FINAL DRAINAGE REPORT for

McDonald's Lot 2B, Block 3
Eby Creek Subdivision
Eagle, CO

Owner:
ANB Bank
3033 East 1st Avenue, Suite 300
Denver, CO 80206

Developer:
McDonald's USA, LLC.
110 North Carpenter Street
Chicago, Illinois 60607

Engineer:
Kimley-Horn and Associates, Inc.
2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903

Project #: 096806041

November 26, 2025

Kimley»Horn

CERTIFICATION

ENGINEER'S STATEMENT

I hereby certify that this *Final Drainage Report* for the design of Eby Creek Subdivision, Lot 2B, Block 3, was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Eagle Drainage Design Criteria and was designed to comply with the provisions thereof. I understand that the Town of Eagle does not and will not assume liability for drainage facilities designed by others.

SIGNATURE (Affix Seal): _____

Colorado P.E. No. 59054 Date

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PURPOSE AND SCOPE OF STUDY

PURPOSE AND SCOPE OF STUDY

The purpose of this report is to outline the Final Drainage Report for Lot 2B, Block 3 of the Eby Creek Subdivision, located northwest of the intersection of Eby Creek Road and Interstate 70 (the "Property"), Eagle, Colorado (the "Town"). This Final Drainage Report identifies on-site and offsite drainage patterns, storm sewer and inlet locations, areas tributary to the site and proposes to safely route developed storm water to adequate outfalls. The Property is approximately 1.07 acres in size.

GENERAL LOCATION AND DESCRIPTION

LOCATION

The proposed improvements consist of the construction of an approximately 4,115 square-foot McDonald's, fast-food restaurant building with a dual drive-thru, parking lot, utilities, and landscaping (the "Project") within the Property. Of the approximately 1.07 acres of the lot, approximately 0.84 acres is being disturbed (the "Site"), as the Project is a redevelopment of an existing Burger King. The foundation of the existing Burger King building is to be reused with a 541 square foot building addition on the east side of the existing building footprint. The existing retaining wall on the west side of the Site is to remain, and much of the existing curb and utilities are to remain. The Project is located within the East ½ of Section 32, Township 4 South, Range 84 West of the Principle Meridian, Town of Eagle, County of Eagle, State of Colorado. The Property is bounded by the following:

- Eby Creek Road and Lot 2A, Block 3 of Eby Creek Subdivision to the north
- Interstate 70 on-ramp and Eby Creek Road to the east
- Interstate 70 on-ramp and CDOT ROW to the south
- Lot 2A, Block 3 and Open Space, Block 3 of Eby Creek Subdivision to the west

The Property is currently an existing, vacant Burger King and consists of an existing 3,574 SF building, asphalt and concrete parking lot and drive aisles, drive-through, trash enclosure, retaining wall, associated utilities and storm sewer system, and water quality pond. The Property generally slopes from northeast to southwest with the existing stormwater outfall being Eby Creek, located south of the Site, with an ultimate outfall to Eagle River. Reference the Appendix for the Vicinity Map.

DESCRIPTION OF PROPERTY

The Property is approximately 1.07 acres in size, and the Site has a disturbed land acreage of approximately 0.84 acres. The Project involves the construction of an approximately 4,115 square foot McDonald's fast-food restaurant with a dual drive-thru.

NRCS soil data is available for this Site (see Appendix) and the on-site soils are USCS Hydrologic Soil Group B. Group B soils have a moderate infiltration rate and possess a moderate rate of water transmission. This Site specifically is comprised of Almy loam and Yamo loam.

The Property is within Special Flood Hazard Area Zone A on the west side of the Property along Eby Creek. There is also an existing 50' riparian setback from Eby Creek on the west side of the Property. The disturbed area of the Site does not encroach with the 50' riparian setback. The existing modified water quality pond outfalls just outside of this 50' riparian setback, as does the existing water quality pond outfall. The Site slopes at approximately 2% to 8% from the northeast to the southwest. This historic runoff pattern will generally be maintained and unaffected with the proposed Project.

The existing landscaped areas of the Project are currently comprised of native grasses, sage brush, trees, weeds, and disturbed ground.

No known previous drainage studies have been conducted for the site.

DRAINAGE DESIGN CRITERIA

DEVELOPMENT CRITERIA REFERENCE

The proposed and existing storm facilities are in compliance with the Town of Eagle Drainage Design Criteria (the "CRITERIA") and the Mile High Flood Control District Manual (the "MANUAL"). There are no deviations from the CRITERIA and MANUAL with the proposed drainage design.

HYDROLOGIC CRITERIA

The 5-year and 100-year design storm events were used in determining rainfall and runoff for the proposed drainage system per the CRITERIA. NOAA Atlas 14 is the source for rainfall data for the 5-year and 100-year design storm events. Design runoff was calculated using the Rational Method for developed conditions as established in the MANUAL. Runoff coefficients for the proposed development were determined per the MANUAL by calculating weighted impervious values for each specific site basin. The water quality capture volume is provided by a modified water quality pond. Based upon this approach, the drainage design provided for the Site is conservative and in keeping with the historic drainage concept for the area.

HYDRAULIC CRITERIA

The existing storm sewer inlet and pipe were analyzed in accordance with the CRITERIA and MANUAL. Floodplain identification was determined using FIRM panels by FEMA. Hydraulic calculations were computed using Bentley Flowmaster. Results of the hydraulic calculations are provided in the Appendix. There are no additional provisions selected or deviations from the CRITERIA or MANUAL.

Inlet capacity calculations are provided in the Appendix for the calculated 5-year and 100-year flows routed to the existing grated inlet on-site, and Bentley Flowmaster calculations are provided for the 2ft wide rectangular concrete pan. The capacity of each inlet and concrete pan is adequate for the 100-year developed flows for each sub-basin.

DRAINAGE BASINS AND SUB-BASINS

MAJOR BASIN DESCRIPTIONS

The Project is within the Eagle River Watershed. The major drainage basin is mostly undeveloped land. Site drainage facilities (water quality pond) are existing that provide water quality for the Project. The existing water quality pond is to be modified with the redevelopment. On-site detention is not required and water attenuation for the major storm is provided in Eby Creek.

EXISTING DRAINAGE CONDITIONS

In existing conditions, the Property predominantly drains from northeast to southwest to the existing grate inlet on the center of the east parking lot outfalling to a grassed swale, an existing curb cut and grassed swale in the southwest corner, and over the existing retaining wall to Eby Creek. The Property and existing water quality pond, located in the southwest corner of the Property, outfall to Eby Creek. An existing drainage map is provided in the Appendix.

Eby Creek is ultimately tributary to Eagle River.

There is one off-site drainage basin tributary to the Site, Sub-basin EX1, located to the east of the Property. It is assumed that any future, adjacent off-site development will not impact any on-site flows.

DRAINAGE FACILITY DESIGN

GENERAL CONCEPT

The developed runoff from the Site will generally be collected by means of private roof drains, trench drain, an existing grate storm sewer inlet located in the drive aisle, and curb cuts and rectangular concrete pans outfalling to an existing grassed swale in the southwest side of the Property, flowing to an existing water quality pond. The water quality pond is to be regraded due to sediment build-up and vegetation overgrowth to provide the required water quality capture volume for the disturbed site. The east portion of the Site will surface flow to the existing grate inlet within the drive aisle, and the roof drain will outfall directly to the existing 18” CMP storm sewer pipe before outfalling to the existing grass swale south of the Site which flows to the water quality pond. The west portion of the Site will surface flow to proposed 2’ curb cuts and rectangular concrete pans before outfalling to the existing grass swale south of the Site which flows to the water quality pond. The water quality pond in the southwest corner of the Property provides water quality for the Site and outfalls to Eby Creek.

The Project has been divided into 7 sub-basins, R1, A1, A2, OS, EX1A, EX1B, and EX2. Offsite flow is routed directly to Eby Creek, following historic drainage patterns.

The Property is within Special Flood Hazard Area Zone A on the west side of the Property along Eby Creek. There is also an existing 50’ riparian setback from Eby Creek on the west side of the Property. The rest of the Property is within Zone X, Area of Minimal Flood Hazard. No structures or proposed site features are located in Special Flood Hazard Area Zone A or the 50’ riparian setback.

DRAINAGE DETAILS

Sub-Basin R1

Sub-basin R1 is 0.09 acres and consists of the rooftop of the proposed building. The runoff developed within this sub-basin is collected via a private building roof drain. The roof drain discharges to the existing 18" CMP storm sewer pipe before outfalling to the existing grass swale and water quality pond for water quality treatment prior to discharging into Eby Creek. Developed runoff during the 5-year and 100-year events are 0.42 cubic feet per second (cfs) and 0.74 cfs respectively.

Sub-Basin A1

Sub-basin A1 is 0.36 acres and consists of primarily the northeast portion of the Site with concrete and asphalt pavement and sidewalks, trash enclosure, and landscape islands. The runoff developed within this sub-basin is collected primarily via a private existing grate inlet within the drive aisle, and a small portion of the northwest corner of the basin is collected via trench drain outfalling to the parking lot via a curb punch out, that outfalls to the existing grass swale and water quality pond for water quality treatment prior to discharging into Eby Creek. The developed direct runoff from sub-basin A1 is 1.54 cfs for the 5-year event and 2.78 cfs for the 100-year event.

Sub-Basin A2

Sub-basin A2 is 0.37 acres and consists primarily of the south and west portions of the Site with concrete and asphalt pavement and sidewalks and landscape areas. The runoff developed within this sub-basin is collected via proposed 2' curb cuts and rectangular concrete pans outfalling to the existing grass swale and water quality pond for water quality treatment prior to discharging into Eby Creek. The developed direct runoff from sub-basin A2 is 1.18 cfs for the 5-year event and 2.36 cfs for the 100-year event.

Sub-Basin OS

Sub-basin OS is 0.02 acres and consists of the proposed landscaping areas in the southwest corner of the Site. Runoff flows directly into Eby Creek. The developed direct runoff from sub-basin OS is 0.01 cfs for the 5-year event and 0.08 cfs for the 100-year event. It is not practical to collect runoff in this area due to the small landscaped area, and it maintains historic drainage patterns.

Sub-Basin EX1A

Sub-basin EX1A is 0.18 acres of offsite areas to the northwest of the Site that remain undisturbed with the development of the Site. The sub-basin consists mostly of existing landscaping and a portion of the shared access drive and sidewalk to the Property. The runoff developed within this sub-basin is collected via proposed 2' curb cuts and rectangular concrete pans outfalling to the existing grass swale. The developed direct runoff from sub-basin EX1A is 0.20 cfs for the 5-year event and 0.76 cfs for the 100-year event.

Sub-Basin EX1B

Sub-basin EX1B is 0.21 acres of offsite area to the north of the Site that remains undisturbed with the development of the Site. The sub-basin consists of existing landscaping. The runoff developed within this sub-basin is collected via a private existing grate inlet within the drive aisle that outfalls to the existing grass swale. The developed direct runoff from sub-basin EX1B is 0.15 cfs for the 5-year event and 0.86 cfs for the 100-year event.

Sub-Basin EX2
Sub-basin EX2 is 0.18 acres of existing, undisturbed landscaped areas to the southwest, south, and southeast of the Site. The runoff developed within this sub-basin flows offsite to Eby Creek. It is not practical to collect runoff in this area due to the area remaining undisturbed and maintaining historic drainage patterns. The developed direct runoff from sub-basin EX2 is 0.12 cfs for the 5-year event and 0.69 cfs for the 100-year event.

DETENTION AND WATER QUALITY REQUIREMENTS

Water quality treatment is provided by the existing re-graded water quality pond in the southwest corner of the Property. Detention is not required for the Site. The re-graded water quality pond provides 1,271 cubic feet of volume, which satisfies the calculated required 1,132 cubic feet of water quality capture volume. The calculations for the Site were completed to determine water quality capture volume with the redeveloped and disturbed areas of the Site. The proposed calculations are provided in the Appendix.

According to the geotechnical exploration report by UES Professional Solutions, LLC ("UES"), dated October 2, 2025 (UES Project No.: A25170.01259.000), no groundwater was encountered on-site up to depths of 11.5 feet.

FLOODPLAIN STATEMENT

The Flood Insurance Rate Map (FIRM) 08037C0387D effective date December 4, 2007, by FEMA, indicates that the Site is located in Zone X (outside of the 500-year flood plain) and Zone A, Special Flood Hazard Area. This panel is included in the Appendix.

CONCLUSIONS

COMPLIANCE WITH STANDARDS

The drainage design presented within this report for McDonald's conforms to the CRITERIA and MANUAL. Additionally, the Site runoff and storm drain facilities are not anticipated to adversely affect the downstream and surrounding developments. Historic drainage patterns are maintained,

The percentage weighted imperviousness in the existing condition for the Site was 86%, and the percentage weighted imperviousness in the proposed condition for the Site is 84%. Overall, the percentage weighted imperviousness is decreased from existing conditions. Therefore, the proposed Project is in general compliance with the CRITERIA and MANUAL in terms of allowable flows generated.

Existing conditions are also improved because the developed Project captures and treats impervious flows that were previously flowing west and overtopping the existing wall directly to Eby Creek.

The proposed Project drainage basins are captured by a private storm sewer network and water quality pond for water quality treatment and are ultimately routed to Eby Creek.

No variances from the CRITERIA or MANUAL are requested.

REFERENCES

1. Town of Eagle Drainage Design Criteria

2. Mile High Flood District Drainage Criteria Manual (MHFD), Vol. 1, prepared by Wright-McLaughlin Engineers, June 2001, with latest revisions.

3. Flood Insurance Rate Map, Eagle County, Colorado and Incorporated Areas, Map Number 08037C0387D, Effective Date December 4, 2007, prepared by the Federal Emergency Management Agency (FEMA).

4. Geotechnical Exploration Report, McDonald's No. 51052, 295 Eby Creek Road, Eagle, CO. Prepared by UES Professional Solutions, LLC, October 2, 2025.

APPENDIX

VICINITY MAP, SOILS MAP, AND FEMA FIRM PANEL

NORTH

VICINITY MAP

NOT TO SCALE


106° 49' 48" W
106° 49' 41" W
343000
343020
343040
343060
343080
343100
343120
343140
343160
39° 39' 40" N
39° 39' 33" N
4391750
4391730
4391710
4391690
4391670
4391650
4391630
4391610
4391590
4391570
4391550
Eby Creek Rd
Eby Creek
6
115
105
70
Soil Map may not be valid at this scale.
Map Scale: 1:1,080 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 15 30 60 90
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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: Aspen-Gypsum Area, Colorado, Parts of Eagle, Garfield, and Pitkin Counties
Survey Area Data: Version 15, Aug 29, 2024

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

Date(s) aerial images were photographed: Sep 5, 2021—Sep 7, 2021

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6	Almy loam, 1 to 12 percent slopes	B	1.6	27.5%
105	Torriorthents-Rock outcrop complex, 45 to 95 percent slopes	C	0.5	8.2%
115	Yamo loam, 6 to 12 percent slopes	B	3.6	64.3%
Totals for Area of Interest			**5.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

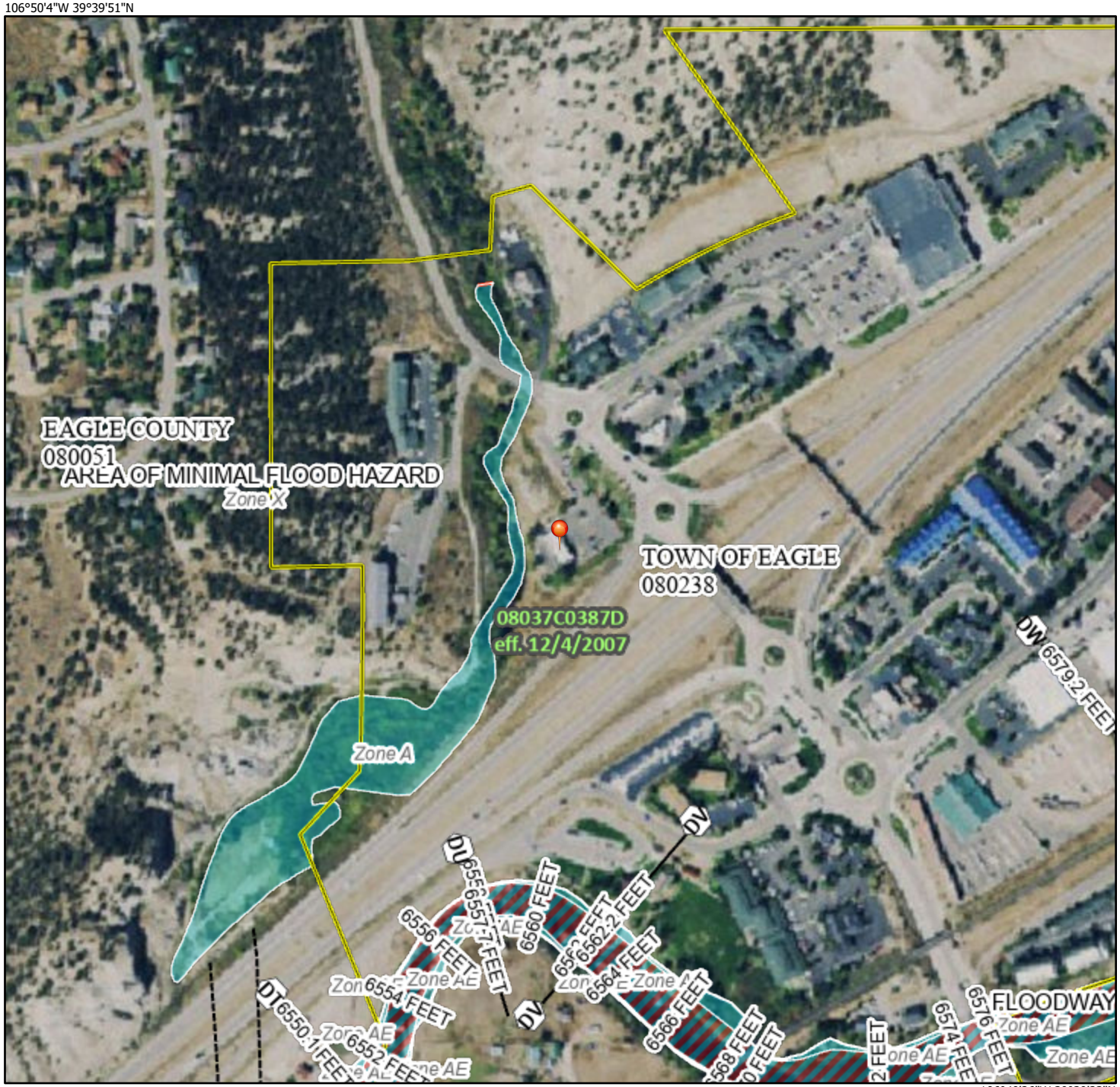
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

FEMA

106°50'4"W 39°39'51"N



106°49'26"W 39°39'23"N

Feet

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

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
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- 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 9/25/2025 at 11:07 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.

HYDROLOGIC CALCULATIONS

NOAA Atlas 14, Volume 8, Version 2
Location name: Eagle, Colorado, USA*
Latitude: 39.6603°, Longitude: -106.8286°
Elevation: 6621 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.103 (0.085-0.129)	0.155 (0.127-0.193)	0.238 (0.194-0.298)	0.306 (0.248-0.385)	0.397 (0.305-0.522)	0.466 (0.349-0.626)	0.533 (0.383-0.742)	0.601 (0.410-0.868)	0.688 (0.447-1.03)	0.752 (0.476-1.16)
10-min	0.152 (0.124-0.186)	0.227 (0.186-0.283)	0.349 (0.284-0.436)	0.448 (0.363-0.563)	0.581 (0.447-0.764)	0.682 (0.511-0.916)	0.781 (0.561-1.09)	0.879 (0.600-1.27)	1.01 (0.655-1.52)	1.10 (0.697-1.70)
15-min	0.185 (0.152-0.230)	0.277 (0.227-0.345)	0.425 (0.347-0.532)	0.546 (0.442-0.687)	0.709 (0.545-0.932)	0.832 (0.623-1.12)	0.952 (0.684-1.32)	1.07 (0.731-1.55)	1.23 (0.799-1.85)	1.34 (0.850-2.07)
30-min	0.255 (0.209-0.316)	0.350 (0.287-0.436)	0.505 (0.412-0.631)	0.634 (0.514-0.798)	0.813 (0.626-1.07)	0.951 (0.715-1.28)	1.09 (0.785-1.52)	1.23 (0.842-1.79)	1.42 (0.925-2.14)	1.56 (0.986-2.41)
60-min	0.332 (0.272-0.413)	0.423 (0.346-0.527)	0.574 (0.468-0.718)	0.703 (0.570-0.885)	0.886 (0.687-1.17)	1.03 (0.776-1.39)	1.18 (0.859-1.65)	1.33 (0.912-1.94)	1.54 (1.00-2.32)	1.70 (1.06-2.62)
2-hr	0.409 (0.338-0.505)	0.496 (0.409-0.613)	0.644 (0.529-0.799)	0.773 (0.630-0.965)	0.959 (0.752-1.26)	1.11 (0.844-1.49)	1.26 (0.923-1.75)	1.43 (0.960-2.06)	1.66 (1.10-2.48)	1.84 (1.17-2.79)
3-hr	0.472 (0.391-0.580)	0.551 (0.456-0.677)	0.688 (0.567-0.849)	0.809 (0.663-1.00)	0.988 (0.781-1.30)	1.14 (0.870-1.52)	1.29 (0.948-1.78)	1.46 (1.02-2.08)	1.69 (1.12-2.50)	1.87 (1.20-2.82)
6-hr	0.604 (0.504-0.736)	0.679 (0.566-0.829)	0.813 (0.675-0.996)	0.935 (0.776-1.15)	1.12 (0.891-1.45)	1.27 (0.982-1.68)	1.43 (1.06-1.95)	1.61 (1.13-2.27)	1.86 (1.25-2.72)	2.06 (1.34-3.06)
12-hr	0.752 (0.631-0.909)	0.859 (0.721-1.04)	1.04 (0.871-1.27)	1.20 (0.998-1.47)	1.44 (1.15-1.84)	1.62 (1.26-2.11)	1.82 (1.36-2.44)	2.03 (1.44-2.82)	2.31 (1.57-3.33)	2.54 (1.67-3.72)
24-hr	0.918 (0.776-1.10)	1.06 (0.894-1.27)	1.30 (1.09-1.56)	1.50 (1.26-1.82)	1.80 (1.45-2.27)	2.03 (1.58-2.61)	2.27 (1.71-3.01)	2.53 (1.81-3.46)	2.87 (1.97-4.07)	3.14 (2.09-4.53)
2-day	1.10 (0.937-1.31)	1.26 (1.07-1.50)	1.52 (1.29-1.82)	1.76 (1.48-2.11)	2.09 (1.70-2.62)	2.37 (1.87-3.01)	2.65 (2.01-3.48)	2.96 (2.14-4.00)	3.37 (2.34-4.72)	3.71 (2.49-5.26)
3-day	1.21 (1.04-1.44)	1.39 (1.18-1.64)	1.68 (1.43-2.00)	1.94 (1.63-2.31)	2.30 (1.88-2.87)	2.60 (2.07-3.29)	2.91 (2.22-3.79)	3.24 (2.36-4.35)	3.70 (2.57-5.12)	4.05 (2.74-5.70)
4-day	1.31 (1.12-1.54)	1.49 (1.28-1.76)	1.80 (1.54-2.13)	2.07 (1.75-2.46)	2.46 (2.01-3.05)	2.77 (2.21-3.49)	3.09 (2.37-4.00)	3.43 (2.51-4.58)	3.90 (2.73-5.37)	4.27 (2.90-5.96)
7-day	1.56 (1.34-1.82)	1.75 (1.50-2.05)	2.07 (1.77-2.44)	2.35 (2.00-2.78)	2.75 (2.26-3.37)	3.07 (2.46-3.82)	3.40 (2.62-4.35)	3.75 (2.76-4.94)	4.22 (2.98-5.74)	4.60 (3.15-6.34)
10-day	1.77 (1.53-2.07)	1.97 (1.70-2.30)	2.30 (1.98-2.70)	2.59 (2.21-3.05)	3.00 (2.48-3.66)	3.34 (2.68-4.13)	3.68 (2.85-4.67)	4.03 (2.98-5.27)	4.52 (3.21-6.09)	4.90 (3.38-6.71)
20-day	2.36 (2.06-2.73)	2.61 (2.27-3.03)	3.03 (2.62-3.52)	3.39 (2.91-3.95)	3.88 (3.23-4.67)	4.27 (3.46-5.22)	4.67 (3.65-5.85)	5.08 (3.80-6.54)	5.64 (4.04-7.46)	6.07 (4.25-8.16)
30-day	2.86 (2.50-3.29)	3.17 (2.76-3.65)	3.68 (3.19-4.24)	4.10 (3.54-4.75)	4.68 (3.91-5.57)	5.12 (4.17-6.20)	5.57 (4.47-6.80)	6.02 (4.60-7.67)	6.62 (4.77-8.67)	7.07 (4.96-9.43)
45-day	3.50 (3.07-4.01)	3.89 (3.41-4.46)	4.52 (3.94-5.19)	5.02 (4.36-5.80)	5.70 (4.76-6.74)	6.21 (5.07-7.45)	6.71 (5.28-8.23)	7.20 (5.42-9.07)	7.82 (5.86-10.1)	8.28 (5.84-10.9)
60-day	4.06 (3.57-4.63)	4.52 (3.97-5.16)	5.25 (4.59-6.01)	5.83 (5.07-6.70)	6.59 (5.51-7.73)	7.14 (5.84-8.50)	7.67 (6.05-9.34)	8.18 (6.18-10.2)	8.80 (6.39-11.3)	9.24 (6.55-12.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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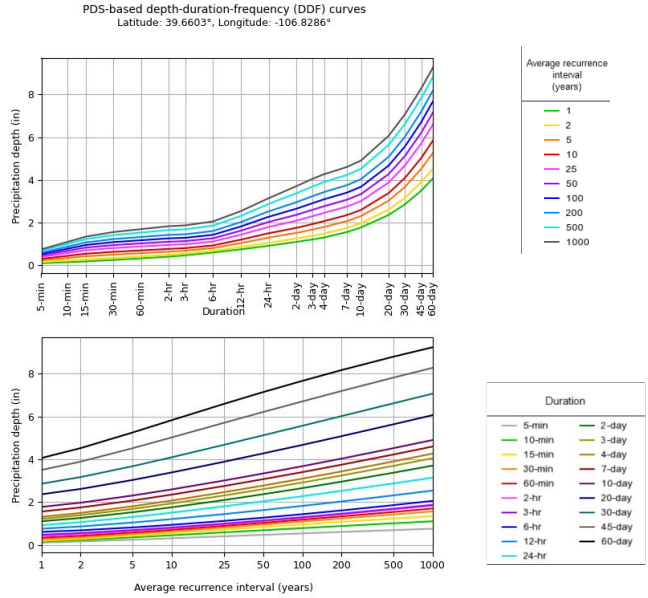
PF graphical



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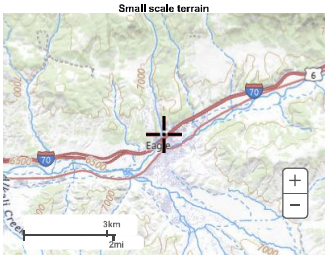
Maps & aerials

Small scale terrain



Large scale terrain

$I_{100} = -2.27\ln(D) + 12.735$

$I_{10} = -1.50\ln(D) + 8.847$

$I_{5} = -1.30\ln(D) + 7.583$

$I_{2} = -1.06\ln(D) + 6.035$

Where:

P = 24-hour rainfall depth (inches) from NOAA Point Precipitation Frequency Estimates for Eagle, CO

I = Rainfall Intensity (in/hr)

D= Duration (minutes)

	2-yr	5-yr	10-yr	100-yr
P =	1.06	1.30	1.50	2.27

Time Intensity Frequency Tabulation

TIME	2 YR	5 YR	10 YR	100 YR
5	0.16	0.24	0.31	0.53
10	0.23	0.35	0.45	0.78
15	0.28	0.43	0.55	0.95
30	0.35	0.51	0.63	1.09
60	0.42	0.57	0.70	1.18
24-HR	1.06	1.30	1.50	2.27

Existing Weighted Imperviousness Calculations

SUB-BASIN	AREA (SF)	AREA (Acres)	ROOF AREA	ROOF IMPERVIOUSNESS	ROOF C2	ROOF C5	ROOF C10	ROOF C100	LANDSCAPE AREA	LANDSCAPE IMPERVIOUSNESS	LANDSCAPE C2	LANDSCAPE C5	LANDSCAPE C10	LANDSCAPE C100	PAVEMENT AREA	PAVEMENT IMPERVIOUSNESS	PAVEMENT C2	PAVEMENT C5	PAVEMENT C10	PAVEMENT C100	WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS C2	WEIGHTED COEFFICIENTS C5	WEIGHTED COEFFICIENTS C10	WEIGHTED COEFFICIENTS C100
R1	3,574	0.08	3,574	95%	0.79	0.81	0.82	0.87	0	20%	0.13	0.15	0.22	0.52	0	95%	0.79	0.81	0.82	0.87	95%	0.79	0.81	0.82	0.87
A1	19,199	0.44	0	95%	0.79	0.81	0.82	0.87	1,308	20%	0.13	0.15	0.22	0.52	17,891	95%	0.79	0.81	0.82	0.87	90%	0.74	0.77	0.78	0.84
A2	4,696	0.11	0	95%	0.79	0.81	0.82	0.87	675	20%	0.13	0.15	0.22	0.52	4,021	95%	0.79	0.81	0.82	0.87	84%	0.69	0.72	0.74	0.82
OS	6,963	0.16	0	95%	0.79	0.81	0.82	0.87	2,300	20%	0.13	0.15	0.22	0.52	4,663	95%	0.79	0.81	0.82	0.87	70%	0.57	0.59	0.62	0.75
EX1	17,006	0.39	0	95%	0.79	0.81	0.82	0.87	15,987	20%	0.13	0.15	0.22	0.52	1,019	95%	0.79	0.81	0.82	0.87	24%	0.17	0.19	0.25	0.54
EX2	10,118	0.23	0	95%	0.79	0.81	0.82	0.87	10,118	20%	0.13	0.15	0.22	0.52	0	95%	0.79	0.81	0.82	0.87	20%	0.13	0.15	0.22	0.52
ON-SITE/ FUTURE DISTURBED	34,432	0.79	3,574	95%	0.79	0.81	0.82	0.87	4,283	20%	0.13	0.15	0.22	0.52	26,575	95%	0.79	0.81	0.82	0.87	86%	0.70	0.73	0.75	0.82
OFF-SITE/ UNDISTURBED	27,124	0.62	0	95%	0.79	0.81	0.82	0.87	26,105	20%	0.13	0.15	0.22	0.52	1,019	95%	0.79	0.81	0.82	0.87	23%	0.15	0.17	0.24	0.53
TOTAL	61,556	1.41	3,574	95%	0.79	0.81	0.82	0.87	30,388	20%	0.13	0.15	0.22	0.52	27,594	95%	0.79	0.81	0.82	0.87	58%	0.46	0.48	0.52	0.70

McDonald's - Drainage Report
Existing Runoff Calculations
Time of Concentration

Watercourse Coefficient

Forest & Meadow	2.50	Short Grass Pasture & Lawns	7.00			Grassed Waterway	15.00
Fallow or Cultivation	5.00	Nearly Bare Ground	10.00			Paved Area & Shallow Gutter	20.00

	SUB-BASIN DATA				INITIAL / OVERLAND TIME			TRAVEL TIME T(t)					T(c) CHECK (URBANIZED BASINS)			FINAL T(c)
DESIGN POINT	DRAIN BASIN	AREA sq. ft.	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	TOTAL LENGTH	L/180+10	min.
A1	R1	3,574	0.08	0.81	100	1.0%	5.3			20.00	0.0	0.0	5.3	100	10.6	5.3
A1	A1	19,199	0.44	0.77	62	4.9%	2.8	125	2.5%	20.00	3.2	0.7	5.0	187	11.0	5.0
A2	A2	4,696	0.11	0.72	27	1.4%	3.3	93	1.9%	20.00	2.8	0.6	5.0	120	10.7	5.0
OS	OS	6,963	0.16	0.59	100	2.4%	6.9	55	4.6%	20.00	4.3	0.2	7.1	155	10.9	7.1
A1	EX1	17,006	0.39	0.19	100	5.5%	9.5	38	2.1%	7.00	1.0	0.6	10.1	138	10.8	10.1
OS	EX2	10,118	0.23	0.15	100	2.9%	12.2	111	3.2%	7.00	1.3	1.5	13.7	211	11.2	11.2

McDonald's - Drainage Report
Existing Runoff Calculations
(Rational Method Procedure)

Design Storm *5 Year*
Point Rainfall *1.30 in*

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
A1	R1	0.08	0.81	5.3	0.07	5.41	0.36					
A2	A1	0.44	0.77	5.0	0.34	5.49	1.85					
A2	A2	0.11	0.72	5.0	0.08	5.49	0.42					
OS	OS	0.16	0.59	7.1	0.09	5.03	0.48	7.1	0.58	5.03	2.90	cumulative for on-site/future disturbed areas
A1	EX1	0.39	0.19	10.1	0.07	4.57	0.34					
OS	EX2	0.23	0.15	11.2	0.03	4.44	0.15	11.2	0.11	4.44	0.48	cumulative for off-site/undisturbed areas

McDonald's - Drainage Report
Existing Runoff Calculations *Design Storm 10 Year*
(Rational Method Procedure) *Point Rainfall 1.50 in*

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
A1	R1	0.082	0.82	5.3	0.07	6.35	0.43					
A1	A1	0.441	0.78	5.0	0.34	6.43	2.22					
A2	A2	0.108	0.74	5.0	0.08	6.43	0.51					
OS	OS	0.16	0.62	7.1	0.10	5.90	0.59	7.1	0.59	5.90	3.49	cumulative for on-site/future disturbed areas
A1	EX1	0.39	0.25	10.1	0.10	5.38	0.53					qsave
OS	EX2	0.232	0.22	11.2	0.05	5.22	0.26	11.2	0.15	5.22	0.78	cumulative for off-site/undisturbed areas

McDonald's - Drainage Report

Existing Runoff Calculations — *Design Storm* *100 Year*

(Rational Method Procedure) — *Point Rainfall* *2.27 in*

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
A1	R1	0.08	0.87	5.3	0.07	8.95	0.64					
A1	A1	0.44	0.84	5.0	0.37	9.08	3.38					
A2	A2	0.11	0.82	5.0	0.09	9.08	0.80					
OS	OS	0.16	0.75	7.1	0.12	8.28	1.00	7.1	0.65	8.28	5.40	cumulative for on-site/future disturbed areas
A1	EX1	0.39	0.54	10.1	0.21	7.48	1.58					
OS	EX2	0.23	0.52	11.2	0.12	7.25	0.87	11.2	0.33	7.25	2.40	cumulative for off-site/undisturbed areas

SUMMARY - EXISTING RUNOFF TABLE					
DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 10-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)
A1	R1	0.08	0.36	0.43	0.64
A1	A1	0.44	1.85	2.22	3.38
A2	A2	0.11	0.42	0.51	0.80
OS	OS	0.16	0.48	0.59	1.00
A1	EX1	0.39	0.34	0.53	1.58
OS	EX2	0.23	0.15	0.26	0.87
ON-SITE/FUTURE DISTURBED		0.79	2.90	3.49	5.40
OFF-SITE/UNDISTURBED		0.62	0.48	0.78	2.40
TOTAL		1.41	3.38	4.28	7.80

Proposed Weighted Imperviousness Calculations

SUB-BASIN	AREA (SF)	AREA (Acres)	ROOF AREA	ROOF IMPERVIOUSNESS	ROOF C2	ROOF C5	ROOF C10	ROOF C100	LANDSCAPE AREA	LANDSCAPE IMPERVIOUSNESS	LANDSCAPE C2	LANDSCAPE C5	LANDSCAPE C10	LANDSCAPE C100	PAVEMENT AREA	PAVEMENT IMPERVIOUSNESS	PAVEMENT C2	PAVEMENT C5	PAVEMENT C10	PAVEMENT C100	WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS C2	WEIGHTED COEFFICIENTS C5	WEIGHTED COEFFICIENTS C10	WEIGHTED COEFFICIENTS C100
R1	4,123	0.09	4,123	95%	0.79	0.81	0.82	0.87	0	20%	0.13	0.15	0.22	0.52	0	95%	0.79	0.81	0.82	0.87	95%	0.79	0.81	0.82	0.87
A1	15,654	0.36	0	95%	0.79	0.81	0.82	0.87	663	20%	0.13	0.15	0.22	0.52	14,991	95%	0.79	0.81	0.82	0.87	92%	0.76	0.78	0.80	0.85
A2	16,006	0.37	0	95%	0.79	0.81	0.82	0.87	4,161	20%	0.13	0.15	0.22	0.52	11,845	95%	0.79	0.81	0.82	0.87	76%	0.62	0.64	0.67	0.78
OS	727	0.02	0	95%	0.79	0.81	0.82	0.87	727	20%	0.13	0.15	0.22	0.52	0	95%	0.79	0.81	0.82	0.87	20%	0.13	0.15	0.22	0.52
EX1A	7,665	0.18	0	95%	0.79	0.81	0.82	0.87	6,646	20%	0.13	0.15	0.22	0.52	1,019	95%	0.79	0.81	0.82	0.87	30%	0.21	0.24	0.30	0.57
EX1B	9,341	0.21	0	95%	0.79	0.81	0.82	0.87	9,341	20%	0.13	0.15	0.22	0.52	0	95%	0.79	0.81	0.82	0.87	20%	0.13	0.15	0.22	0.52
EX2	8,006	0.18	0	95%	0.79	0.81	0.82	0.87	8,006	20%	0.13	0.15	0.22	0.52	0	95%	0.79	0.81	0.82	0.87	20%	0.13	0.15	0.22	0.52
ON-SITE/ DISTURBED	36,510	0.84	4,123	95%	0.79	0.81	0.82	0.87	5,551	20%	0.13	0.15	0.22	0.52	26,836	95%	0.79	0.81	0.82	0.87	84%	0.69	0.71	0.73	0.81
OFF-SITE/ UNDISTURBED	25,012	0.57	0	95%	0.79	0.81	0.82	0.87	23,993	20%	0.13	0.15	0.22	0.52	1,019	95%	0.79	0.81	0.82	0.87	23%	0.15	0.18	0.24	0.53
TOTAL	61,522	1.41	4,123	95%	0.79	0.81	0.82	0.87	29,544	20%	0.13	0.15	0.22	0.52	27,855	95%	0.79	0.81	0.82	0.87	59%	0.47	0.49	0.53	0.70

McDonald's - Drainage Report
Proposed Runoff Calculations
Time of Concentration

Watercourse Coefficient

Forest & Meadow	2.50	Short Grass Pasture & Lawns	7.00	Grassed Waterway	15.00
Fallow or Cultivation	5.00	Nearly Bare Ground	10.00	Paved Area & Shallow Gutter	20.00

	SUB-BASIN DATA				INITIAL / OVERLAND TIME			TRAVEL TIME T(t)					T(c) CHECK (URBANIZED BASINS)			FINAL T(c)
DESIGN POINT	DRAIN BASIN	AREA sq. ft.	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	TOTAL LENGTH	L/180+10	min.
R1	R1	4,123	0.09	0.81	100	1.0%	5.3			20.00	0.0	0.0	5.3	100	10.6	5.3
A1	A1	15,654	0.36	0.78	100	4.8%	3.4	32	4.6%	20.00	4.3	0.1	5.0	132	10.7	5.0
A2	A2	16,006	0.37	0.64	100	3.8%	5.4	308	2.0%	20.00	2.8	1.8	7.2	408	12.3	7.2
OS	OS	727	0.02	0.15	15	3.6%	4.4			7.00	0.0	0.0	5.0	15	10.1	5.0
A2	EX1A	7,665	0.18	0.24	100	5.5%	9.0	38	2.1%	15.00	2.2	0.3	9.3	138	10.8	9.3
A1	EX1B	9,341	0.21	0.15	85	5.5%	9.1			7.00	0.0	0.0	9.1	85	10.5	9.1
OS	EX2	8,006	0.18	0.15	100	2.9%	12.2	111	3.2%	7.00	1.3	1.5	13.7	211	11.2	11.2

McDonald's - Drainage Report
Proposed Runoff Calculations
(Rational Method Procedure)

Design Storm *5 Year*
Point Rainfall *1.30 in*

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
R1	R1	0.09	0.81	5.3	0.08	5.41	0.42					
A1	A1	0.36	0.78	5.0	0.28	5.49	1.54					
A2	A2	0.37	0.64	7.2	0.23	5.01	1.18	7.2	0.59	5.01	2.97	cumulative for areas to WQ pond
OS	OS	0.02	0.15	5.0	0.00	5.49	0.01	7.2	0.59	5.01	2.98	cumulative for on-site/disturbed areas
A2	EX1A	0.18	0.24	9.3	0.04	4.69	0.20					
A1	EX1B	0.21	0.15	9.1	0.03	4.71	0.15					
OS	EX2	0.18	0.15	11.2	0.03	4.44	0.12	11.2	0.10	4.44	0.45	cumulative for off-site/undisturbed areas

McDonald's - Drainage Report
Proposed Runoff Calculations *Design Storm 10 Year*
(Rational Method Procedure) *Point Rainfall 1.50 in*

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
R1	R1	0.095	0.82	5.3	0.08	6.35	0.49					
A1	A1	0.359	0.80	5.0	0.29	6.43	1.84					
A2	A2	0.367	0.67	7.2	0.24	5.88	1.44	7.2	0.61	5.88	3.59	cumulative for areas to WQ pond
OS	OS	0.017	0.22	5.0	0.00	6.43	0.02	7.2	0.61	5.88	3.61	cumulative for on-site/disturbed areas
A2	EX1A	0.176	0.30	9.3	0.05	5.50	0.29					
A1	EX1B	0.214	0.22	9.1	0.05	5.53	0.26					
OS	EX2	0.184	0.22	11.2	0.04	5.22	0.21	11.2	0.14	5.22	0.73	cumulative for off-site/undisturbed areas

McDonald's - Drainage Report

Proposed Runoff Calculations — *Design Storm* 100 Year

(Rational Method Procedure) — *Point Rainfall* 2.27 in

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
R1	R1	0.09	0.87	5.3	0.08	8.95	0.74					
A1	A1	0.36	0.85	5.0	0.31	9.08	2.78					
A2	A2	0.37	0.78	7.2	0.29	8.25	2.36	7.2	0.67	8.25	5.56	cumulative for areas to WQ pond
OS	OS	0.02	0.52	5.0	0.01	9.08	0.08	7.2	0.68	8.25	5.63	cumulative for on-site/disturbed areas
A2	EX1A	0.18	0.57	9.3	0.10	7.67	0.76					
A1	EX1B	0.21	0.52	9.1	0.11	7.72	0.86					
OS	EX2	0.18	0.52	11.2	0.10	7.25	0.69	11.2	0.31	7.25	2.22	cumulative for off-site/undisturbed areas

SUMMARY - PROPOSED RUNOFF TABLE					
DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 10-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)
R1	R1	0.09	0.42	0.49	0.74
A1	A1	0.36	1.54	1.84	2.78
A2	A2	0.37	1.18	1.44	2.36
OS	OS	0.02	0.01	0.02	0.08
A2	EX1A	0.18	0.20	0.29	0.76
A1	EX1B	0.21	0.15	0.26	0.86
OS	EX2	0.18	0.12	0.21	0.69
ON-SITE/DISTURBED		0.84	2.98	3.61	5.63
OFF-SITE/UNDISTURBED		0.57	0.45	0.73	2.22
TOTAL		1.41	3.43	4.34	7.85

HYDRAULIC CALCULATIONS

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: McDonald's Eagle
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A1
Inlet Application (Street or Area)	STREET
Hydraulic Condition	In Sump
Inlet Type	CDOT Type C Grate
Number of Inlet Units	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.85
Major Peak Flow, Q (cfs)	1.82

Bypass (Carry-Over) Flow from Upstream — Inlets must be organized from upstream (left) t

Receive Bypass Flow from:	
Bypass Flow Description (Optional):	
Minor Bypass Flow Received, Q_b (cfs)	
Major Bypass Flow Received, Q_b (cfs)	

CALCULATED OUTPUT

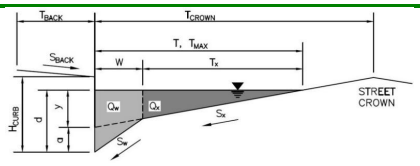
Minor Total Design Peak Flow, Q (cfs)	0.85
Major Total Design Peak Flow, Q (cfs)	1.82
Minor Inlet Interception Capacity, Q_a (cfs)	1.13
Major Inlet Interception Capacity, Q_a (cfs)	1.13
Minor Flow Bypassed Downstream, Qb (cfs)	N/A
Major Flow Bypassed Downstream, Qb (cfs)	N/A
Minor Flow Capture Percentage, C%	100%
Major Flow Capture Percentage, C%	62%

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: McDonald's Eagle

Inlet ID: Inlet A1



Gutter Geometry:

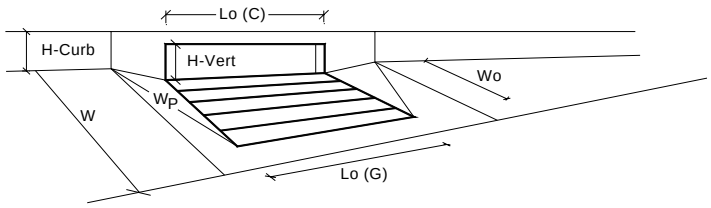
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	30.0	ft
Gutter Width	W =	2.92	ft
Street Transverse Slope	S_X =	0.026	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.066	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	29.0	29.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.6	4.6	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



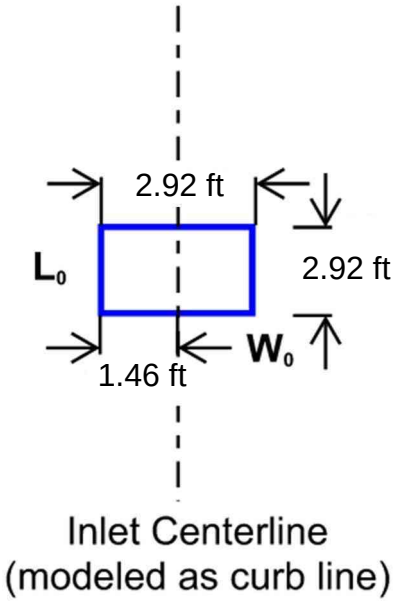
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type C Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	0.00	0.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	4.6	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	2.92	2.92	feet
Warning 1 Width of a Unit Grate	W_o =	1.46	1.46	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.70	0.70	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	2.41	2.41	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.67	0.67	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.33	0.33	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	1.1	1.1	cfs
WARNING: Inlet Capacity < Q Peak for Major Storm	$Q_{PEAK\ REQUIRED}$ =	0.8	1.8	cfs

Warning 1: Dimension entered is not a typical dimension for inlet type specified.

INLET CAPACITY ABLE TO CAPTURE MINOR STORM. REF. INLET CROSS-SECTION FOR 100-YR PONDING DEPTH.

Kimley»Horn

Inlets for this project have been modeled using the MHFD Inlet Sizing Software. This software can model flows into Street Inlets and Inlets Within a Swale. All inlets for this project within paved areas have been modeled as Street Inlets as the Area Inlet in Swale option requires the inlet to be depressed a minimum of 1 foot. The existing inlet is a true area inlet on this project. This inlet (CDOT Type C Inlets) was modeled as a Street Inlet, but only 1/2 of the inlet was modeled as the software assumes water is entering the inlet from only one side. The Q100 values used for the inlets are 1/2 of the total flows that reach that inlet as only one side of the inlet is being modeled. The figures below indicate how the inlet was divided in half depending on the inlet orientation.



INLET PICTURES


CDOT Type R Curb Opening


Denver No. 14 Curb Opening


Colorado Springs D-10-R


CDOT/Denver 13 Valley Grate

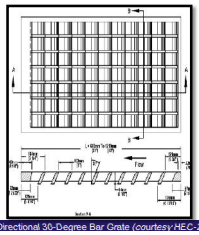

CDOT/Denver 13 Combination


Denver No. 16 Combination


Wheat Ridge Combination Inlet


Denver No. 16 Valley Grate

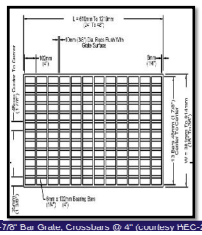

Directional Cast Vane Grate

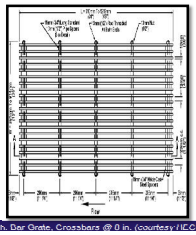

Directional 30-Degree Bar Grate (courtesy HEC-22)

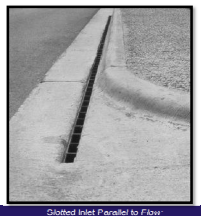

Directional 45-Degree Bar Grate


Reticuline Riveted Grate


1-7/8" Bar Grate, Crossbars @ 8"


1-7/8" Bar Grate, Crossbars @ 4" (courtesy HEC-22)


1-1/8 in. Bar Grate, Crossbars @ 8 in. (courtesy HEC-22)


Slotted Inlet Parallel to Flow

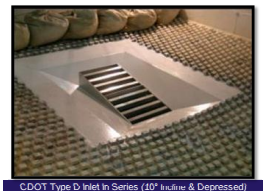

CDOT Type C Grate (Close Mesh)


CDOT Type C Grate


CDOT Type C Inlet

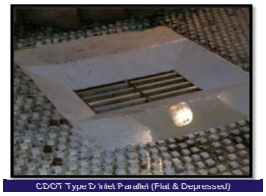

CDOT Type C Inlet in Depression


CDOT Type D Inlet In Series (Flat & Depressed)


CDOT Type D Inlet In Series (10° Incline & Depressed)


CDOT Type D Inlet In Series (20° Incline & Depressed)


CDOT Type D Inlet In Series (30° Incline & Depressed)


CDOT Type D Inlet Parallel (Flat & Depressed)


CDOT Type D Inlet Parallel (10° Incline & Depressed)


CDOT Type D Inlet Parallel (20° Incline & Depressed)


CDOT Type D Inlet Parallel (30° Incline & Depressed)

Worksheet for INLET 100-YR PONDING DEPTH

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.030 ft/ft
Discharge	3.64 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+30	0.75
0+00	0.00
0+32	2.23

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+30, 0.75)	(0+32, 2.23)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	2.4 in
Roughness Coefficient	0.016
Elevation	0.20 ft
Elevation Range	0.0 to 2.2 ft
Flow Area	1.1 ft²
Wetted Perimeter	10.7 ft
Hydraulic Radius	1.2 in
Top Width	10.74 ft
Normal Depth	2.4 in
Critical Depth	3.1 in
Critical Slope	0.007 ft/ft
Velocity	3.43 ft/s
Velocity Head	0.18 ft
Specific Energy	0.38 ft
Froude Number	1.925
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in

Worksheet for INLET 100-YR PONDING DEPTH

GVF Input Data	
Length	0.0 ft
Number Of Steps	0

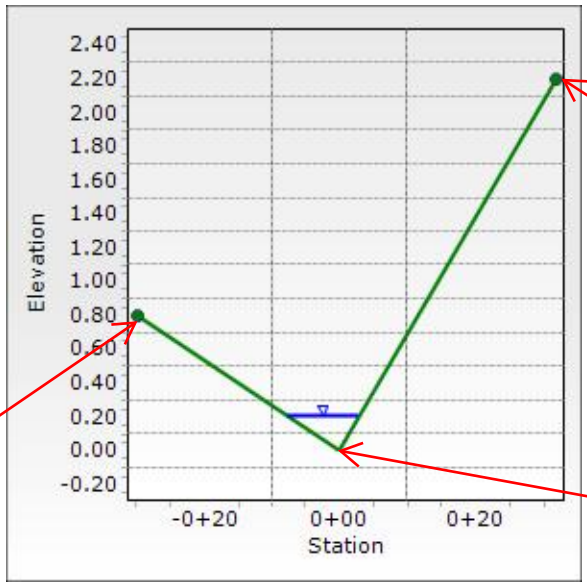
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.4 in
Critical Depth	3.1 in
Channel Slope	0.030 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for INLET 100-YR PONDING DEPTH

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.030 ft/ft
Normal Depth	2.4 in
Discharge	3.64 cfs

DEPTH OF PONDING IN 100-YR



BACK OF ADJACENT ROW OF PARKING TO EAST

WEST CURB FLOWLINE AT BUILDING

INLET

Worksheet for Existing 18in Storm Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.024	
Channel Slope	0.006	ft/ft
Diameter	18.0	in
Discharge	4.38	cfs

Results

Normal Depth	15.3	in
Flow Area	1.6	ft²
Wetted Perimeter	3.5	ft
Hydraulic Radius	5.5	in
Top Width	1.08	ft
Critical Depth	9.6	in
Percent Full	84.8	%
Critical Slope	0.019	ft/ft
Velocity	2.74	ft/s
Velocity Head	0.12	ft
Specific Energy	1.39	ft
Froude Number	0.397	
Maximum Discharge	4.58	cfs
Discharge Full	4.26	cfs
Slope Full	0.006	ft/ft
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

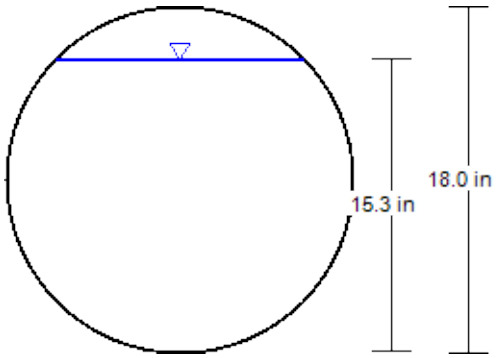
GVF Output Data

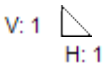
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	0.0	%
Downstream Velocity	0.00	ft/s
Upstream Velocity	0.00	ft/s
Normal Depth	15.3	in
Critical Depth	9.6	in
Channel Slope	0.006	ft/ft
Critical Slope	0.019	ft/ft

Cross Section for Existing 18in Storm Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.024
Channel Slope	0.006 ft/ft
Normal Depth	15.3 in
Diameter	18.0 in
Discharge	4.38 cfs





Worksheet for 2ft Curb Cut

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.016	
Channel Slope	0.040	ft/ft
Bottom Width	2.00	ft
Discharge	1.04	cfs

Results		
Normal Depth	1.5	in
Flow Area	0.2	ft²
Wetted Perimeter	2.2	ft
Hydraulic Radius	1.3	in
Top Width	2.00	ft
Critical Depth	2.4	in
Critical Slope	0.008	ft/ft
Velocity	4.24	ft/s
Velocity Head	0.28	ft
Specific Energy	0.40	ft
Froude Number	2.136	
Flow Type	Supercritical	

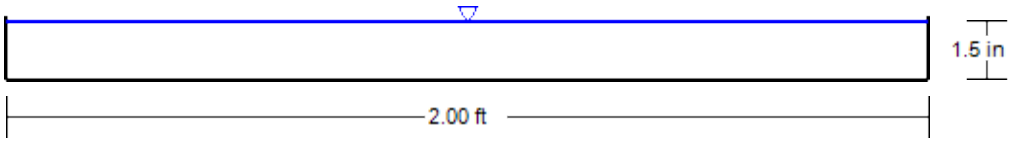
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

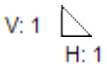
GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.5	in
Critical Depth	2.4	in
Channel Slope	0.040	ft/ft
Critical Slope	0.008	ft/ft

Cross Section for 2ft Curb Cut

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.016	
Channel Slope	0.040	ft/ft
Normal Depth	1.5	in
Bottom Width	2.00	ft
Discharge	1.04	cfs





Worksheet for 2ft Wide Rectangular Concrete Pan

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.020	ft/ft
Normal Depth	4.0	in
Bottom Width	2.00	ft

Results

Discharge	4.28	cfs
Flow Area	0.7	ft²
Wetted Perimeter	2.7	ft
Hydraulic Radius	3.0	in
Top Width	2.00	ft
Critical Depth	6.3	in
Critical Slope	0.005	ft/ft
Velocity	6.41	ft/s
Velocity Head	0.64	ft
Specific Energy	0.97	ft
Froude Number	1.959	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data

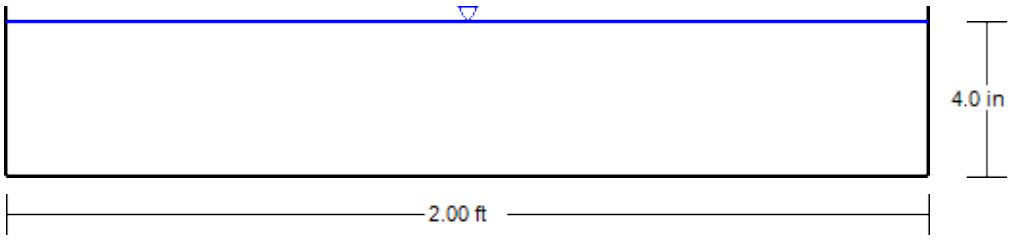
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.0	in
Critical Depth	6.3	in
Channel Slope	0.020	ft/ft
Critical Slope	0.005	ft/ft

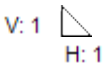
Cross Section for 2ft Wide Rectangular Concrete Pan

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.020	ft/ft
Normal Depth	4.0	in
Bottom Width	2.00	ft
Discharge	4.28	cfs

100-YR Q TO PAN = 3.12cfs





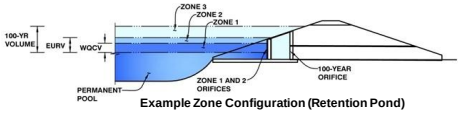
WATER QUALITY CAPTURE VOLUME CALCULATIONS

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: McDonald's Eagle

Basin ID: WQ Pond



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	0.81	acres
Watershed Length =	230	ft
Watershed Length to Centroid =	115	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	87.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.018	acre-feet	0.018	acre-feet
Excess Urban Runoff Volume (EURV) =	0.079	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.42 in.) =	0.018	acre-feet	0.42	inches
5-yr Runoff Volume (P1 = 0.57 in.) =	0.026	acre-feet	0.57	inches
10-yr Runoff Volume (P1 = 0.7 in.) =	0.034	acre-feet	0.70	inches
25-yr Runoff Volume (P1 = 0.89 in.) =	0.044	acre-feet	0.89	inches
50-yr Runoff Volume (P1 = 1.03 in.) =	0.053	acre-feet	1.03	inches
100-yr Runoff Volume (P1 = 1.18 in.) =	0.062	acre-feet	1.18	inches
500-yr Runoff Volume (P1 = 1.54 in.) =	0.085	acre-feet	1.54	inches
Approximate 2-yr Detention Volume =	0.023	acre-feet		
Approximate 5-yr Detention Volume =	0.032	acre-feet		
Approximate 10-yr Detention Volume =	0.041	acre-feet		
Approximate 25-yr Detention Volume =	0.048	acre-feet		
Approximate 50-yr Detention Volume =	0.052	acre-feet		
Approximate 100-yr Detention Volume =	0.055	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.018	acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.018	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Total detention volume is less than 100-year volume.

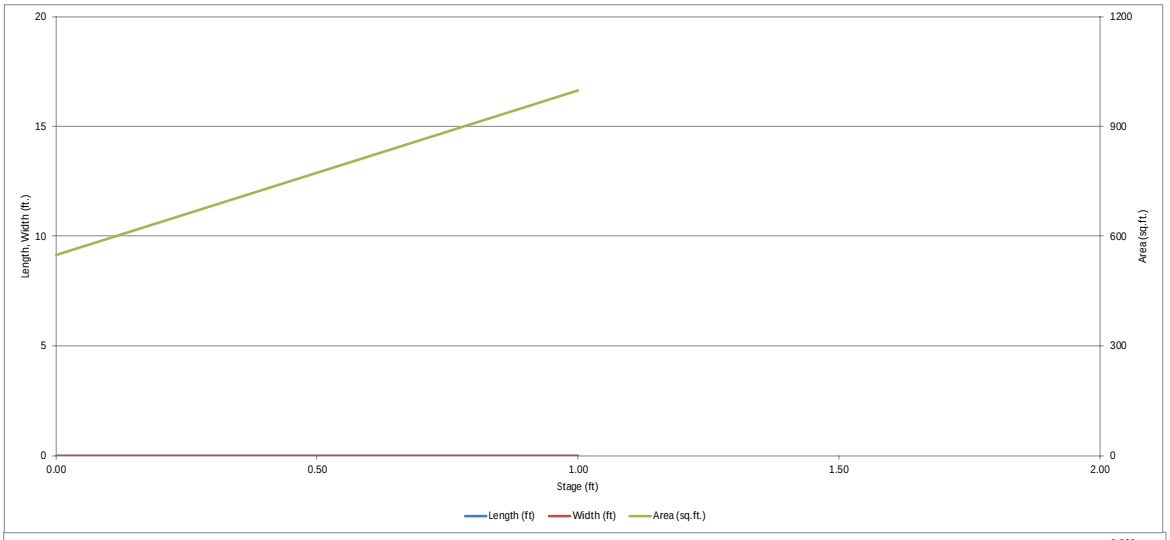
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

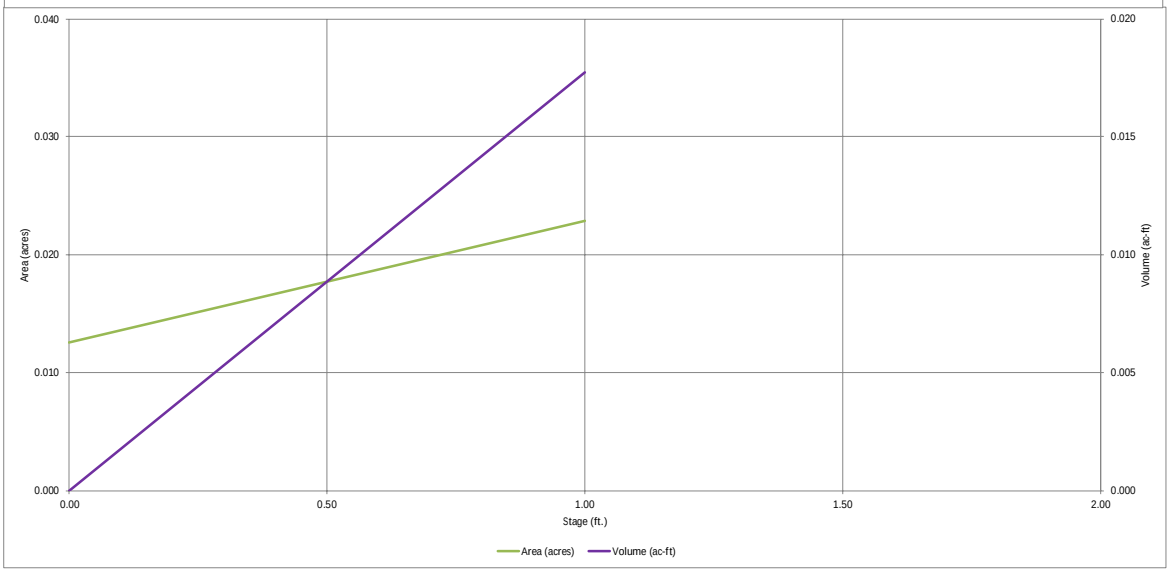
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	548	0.013		
	--	1.00	--	--	--	998	0.023	773	0.018

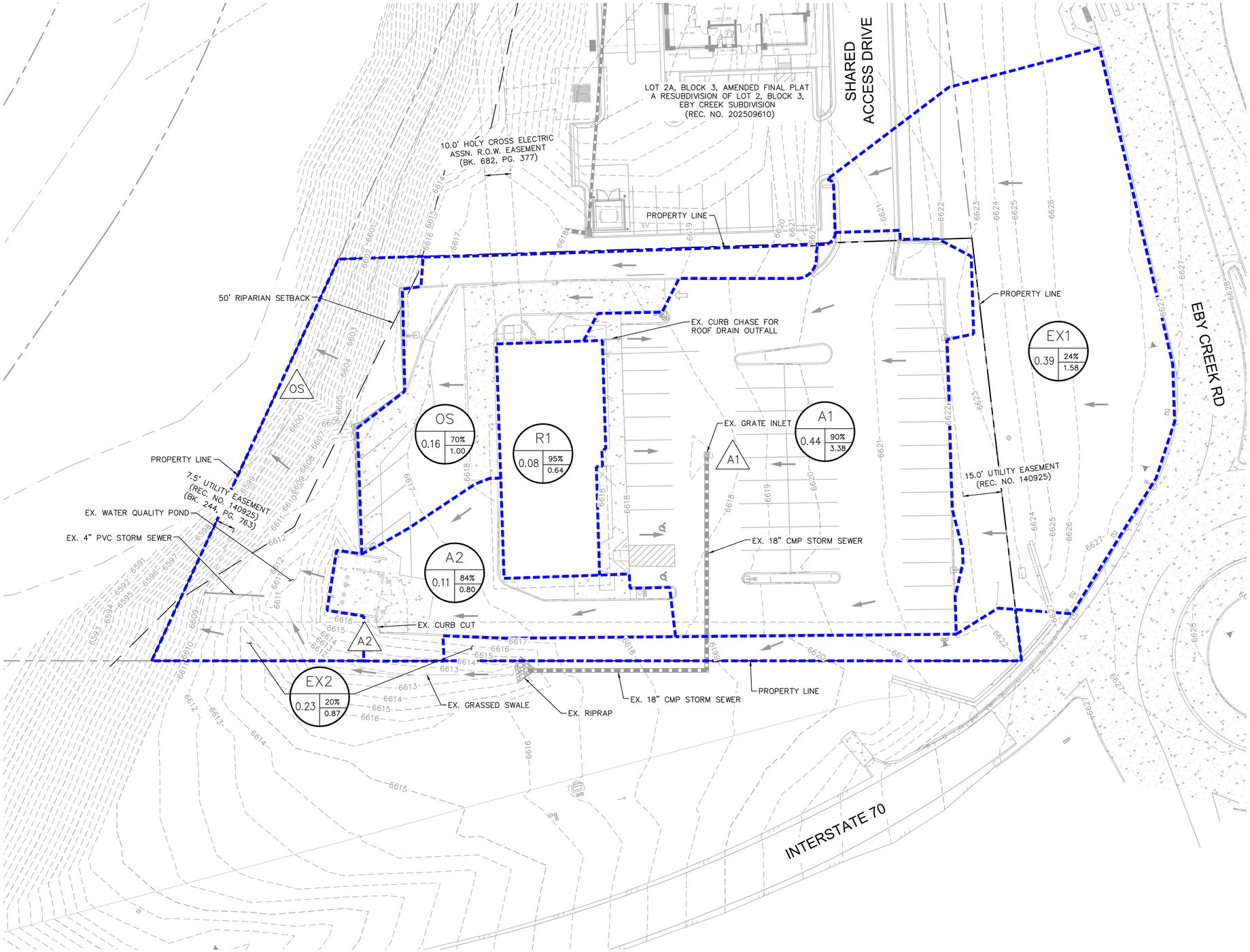
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)





DRAINAGE EXHIBITS



LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

= DESIGN POINT

FLOW DIRECTION

ADJACENT PROPERTY LINE
PROPERTY LINE
SETBACK
EXISTING EASEMENT
FLOOD ZONE BOUNDARY
EXISTING STORM SEWER
EXISTING STORM INLET
DRAINAGE BASIN BOUNDARY
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR

SUMMARY - EXISTING RUNOFF TABLE

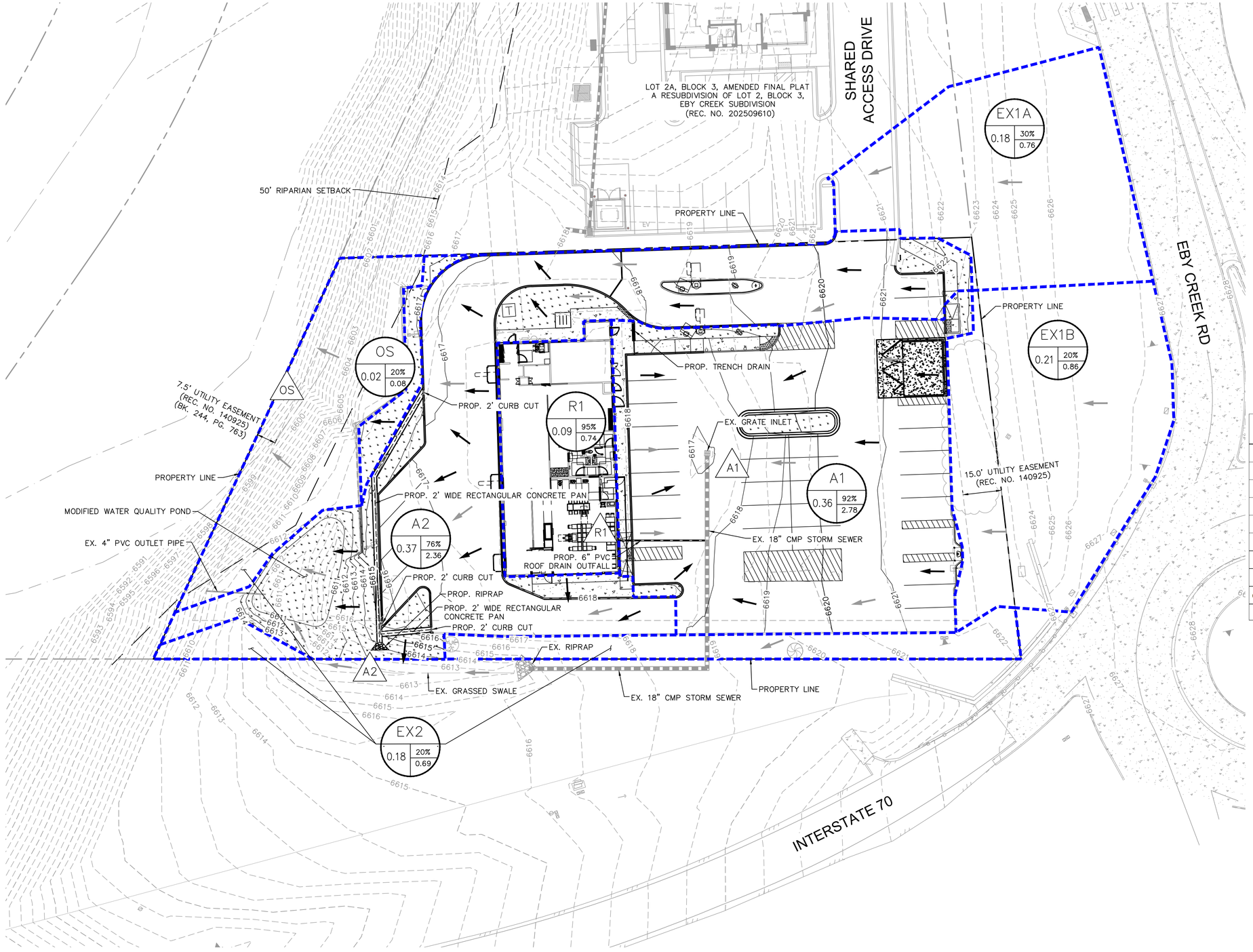
DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 10-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)
A1	R1	0.08	0.36	0.43	0.64
A1	A1	0.44	1.85	2.22	3.38
A2	A2	0.11	0.42	0.51	0.80
OS	OS	0.16	0.48	0.59	1.00
A1	EX1	0.39	0.34	0.53	1.58
OS	EX2	0.23	0.15	0.26	0.87

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

EXISTING CONDITIONS DRAINAGE EXHIBIT – MCDONALD'S EAGLE, CO

Kimley»Horn



LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

= DESIGN POINT

EXISTING FLOW DIRECTION
PROPOSED FLOW DIRECTION
ADJACENT PROPERTY LINE
PROPERTY LINE
SETBACK
EXISTING EASEMENT
FLOOD ZONE BOUNDARY
EXISTING STORM SEWER
EXISTING STORM INLET
DRAINAGE BASIN BOUNDARY
XXXX PROPOSED MAJOR CONTOUR
XXXX PROPOSED MINOR CONTOUR
XXXX EXISTING MAJOR CONTOUR
XXXX EXISTING MINOR CONTOUR
PROPOSED STORM SEWER

DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 10-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)
R1	R1	0.09	0.42	0.49	0.74
A1	A1	0.36	1.54	1.84	2.78
A2	A2	0.37	1.18	1.44	2.36
OS	OS	0.02	0.01	0.02	0.08
A2	EX1A	0.18	0.20	0.29	0.76
A1	EX1B	0.21	0.15	0.26	0.86
OS	EX2	0.18	0.12	0.21	0.69
ON-SITE/DISTURBED		**0.84**	**2.98**	**3.61**	**5.63**
OFF-SITE/UNDISTURBED		**0.57**	**0.45**	**0.73**	**2.22**
TOTAL		1.41	3.43	4.34	7.85

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

PROPOSED CONDITIONS DRAINAGE EXHIBIT – MCDONALD'S EAGLE, CO

Kimley»Horn

GEOTECHNICAL REPORT

Geotechnical Exploration Report

MCDONALDS NO. 51052
295 Eby Creek Road
Eagle, CO

Prepared for:
McDonald's USA
110 N Carpenter Street
Chicago, Illinois 60607

Prepared By:
UES
4480 W. Hacienda Avenue, Suite 104, Las Vegas, NV 89118

October 2, 2025
Project No. A25170.01259.000

UES
4480 W. Hacienda Avenue, Suite 104
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October 2, 2025

McDonald's USA
110 N Carpenter Street
Chicago, Illinois 60607

Attention: Robert Yagusesky

Reference: Geotechnical Engineering Report
McDonalds No. 52052 - Eagle
295 Eby Creek Road
Eagle, CO
Project No: A25170.01259.000

UES Professional Solutions, LLC ("UES") is pleased to submit this Geotechnical Engineering Report for the referenced project. This report includes the results from the field exploration and laboratory testing program, along with recommendations for use in the preparation of the appropriate design and construction documents for this project.

UES appreciates the opportunity to provide this Geotechnical Engineering Report and looks forward to continuing participation during the design and construction phases of this project. UES also has great interest in providing construction services, including materials testing and inspection services during the construction of this project, and will be glad to meet with you to further discuss how we can be of assistance as the project advances.

If there are questions pertaining to this report, or if UES may be of further service, please contact us at your convenience.

Respectfully,
UES

Lee J. Mitchell, P.E. (NV, UT)
Senior Geotechnical Engineer

Martin D. Jensen, P.E.
Principal Engineer

Table of Contents

FIGURES

APPENDIX

1.0 INTRODUCTION

UES has completed the geotechnical exploration for the proposed McDonald's restaurant located at 295 Eby Creek Road in Eagle, CO. The purposes of this study were to explore the existing soil, geological, and groundwater conditions at the site, and to provide geotechnical engineering conclusions and recommendations for use by the other members of the design team for design and construction of the proposed project. This report presents the results of our study.

1.1 AUTHORIZATION

UES (Consultant) has completed a field exploration and geotechnical evaluation for the McDonald's - Eagle, Colorado project. Mr. Todd Wright, representing McDonald's USA, authorized UES services via Purchase Order No. 2879043 on August 22, 2025.

1.2 PROPOSED DEVELOPMENT

Based on a review of the "Concept Plan 7", sent to UES by the Client, UES understands the renovation of an existing slab-on-grade, one story McDonald's with a drive through approximately 3,572 square feet in plan area. Maximum column and wall loads are assumed to be approximately 80 kips and 2.5 kips per lineal foot, respectively.

Associated improvements will consist of new and/or improved asphalt concrete parking areas, exterior concrete flatwork, and underground utilities. Based on our experience, the drive through and truck access areas will consist of Portland cement concrete pavement. We anticipate the building will develop relatively light to moderate structural loads based on this type of construction.

A grading plan was not available when this report was prepared. However, based on existing site topography and our understanding of the proposed construction, we anticipate cuts and fills on the order of about one to three feet will be required to establish final subgrade levels across the site.

1.3 SCOPE OF WORK

Our scope of work included the following:

- Site reconnaissance
- Review of United States Geological Survey (USGS) topographic maps, aerial photographs and available groundwater data
- Review of geologic maps and fault maps
- Subsurface exploration, including the drilling and sampling of five (5) borings to target depths ranging from 10 to 25 feet below the ground surface (bgs).
- Laboratory testing of selected soil samples
- Engineering analyses
- Preparation of this report

2.0 SITE INFORMATION

2.1 SITE DESCRIPTION

The project site is located within the northwest quadrant of I-70 and Eby Creek Road in Eagle, Colorado. The property consists of an existing single-story building previously utilized as a restaurant and occupies approximately 1.07 acres.

The topography of the site is relatively flat with an overall relief of approximately 7 feet sloping from east to west. The average surface elevation within the planned building areas is about 7,216 feet above mean sea level based on review of Google Earth Imagery.

2.2 SITE HISTORY

UES reviewed historical aerial photographs of the site available from the Historicaerials.com website and Google Earth. Available photographs were taken in 1951, 1960, 1983, 1999, 2005, 2009, 2017, and 2023. Review of the 1951 and 1960 aerial photographs reveal the area to be rural and undeveloped, with the land primarily used for agriculture. I-70 was not constructed at the time of these photographs. The 1983 aerial photo shows I-70 and the re-routing of Eby Creek Road. Much of the agricultural activity appears to have been replaced by commercial development. The 1999 aerial photograph shows the building and parking area on the subject property with additional commercial development to the east of Eby Creek Road and south of I-70. The 2005 and 2009 aerial photographs do not show any significant changes to the property or surrounding area. The 2017 aerial photograph shows the two roundabout intersections at the westbound I-70 exit ramp and at the access point to the subject property. The site has remained essentially unchanged since the 2017 and 2023 photographs until our field exploration in August of 2025.

2.3 GEOLOGICAL SETTING

The site is located approximately 90 miles west of the Denver metropolitan area. Surficial geologic conditions at the site, as mapped by the U.S. Geological Survey (USGS) (Lidke, 2002[1]), consist of Alluvium and Colluvium deposits of Holocene and Upper Pleistocene Age. Bedrock underlying the surface units consists of sandstone and other bedrock formations of Upper & Lower Cretaceous Age. Refer to Figure No. 3, Geologic Map.

The mapped geology was found to be consistent with the subsurface soil conditions encountered within our borings performed at the site to the explored depths of approximately 5½ to 11 ½ feet below existing site grades.

2.4 SEISMIC DESIGN PARAMETERS

The 2021 International Building Code (IBC) requires that a default Site Class D be assumed for seismic design when soil conditions for the top 100 feet are not known in sufficient detail for determination in accordance with Table 20.3-1 of ASCE Standard 7.

[1] Lidke, David J., 2002, ***Geologic Map of the Eagle Quadrangle, Eagle County, Colorado***, United States Geological Survey, Map MF-2361.

The site is located at approximately the following latitude and longitude: 39.6604, -106.8291.

A search of the USGS Earthquake Hazards Program's ASCE 7-16 data, as published by the ASCE 7 Hazard Tool (https://asce7hazardtool.online/), indicated the following spectral acceleration parameters for the location indicated above and a Site Class D:

Table 2-1: Ground Motion Values

Period (sec)	Mapped MCE Spectral Response Acceleration (g)		Site Coefficients		Adjusted MCE_R Spectral Response Acceleration (G)		Design Spectral Response Acceleration (g)	
0.2	S_s	0.348	F_a	1.521	S_{Ms}	0.530	S_{Ds}	0.353
1.0	S_1	0.080	F_v	2.4	S_{M1}	0.192	S_{D1}	0.128

3.0 FIELD EXPLORATION & LABORATORY PROGRAM

3.1 FIELD ACTIVITIES

The scope of our services for this project included a subsurface exploration program. The subsurface exploration program consisted of drilling five (5) borings to target depths ranging from approximately 10 to 25 feet below existing site grades on September 2, 2025, at the approximate locations shown on the attached Site Plan. The borings were logged during drilling by a graduate geologist and samples were obtained to aid in material classification and for possible laboratory testing. The approximate locations of the borings are shown in the Project Site Plan. The locations of the boring were determined in the field by using a tablet GPS. The locations of the borings should be considered accurate only to the degree implied by the method used. Results of the boring are presented in the Appendix. At the completion of our field explorations, the borings holes were backfilled with auger cuttings per the UES proposal.

3.2 LAB PROGRAM

The soil samples collected in the field as part of our field exploration were transported to our lab. Laboratory tests were conducted to determine certain physical and chemical properties of the soils. The laboratory testing results are presented in the Appendix.

3.3 SUBSURFACE CONDITIONS

Fill was encountered in all borings. Fill consisted of 2½ to 3 inches of asphalt at the surface, overlying aggregate base to a depth of about 10 inches, overlying silty sand with gravel to depths ranging from 1½ to 2½ feet. However, due to previous site development/grading there could be deeper and/or poorer quality fill in other areas of the site beyond our explorations.

Natural soils consisted of dense to very dense silty gravel with sand and clayey gravel with sand to the boring termination depths in borings B-1 through B-4. Moderately hard sandstone was encountered in boring B-5 at a depth of 5 feet to the boring termination depth of 11½ feet. Auger refusal was encountered on bedrock in borings B-2, B-3 and B-4. Refer to Table 3-1 below for depths to auger refusal.

Table 3-1: Depth to Bedrock

BORING NO.	DEPTH TO AUGER REFUSAL (FT)	MATERIAL
B-2	9.0	Bedrock
B-3	5.5	Bedrock
B-4	11.0	Bedrock

Groundwater was not encountered during our exploration. Groundwater may fluctuate with seasonal variations/precipitation, irrigation practices and due to groundwater withdrawal and recharge. The boring logs and laboratory test results presented in Appendix A should be referred to for more detailed information.

3.4 GROUNDWATER

Groundwater was not encountered within the maximum explored borings to depths of approximately 11½ feet, performed on September 2, 2025.

To supplement the groundwater data, we reviewed available data published by the Colorado Department of Water Resources (DWR) from wells located within one mile northeast and northwest of the site. Our findings are reported in Table 3-2, below.

Table 3-2: Well log query

Well Log Number	Distance From Site [miles]	Date of Last Record	Depth to Groundwater [ft]
SC00408433CBD	0.37	2003	6.26*
SC00408431DDB	0.93	2003	125

*Well is located adjacent to Eagle River

3.4.1 Groundwater Effect on Development and Seasonal Water

Review of available groundwater data revealed the groundwater elevation at nearby ~~monitoring~~ wells has ranged from 6 to 125 feet below the existing well ground surface. Groundwater levels at the site should be expected to fluctuate throughout the year based on variations in seasonal precipitation, local pumping, and other factors. Locally perched shallower groundwater may be encountered.

Based on our subsurface exploration, experience at the site, and review of groundwater information near the site, the permanent groundwater table will not likely be a significant factor in construction for excavations extending less than 15 feet below the ground surface. However, it is possible that perched groundwater may be encountered in excavations if construction begins in the winter and early spring months. If groundwater is encountered, the use of sumps, submersible pumps, deep wells or a well point system could be used as methods to lower the groundwater level. The dewatering method used will depend on the soil conditions, depth of the excavation and amount of groundwater present within the excavation. Dewatering, if required, should be the contractor's responsibility. The dewatering system should be designed and constructed by a dewatering contractor with local experience. We recommend

the selected dewatering system lower the groundwater level to at least two feet below the bottom of the proposed excavations.

During the wet season, infiltrating surface runoff water can create saturated surface conditions. Earthwork operations attempted following the onset of winter rains and prior to prolonged drying periods will be hampered by high soil moisture contents.

3.5 CORROSION

3.5.1 Soil Corrosion Potential

Three soil samples were tested to determine minimum resistivity, pH, total solids, chloride, and sulfate concentrations to help evaluate the potential for corrosive attack upon reinforced concrete and buried metal. Copies of the corrosion potential test results are presented in Appendix B.

A site is generally considered to be corrosive to foundation elements if one or more of the following conditions exists for the representative soil and/or water samples taken: has a chloride concentration greater than or equal to 500 ppm, sulfate concentration greater than or equal to 1500 ppm, or the pH is 5.5 or less. Based on this criterion, the on-site, near-surface soil should be considered damaging to normal strength concrete and corrosive to steel reinforcement properly embedded within PCC or foundation for the samples tested.

Using the American Concrete Institute (ACI) 318 Table 19.3.1.1 - Exposure Categories and Classes, we recommend the exposure categories provided in Table 3-3. The project Structural Engineer should review the requirements of ACI 318 and determine their applicability to the site.

Table 3-3: Concrete exposure categories and classes (ACI 318)

Category	Class	Condition
Freezing and thawing	F3	Concrete exposed to freezing-and-thawing cycles with frequent exposure to water and exposure to deicing chemicals
Sulfates	S0	Negligible
In contact with water	W1	Concrete in contact with water and low permeability is required
Corrosion Protection of reinforcements	C2	Concrete exposed to moisture and an external source of chlorides

UES are not corrosion engineers. Therefore, if it is desired to further define the soil corrosion potential at the site, a Corrosion Engineer should be consulted.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 GEOTECHNICAL DISCUSSION

Our recommendations are based on the assumption that the soil conditions are similar to those disclosed by the explorations. If variations are noted during construction or if changes are made in the site plan, structural loading, foundation type or floor level, we should be notified so we can supplement our recommendations, as applicable.

Our subsurface explorations revealed that the project site's coarse-grained soils are typical of the vicinity's mapped geology.

As indicated, there was fill on-site. This fill would be considered uncontrolled fill unless observation and testing were performed during placement. All uncontrolled fill should be removed and replaced with properly compacted fill. The uncontrolled fill soils can be re-used for controlled fill provided almost all oversized material, unsuitable material (as determined by the geotechnical engineer), vegetation, and debris are removed, as determined by visual observation by the 3rd party inspector.

Bedrock and partially cemented soils were encountered in the majority of our borings. Bedrock was initially encountered at a depth of 5½ feet. Hence, bedrock is expected to affect the excavation and construction of utilities. Excavating through bedrock will require heavy-duty ripping equipment, rock saw and other special equipment. In addition, large quantities of oversized materials are expected to be generated from excavation of such bedrock and cemented soils and hence will require additional effort to extract such oversized materials particularly in deep, narrow utility excavation trenches. Utility contractors should review the boring logs and satisfy themselves as to the hardness of materials and equipment required, and should plan and budget accordingly.

Native soils utilized as engineered fill should meet the criteria outlined in *Section 4.3.3* of this report. Engineered fill, properly placed and compacted in accordance with the recommendations of this report, will be capable of supporting the proposed structures and pavements.

4.2 SITE PREPARATION

Strip and remove existing vegetation, topsoil, debris, uncontrolled fill (where encountered), all loose or disturbed natural soils, and other deleterious materials from proposed building areas, adjacent walks and slabs, and in areas to be paved. Excavations should extend at least 5 feet beyond the areas to be improved in plan view. Uncontrolled fill is defined as any existing fill that was not properly placed, observed and tested.

Where the proposed new foundations or other improvements are too close to existing foundations or property line to allow for full 5 feet lateral site preparation or overbuild of foundation without undermining the existing foundations or encroaching into adjacent parcel, lateral overexcavation or site preparation may be reduced or eliminated. As much lateral overbuild and site preparation as possible should be implemented without undermining the adjacent existing footing or encroaching into adjacent property.

All exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

If unexpected fills or abandoned structures/improvements are encountered during site clearing, such features should be removed and the excavation thoroughly cleaned and backfilled. All excavations should be observed by the geotechnical engineer prior to backfill placement.

Demolition of existing structures/improvements should include removal of any foundation system and utilities. Any excavations as a result of demolition and removal should be properly filled.

All materials derived from the demolition of existing structures/improvements should be removed from the site, and not be allowed for use in any fills. In some cases, existing pavements, if properly broken up, can be used in required fills. The geotechnical engineer should determine the suitability for use based on conditions in the field.

4.3 EARTHWORK

Earthwork should be performed in accordance with the guidelines presented in Chapter 18 of the 2021 IBC, except where specific recommendations are presented in this report. It is recommended that contractors perform their own reconnaissance of the site. If the contractors have any questions regarding site conditions, site preparation, or recommendations in this report, they should contact a representative of UES.

4.3.1 Subgrade Preparation

Following site clearing activities, areas designated to receive fill, at-grade areas, or those achieved by excavation should be scarified to a depth of at least 12 inches, moisture conditioned and compacted as recommended in the Fill Placement and Compaction Section of this report.

Difficulty in achieving the recommended compaction may require drying the near-surface subgrade to a compactable moisture content, removal and replacement. In addition, difficulty in subgrade compaction may be an indication of loose, soft or unstable soil conditions that could require additional excavation. If these conditions exist, additional subgrade stabilization recommendations may be required at the time of construction.

Recommendations to achieve the recommended compaction can be made during construction and will depend on the conditions encountered in the field and other factors, such as project schedule and prevailing weather conditions.

Compaction of all subgrade soils should be performed using a heavy, self-propelled, smooth steel drum compactor capable of achieving the required compaction and must be performed in the presence of the Geotechnical Engineer's representative who will evaluate the performance of subgrade under compactive load. Difficulty in achieving subgrade compaction may be an indication of loose, soft, or unstable soil conditions that could require additional excavation. If these conditions exist, additional subgrade stabilization recommendations may be required at the time of construction.

4.3.2 Excavation

It is anticipated that excavation of the on-site natural non-cemented deposits for the proposed project can be accomplished with conventional earthmoving equipment.

Excavations penetrating moderately hard or relatively thin (less than one foot) hard layers of bedrock should be able to be excavated using heavy-duty equipment.

Excavations penetrating hard or very hard bedrock will require special consideration where they are to be performed.

Contractors, especially those excavating for utilities, should satisfy themselves as to the hardness of materials and equipment required.

Some additional effort may be necessary to extract boulder-sized materials, particularly in deep, narrow excavations such as utility trenches.
Temporary unsurcharged construction excavations should be sloped or shored. Slopes should not be steeper than 2 (horizontal) to 1 (vertical). Slopes may need to be flattened depending on conditions exposed during construction. Exposed slopes should be kept moist (but not saturated) during construction.

If there is not enough space for sloped excavations, shoring should be used. Traffic and surcharge loads should be kept back at least 10 feet from the top of the excavation.

Underpinning may be required to protect the existing structure if excavations will be deeper than existing foundations. If underpinning is utilized during foundation construction, please refer to *Section 1803.5.7, 1804.1,* and *1804.2* of the *2018 IBC* for underpinning design requirements to be prepared by a registered design professional. Excavations near foundations that may affect the vertical or lateral support of that existing foundation should be evaluated for stability by a registered design professional on a case-by-case basis.

If excavations, including utility trenches, are extended to a depth of more than 20 feet, OSHA requires that the protective system of such excavations be designed by a professional engineer. Excavation, trenching and shoring should be conducted in accordance with the *U.S. Department of Labor Occupational Safety and Health Administration's (OSHA) Excavation and Trenching Standard, Title 29 of the Code of Federal Regulation (CFR), Part 1926.650*. The safety of construction personnel is the responsibility of the contractor.

4.3.3 Engineered Fill Materials and Placement

The on-site granular soils encountered in our borings are considered suitable for use in engineered fill construction, provided these materials do not contain rubble, rubbish, significant organic concentrations, and are at a workable moisture content appropriate for compaction.

Soils containing clay within the soil matrix should not be allowed to dry out such that cracking occurs during or after grading. Sufficient moisture contents should be maintained, to prevent cracking, at least until foundations, floor slabs, flatwork, and pavements are constructed. Any significantly dried or cracked soils could be wetted until they reach acceptable moisture contents or they could be excavated and replaced with acceptable properly compacted fill. In addition, no fill or foundation concrete should be placed on frozen ground/subgrade.

Fill materials shall not be placed, spread or compacted while the ground is frozen or during unfavorable weather conditions. When site grading is interrupted by heavy rain, filling operations shall not resume until the Geotechnical Engineer approves the moisture and density conditions of the previously placed fill.

Imported fill materials, should be granular, compactable materials with a Plasticity Index of 12 or less when tested in accordance with ASTM D4318; an Expansion Index of 20 or less when tested in accordance with ASTM D4829; an organic content less than four percent; do not contain particles greater than three inches in maximum dimension, and be within a compactable moisture content. Imported fill should be observed and approved by the Geotechnical Engineer at least three business days prior to being transported to the site. Also, if import fills are required (other than aggregate base), the contractor must provide appropriate documentation that the import is clean of known contamination and within acceptable corrosion limits.

Structural fill should be observed and tested as necessary to determine compliance with the compaction requirements presented in this report. In general, one compaction test should be performed for approximately every 500 cubic yards of fill, one for one foot of fill placed, or change in material. Structural fill should be placed in lifts not exceeding six inches in compacted thickness with each lift being uniformly moisture conditioned to at least the optimum moisture content and compacted to not less than 98 percent of the maximum dry density per ASTM D698. Refer to Table 4-1 for additional information.

The upper six inches of pavement subgrade should be moisture conditioned to at least the optimum moisture content and compacted to no less than 95 percent relative compaction, regardless of whether final subgrade is achieved by excavation, filling or left at existing grade. Final pavement subgrade processing and compaction should be performed after completion of underground utilities and must be stable under construction traffic prior to aggregate base placement.

Earthwork operations should be accomplished in accordance with the recommendations contained within this report. We recommend the Geotechnical Engineer's representative be present on a regular basis during all earthwork operations to observe and test the engineered fill and to verify compliance with the recommendations of this report and the project plans and specifications.

Table 4-1: Compaction Criteria and Testing Frequency

Material Type (location)	Per ~~Modified~~ Standard Proctor Test (ASTM D698)			
	Minimum Compaction (%)	Moisture Content Range		Testing Frequency (min. 3 per lift)
		Minimum	Maximum	
Engineered Fill (Fine Grained)	95	OMC	+2%	1 per 2,500 sf
Engineered Fill (Coarse Grained) and General Fill (granular)	98	-2%	+2%	1 per 2,500 sf
Subgrade	95	-2%	+2%	1 per 5,000 sf
Aggregate Base (pavements)	98	-2%	+2%	1 per 5,000 sf

Notes: OMC = Optimum Moisture Content

1. For compaction, fine-grained soils are soils with at least 30 percent passing the No. 200 sieve and/or soils having an expansion of less than 4 percent (Expansion Index less than 20).
2. All fill placed deeper than 5 feet below the final grade should be compacted to a minimum of 98 percent at a moisture content of optimum or greater.
3. Retaining wall backfill only need to be compacted to a minimum of 95 percent.

4.4 EXCAVATIONS

4.4.1 Excavation Conditions

The surface and near-surface soils at the site should be able to readily excavatable with conventional earthmoving and trenching equipment. Subsurface remnants from existing and/or previous development of the site, if any, may be encountered and can be slow to excavate with a standard, rubber-tired backhoe; however, experience has shown that excavators can remove these materials with moderate effort.

Based on our borings, excavations associated with building foundations, shallow trenches for utilities, and other excavations less than five feet deep associated with the proposed construction, should stand vertically for short periods of time (i.e., less than one day) required for construction, unless cohesionless, saturated or disturbed soils are encountered. These unstable conditions may result in caving or sloughing; therefore, the contractor should be prepared to brace or shore the excavations, if necessary.

Excavations deeper than five feet that will be entered by workers should be sloped, braced or shored in accordance with current OSHA regulations. The contractor must provide an adequately constructed and braced shoring system in accordance with federal, state, and local safety regulations for individuals working in an excavation that may expose them to the danger of moving ground.

Temporarily sloped excavations should be constructed no steeper than a one (horizontal) to one (vertical) (1H:1V) inclination. Temporary slopes likely will stand at this inclination for the short-term duration of construction, provided significant pockets of loose and/or saturated granular soils are not encountered. Flatter slopes would be required if these conditions are encountered.

Excavated materials should not be stockpiled directly adjacent to an open excavation to prevent surcharge loading of the excavation sidewalls. Excessive truck and equipment traffic should be avoided near excavations. If material is stored or heavy equipment is stationed and/or operated near an excavation, a shoring system must be designed to resist the additional pressure due to the superimposed loads.

4.4.2 Utility Trench Backfill

Utility trench backfill should be mechanically compacted as engineered fill in accordance with the following recommendations. Bedding and initial backfill around and over the pipe should conform to the pipe manufacturers' recommendations for the pipe materials selected and applicable sections of the governing agency standards.

Utility trench backfill should be placed in thin lifts, thoroughly moisture conditioned to at least the optimum moisture content and compacted to at least 95 percent of the maximum dry density as determined by ASTM D698. The lift thickness will depend on the type of compaction equipment used to backfill utility trenches.

Within the upper six inches of pavement subgrade soils, compaction should be increased to at least 95 percent relative compaction at no less than two percent above the optimum moisture content.

Backfill for the upper 12 inches of trenches must match the adjacent materials.

We recommend that all underground utility trenches aligned nearly parallel with new foundations be at least three feet from the outer edge of foundations, wherever possible. Trenches should not encroach into the zone extending outward at a one (horizontal) to one (vertical) (1H:1V) inclination below the bottom of foundations. The intent of these recommendations is to prevent loss of both lateral and vertical support of foundations, resulting in possible settlement.

4.5 FOUNDATIONS

If the grading recommendations presented in the Earthwork section of this report are complied with, the proposed structures, additions and any block walls or retaining walls may be supported by conventional type foundations. Foundations should be established on native soils at least medium dense in consistency or properly compacted fill as discussed in *Section 4.3.3* above.

Soil-moisture changes below foundations and floor slabs is the major factor in damages relating to soils. Settlement of the proposed structures, supported as recommended, should be within acceptable limits as provided above. However, if the soils beneath foundations experience an increase in moisture, settlement could occur and cause additional movement of a structure. Therefore, it is important that the recommendations presented in the Drainage and Moisture Protection section of this report be adhered to.

4.5.1 Shallow Foundations

If the grading recommendations presented in the Earthwork section of this report are complied with, the proposed structure, additions and any block walls or retaining walls may be supported by conventional type foundations. Foundations should be established on native soils at least medium dense in consistency or properly compacted fill. Parameters for foundations are shown in the table below. These parameters should be used for design of all grade beams bearing on recompacted fill soils as recommended.

Table 4-5.1: Foundation Design Parameters

Description	Parameter
Allowable bearing pressure [1,2]	3,500 psf (soil)
Minimum width [3]	12 inches
Minimum embedment depth [3, 4]	48 inches
Anticipated total settlement	Less than 1 inch
Anticipated differential settlement[5]	Less than ½ inch

Notes:
1. The bearing value may be increased by 500 psf for each additional 12 inches of embedment up to a maximum of 4,000 psf.
2. A one-third increase may be used for wind or seismic loads.
3. Minimum width and embedment depth are for conventional spread footings or the thickened edge of post-tension slab foundations.
4. Below the lowest adjacent final compacted subgrade (generally pad grade before landscaping; exterior footings) or the top of the finished floor slab (interior footings).
5. Differential settlements may be as much as ½ total settlement within a distance of 50 feet or the least dimension of the structure, whichever is less.

We recommend that all foundations be adequately reinforced to provide structural continuity, mitigate cracking and permit spanning of local soil irregularities. The structural engineer or civil engineering consultant should determine final foundation reinforcing requirements. It should be noted again that concrete shall not be placed on frozen subgrade/ground.

Resistance to lateral displacement of shallow foundations may be computed using an allowable friction factor of 0.42 multiplied by the effective vertical load on each foundation. Additional lateral resistance may be achieved using an allowable passive earth pressure against the vertical projection of the foundation equal to an equivalent fluid pressure of 240 psf per foot of depth. These two modes of resistance should not be added unless the frictional component is reduced by 50 percent since mobilization of the passive resistance requires some horizontal movement, effectively reducing the frictional resistance.

4.5.2 Interior Floor Slab Support

Interior concrete slab-on-grade floors can be supported upon the soil subgrade prepared in accordance with the recommendations in this report and maintained in that condition (optimum moisture) and are protected from disturbance. Slabs-on-grade should be at least four inches thick, and final thickness, reinforcement and joint spacing should be determined by the slab designer. Proper and consistent location

of the reinforcement near mid-slab is essential to its performance. The risk of uncontrolled shrinkage cracking is increased if the reinforcement is not properly located within the slab.

Interior floor slabs should be underlain by a layer of free-draining gravel/crushed rock, serving as a deterrent to migration of capillary moisture. The gravel/crushed rock layer should be between four and six inches thick and graded such that 100 percent passes a one-inch sieve and less than five percent passes a No. 4 sieve. Additional moisture protection may be provided by placing a plastic, water vapor retarder (at least 10-mils thick) directly over the gravel/crushed rock. The water vapor retarder should meet or exceed the minimum specifications for plastic water vapor retarders as outlined in ASTM E1745 and be installed in strict conformance with the manufacturer's recommendations.

Floor slab construction practice over the past 30 years or more has included placement of a thin layer of sand or pea gravel over the vapor retarder membrane. The intent of the sand/ pea gravel is to aid in the proper curing of the slab concrete. However, recent debate over excessive moisture vapor emissions from floor slabs includes concern of water trapped within the sand/pea gravel. As a consequence, we consider use of the sand/pea gravel layer as optional and not required from a geotechnical perspective. The concrete curing benefits should be weighed against efforts to reduce slab moisture vapor transmission.

The recommendations presented above are intended to reduce significant soils-related cracking of slab-on-grade floors. Also important to the performance and appearance of a PCC slab is the quality of the concrete, the workmanship of the concrete contractor, the curing techniques utilized and the spacing of control joints.

4.5.3 Floor Slab Moisture Penetration Resistance

It is considered likely that floor slab subgrade soils will become wet to near saturated at some time during the life of structures. This is a certainty when slabs are constructed during the wet seasons, or when constantly wet ground or poor drainage conditions exist adjacent to structures. For this reason, it should be assumed that interior slabs intended for moisture-sensitive floor coverings or materials, require protection against moisture or moisture vapor penetration. Standard practice includes the gravel/crushed rock and vapor retarder as suggested above. However, the gravel/crushed rock and plastic membrane offer only a limited, first line of defense against soil-related moisture; they do not moisture-proof the slab. Recommendations contained in this report concerning foundation and floor slab design are presented as minimum requirements, only from the geotechnical engineering standpoint.

It is emphasized that the use of gravel/crushed rock and plastic membrane below the slab will not "moisture proof" the slab, nor does it assure that slab moisture transmission levels will be low enough to prevent damage to floor coverings or other building components. If increased protection against moisture vapor penetration of slabs is desired, a concrete moisture protection specialist should be consulted. The design team should consider all available measures for slab moisture protection. It is commonly accepted that maintaining the lowest practical water-cement ratio in the slab concrete is one of the most effective ways to reduce future moisture vapor penetration of the completed slabs.

4.6 Exterior Flatwork Construction

The upper 12 inches of final soil subgrade for exterior concrete flatwork areas should consist of approved, imported, compactable, low-expansive (Expansion Index ≤ 20) granular soils and compacted in accordance with the Engineered Fill Construction recommendations included in this report. Exterior flatwork subgrade

soils should be maintained in a moist condition and protected from disturbance. Exterior flatwork should be underlain by at least four inches of Class 6 aggregate base compacted to at least 95 percent relative compaction. The aggregate base can be included in the 12 inches of very-low expansive granular soils.

Proper moisture conditioning of the subgrade soils is considered important to the performance of exterior flatwork. Expansion joints should be provided to allow for minor vertical movement of the flatwork. Exterior flatwork should be constructed independent of the perimeter building foundation and isolated column foundations by the placement of a layer of felt material between the flatwork and the foundation.

Exterior flatwork concrete should be at least four inches thick in pedestrian traffic areas and underlain by at least four inches of aggregate base compacted to at least 98 percent of the ASTM D698 maximum dry density. The four inches of aggregate base is not required if the low-expansion imported fill below the flatwork consists of aggregate base.

Consideration should be given to thickening the edges of the slabs at least twice the slab thickness where wheel traffic is expected over the slabs. Expansion joints should be provided to allow for minor vertical movement of the flatwork. Exterior flatwork should be constructed independent of other structural elements by the placement of a layer of felt material between the flatwork and the structural element. The slab designer should determine the final thickness, strength and joint spacing of exterior slab-on-grade concrete. The slab designer should also determine if slab reinforcement for crack control is required and determine final slab reinforcing requirements.

Our recommendations are intended to reduce the effects of variable soil subgrade conditions in exterior concrete flatwork areas. However, some seasonal movement of exterior flatwork should be anticipated where flatwork is adjacent to landscape areas.

Areas adjacent to new exterior flatwork should be landscaped to maintain more uniform soil moisture conditions adjacent to and beneath flatwork. We recommend final landscaping plans not allow fallow ground adjacent to exterior concrete flatwork.

4.7 Drainage Considerations

Foundation soils should generally not be allowed to become saturated during or after construction, except when necessary to increase moisture contents prior to construction. Infiltration of water into foundation or utility excavations should be prevented during construction. Utility lines should be properly installed and the backfill properly compacted to avoid possible sources for subsurface saturation.

Positive drainage away from the structures should be provided during construction and maintained throughout the life of the structure. Any downspouts, roof drains or scuppers should discharge into splash blocks or extensions and away from the structures. Backfill against footings, exterior walls, and in utility trenches should be properly compacted and free of all construction debris to reduce the possibility of moisture infiltration.

If the above recommendations are not followed there would be an increased risk/potential for increasing moisture below foundations and slabs, resulting in additional movement and distress to structures and slabs.

4.8 RETAINING WALLS

For soils above any free water surface, with level backfill and no surcharge loads, we recommend the following equivalent fluid pressures and coefficient of friction:

Table 4-2: Soil Parameters

Soil Parameter	Value
Soil Unit Weight	125 pcf
Internal Angle of Friction	34°
Cohesion	0 psf
Coefficient of Friction	0.42

Table 4-3: Lateral Seismic Pressure

Loading Condition	Lateral Earth Coefficient		Equivalent Fluid Pressures (pcf)
Horizontal backfill	K_0	0.44	55
	K_a	0.28	35
	K_p	3.54	440

Notes:
1. The above values are ultimate and do not include a factor of safety. The designer should employ an adequate factor of safety
2. The above values assume no hydrostatic pressure.
3. Active pressure assumes unrestrained (cantilever) wall and assumes no loading from heavy compaction equipment.
4. Passive pressure should not exceed a maximum of 2,500 psf. A one-third increase may be used for wind or seismic loads.
5. The passive pressure and the frictional resistance of the soils may be combined with a reduction of half of the frictional resistance in determining the total lateral resistance.
6. Passive earth pressures should be considered negligible for block or retaining walls within 5-feet of a descending slope.

If required by the 2021 IBC, the lateral seismic pressure acting on an unrestrained wall can be estimated by the method presented in the following equation, where the dynamic (seismic) lateral thrust, ΔP_{AE}, per linear foot of wall may be determined as follows:

$$\Delta P_{AE} = {}^{3}/_{8}(k_h)H^2\gamma$$

- k_h is equal to $S_{DS}/2.5$
- H is the height of the wall in feet
- γ is equal to the unit weight of the backfill material, in pcf

The resultant dynamic force acts at 0.6H above the base of the wall. This equation applies to level backfill and walls that retain no more than 15 feet.

Where the design includes unrestrained walls, above any free water, with level backfill and no surcharge loads, we recommend the wall be designed to resist an earth pressure with the distribution shown below:

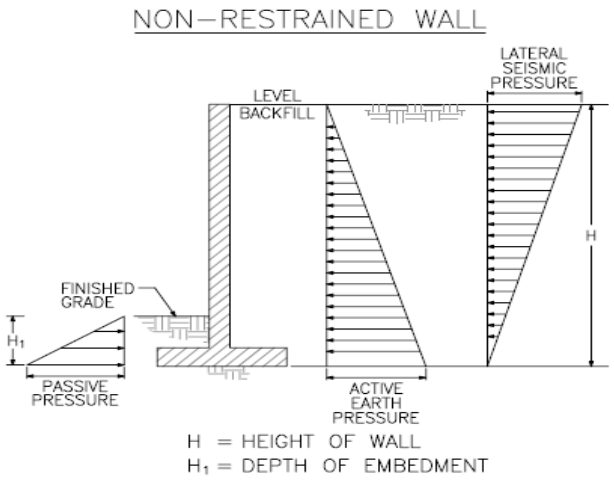


Figure 5-1: Non-restrained Wall

Any surcharge from adjacent loadings should be added to the retaining wall pressures using the K_a factor for non-restrained walls. K_a is presented in the table above. As indicated, the pressures assume that there will be no build-up of hydrostatic pressure. Therefore, if walls are subject to saturated conditions, we recommend weep holes (if practical) and a wall drainage system. The wall drainage may consist of a minimum of 2 cubic feet of drain rock per foot of length of retaining wall wrapped in filter fabric, Mirafi 140N or equivalent, placed at the base of the wall and discharge to an appropriate outlet. Drain rock should consist of clean, uniformly sized gravel, ¾-inch in nominal size. Alternatively, a drainage system including perforated pipe with filter sock placed within the drain rock is also acceptable. The structural fill immediately behind retaining walls (6 to 12 inches) should be granular and free draining. The upper two feet of backfill should consist of compacted native soils. As an option, a prefabricated drain could be used behind the walls. The wall drainage system is an integral part of the retaining wall design. The retaining wall designer is ultimately responsible for the retaining wall design and shall ensure that the above recommended drainage system is compatible with the design of the wall or select a different drainage system at their discretion. All walls below grade should be waterproof or at least dampproof.

Fill against foundations, grade beams and retaining walls should be properly placed and compacted. Backfill should be mechanically compacted in layers (12 inches maximum thickness); flooding should not be permitted. Backfill within a lateral distance equal to the height of retaining walls should be compacted to at least 95 percent of the maximum dry density obtainable by the ASTM D698 method. The backfill materials within this zone should consist of none too low expansive soils. If expansive soils are used within this backfill zone, the wall should be designed to resist the additional pressure that may be exerted by the expansive soils. Backfill outside this zone should be compacted as outlined in the Fill Placement and Compaction section of this report. Care should be taken when placing backfill so as not to damage the walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over-compaction may cause excessive lateral earth pressures which could

result in wall movements. Retaining walls should not be backfilled until the concrete or masonry has reached an adequate strength as specified by the wall designer.

4.9 PAVEMENT DESIGN

4.9.1 Pavement Design Recommendations

Based on laboratory test results for the surface and near-surface sandy lean clay soils present at the site, we used an estimated Resistance ("R") value of 50 for pavement subgrades. Pavement sections presented in the table below have been calculated using the above R-values and traffic indices (TIs) assumed to be appropriate for this project, per our experience. The project civil engineer should determine the appropriate traffic index for pavements based on anticipated traffic conditions. If needed, we can provide additional pavement sections for different traffic indices.

Table 4-3: Pavement Design Alternatives

Traffic Index (TI)	Pavement Use	Subgrades R-values = 5		
		Type A Asphalt Concrete (inches)	Portland Cement Concrete (inches)	Class 6 Aggregate Base (inches)
4.5	Automobile Parking Only	2½	--	4
		--	5	4
6.0	Automobile, Light to Moderate Truck Traffic, and Fire Lanes	4	--	4
		--	5	6
7.0	Moderate Truck Traffic, Trash Enclosures, Loading Areas, and Entryways	5	--	8
		--	6	6

We emphasize that the performance of pavements is critically dependent upon uniform and adequate compaction of the soil subgrade, as well as all engineered fill and utility trench backfill within the limits of the pavements. We recommend that pavement subgrade preparation (i.e., scarification, moisture conditioning and compaction) be performed after underground utility construction is completed and just prior to aggregate base placement. All aggregate base should be compacted to at least 98 percent of the maximum dry density determined by ASTM D698.

In the summer heat, high axle loads coupled with shear stresses induced by sharply turning tire movements can lead to failure in asphalt concrete pavements. Therefore, we recommend that consideration be given to using the Portland cement concrete (PCC) pavements in areas subjected to concentrated heavy wheel loading, such as truck turning areas and in front of trash enclosures. These PCC pavements should be designed in accordance with the pavement sections provided in the table above.

We suggest the concrete slabs be constructed with thickened edges in accordance with ACI design standards. Reinforcing for crack control, if desired, should consist of No. 4 reinforcing bars placed on maximum 24-inch centers each way throughout the slab. Reinforcement must be located at mid-slab depth to be effective. Joint spacing and details should conform with the current PCA or ACI guidelines.

Portland cement concrete should achieve a minimum compressive strength of 3500 pounds per square inch at 28 days.

Pavement subgrades must be stable and unyielding under heavy wheel loads of construction equipment. A proof-roll test using a fully loaded water truck should be performed prior to placement of aggregate base to help identify areas that are unstable, as observed by our representative. Areas that are found to be unstable should be excavated to firm, undisturbed materials and restored to grade with compacted aggregate base.

Materials quality and construction within the structural section of the pavement should conform to the applicable provisions of the latest edition of the Caltrans Standard Specifications.

It has been our experience that pavement failures may occur where a non-uniform or disturbed subgrade soil condition is created. Subgrade disturbances can result if pavement subgrade preparation is performed prior to underground utility construction and/or if a significant time period passes between subgrade preparation and placement of aggregate base. Therefore, we recommend that final pavement subgrade preparation (i.e., scarification, moisture conditioning, and compaction) be performed just prior to aggregate base placement.

4.10 Plan Review

We recommend that our firm be retained to review the final plans and specifications to determine if the intent of our recommendations has been implemented in those documents. We would be pleased to submit a proposal to provide these services upon request.

5.0 GEOTECHNICAL RISK AND LIMITATIONS

Our recommendations are based upon the information provided regarding the proposed construction, combined with our analysis of site conditions revealed by the field exploration and laboratory testing programs. We have used prudent engineering and geologic judgment based upon the information provided and the data generated from our investigation. This report has been prepared in substantial compliance with generally accepted geotechnical engineering practices that exist in the area of the project at the time the report was prepared. No warranty, either express or implied, is provided.

If the proposed construction is modified or relocated or, if it is found during construction that subsurface conditions differ from those we encountered at our boring and/or CPT locations, we should be afforded the opportunity to review the new information or changed conditions to determine if our conclusions and recommendations must be modified.

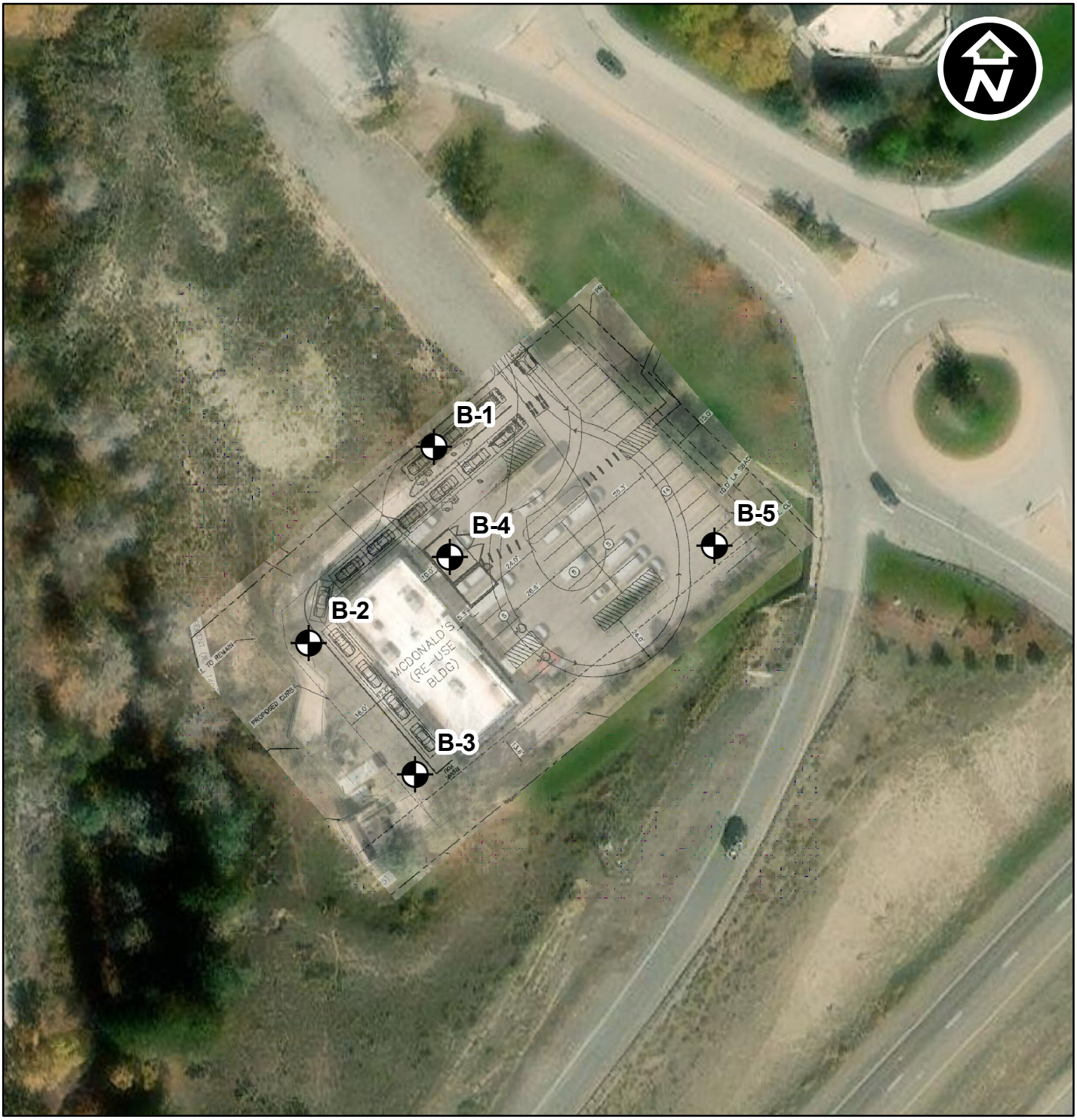
We emphasize that this report is applicable only to the proposed construction and the investigated site. This report should not be utilized for construction on any other site. This report is considered valid for the proposed construction for a period of two years following the date of this report. If construction has not started within two years, we must re-evaluate the recommendations of this report and update the report, if necessary.

FIGURES

Legend

★ Approximate Project Site

Universal Engineering Sciences	PROJECT: **McDonalds No. 51052 I-70 and Eby Creek Road Eagle, Colorado**	**VICINITY MAP**	
	CLIENT: **McDonalds USA**	PROJECT NO: **A25170.01259**	FIGURE NO: **1**



0 20 40 80 120 160 200 Feet

Legend

Approximate Boring Location

The presented layers were obtained from various sources including USGS, USDA, GIS User Community among others. The GIS information is presented for reference only. No warranties, either expressed or implied, are intended or made. If you have any questions regarding this information, please contact UES.

Universal Engineering Sciences	PROJECT: **McDonalds 51052 I-70 and Eby Creek Road Eagle, Colorado**	SITE MAP	
	CLIENT: **McDonalds USA**	PROJECT NO: **A25171.01259**	FIGURE NO: **2**

APPENDIX

Site Exploration

The subsurface conditions of the site were explored by drilling five (5) borings to target depths of 10 feet and 25 feet below existing site grades. Early auger refusal was encountered on bedrock at depths ranging from of approximately 5½ to 11 feet below existing site grades in borings B-2, B-3 and B-4. Borings were drilled using a truck-mounted, auger drill rig. Refer to Figure 2 for a boring location map.

Soils were logged during drilling by a graduate geologist, and samples were obtained to aid in material classification and for possible laboratory testing. Boring logs are presented on Plates 1 through 6. Sampling was performed using a standard split spoon sampler ("SPT" in boring logs). The SPT sampler was driven in three 6-inch intervals into the substrata with blows from a 140-pound automatic hammer free-falling 30 inches. Penetration resistance (blow counts) was recorded for each 6-inch drive. Blow counts for the final 12 inches of the total 18 inches are presented as blows per foot in boring logs at the respective depths the samples were taken. Bag/bulk samples ("B" in boring logs) were also collected from the borings for laboratory testing. The soils are generally classified by the Unified Soil Classification System. Plate 7 presents an explanation of material classifications used in this report.

Laboratory Testing

Laboratory testing was performed on selected samples of on-site soils. Tests were performed in general accordance with applicable ASTM or local standards.

Field moisture contents were performed on undisturbed samples. The results of these tests are presented on the boring logs.

Sieve Analyses, Minus 200 and Atterberg Limits (liquid limit and plastic limit) tests, along with the percent passing the No. 200 sieve were performed for selected samples to aid in classification. Test results are presented on Plates 7a through 7c and summarized below.

Sample Location	Material Description	Liquid Limit	Plasticity Index	Passing No. 200
B-1 @ 1-6 ft	Silty SAND with Gravel	NV	NP	27
B-2 @ 2-7 ft	Clayey GRAVEL with Sand	29	9	41
B-4 @ 2-7 ft	GRAVEL with Sand and Clay	20	4	20.3

Chemical tests were performed on a representative sample. The tests were performed to determine the percent chloride, water-soluble sodium, sulfate and sodium sulfate, as well as the soil solubility. Test results are presented on Plates 8a through 8c.

BORING LOG B-1

CLIENT:	PROJECT:
McDonalds USA	McDonalds 51052 - Eagle, CO
BORING LOCATION: See site map	**ELEVATION (ft):** N/A
SITE: 295 Eby Creek Road	

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	FILL		FILL: 2.5-inches Asphalt FILL: Silty SAND with gravel, slightly moist, reddish brown	
					1				
					2	GM		Silty GRAVEL with sand, slightly moist, reddish brown	Dense
2.6		SPT B		50	3				V. Dense
					4				
					5				
3.8		SPT		86/11"	6				
					7			- partially cemented	
					8				
					9				
					10			- brownish grey	
1.6		SPT		98/8"	11				
								Bottom of Boring at 11.2 feet	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION DCP = DYNAMIC CONE PENETROMETER

UNIVERSAL ENGINEERING SCIENCES

NOTES:
Groundwater was not encountered within the depth drilled.

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PROJECT NO.:	**PLATE NO.:**
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BORING LOG B-2

CLIENT:		PROJECT:
McDonalds USA		McDonalds 51052 - Eagle, CO
BORING LOCATION:	**ELEVATION (ft):**	**SITE:**
See site map	N/A	295 Eby Creek Road

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	FILL		FILL: 2.5-inches Asphalt FILL: Silty GRAVEL with sand, slightly moist, dark brown	
					1				
					2				
					3	GC		Clayey GRAVEL with sand, slightly moist, dark brown	V. Dense
10.7		SPT		54/11"					
					4			- partially cemented	
		B							
					5	GM		Silty GRAVEL with sand, slightly moist, reddish brown to dark brown	
7.3		SPT		58	6				
								- dark brown	
					7				
								- reddish brown	
					8				
4.3		SPT		50/2"				- partially cemented	
					9			Refusal on BEDROCK	
								Bottom of Boring at 9 feet	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION DCP = DYNAMIC CONE PENETROMETER

UNIVERSAL ENGINEERING SCIENCES

NOTES:
Groundwater was not encountered within the depth drilled.

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BORING LOG B-3

CLIENT:	PROJECT:
McDonalds USA	McDonalds 51052 - Eagle, CO
BORING LOCATION: See site map	**ELEVATION (ft):** N/A
SITE: 295 Eby Creek Road	

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	FILL		FILL: 3-inches Asphalt FILL: Silty SAND with gravel, slightly moist, dark brown	
					1				
					2			- reddish brown	
3.9		SPT		50/1"	3	GM		Silty GRAVEL with sand, slightly moist, reddish brown to dark brown	V. Dense
3.5		B			4				
					5			- with quartz	
4.5		SPT		50/6"				Refusal on BEDROCK	
								Bottom of Boring at 5.5 feet	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION DCP = DYNAMIC CONE PENETROMETER

UNIVERSAL ENGINEERING SCIENCES

NOTES:
Groundwater was not encountered within the depth drilled.

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PROJECT NO.:	**PLATE NO.:**
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BORING LOG B-4

CLIENT:	PROJECT:
McDonalds USA	McDonalds 51052 - Eagle, CO
BORING LOCATION: See site map	**ELEVATION (ft):** N/A
SITE: 295 Eby Creek Road	

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	FILL		FILL: Approximately 3.0" Asphalt FILL: Silty SAND with gravel, slightly moist, dark brown	
					1				
					2			-gravelly	
2.8		SPT		50	3	GC/ GM		Silty-Clayey GRAVEL with sand, with quartz, slightly moist, reddish brown to grey	V. Dense
		B			4			- partially cemented	
3.9		SPT		76	5				
					6				
					7				
					8				
2.3		SPT		50/0"	9			- brown	
					10				
					11			Refusal on BEDROCK	
								Bottom of Boring at 11 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION DCP = DYNAMIC CONE PENETROMETER

UNIVERSAL ENGINEERING SCIENCES

NOTES:
Groundwater was not encountered within the depth drilled.

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-5

CLIENT:	PROJECT:
McDonalds USA	McDonalds 51052 - Eagle, CO
BORING LOCATION: See site map	**ELEVATION (ft):** N/A
SITE: 295 Eby Creek Road	

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	FILL		FILL: Approximately 2.5" Asphalt FILL: Silty SAND with gravel, slightly moist, reddish brown	
					1				
					2	GM		Silty GRAVEL with sand, slightly moist, reddish brown to brown	M. Dense
								- with quartz sandstone	Dense
4.1		SPT		46	3				
					4				
					5	ROCK		SANDSTONE, slightly moist, intermittent layers of clay, reddish brown to grey	M. Hard
4.6		SPT		53	6				
					7				
					8				
					9				
					10			- brown	
1.9		SPT		56	11				
								Bottom of Boring at 11.5 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION DCP = DYNAMIC CONE PENETROMETER

UNIVERSAL ENGINEERING SCIENCES

NOTES:
Groundwater was not encountered within the depth drilled.

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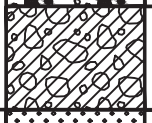
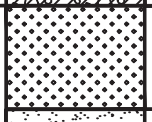
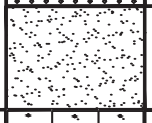
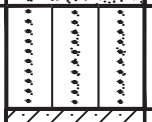
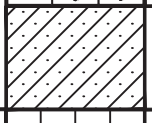
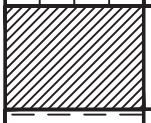
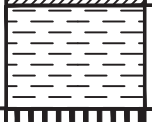
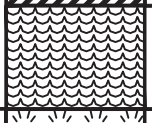
MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

UNVIERSAL ENGINEERING SCIENCES

CLIENT: McDonalds USA

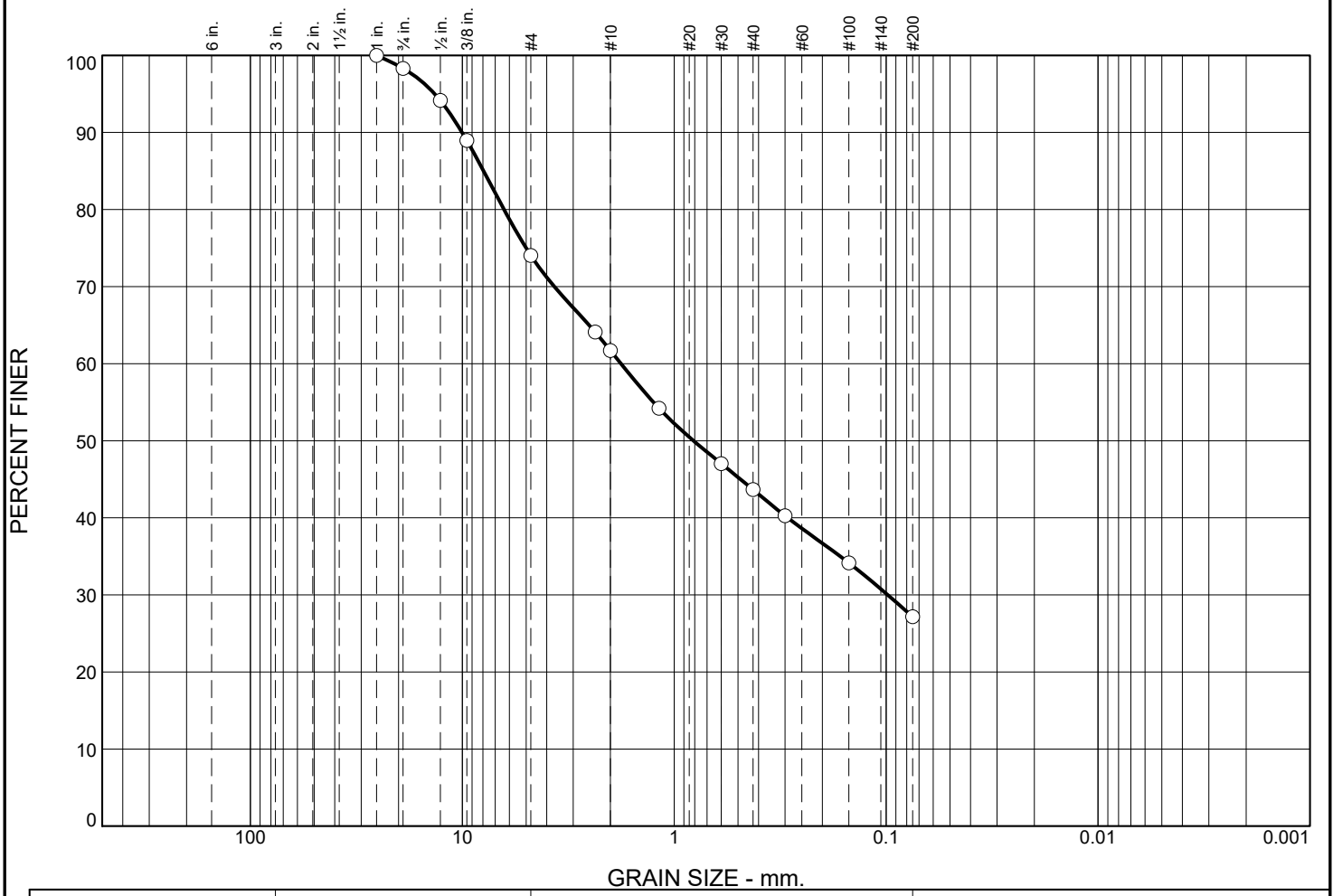
PROJECT: McDonalds 51052 Eagle, Colorado

Materials Classification

PROJECT NO.: A25170.01259

PLATE NO.: 6

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	1.7	24.3	12.3	18.0	16.5	27.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	7.9392	1.7839	0.8111	0.0984				

Material Description	USCS	AASHTO
○ Silty Sand with Gravel	SM	A-2-4(0)

Project No. A25170.01259 **Client:** McDonalds USA

Project: McDonalds 51052 - Eagle, CO

○ **Source of Sample:** B-1 **Depth:** 1-6 ft

Remarks:

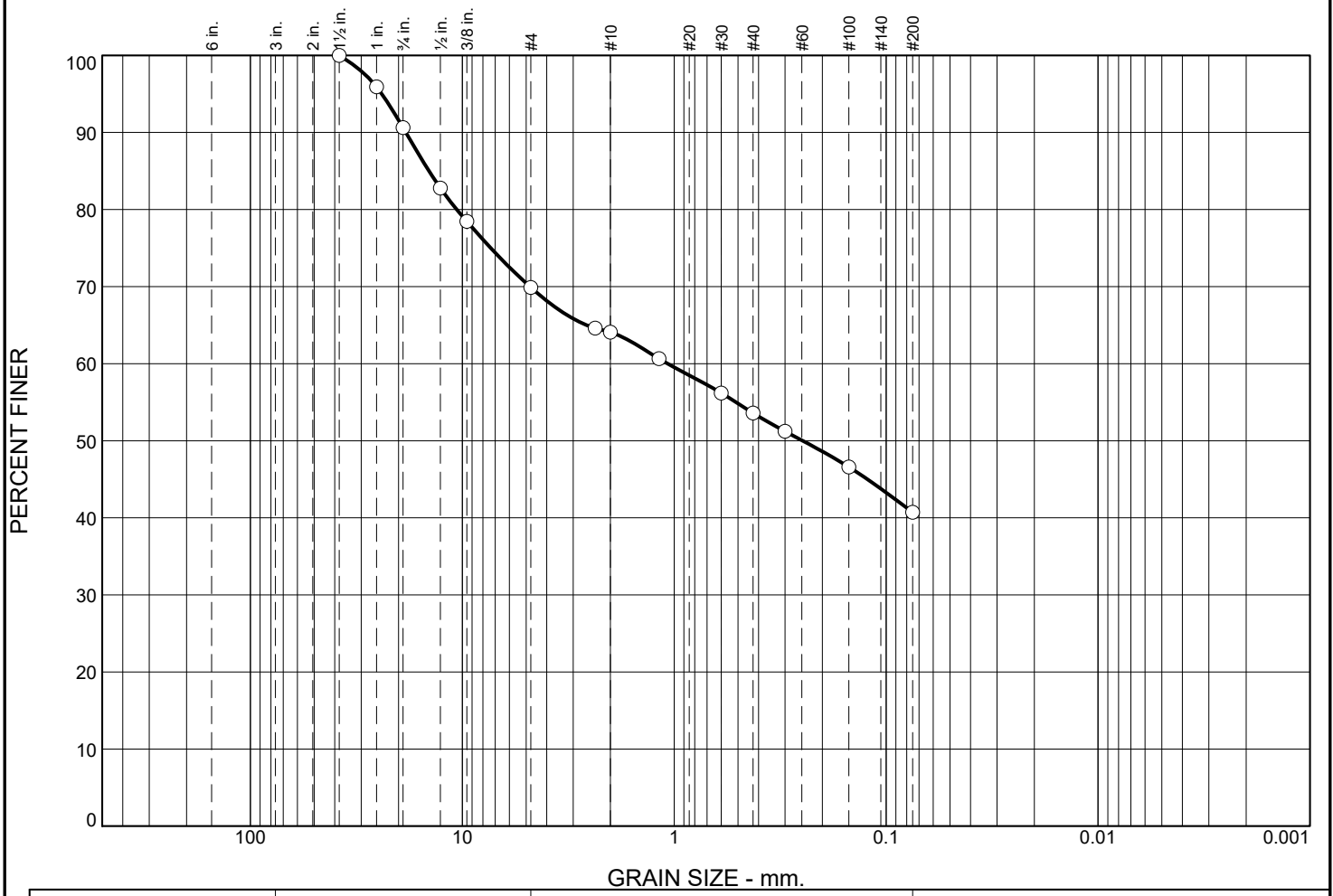
Universal Engineering Sciences

Las Vegas, Nevada

Plate 7a

Tested By: DP **Checked By:** LM

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	9.4	20.7	5.8	10.5	12.9	40.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	29	9	14.3666	1.0746	0.2478					

Material Description	USCS	AASHTO
○ Clayey GRAVEL with sand	GC	A-6(3)

Project No. A25170.01259 **Client:** McDonalds USA

Project: McDonalds 51052 - Eagle, CO

○ **Source of Sample:** B-2 **Depth:** 2-7 ft

Remarks:

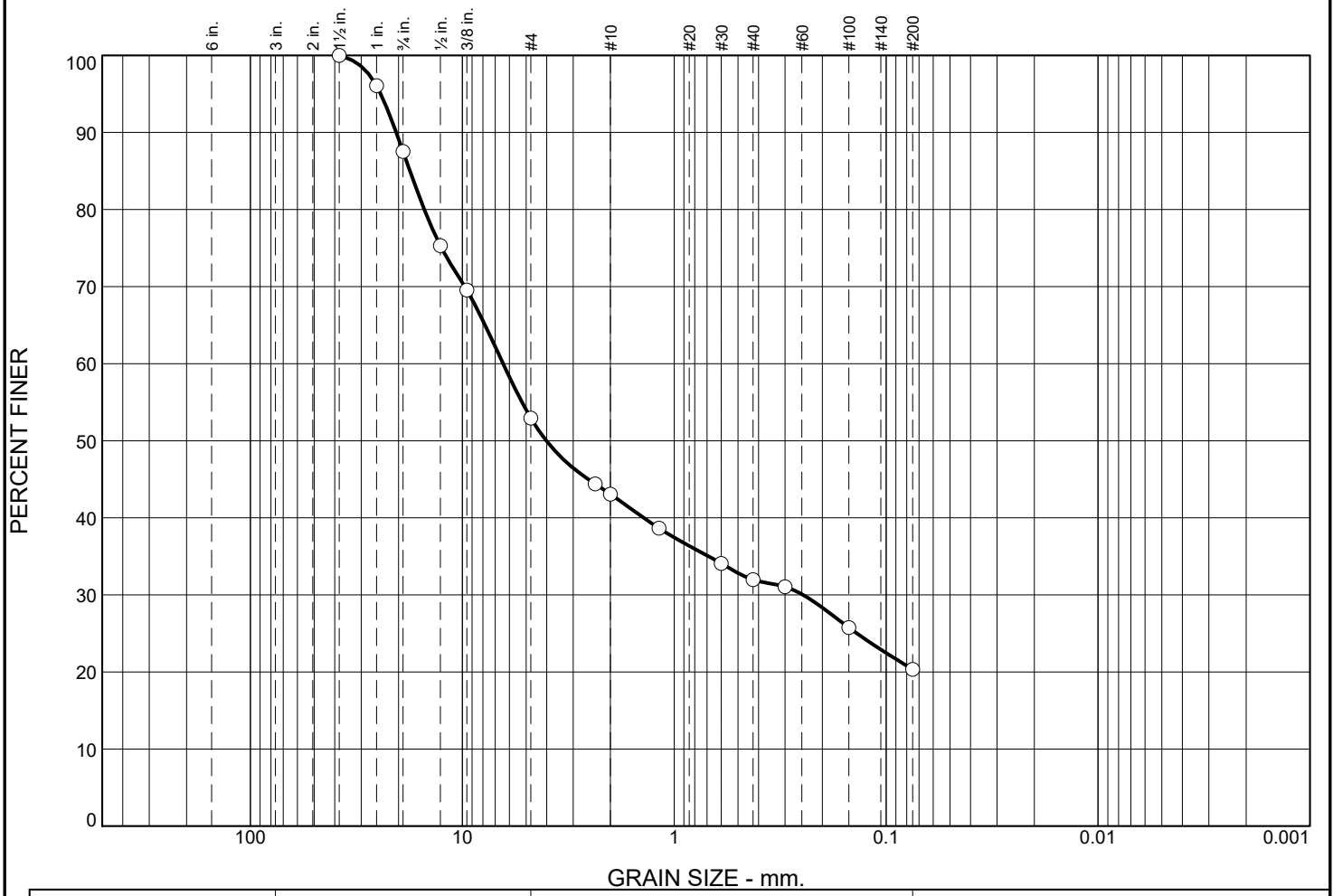
Universal Engineering Sciences

Las Vegas, Nevada

Plate 7b

Tested By: DP **Checked By:** LM

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	12.5	34.6	9.8	11.1	11.7	20.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	16	17.6654	6.4197	4.0123	0.2467				

Material Description	USCS	AASHTO
○ Gravel with Sand and Clay	GC-GM	A-1-b

Project No. A25170.01259 **Client:** McDonalds USA

Project: McDonalds 51052 - Eagle, CO

○ **Source of Sample:** B-4 **Depth:** 2-7 ft

Remarks:

Universal Engineering Sciences

Las Vegas, Nevada

Plate 7c

Tested By: DP **Checked By:** LM

4480 West Hacienda Ave, Suite 104
Las Vegas, NV 89118
(702) 873-3478

SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: 8360 W. Sahara Ave, Suite 110
McDonalds USA
Chicago, IL 60607-2101

REPORT DATE: 9/26/2025
PROJECT: **McDonalds 51052 - Eagle, CO**

PROJECT NO.: **A25170.01259.000**

Tested By: J. Sloan
Sample Loc.: B1 @ 1'-6'
Sample Description:

CHEMICAL LABORATORY TEST RESULTS

Laboratory Test	Results	Spec's.	Pass/Fail
Soluble Sodium, ASTM D2791, %	<0.01		
Soluble Sulfate, 4500 E, %	0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	<0.01		
Solubility, AWWA 2540 C, %	0.31		
Chloride, 4500 CL B, mg/kg	203.2		

Comments:

Reviewed By: John Sloan
For John Sloan
Chemistry Laboratory Director

4480 West Hacienda Ave, Suite 104
Las Vegas, NV 89118
(702) 873-3478

SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: 8360 W. Sahara Ave, Suite 110
McDonalds USA
Chicago, IL 60607-2101

REPORT DATE: 9/26/2025
PROJECT: **McDonalds 51052 - Eagle, CO**

PROJECT NO.: **A25170.01259.000**

Tested By: J. Sloan
Sample Loc.: B2 @ 2'-7'
Sample Description:

CHEMICAL LABORATORY TEST RESULTS

Laboratory Test	Results	Spec's.	Pass/Fail
Soluble Sodium, ASTM D2791, %	<0.01		
Soluble Sulfate, 4500 E, %	0.02		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	<0.01		
Solubility, AWWA 2540 C, %	0.25		
Chloride, 4500 CL B, mg/kg	107.7		

Comments:

Reviewed By: John Sloan
For John Sloan
Chemistry Laboratory Director

4480 West Hacienda Ave, Suite 104
Las Vegas, NV 89118
(702) 873-3478

SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: 8360 W. Sahara Ave, Suite 110
McDonalds USA
Chicago, IL 60607-2101

REPORT DATE: 9/26/2025
PROJECT: **McDonalds 51052 - Eagle, CO**

PROJECT NO.: **A25170.01259.000**

Tested By: J. Sloan
Sample Loc.: B3 @ 1'-6'
Sample Description:

CHEMICAL LABORATORY TEST RESULTS

Laboratory Test	Results	Spec's.	Pass/Fail
Soluble Sodium, ASTM D2791, %	<0.01		
Soluble Sulfate, 4500 E, %	0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	<0.01		
Solubility, AWWA 2540 C, %	0.06		
Chloride, 4500 CL B, mg/kg	165.6		

Comments:

Reviewed By: John Sloan
For John Sloan
Chemistry Laboratory Director

ADJACENT DRAINAGE STUDIES

DRAINAGE REPORT

ANB BANK

Eby Creek Road

EAGLE, COLORADO

April 2025

Prepared for: Will Coffield
Alder Real Estate
wcoffield@aldercos.com

Prepared by: Alpine Engineering, Inc.
P.O. Box 97
Edwards, CO 81632
(970) 343-9109

ALPINE ENGINEERING INC.
34510 HWY 6 / UNIT A9 / PO BOX 97
EDWARDS CO 81632 / 970.926.3373

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Figure 1: Vicinity Map- Block 3 Lot 2 Eby Creek Rd, Eagle

I. INTRODUCTION

The proposed Project is north of the Interstate 70 exit ramps in Eagle Colorado on Eby Creek Road. The existing property is Block 3 Lot 2 and will be subdivided to provide a separate property for the development (see Figure 1 Vicinity Map). The Project has access from an existing driveway that extends from the Eby Creek Road roundabout. The new subdivided lot is approximately 0.9 acres and is bordered by Eby Creek to the north and west, Eby Creek Road to the east and an abandoned Burger King parking lot to the south. The Project is a proposed ANB Bank facility with building and parking lot. This report addresses the stormwater generated runoff from the proposed development and water quality prior to stormwater being released to the Eby Creek and the receiving waters of nearby Eagle River.

II. EXISTING LAND USE

The Property currently is a vacant native grass area to the north and the existing Burger King building and parking lot to the south. The northern vacate area will be subdivided (0.9 AC) for the proposed development. The northern lot has an existing asphalt access drive and some parking and is relatively flat for the eastern half of the lot. The western portion of the lot is a steep 40 ft vertical slope towards Eby Creek. Most of the pervious areas of the property contains native grass and some sage brush. Along Eby Creek the property contains deciduous trees and wetland vegetation.

III. DRAINAGE BASINS

Existing offsite drainage from the Eby Creek Road roundabout flows towards the Property's access entrance and is diverted into an existing storm culvert at the end of curb and gutter. The storm culvert travel under the entrance drive and daylights north of the Property access where runoff flows towards Eby Creek. The offsite drainage basins N4, N5, N6 have been studied and quantified in the Town of Eagles', "I-70 Interchange Upgrade Final Drainage Report", November 2014. These (3) offsite drainage basins can be seen in the Drainage Area Maps. The proposed project will install additional curb and gutter into the property and install curb cuts and sidewalk chases to divert the existing runoff to follow historic flow patterns and not flow into the proposed site. A small area of offsite runoff will travel across landscaping from the edge of Eby Creek western sidewalk to the new access drive, however this runoff is negligible.

Proposed development will form (2) drainage basins on the site as seen in DAM-2 proposed Drainage Area Map. The basin A1 (0.13 acres) and A2 (0.38) acres are comprised of mostly impervious surfaces including roof, asphalt parking and concrete curb and sidewalk. All developed stormwater runoff is collected in (2) curb inlets at the low point of each drainage basin.

IV. HYDROLOGY- PEAK FLOW DETERMINATION

Historic Peak flows have been calculated using TR55 (SCS method for Type II rainfall), "Urban Hydrology for Small Watersheds", June 1986 as prepared by the U.S. Soil Conservation Service. The Town of Eagle Drainage Design Criteria was reviewed to adhere to the standards. The 2, 10, 25 and 100 year storm event were analyzed. Rainfall

intensity were taken NOAA Atlas 14 and the precipitation tables are included in Appendix A.

Soil classification types were found in the “Soil Survey of Eagle County” prepared by the U.S. Department of Agriculture Soil Conservation Service (NRCS). A summary and map of the soils may be found in Appendix B. The entire site is comprised of Type B soils, which have moderate infiltration rates, are well drained and have moderate water transmission rates.

Developed Peak Flows were determined utilizing TR55 (SCS method). The specific developed drainage basins were given runoff curve numbers (RCN) representative of their relative impervious areas. Historic and Developed 2, 10, 25 and 100 year peak flows can be found in the summary table “Stormwater Runoff” in Appendix C and seen below. All runoff calculations (TR55) for Historic and Developed flows can be seen in Appendix D and E.

ANB Bank
Stormwater Runoff
Type II rain, Type B soils

Basins	Area	Area (Acre)	Area Roof/hardscape	Area Grass	RCN	TC	Q-2	Q-10	Q-25	Q-100
A1	5,663	0.13	0.13	0.00	98	0.10	0.16	0.23	0.28	0.36
A2	16,553	0.38	0.33	0.05	93	0.10	0.29	0.50	0.65	0.89
DEVELOPED		**0.51**					**0.45**	**0.73**	**0.93**	**1.25**
HISTORIC				grass- FAIR						
H		0.93		0.28	69	0.12	**0.00**	**0.00**	**0.12**	**0.36**

The historic stormwater runoff was relatively low given the small site and Type B soils. The developed stormwater runoff was calculated as 0.45, 0.73, 0.93 and 1.25 cfs for the 2, 10, 25 and 100 year events.

V. DETENTION AND WATER QUALITY

Town of Eagle Stormwater Design Standards typically requires detention of the 10 year, 24 hour storm event (2020 Town Ordinance) to keep released runoff from the developed site to historic conditions. Due to the adjacent proximity of Eby Creek and the Eagle River the Project is proposing to detain the 2 year storm event prior to release to Eby Creek. The 2 year event is deemed a Water Quality Capture Volume, where settlement of sediment can occur prior to infiltration and release. The minor volume of stormwater generated runoff from the proposed site will be negligible in volume compared to the receiving waters. The 100 year generated runoff from the proposed site is 1.25 cfs, while Eby Creek's volume for the 100 year event would be 270 cfs (USGS StreamStats). Also, the short time of concentration of developed runoff will allow storm events to reach the receiving waters prior to accumulating upstream basin's stormwater runoff inundate Eby Creek.

The proposed Water Quality Pond is located at the storm sewer pipe outfall prior to Eby Creek. The Water Quality Pond is designed to infiltrate some of the settled runoff by utilizing soil amendment mixture of sand, compost and topsoil while minimizing compaction.

VI. HYDRAULICS- CULVERTS

The proposed storm collections pipes will be 12" HDPE ultraflow culverts. The 100 year storm event results in a maximum flowrate of 1.26 cfs. A 12" HDPE storm pipe at 2.5% can carry 8.1 cfs at full flow. (Manning's Equation- Appendix H).

VII. SEDIMENT AND EROSION CONTROL

A sediment and erosion control plan have been developed for the project to limit the transport of sediments and contaminants to the receiving waters of Eby Creek and the Eagle River. Devices to be used during construction to prevent sediment laden runoff from leaving the site include stabilized construction entrances, excelsior wattles , ditch erosion logs and inlet protection. (See Storm Sewer plan sheet in Appendix)

APPENDIX A

Precipitation Data

NOAA Atlas 14, Volume 8, Version 2
Location name: Eagle, Colorado, USA*
Latitude: 39.6567°, Longitude: -106.8251°
Elevation: 6589 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.103** (0.085-0.129)	**0.155** (0.127-0.193)	**0.238** (0.194-0.298)	**0.306** (0.248-0.385)	**0.397** (0.305-0.522)	**0.466** (0.349-0.626)	**0.533** (0.383-0.742)	**0.601** (0.410-0.868)	**0.688** (0.447-1.03)	**0.752** (0.476-1.16)
10-min	**0.152** (0.124-0.188)	**0.227** (0.186-0.283)	**0.349** (0.284-0.436)	**0.448** (0.363-0.563)	**0.581** (0.447-0.764)	**0.682** (0.511-0.916)	**0.781** (0.561-1.09)	**0.879** (0.600-1.27)	**1.01** (0.655-1.52)	**1.10** (0.697-1.70)
15-min	**0.185** (0.152-0.230)	**0.277** (0.227-0.345)	**0.425** (0.347-0.532)	**0.546** (0.442-0.687)	**0.709** (0.545-0.932)	**0.832** (0.623-1.12)	**0.952** (0.684-1.32)	**1.07** (0.731-1.55)	**1.23** (0.799-1.85)	**1.34** (0.850-2.07)
30-min	**0.255** (0.209-0.318)	**0.350** (0.287-0.436)	**0.505** (0.412-0.631)	**0.634** (0.514-0.798)	**0.813** (0.628-1.07)	**0.951** (0.715-1.28)	**1.09** (0.785-1.52)	**1.23** (0.842-1.79)	**1.42** (0.925-2.14)	**1.56** (0.988-2.41)
60-min	**0.332** (0.273-0.413)	**0.423** (0.346-0.527)	**0.574** (0.469-0.718)	**0.703** (0.570-0.885)	**0.886** (0.687-1.17)	**1.03** (0.776-1.39)	**1.18** (0.850-1.65)	**1.33** (0.912-1.94)	**1.54** (1.00-2.32)	**1.70** (1.08-2.62)
2-hr	**0.409** (0.338-0.505)	**0.496** (0.409-0.613)	**0.644** (0.529-0.799)	**0.773** (0.630-0.965)	**0.959** (0.752-1.26)	**1.11** (0.844-1.49)	**1.26** (0.923-1.75)	**1.43** (0.990-2.06)	**1.66** (1.10-2.48)	**1.84** (1.17-2.79)
3-hr	**0.472** (0.391-0.580)	**0.551** (0.456-0.677)	**0.688** (0.567-0.849)	**0.809** (0.663-1.00)	**0.988** (0.781-1.30)	**1.14** (0.870-1.52)	**1.29** (0.948-1.78)	**1.46** (1.02-2.08)	**1.69** (1.12-2.50)	**1.87** (1.20-2.82)
6-hr	**0.604** (0.504-0.736)	**0.679** (0.566-0.829)	**0.813** (0.675-0.996)	**0.935** (0.770-1.15)	**1.12** (0.891-1.45)	**1.27** (0.982-1.68)	**1.43** (1.06-1.95)	**1.61** (1.13-2.27)	**1.86** (1.25-2.72)	**2.06** (1.34-3.06)
12-hr	**0.752** (0.631-0.909)	**0.859** (0.721-1.04)	**1.04** (0.871-1.27)	**1.20** (0.998-1.47)	**1.44** (1.15-1.84)	**1.62** (1.26-2.11)	**1.82** (1.36-2.44)	**2.03** (1.44-2.82)	**2.31** (1.57-3.33)	**2.54** (1.67-3.72)
24-hr	**0.918** (0.776-1.10)	**1.06** (0.894-1.27)	**1.30** (1.09-1.56)	**1.50** (1.26-1.82)	**1.80** (1.45-2.27)	**2.03** (1.59-2.61)	**2.27** (1.71-3.01)	**2.53** (1.81-3.46)	**2.87** (1.97-4.07)	**3.14** (2.09-4.53)
2-day	**1.10** (0.937-1.31)	**1.26** (1.07-1.50)	**1.52** (1.29-1.82)	**1.76** (1.48-2.11)	**2.09** (1.70-2.62)	**2.37** (1.87-3.01)	**2.65** (2.01-3.48)	**2.96** (2.14-4.00)	**3.37** (2.34-4.72)	**3.71** (2.49-5.26)
3-day	**1.21** (1.04-1.44)	**1.39** (1.18-1.64)	**1.68** (1.43-2.00)	**1.94** (1.63-2.31)	**2.30** (1.88-2.87)	**2.60** (2.07-3.29)	**2.91** (2.22-3.79)	**3.24** (2.36-4.35)	**3.70** (2.57-5.12)	**4.05** (2.74-5.70)
4-day	**1.31** (1.12-1.54)	**1.49** (1.28-1.76)	**1.80** (1.54-2.13)	**2.07** (1.75-2.46)	**2.46** (2.01-3.05)	**2.77** (2.21-3.49)	**3.09** (2.37-4.00)	**3.43** (2.51-4.58)	**3.90** (2.73-5.37)	**4.27** (2.90-5.96)
7-day	**1.56** (1.34-1.82)	**1.75** (1.50-2.05)	**2.07** (1.77-2.44)	**2.35** (2.00-2.78)	**2.75** (2.26-3.37)	**3.07** (2.46-3.82)	**3.40** (2.62-4.35)	**3.75** (2.76-4.94)	**4.22** (2.98-5.74)	**4.60** (3.15-6.34)
10-day	**1.77** (1.53-2.07)	**1.97** (1.70-2.30)	**2.30** (1.98-2.70)	**2.59** (2.21-3.05)	**3.00** (2.48-3.66)	**3.34** (2.68-4.13)	**3.68** (2.85-4.67)	**4.03** (2.98-5.27)	**4.52** (3.21-6.09)	**4.90** (3.38-6.71)
20-day	**2.36** (2.06-2.73)	**2.61** (2.27-3.03)	**3.03** (2.62-3.52)	**3.39** (2.91-3.95)	**3.88** (3.23-4.67)	**4.27** (3.46-5.22)	**4.67** (3.65-5.85)	**5.08** (3.80-6.54)	**5.64** (4.04-7.46)	**6.07** (4.22-8.16)
30-day	**2.86** (2.50-3.29)	**3.17** (2.76-3.65)	**3.68** (3.19-4.24)	**4.10** (3.54-4.75)	**4.68** (3.90-5.57)	**5.12** (4.17-6.20)	**5.57** (4.37-6.90)	**6.02** (4.52-7.67)	**6.62** (4.77-8.67)	**7.07** (4.96-9.43)
45-day	**3.50** (3.07-4.01)	**3.89** (3.41-4.46)	**4.52** (3.94-5.19)	**5.02** (4.36-5.80)	**5.70** (4.76-6.74)	**6.21** (5.07-7.45)	**6.71** (5.28-8.23)	**7.20** (5.42-9.07)	**7.82** (5.66-10.1)	**8.28** (5.84-10.9)
60-day	**4.06** (3.57-4.63)	**4.52** (3.97-5.16)	**5.25** (4.59-6.01)	**5.83** (5.07-6.70)	**6.59** (5.51-7.73)	**7.14** (5.84-8.50)	**7.67** (6.05-9.34)	**8.18** (6.18-10.2)	**8.80** (6.39-11.3)	**9.24** (6.55-12.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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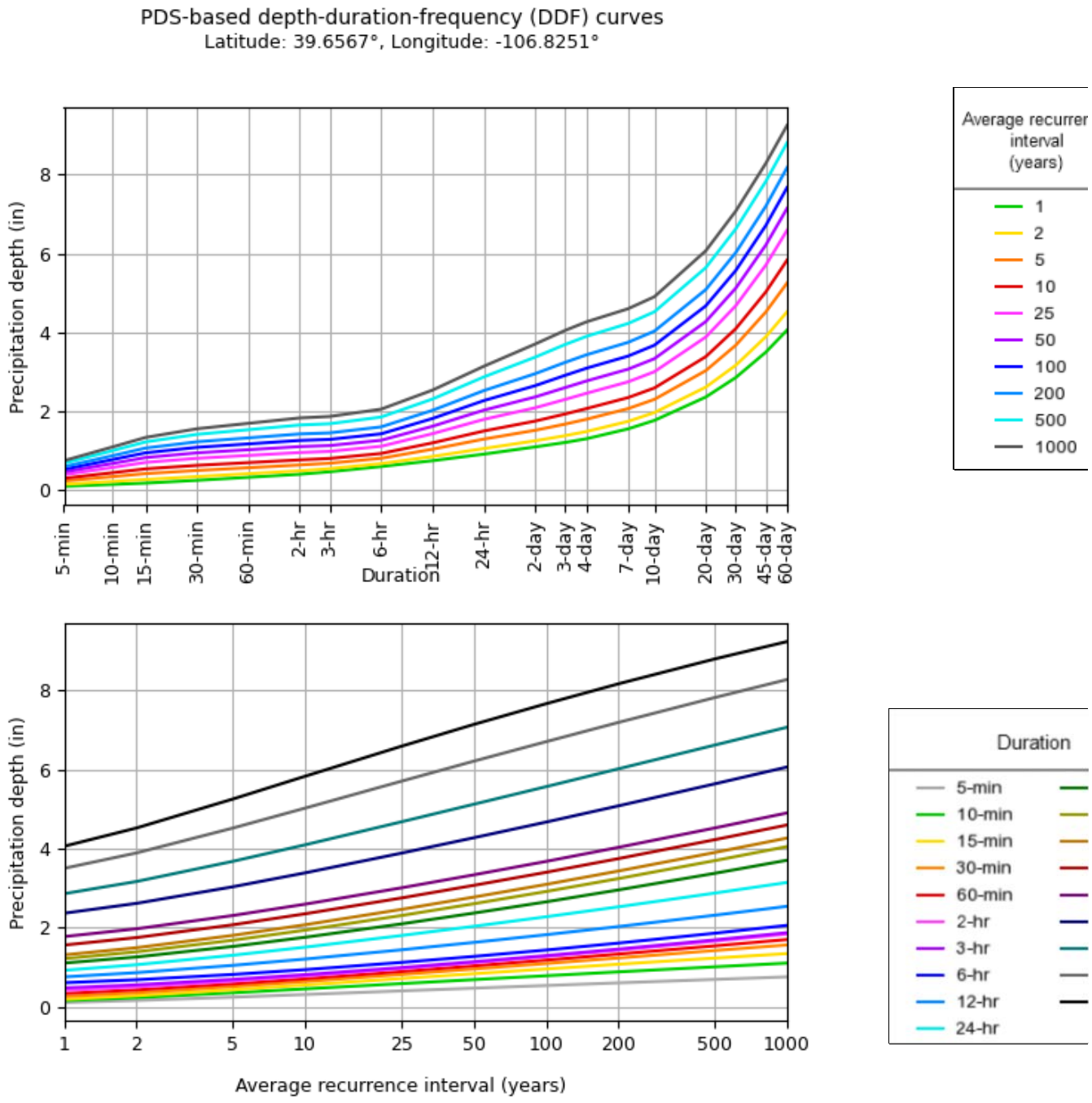
PF graphical



NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Thu Dec 5 22:21:51 2024

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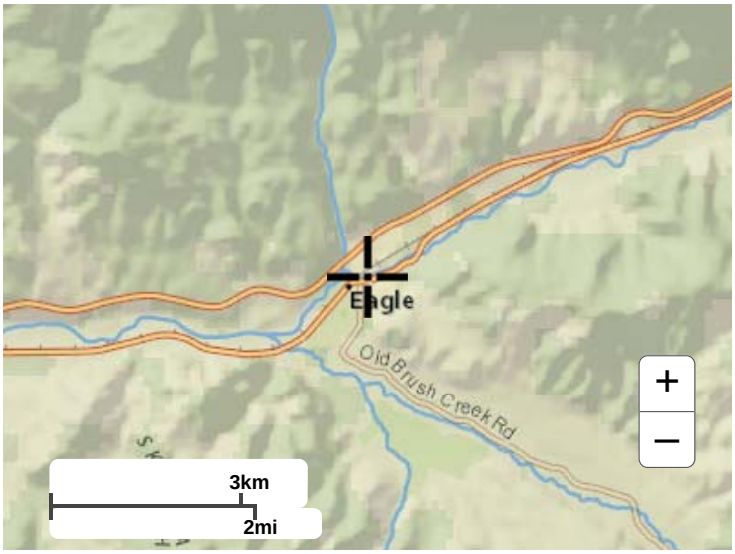
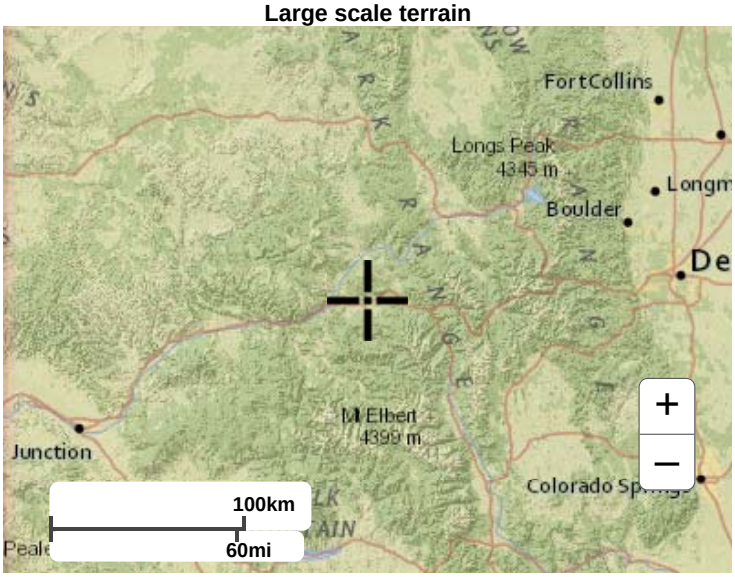
Maps & aerials

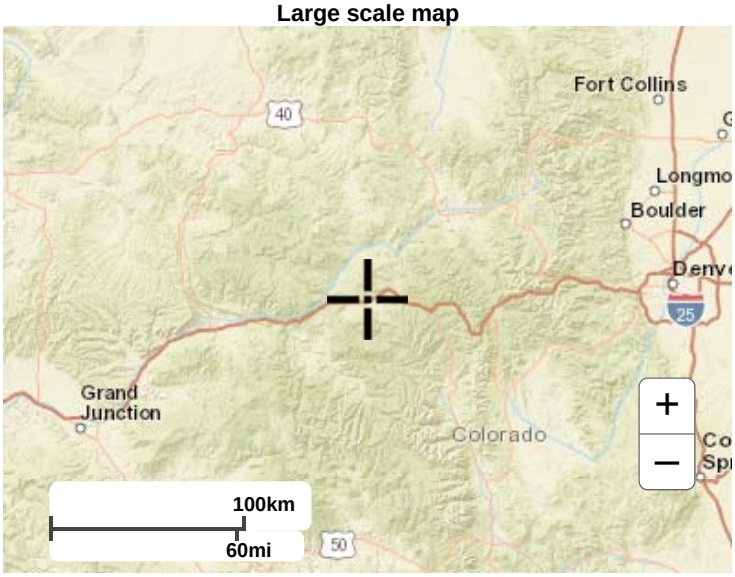
Small scale terrain



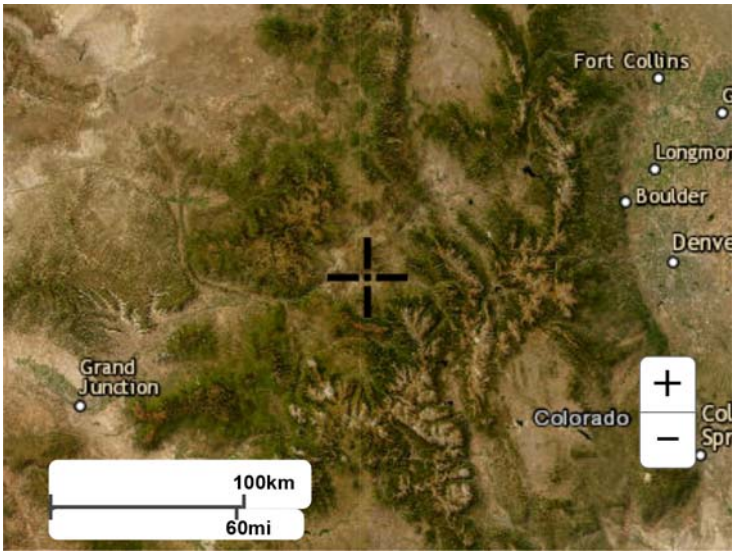
Large scale terrain



Large scale map



Large scale aerial



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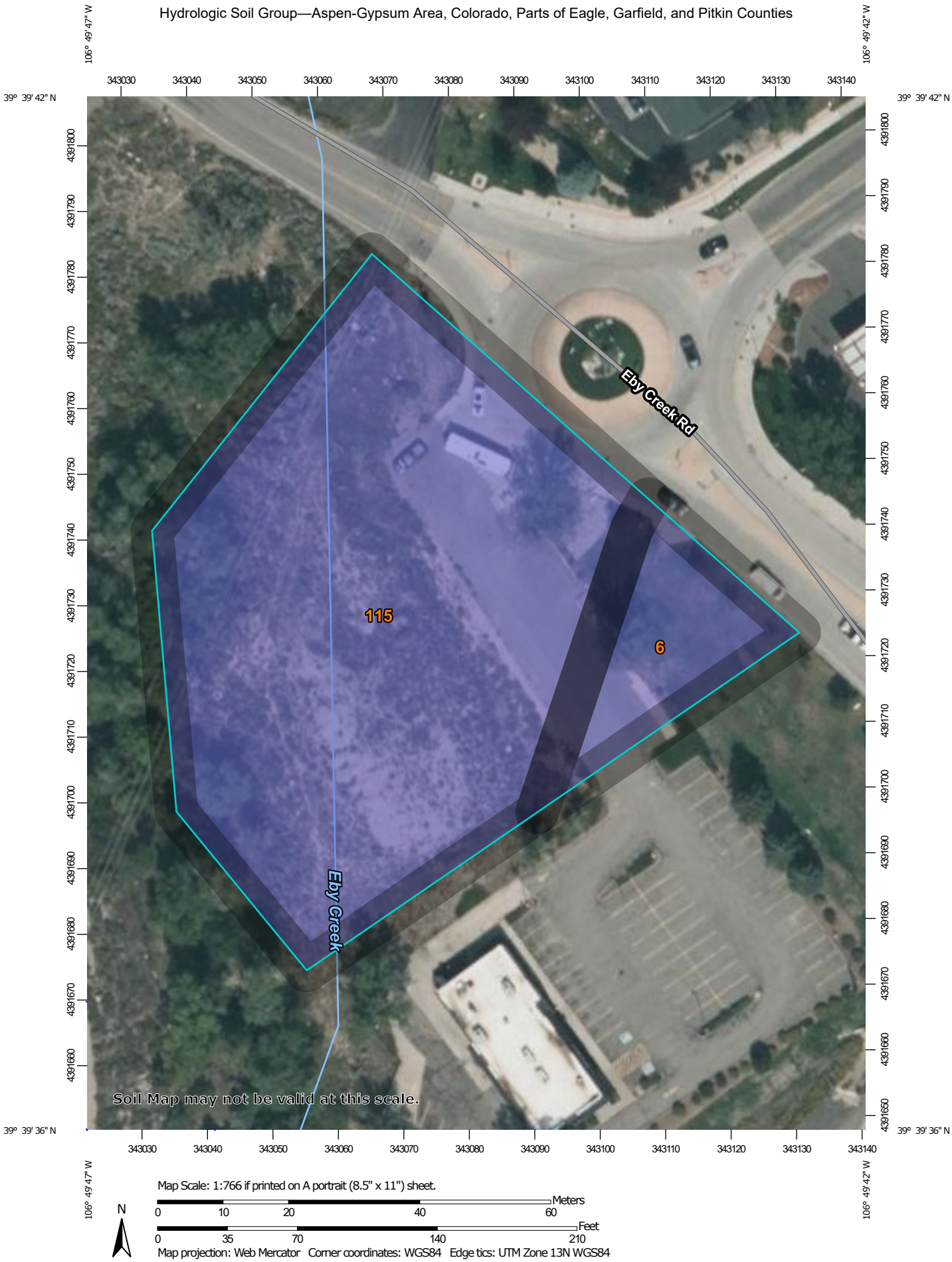
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX B

Soils Summary

Hydrologic Soil Group—Aspen-Gypsum Area, Colorado, Parts of Eagle, Garfield, and Pitkin Counties



Map Scale: 1:766 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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: Aspen-Gypsum Area, Colorado, Parts of Eagle, Garfield, and Pitkin Counties
Survey Area Data: Version 15, Aug 29, 2024

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

Date(s) aerial images were photographed: Sep 5, 2021—Sep 7, 2021

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6	Almy loam, 1 to 12 percent slopes	B	0.2	12.7%
115	Yamo loam, 6 to 12 percent slopes	B	1.3	87.3%
Totals for Area of Interest			**1.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

APPENDIX C

Historic and Developed Stormwater Runoff

ANB Bank

Stormwater Runoff

Type II rain, Type B soils

Basins	Area	Area (Acre)	Area Roof/hardscape	Area Grass	RCN	TC	Q-2	Q-10	Q-25	Q-100
A1	5,663	0.13	0.13	0.00	98	0.10	0.16	0.23	0.28	0.36
A2	16,553	0.38	0.33	0.05	93	0.10	0.29	0.50	0.65	0.89
DEVELOPED		**0.51**					**0.45**	**0.73**	**0.93**	**1.25**
HISTORIC				grass- FAIR						
H		0.93		0.28	69	0.12	**0.00**	**0.00**	**0.12**	**0.36**

APPENDIX D

Historic Flowrate Calculations TR55

WinTR-55 Current Data Description

--- Identification Data ---

User: MW
Project: ANB Bank Eagle
SubTitle: Historic
State: Colorado
County: Eagle
Filename: <new file>

Date: 12/20/2024
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
Historic		Outlet	0.93	69	.116

Total area: .93 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.06	1.3	1.5	1.8	2.03	2.27	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

==========

MW
ANB Bank Eagle
Historic
Eagle County, Colorado

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.06	1.3	1.5	1.8	2.03	2.27	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

==========

MW
ANB Bank Eagle
Historic
Eagle County, Colorado

Watershed Peak Table

Sub-Area Peak Flow by Rainfall Return Period

or Reach Identifier	2-Yr (cfs)	10-Yr (cfs)	25-Yr (cfs)	100-Yr (cfs)
SUBAREAS				
Historic	.00	.00	0.12	0.36
REACHES				
OUTLET	.00	.00	0.12	0.36

==========

MW

ANB Bank Eagle
Historic
Eagle County, Colorado

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
Historic	.93	0.116	69	Outlet	

Total Area: .93 (ac)

==========

MW

ANB Bank Eagle
Historic
Eagle County, Colorado

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Historic							
SHEET	100	0.2000	0.150				0.113
SHALLOW	110	0.5000	0.050				0.003
						Time of Concentration	.116

==========

MW

ANB Bank Eagle
Historic
Eagle County, Colorado

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Historic	Open space; grass cover 50% to 75% (fair)	B	.93	69
	Total Area / Weighted Curve Number		.93	69

APPENDIX E

Developed Flowrate Calculations TR55

WinTR-55 Current Data Description

--- Identification Data ---

User: MW
Project: ANB Bank- Eagle
SubTitle: Developed
State: Colorado
County: Eagle
Filename: O:\Eagle\ANB Bank- Eby Creek- 2024\dwg\Drainage\tr55\developed.w55

Date: 1/3/2025
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
basin A1		Outlet	0.13	98	0.100
basin A2		Outlet	0.38	93	0.100

Total area: .51 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.06	1.3	1.5	1.8	2.03	2.27	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

==========

MW
ANB Bank- Eagle
Developed
Eagle County, Colorado

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 2-Yr (cfs)	10-Yr (cfs)	25-Yr (cfs)	100-Yr (cfs)
SUBAREAS				
basin A1	0.16	0.23	0.28	0.36
basin A2	0.29	0.50	0.65	0.89
REACHES				
OUTLET	0.45	0.74	0.94	1.26

==========

MW
ANB Bank- Eagle
Developed
Eagle County, Colorado

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
basin A1	.13	0.100	98	Outlet	
basin A2	.38	0.100	93	Outlet	

Total Area: .51 (ac)

==========

MW

ANB Bank- Eagle
Developed
Eagle County, Colorado

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
basin A1							
User-provided							0.100
						Time of Concentration	0.100
basin A2							
User-provided							0.100
						Time of Concentration	0.100

==========

MW

ANB Bank- Eagle
Developed
Eagle County, Colorado

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
basin A1	Paved parking lots, roofs, driveways	B	.13	98
	Total Area / Weighted Curve Number		.13	98
basin A2	Open space; grass cover > 75% (good)	B	.05	61
	Paved parking lots, roofs, driveways	B	.33	98
	Total Area / Weighted Curve Number		.38	93

==========

APPENDIX F

Detention Hydrograph

Hydrograph Report

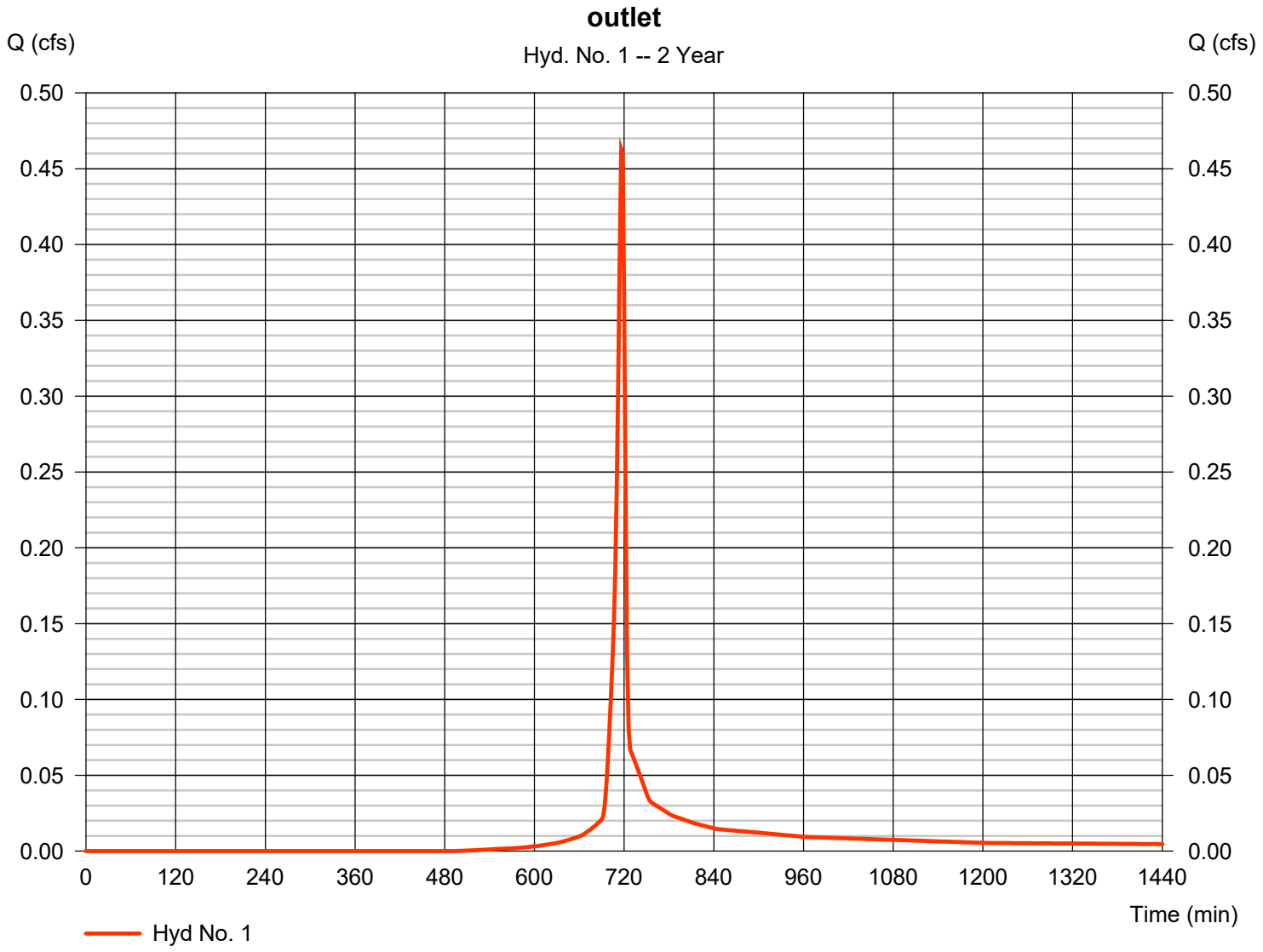
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Friday, 01 / 3 / 2025

Hyd. No. 1

outlet

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.463 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	935 cuft
Drainage area	=	0.510 ac	Curve number	=	94*
Basin Slope	=	2.0 %	Hydraulic length	=	220 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.04 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	486

* Composite (Area/CN) = [(1.000 x 96) + (0.380 x 98) + (0.060 x 61)] / 0.510



APPENDIX G

Pond Sizing

TABLE 1

ANB Bank, Eby Creek Rd, Eagle

DETENTION POND - DETENTION STORAGE VOLUME

POND A

Elevation	Area (ft^2)	Avg. Area (ft^2)	Depth (ft)	Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (Ac-ft)	Cumulative Volume (Gallons)
6612.5	30	30	0	0	0	0.000	0
6613	203	117	0.5	58	58	0.001	436
6614	399	301	1	301	359	0.008	2,687
6615	695	449	2	898	956	0.022	7,153

TOTAL PROVIDED	956

APPENDIX H

Culvert Calculations (Manning's Equation)

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.0000 in
Flowrate	1.2600 cfs
Slope	0.0250 ft/ft
Manning's n	0.0090

Computed Results:

Depth	3.1921 in
Area	0.7854 ft2
Wetted Area	0.1676 ft2
Wetted Perimeter	13.0054 in
Perimeter	37.6991 in
Velocity	7.5200 fps
Hydraulic Radius	1.8552 in
Percent Full	26.6008 %
Full flow Flowrate	8.1370 cfs
Full flow velocity	10.3603 fps

APPENDIX I

Riprap Calculations

Trapezoidal Riprap-Lined Waterway Design.xlsm

Landowner	ANB bank	County	Eagle	V1.02
Computed By	mcw	Date	3/31/2025	2/11/2013
Checked by		Date		

Note: Macros must be enabled in this spreadsheet in order for the "Solve" button to work.

Design flow, Q=	1.26	cfs		WW horiz. Length=	100.0 ft
Slope, S=	25%	ft/ft =	4.00 :1	U/S WW F.L. elev=	997.0 ft
Bottom Width, W=	3	ft		D/S WW F.L. elev=	**972.0** ft
Side slope, Z=	2	:1		Waterway drop=	**25.0** ft
Safety factor=	1.2			WW length along slope=	**103.1** ft
Rock shape =	Angular				
Min. req'd D50=	**2.75**	in			
D50 used=	6.00	in			
n=	**0.050**				
Freeboard=	0.25	ft			

Spreadsheet formatting key:

XXX	*=Input cells*
X.XX	*=Output from "Solve" button*
X.XX	*=Other computed output*
Red text	*=Instructions, warnings, info*

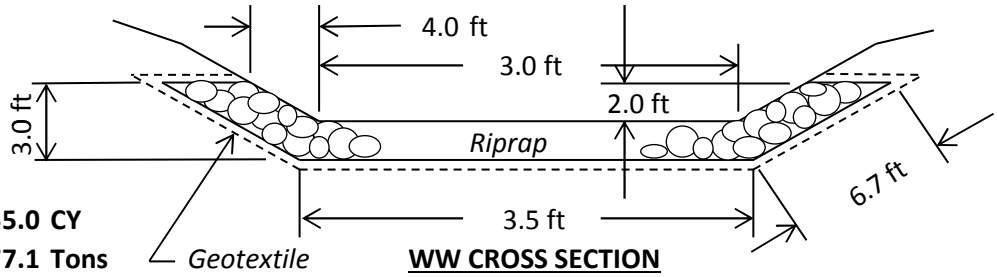
Flow depth, d=	**0.10** ft	**Please click Solve.**	
Critical depth, d_c=	**0.15** ft		
Critical slope, S_c=	**0.115** ft/ft	$0.7S_c$ =	**0.0805** ft/ft
		$1.3S_c$ =	**0.1495** ft/ft
Design slope, S=	0.2500 ft/ft	*Design slope OK. Flow is Supercritical.*	
Velocity=	**3.74** fps	Est. riprap unit wt=	1.4 Tons/CY
		Rock shape = Angular	Rock Gs = 2.65

Riprap thickness:
Minimum= **1.00** ft
Provided= 1.00 ft

Sideslope height:
Minimum= **0.35** ft
Provided= 2.00 ft

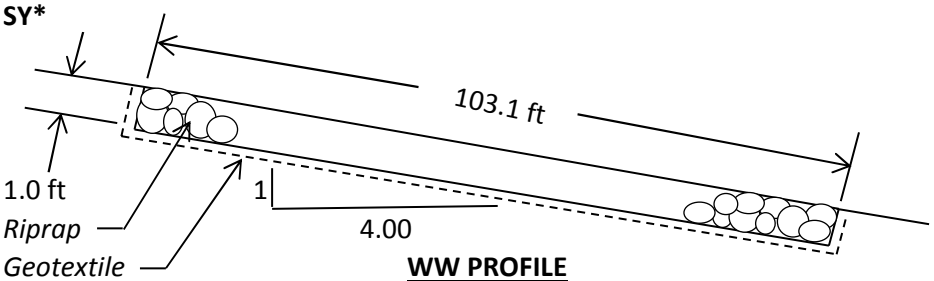
Required riprap gradation for D50 selected

% Smaller	Rock dia., inches min.	Rock dia., inches max.	Rock weight, lb min.	Rock weight, lb max.
100	**9.0**	**12.0**	**53**	**126**
85	**7.8**	**10.8**	**35**	**92**
50	**6.0**	**9.0**	**16**	**53**
10	**4.8**	**7.8**	**8**	**35**



WW CROSS SECTION

Quantities:
Riprap volume= **55.0 CY**
Approx. weight= **77.1 Tons**
Geotextile area= **249.4 SY***



WW PROFILE

*Geotextile area includes actual covered surfaces only (no extra for laps or anchorage)

MAPS

OFFSITE
N4 (0.07 AC)
Q2=0.14 CFS
Q100=0.38 CFS

OFFSITE
N5 (0.05 AC)
Q2=0.10 CFS
Q100=0.27 CFS

OFFSITE
N6 (0.29 AC)
Q2=0.56 CFS
Q100= 1.51 CFS

BASIN
LOT 2 AND OFFSITE (0.81 AC)
TO LOT 1

LOT 2, BLOCK 3
2.025 AC

NATIVE GRASS

LANDSCAPE

ASPHALT DRIVE

EXISTING STORM
CULVERT

EXISTING & ABANDONED
BURGER KING BUILDING

1 STORY STUCCO
COMMERCIAL
BUILDING

EBY CREEK ROAD

EBY CREEK ROAD
(150' R.O.W.)

POND ROAD
(60' R.O.W.)

OPEN SPACE
BLOCK 3

EBY CREEK

EBY CREEK
100 YEAR STORM EVENT = 270 CFS
(STREAM STATS)

EDGE OF WATER
MEASURED
12/13/2024

CENTERLINE STREAM
MEASURED
12/13/2024

UTILITY EASEMENT (R.N. 140925)

PROPERTY LINE

INLET RIM
6623.3
INVERT OUT
18" CPP=6619.2

INVERT 72" CMP
6596.7

INVERT 18" CPP
6618.2

INVERT
18" CMP
6617.4

INVERT
18" CMP
OBSTRUCTED
6618.7

SEWER MANHOLE
RIM= 6622.4
INVERT IN (NW) 8" PVC 6613.6
INVERT IN (SE) 8" PVC 6613.4

SEWER MANHOLE
RIM= 6624.4
INVERT IN (NW) 8" PVC 6612.8
INVERT IN (E) 8" PVC 6612.9
INVERT OUT (SW) 8" PVC 6612.6

SEWER MANHOLE
RIM= 6623.3
INVERT IN (NW) 8" PVC 661
INVERT IN (E) 8" PVC 6611.
INVERT OUT (SW) 8" PVC 6

INLET RIM
6613.9'
INVERT OUT
18" CMP
6610.5'

VAULT

TOPOGRAPHIC INFORMATION WAS
PROVIDED BY
EAGLE VALLEY SURVEYING 2024

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1 inch = 20 ft.

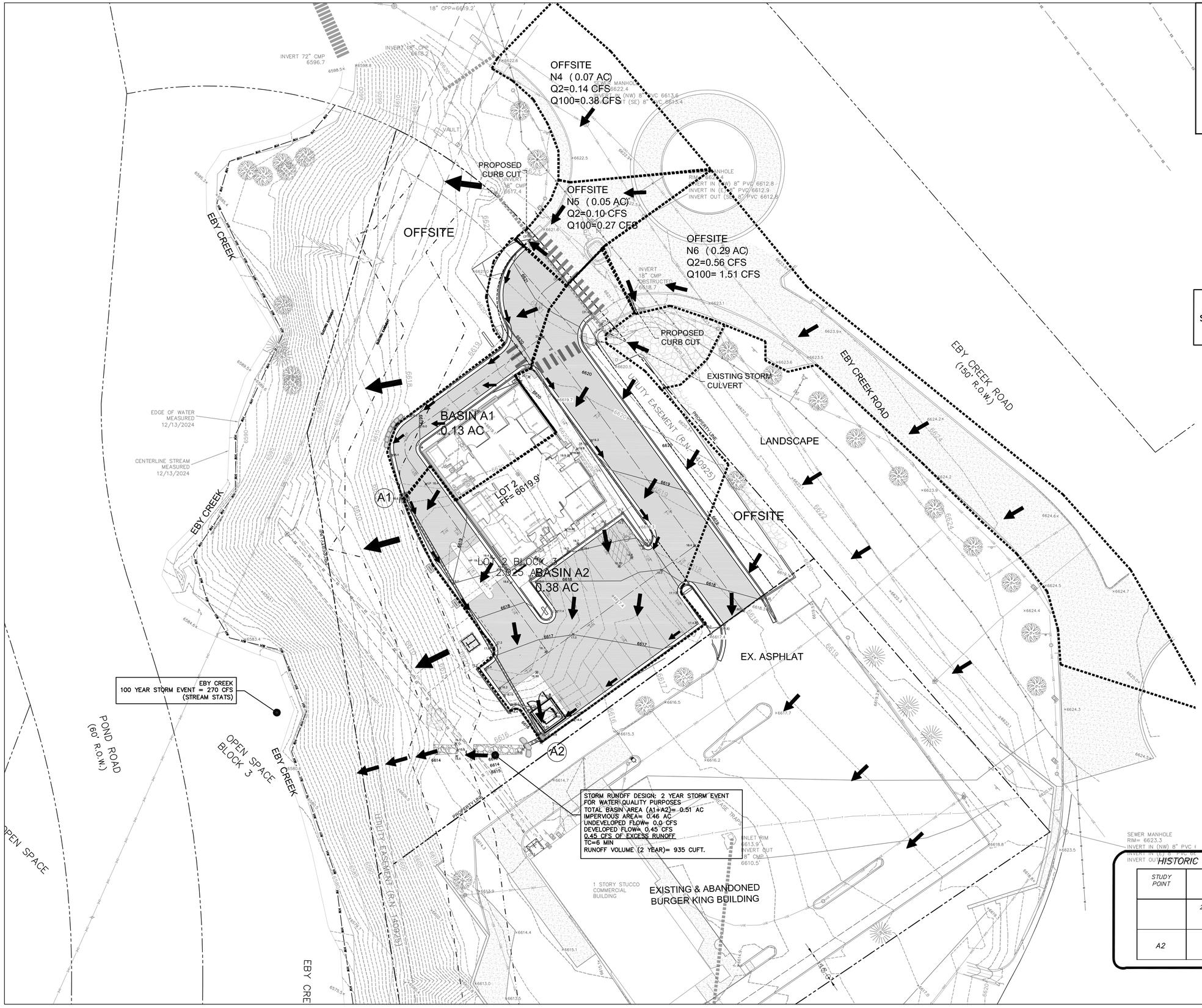
ALPINE ENGINEERING INC.
34510 HWY 6 / UNIT A9 / PO BOX 97
EDWARDS CO 81632 / 970.926.3373
WWW.ALPINECIVIL.COM

ANB BANK
EBY CREEK ROAD, EAGLE CO
HISTORIC DRAINAGE AREA MAP

NO.	DATE	REVISIONS	BY
	01/30/25	DEVELOPMENT PERMIT	MCW

DESIGNED MCW
DRAWN TSL, MCW
CHECKED MCW
JOB NO. --
DATE 12/02/2024

SHEET
DAM-1



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- EASEMENT
- PROPOSED CONTOUR
- PROPOSED GRADING, SLOPE/SPOT
- EXISTING GRADING, SLOPE/SPOT
- PROPOSED STORM SEWER
- PROPOSED BOULDER RETAINING
- PROPOSED CONCRETE/ASPHALT
- EROSION LOG WATTLES
- DITCH EROSION LOG

TOPOGRAPHIC INFORMATION WAS PROVIDED BY EAGLE VALLEY SURVEYING 2024

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1 inch = 20 ft.

CONTRACTOR SHALL DEVELOP A MEANS AND METHODS TO CONTROL SEDIMENT DURING CONSTRUCTION TO ASSURE THAT NO SEDIMENT IS DISCHARGED OFF-SITE.

GRADE TO DRAIN AWAY FROM BUILDING IN ALL AREAS

HISTORIC vs. DEVELOPED INTO POND

STUDY POINT	HISTORIC		DEVELOPED INTO WATER QUALITY POND	
	2 YEAR (cfs)	100 YEAR (cfs)	2 YEAR (cfs)	100 YEAR (cfs)
A2	0.0	0.36	0.45	1.26

ALPINE ENGINEERING INC.
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EDWARDS CO 81632 I 970.926.3373
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ANB BANK
EBY CREEK ROAD, EAGLE CO
DRAINAGE AREA MAP

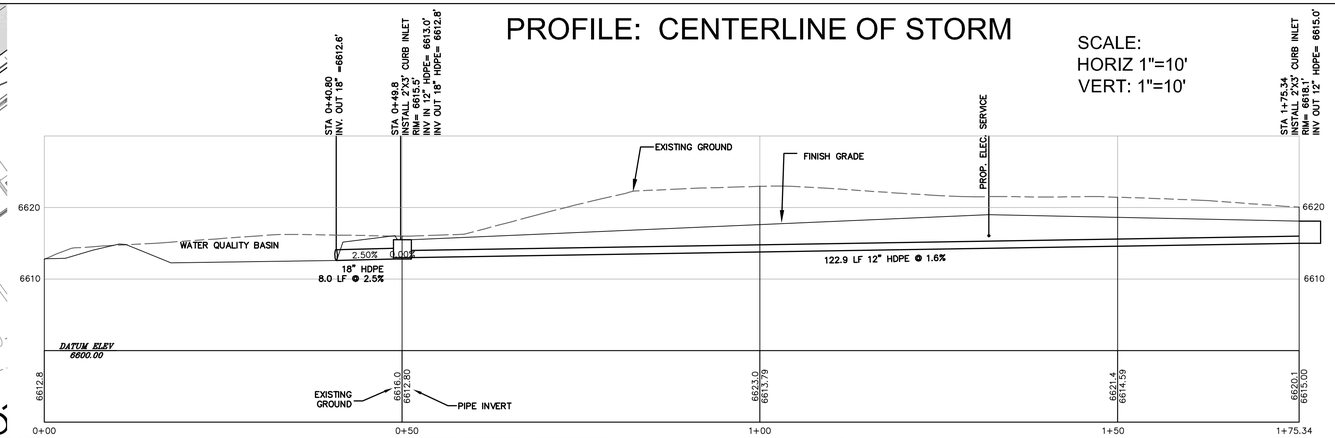
NO.	DATE	REVISIONS	BY
	01/30/25	DEVELOPMENT PERMIT	MCW

DESIGNED MCW
DRAWN TSL, MCW
CHECKED MCW
JOB NO. --
DATE 12/02/2024

SHEET
DAM-2

PROFILE: CENTERLINE OF STORM

SCALE:
HORIZ 1"=10'
VERT: 1"=10'



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WWW.ALPINECIVIL.COM

ANB BANK
EBY CREEK ROAD, EAGLE CO
STORM SEWER PLAN

A1

INSTALL 2'X3' CURB INLET
RIM= 6618.1'
INV OUT 12" HDPE= 6615.0'

PROPERTY LINE

UTILITY AND DRAINAGE EASEMENT

POND DESIGNED FOR WATER QUALITY SETTLEMENT ONLY AS THE STORMWATER RUNOFF VOLUME FOR THE PROPOSED SITE IS NEGLIGIBLE AND TIME OF CONCENTRATION IS SHORT COMPARED TO THE RECEIVING WATERS RUNOFF VOLUME OF EBY CREEK. EBY CREEK 100 YEAR FLOW IS 270 CFS.

STORM RUNOFF DESIGN: 2 YEAR STORM EVENT FOR WATER QUALITY PURPOSES
TOTAL BASIN AREA (A1+A2)= 0.51 AC
IMPERVIOUS AREA= 0.46 AC
UNDEVELOPED FLOW= 0.0 CFS
DEVELOPED FLOW= 0.45 CFS
0.45 CFS OF EXCESS RUNOFF
TC=5 MIN
RUNOFF VOLUME (2 YEAR)= 935 CUFT.

SNOW STORAGE

WATER QUALITY POND

INSTALL RIPRAP BLANKET.
ROCK: D50=6"
SIZE: 4' W X 12' L X 12" DEPTH
UNDERALIN WITH GEOFABRIC
Q100=1.26 CFS, WHICH RESULTS IN
VELOCITY= 3.74 FT/S
RIPRAP CALCULATIONS= D50 MINIMUM=3"

INSTALL RIPRAP BLANKET.
ROCK: D50=6"
SIZE: 4' W X 24' L X 9" DEPTH
UNDERALIN WITH GEOFABRIC

A2

COORDINATE DEPTH OF FOOTER/INTERACTION WITH PROPOSED 12" HDP STORM PIPE. TOW OF FOOTING MAY NEET TO BE DEEPEND OR FLOWFILL VOID BETWEEN EXTERIOR OF PIPE AND FOOTING.

18" HDPE
8.0 LF @ 2.5%
INV. OUT 18" HDPE= 6612.6'

INSTALL 2'X3' CURB INLET
RIM= 6615.5'
INV IN 12" HDPE= 6613.0'
INV OUT 18" HDPE= 6612.8'

EBY CREEK
100 YEAR STORM EVENT = 270 CFS
(STREAM STATS)

PROPERTY LINE

UTILITY EASEMENT

TOPOGRAPHIC INFORMATION WAS PROVIDED BY EAGLE VALLEY SURVEYING 2024

GRAPHIC SCALE
0 5 10 20
(IN FEET)
1 inch = 10 ft.

CONTRACTOR SHALL DEVELOP A MEANS AND METHODS TO CONTROL SEDIMENT DURING CONSTRUCTION TO ASSURE THAT NO SEDIMENT IS DISCHARGED OFF-SITE.

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	2 YEAR (cfs)	100 YEAR (cfs)	2 YEAR (cfs)	100 YEAR (cfs)
A2	0.0	0.36	0.45	1.26

LEGEND

- PROPERTY LINE
- 8110 EXISTING CONTOUR
- EASEMENT
- 8106 PROPOSED CONTOUR
- 1.5% PROPOSED GRADING, SLOPE/SPOT
- 1.5% EXISTING GRADING, SLOPE/SPOT
- PROPOSED STORM SEWER
- PROPOSED BOULDER RETAINING
- PROPOSED CONCRETE/ASPHALT
- EROSION LOG WATTLES
- DITCH EROSION LOG

NO.	DATE	REVISIONS	BY
	01/30/25	DEVELOPMENT PERMIT	MCW

DESIGNED MCW
DRAWN TSL, MCW
CHECKED MCW
JOB NO. --
DATE 12/02/2024

SHEET
C3.1

O:\Eagle\ANB Bank- Eby Creek- 2024\dwg\Master\Storm- ANB Bank .dwg, 4/2/2025 1:00:15 PM, Wadey