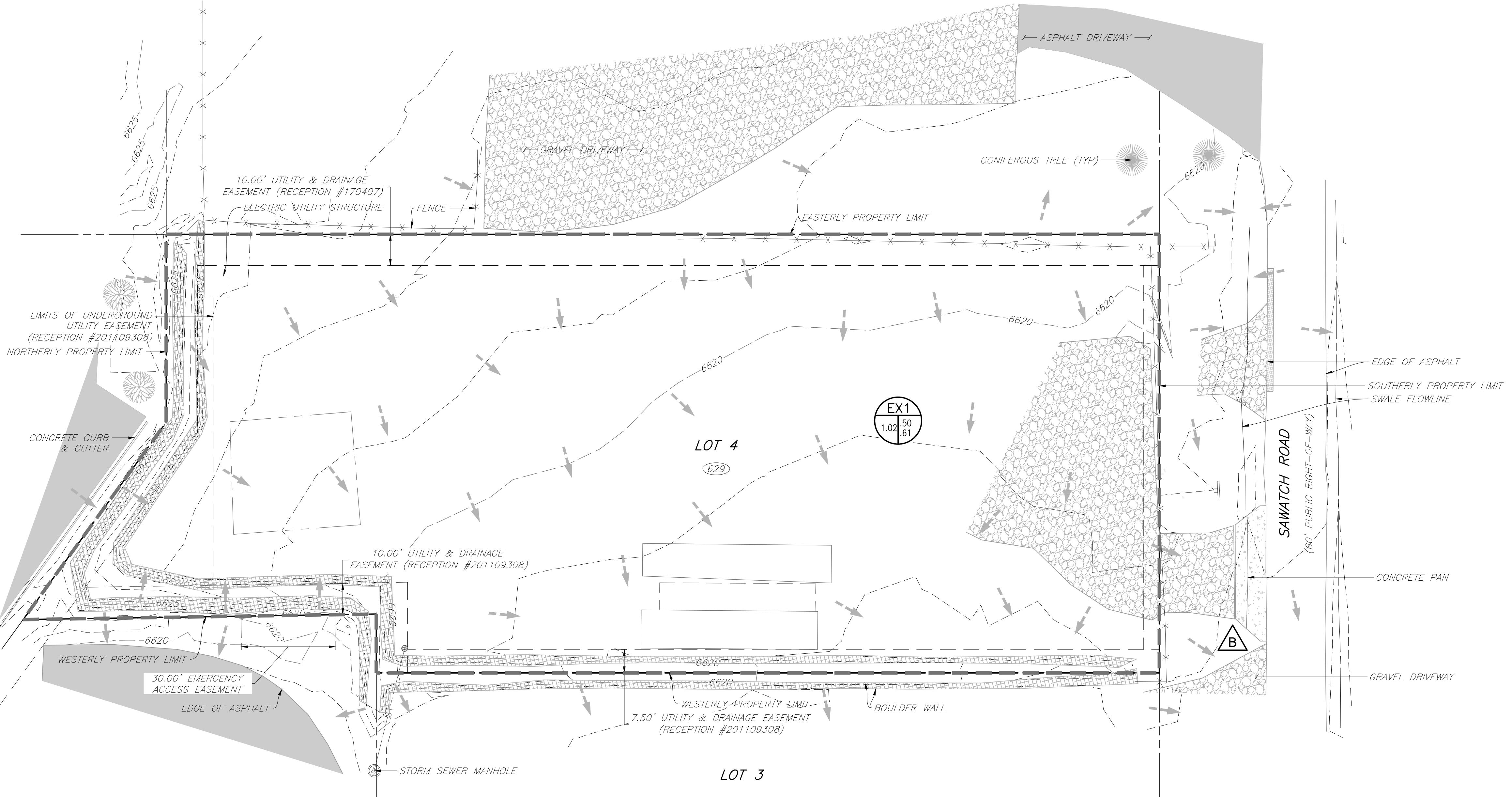


Justin J. Yarnell, PE
Colorado PE Number 47241



Attachments:

1. *Drainage Plan (Existing)* sheet D1
2. Rational Method calculations – Existing
3. *Drainage Plan (Proposed)* sheet D2
4. Rational Method calculations – Proposed
5. Hydraflow Express analysis for pipe capacity

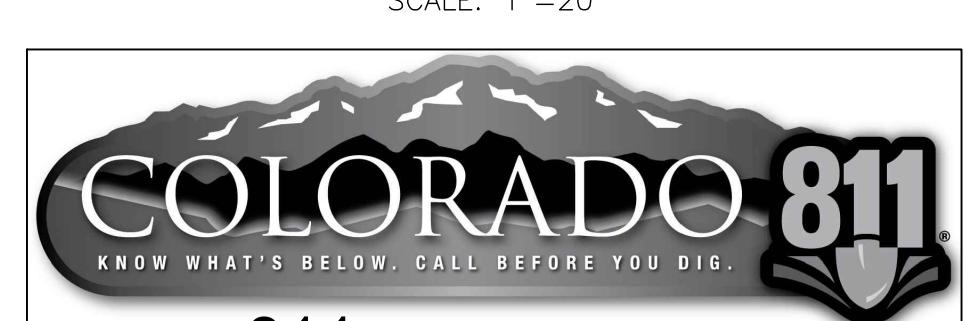


NOTES:

1. FOR ADDITIONAL INFORMATION REGARDING THE DRAINAGE PATTERNS AND FLOW RATES FOR THE PROJECT, RE: DRAINAGE REPORT.

YARNELL CONSULTING & CIVIL DESIGN, LLC
P.O. BOX 3901 EAGLE, COLORADO 81631
(970) 323-7008

WAREHOUSE / INDUSTRIAL FACILITY
629 SAWATCH ROAD
LOT 4, 700 CHAMBERS SUBDIVISION
EAGLE, COLORADO



CALL 811 2-BUSINESS DAYS IN ADVANCE
BEFORE YOU DIG, GRADE OR EXCAVATE FOR
MARKING OF UNDERGROUND MEMBER UTILITIES

ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS.
THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM
THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE
CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE SIZE,
MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES
PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.

DESIGN BY: J. YARNELL	NO. ISSUE / REVISION	DATE	NAME
DRAWN BY: J. YARNELL	1. SCHEMATIC DESIGN (NO CONST.)	12/19/24	JY
REVIEWED BY: J. YARNELL	2. DESIGN DEVELOPMENT (NO CONST.)	1/17/25	JY
	3.	JY	
PROJECT NO: 23.005	4.	JY	
DATE: 2/10/2025	5.	JY	

SHEET TITLE
DRAINAGE PLAN
(EXISTING)

SHEET NO.
D1

P.O. Box 3901
Eagle, Colorado 81631

**YARNELL CONSULTING &
CIVIL DESIGN, LLC**

129 Midland Avenue
Basalt, Colorado 81621

(970) 323-7008

2/10/2025

Project Name: 629 Sawatch Road

Project No.: 23.005

RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Existing

Jurisdiction: Town of Eagle

Soil Type: B	STORM EVENT:		2	5	10	25	100	PERCENT IMPERVIOUS
	RUNOFF COEFF.:		C ₂	C ₅	C ₁₀	C ₂₅	C ₁₀₀	
	SURFACE	Landscape	0.01	0.01	0.07	0.26	0.44	
		Roof	0.74	0.77	0.79	0.82	0.85	
		Asphalt	0.84	0.86	0.87	0.88	0.90	
		Concrete	0.74	0.77	0.79	0.82	0.85	
		Gravel	0.29	0.32	0.38	0.50	0.61	

SUB-BASIN	AREA (ac)	AREA PER SURFACE CHARACTERISTIC (ac)					COMPOSITE RUNOFF COEFFICIENTS					COMPOSITE IMPERVIOUS
		Landscape	Roof	Asphalt	Concrete	Gravel						
EX1	1.02					1.02	0.29	0.32	0.38	0.50	0.61	40.0%
	0.00											
	0.00											
	0.00											
	0.00											
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TOTAL	1.02	0.00	0.00	0.00	0.00	1.02	0.29	0.32	0.38	0.50	0.61	40.0%

129 Midland Avenue
Basalt, Colorado 81621

YARNELL CONSULTING & CIVIL DESIGN, LLC

(970) 323-7008

2/10/2025

P.O. Box 3901
Eagle, Colorado 81631-3901

Project Name: 629 Sawatch Road

Project No.: 23.005

RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Existing

STANDARD FORM SF-2 (TIME OF CONCENTRATION SUMMARY)

*All calculations are per UDFCD (Volume 1), Chapter 5

TOC

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Basalt, Colorado 81621

YARNELL CONSULTING & CIVIL DESIGN, LLC

P.O. Box 3901
Eagle, Colorado 81631-3901

(970) 323-7008

2/10/2025

Project Name: 629 Sawatch Road

Project No.: 23.005

RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Existing

STANDARD FORM SF-3 (STORM DRAINAGE SYSTEM DESIGN)

Return Period: 25-YEAR

Rainfall Depth: 0.886

*All calculations are per UDFCD (Volume 1), Chapter 5

25-YEAR

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2/10/2025

Project Name: 629 Sawatch Road

Project No.: 23.005

RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Existing

STANDARD FORM SF-3 (STORM DRAINAGE SYSTEM DESIGN)

Return Period: 100-YEAR

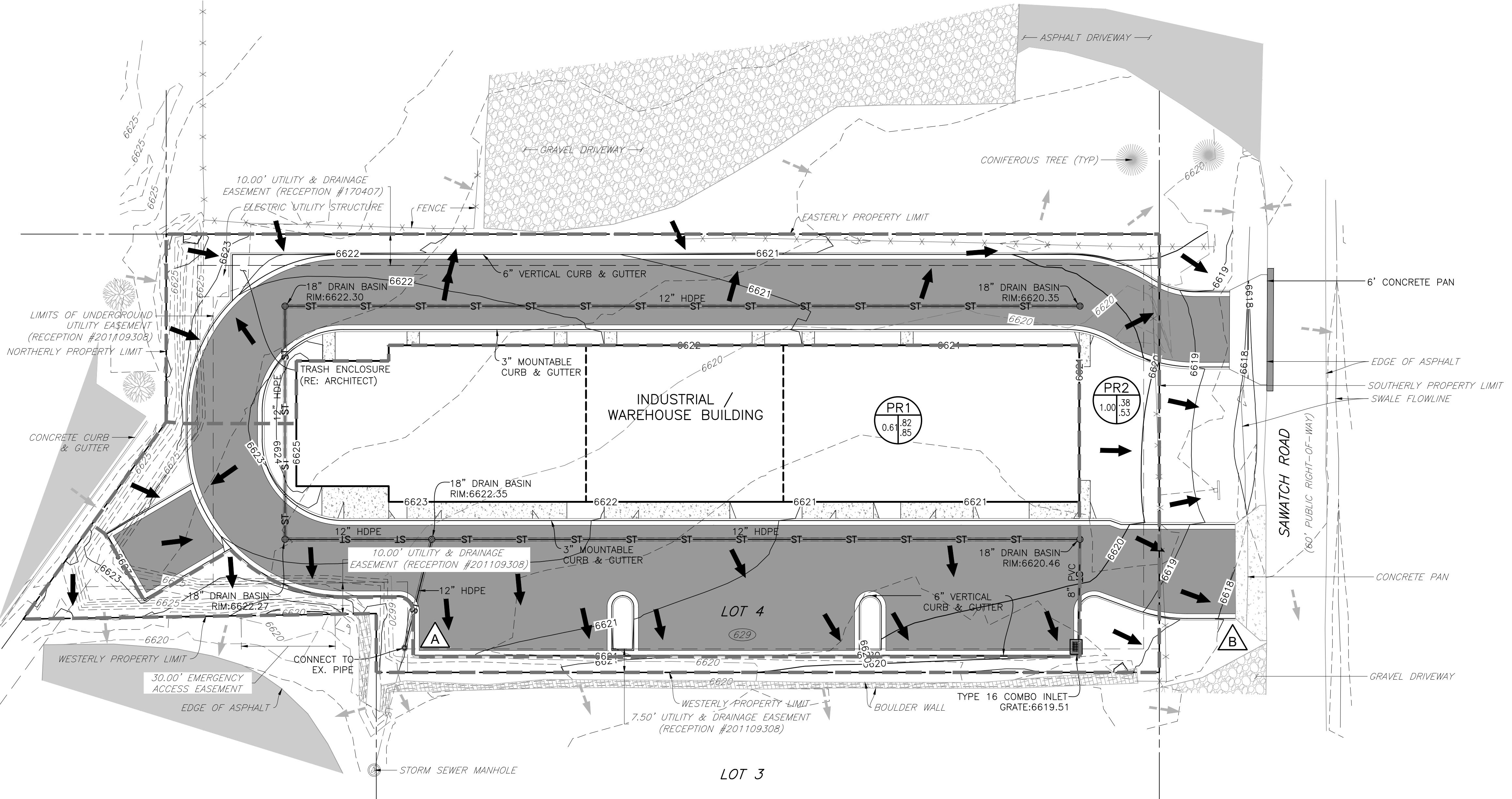
Rainfall Depth: 1.18

*All calculations are per UDFCD (Volume 1), Chapter 5

100-YEAR

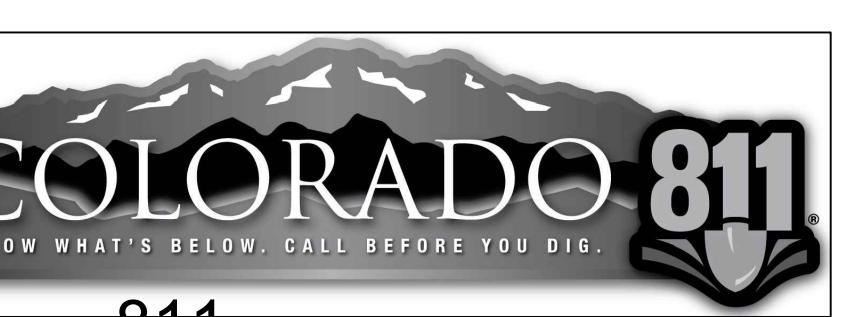
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NOTES:

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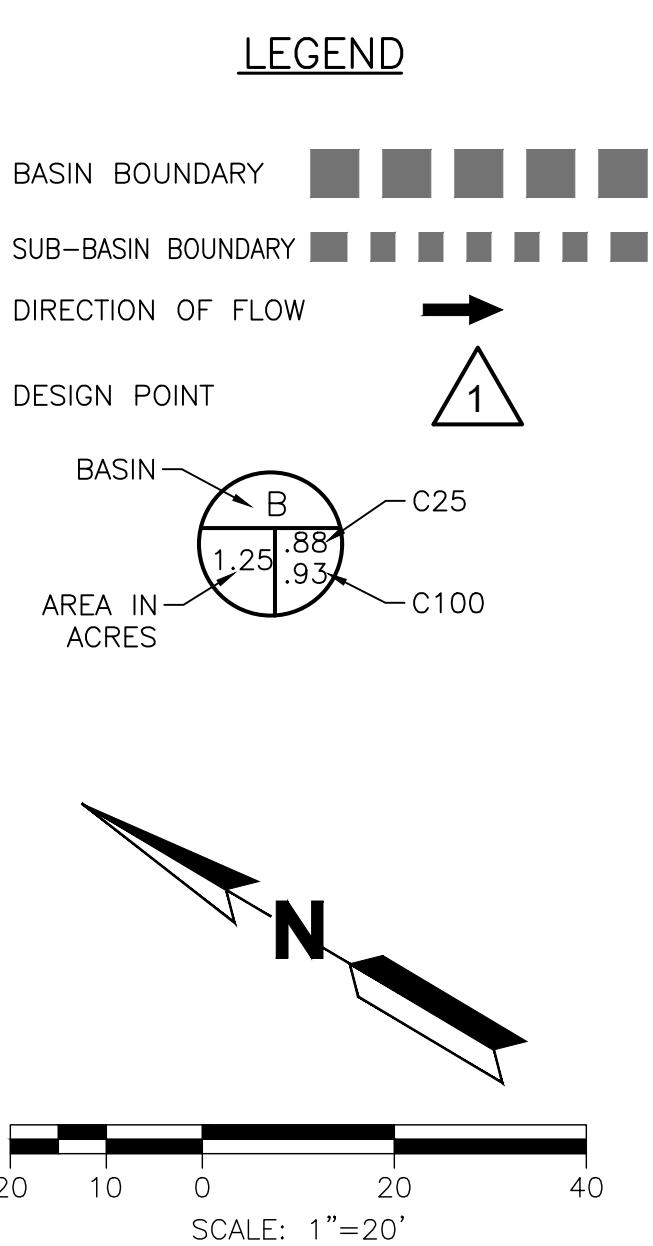
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**WAREHOUSE /
INDUSTRIAL FACILITY**
629 SAWATCH ROAD
LOT 4, 700 CHAMBERS SUBDIVISION
EAGLE, COLORADO



20 10 0 20 40
SCALE: 1"=20'

DESIGN BY: J. YARNELL
NO. ISSUE / REVISION
1. SCHEMATIC DESIGN (NO CONST.)
DRAWN BY: J. YARNELL
2. DESIGN DEVELOPMENT (NO CONST.)
REVIEWED BY: J. YARNELL
3.
PROJECT NO.: 23.005
DATE: 2/10/2025
4.
5.

SHEET TITLE
DRAINAGE PLAN (PROPOSED)

SHEET NO.
D2

P.O. Box 3901
Eagle, Colorado 81631

**YARNELL CONSULTING &
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129 Midland Avenue
Basalt, Colorado 81621

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2/10/2025

Project Name: 629 Sawatch Road

Project No.: 23.005

RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Proposed

Jurisdiction: Town of Eagle

Soil Type: B		STORM EVENT:		2	5	10	25	100	PERCENT IMPERVIOUS			
		RUNOFF COEFF.:		C ₂	C ₅	C ₁₀	C ₂₅	C ₁₀₀				
		SURFACE	Landscape	0.01	0.01	0.07	0.26	0.44				
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			Concrete	0.74	0.77	0.79	0.82	0.85				
			Gravel	0.29	0.32	0.38	0.50	0.61				
SUB-BASIN	AREA (ac)	AREA PER SURFACE CHARACTERISTIC (ac)					COMPOSITE RUNOFF COEFFICIENTS					
		Landscape	Roof	Asphalt	Concrete	Gravel						
PR1	0.61	0.03	0.28	0.28	0.03		0.75	0.77	0.79			
PR2	1.00	0.80		0.19	0.00		0.17	0.18	0.23			
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TOTAL	1.61	0.83	0.28	0.47	0.03	0.00	0.39	0.41	0.44	0.55	0.65	47.7%

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Project Name: 629 Sawatch Road

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RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Proposed

STANDARD FORM SF-2 (TIME OF CONCENTRATION SUMMARY)

*All calculations are per UDFCD (Volume 1), Chapter 5

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Project No.: 23.005

RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Proposed

STANDARD FORM SF-3 (STORM DRAINAGE SYSTEM DESIGN)

Return Period: 25-YEAR

Rainfall Depth: 0.886

*All calculations are per UDFCD (Volume 1), Chapter 5

25-YEAR

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Project Name: 629 Sawatch Road

Project No.: 23.005

RATIONAL METHOD DRAINAGE CALCULATIONS

Storm Event: Proposed

STANDARD FORM SF-3 (STORM DRAINAGE SYSTEM DESIGN)

Return Period: 100-YEAR

Rainfall Depth: 1.18

*All calculations are per UDFCD (Volume 1), Chapter 5

100-YEAR

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Channel Report

12-inch HDPE at 1.0% Slope

Circular

Diameter (ft) = 1.00

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.010

Calculations

Compute by: Known Q

Known Q (cfs) = 2.20

Highlighted

Depth (ft) = 0.49

$$Q \text{ (cfs)} = 2.200$$

Area (sqft) = 0.38

$$\text{Velocity (ft/s)} = 5.72$$

Wetted Perim (ft) = 1.55

Crit Depth, Y_c (ft) = 0.64

Top Width (ft) = 1.00

EGL (ft) = 1.00

