



Ph: 970-871-6772 · Fax: 970-879-8023 · P.O. Box 775966 · Steamboat Springs, Colorado 80477

Draft Drainage Letter
for
Richey Construction Outdoor Storage
Lot 3 Copper Ridge Business Park Subdivision F4
Steamboat Springs, Colorado

Draft Drainage Letter: July 15, 2021
Revised: November 16, 2021

**Prepared by: Matthew McLeod, P.E.
Four Points Surveying & Engineering**

**P.O. Box 775966
Steamboat Springs, Colorado 80477
(970) 819-1161**

City of Steamboat Springs plan review and approval is only for general conformance with City design criteria and the City code. The City is not responsible for the accuracy and adequacy of the design, dimensions, and elevations that shall be confirmed and correlated at the job site. The City of Steamboat Springs assumes no responsibility for the completeness or accuracy of this document.

Introduction

This drainage letter presents an analysis of a proposed outdoor storage and paved access drive with parking to be completed on Lot 3 Copper Ridge Business Park Subdivision Filing 4. The existing lot was platted on December 2002 and contains 0.32 acres. The site is located at 1716 Copper Ridge Spur.

Drainage reports reviewed as a part of this letter include the Copper Ridge Business Park Final Drainage Report dated July 2002 and prepared by Civil Design Consultants (CDC).

Drainage Criteria, Design Criteria, and Methodology Used

Design rainfall: NOAA Atlas 14, Volume 8, Version 2 for Steamboat Springs, CO.

- Minor Event (5-year) 24-hour rainfall depth: 1.59 inches
- Major Event (100-year) 24-hour rainfall depth: 2.91 inches

This report was prepared in accordance with the most recent version of the City of Steamboat Springs Drainage Criteria. Effects of the proposed development on storm runoff were determined for the 5- year (minor) and 100-year (major) storm events using the Rational Method, $Q = CiA$, where Q is the design flow rate, i is the storm intensity, A is the basin area, and C is the runoff coefficient. Stormwater detention volume and release rate calculations were performed per City of Steamboat Springs Drainage Criteria Section 5.11.

Existing Conditions

Lot 3 Copper Ridge Business Park is currently vacant. There is a shared access easement with Lot 4 to the north which has gravel access to that lot with a culvert along Copper Ridge Spur across it. The site is primarily covered in native grasses and weeds. Site drainage is fairly uniform, sheet flowing from northeast to southwest collecting in an existing drainage swale offsite from the southwest corner. The swale is part of the existing Copper Ridge Business Park drainage infrastructure which conveys flow out to the Yampa River. Flows eventually enter the Yampa River. The capacities of the existing drainage infrastructure were designed by CDC. NRCS soils are primarily impass silty clay loam. FEMA flood map 08107C0713D was reviewed and the site is located in Zone X, and area of minimal flood hazard.

Proposed Conditions

The proposed use of this site includes the development of an 8,200 square foot gravel outdoor storage lot with a paved access and screening fence. The developed site will sheet flow along the existing drainage pattern and out to the existing swale at the southwest corner at Design Point (DP) #1. The culvert across the proposed paved access will be reinstalled with riprap control at the inverts, which currently do not exist. A cut off swale directing flow coming from Lot 4 into the existing ditch to the west will be installed along the north side of the outdoor storage area with level spreader. The basin characteristic summary is outlined below with calculations in the Appendix.

**Lot 3 % Impervious
Proposed**

BASIN CHARACTERISTICS			
	Area, ac	% imp	Soil Type
Landscape	0.13	2%	C
Asphalt Parking & Walkways	0.01	100%	
Roof	0.00	90%	P2
Gravel	0.18	40%	
Other	0.00	0%	
0.32		26%	

Table 1: Summary Table for the 5- and 100-year storms

Basin	Area (acres)	% Imperviousness	Q5 (cfs)	Q100 (cfs)
EB1	0.32	4%	0.16	1.00
DB1	0.32	29%	0.23	0.97

Detention and Water Quality

The site will not require on site detention due to the decrease in flow for the 100-yr storm and generally equal flows for other storm conditions. Water quality for the site will be handled by the installation of a grass buffer with level spreader along the southwest corner of the site where sheet from the gravel outdoor storage area flows to. The grass buffer is designed to remove the required TSS from the anticipated run-off. Expected contaminants are vehicle leakage and sediment from outdoor storage area. See calculations in the Appendix.

Conclusions

In conclusion, drainage from proposed outdoor storage area will be directed toward the existing discharge point designated as design point 1 (DP1). Runoff will be treated by a grass buffer along the southwest corner of the lot. The proposed flow is less than peak historic flow, on site detention is not required. This development complies with the City of Steamboat Springs drainage criteria and needs no variances.

References

WRC, Engineering, Inc., September 2007, Updated July 2019. *City of Steamboat Springs Engineering Standards, Section 5.0 Drainage Criteria*. Prepared for City of Steamboat Springs, Department of Public Works. September.

Urban Storm Drainage Criteria Manual, Volume 3 Urban Drainage and Flood Control District,
November 2010

The City of Steamboat Springs Stormwater Master Plan, June 2013

Copper Ridge Business Park (CRBP) Final Drainage Report Civil Design Consultants, Inc, July 2002

Certification Statement

I, hereby affirm that this drainage letter and plan for Lot 3 Copper Ridge Business Park Subdivision was prepared by me (or under my direct supervision) for the owners thereof and is, the best of my knowledge, in accordance with the provisions of the City of Steamboat Springs Drainage Criteria and approved variances. I understand that the City of Steamboat Springs does not and will not assume liability for drainage facilities designed by others.

Matthew McLeod, P.E.
State of Colorado
Four Points Surveying and Engineering
970-819-1161

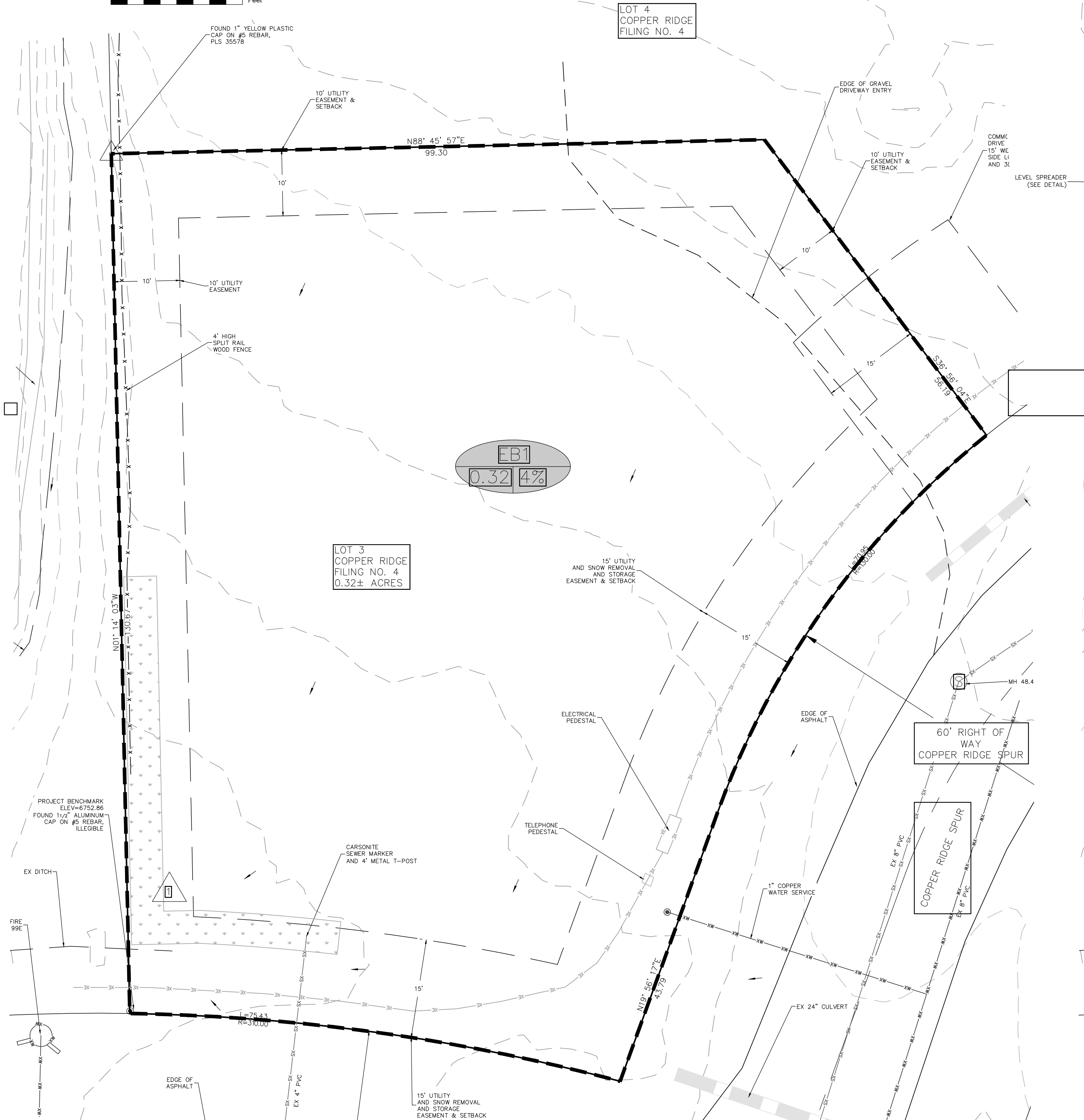
Appendices

- Drainage Exhibit - DR1 (Existing and Proposed Conditions)
- Drainage Basin Calculations using Rational Method
- USDA NRCS Web Soil Survey
- TSS Calculations
- Standard Form No. 1 – Drainage Letter Checklist
- Standard Form No. 4 – Stormwater Quality Plan Checklist
- O&M Plan
- Approved Scope Approval Form

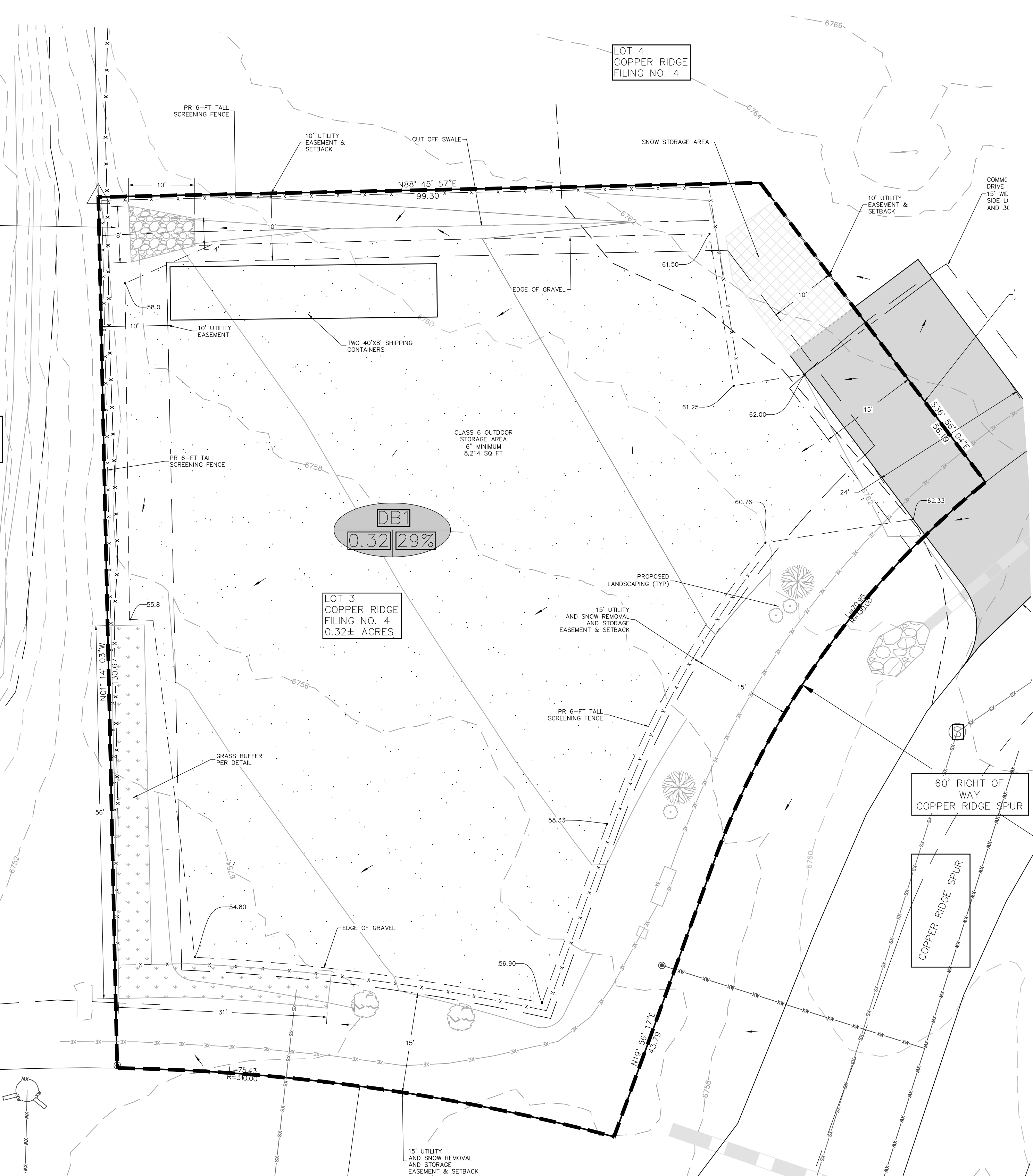
Appendix



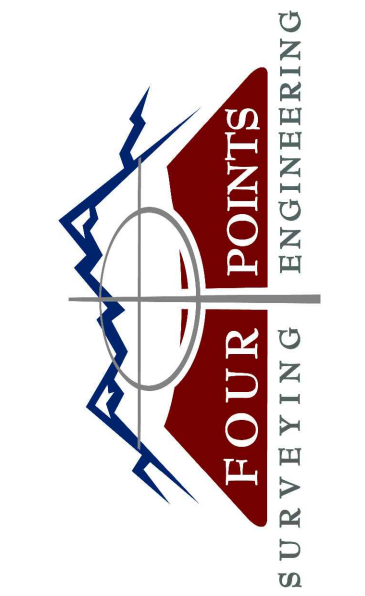
VICINITY MAP
0 500 1000
Feet



EXISTING DRAINAGE CONDITIONS



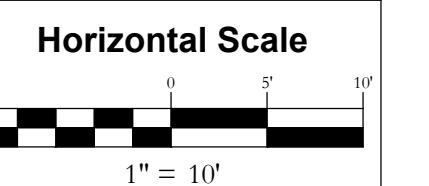
PROPOSED DRAINAGE CONDITIONS



440 S. Lincoln Ave, Suite 4A
P.O. Box 775966
Steamboat Springs, CO 80487
(970)-871-6772
www.fourpointse.com

No.	DATE	REVISIONS	INT	
			MDM	MDM
1	9/20/2021	DIRT REVIEW & RESPONSE		
2	11/16/2021	ADD LEVEL SPREADER		

**RICHEY CONSTRUCTION
OUTDOOR STORAGE**
1716 COPPER RIDGE SPUR
STEAMBOAT SPRINGS, CO 80487



Horizontal Scale
1" = 10'

Contour Interval = 2 ft
DATE: 7-15-2021
JOB #: 1647-007
DRAWN BY: MDM
DESIGN BY: MDM
REVIEW BY: FPSE

IF THIS DRAWING IS PRESENTED IN A
FORMAT OTHER THAN A4 X 36", THE
GRAPHIC SCALE SHOULD BE UTILIZED.

DRAWING:
DRAINAGE EXHIBIT

SHEET #
DR

Appendix
RATIONAL METHOD RUNOFF ANALYSIS

Job # 1647-007 Date: July 9, 2021
 Job Name Lot 3 Copper Ridge Business Park F4 Revised: September 20, 2021 cc
 Designed by: MDM
 Checked by:

Pre-development Existing Basin 1 (EB1)															
BASIN CHARACTERISTICS				TIME OF CONCENTRATION						RESULTS					
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Channel Flow 1		Channel Flow 2		Tc, min	Event	C	i, in/hr	A, acres	Q, cfs
Landscape	0.30	2%	C	Surface Imperviousness	0.02	Land Surface	Grassed Waterways	Land Surface	Paved Areas and Shallow Swales	Minimum	1.25-YR	0.65	1.3	0.32	0.27
Asphalt Parking & Walkways	0.00	100%		Length, ft	153	Length, ft	0	Length, ft	0	Tc, min	2-YR	0.07	1.9	0.32	0.04
Roof	0.00	90%	P2	Slope, percent	7.1000	Slope, ft/ft	1.0000	Slope, ft/ft	1.0000	5-YR	0.18	2.8	0.32	0.16	
Gravel	0.02	40%		Runoff Coefficient	0.162	Conveyance Coefficient	15	Conveyance Coefficient	20	Final	10-YR	0.27	3.5	0.32	0.31
Other	0.00	0%		Velocity, ft/s	15.0	Velocity, ft/s	20.0	Velocity, ft/s	20.0	Tc, min	25-YR	0.39	4.5	0.32	0.57
				Ti, min=	10.9	Tt, min=	0.0	Tt, min=	0.0	10.9	100-YR	0.52	6.1	0.32	1.00

Post-development Basin 1 (DB1)															
BASIN CHARACTERISTICS				TIME OF CONCENTRATION						RESULTS					
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Overland Flow - Surface Type 1		Overland Flow - Surface Type 1		Tc, min	Event	C	i, in/hr	A, acres	Q, cfs
Landscape	0.11	2%	C	Surface Imperviousness	0.4	Surface Imperviousness	0.02	Surface Imperviousness	0.02	Minimum	1.25-YR	0.65	1.1	0.32	0.24
Asphalt Parking & Walkways	0.01	100%		Length, ft	133	Length, ft	13	Length, ft	10	Tc, min	2-YR	0.22	1.6	0.32	0.11
Roof	0.00	90%	P2	Slope, percent	5.0000	Slope, percent	8.9000	Slope, percent	16.0000	5-YR	0.30	2.4	0.32	0.23	
Gravel	0.20	40%		Runoff Coefficient	0.35	Runoff Coefficient	0.162	Runoff Coefficient	0.162	Final	10-YR	0.38	3.1	0.32	0.38
Other	0.00	0%		Tc, min	25-YR	0.47	4.0	0.32	0.60	14.2	100-YR	0.57	5.4	0.32	0.97
				Ti, min=	9.1	Ti, min=	2.9	Ti, min=	2.1						

Custom Soil Resource Report for Routt Area, Colorado, Parts of Rio Blanco and Routt Counties

Lot 3 Copper Ridge



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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C10—Impass silty clay loam, 3 to 12 percent slopes.....	11

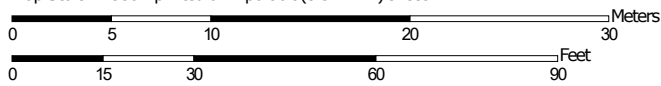
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map




Map Scale: 1:380 if printed on A portrait (8.5" x 11") sheet.



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 Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 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: Routt Area, Colorado, Parts of Rio Blanco and Routt Counties
 Survey Area Data: Version 10, Jun 5, 2020

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

Date(s) aerial images were photographed: May 8, 2012—Oct 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
C10	Impass silty clay loam, 3 to 12 percent slopes	0.6	100.0%
Totals for Area of Interest		0.6	100.0%

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Custom Soil Resource Report

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

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

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

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

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

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

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

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

Routt Area, Colorado, Parts of Rio Blanco and Routt Counties

C10—Impass silty clay loam, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: k0ky
Elevation: 6,560 to 7,870 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 38 to 41 degrees F
Frost-free period: 30 to 70 days
Farmland classification: Not prime farmland

Map Unit Composition

Impass and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Impass

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone and shale

Typical profile

A - 0 to 4 inches: silty clay loam
Bss - 4 to 18 inches: silty clay
Bkss - 18 to 25 inches: silty clay
Bk1 - 25 to 45 inches: silty clay
Bk2 - 45 to 60 inches: silty clay

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.07 to 0.21 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 6c
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C
Ecological site: R048BY296CO
Hydric soil rating: No

Minor Components

Gourley

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R048AY247CO
Hydric soil rating: No

Routtskin

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R048AY247CO
Hydric soil rating: No

Eckmanpark

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R048BY296CO
Hydric soil rating: No

TSS Removal

BMP Designation SB2 Grass Buffer

Event Mean TSS Per Table 5.12.3

150 mg/L

Variable	Value	Unit	
n	3	-	(Turbulence Factor: 1=bad, 5=good)
V_s	0.0059	ft/sec	(Settling Velocity of Particles)
Q	0.24	ft ³ /sec	(Applied Flow Rate, 1.25 year)
A	412	ft ²	(Area of Treatment)
R	0.99	-	(Fraction of solids removed)

TSS Concentration After Treatment

1.79 mg/L

CITY OF STEAMBOAT SPRINGS ENGINEERING STANDARDS

STANDARD FORM NO. 1 DRAINAGE LETTER CHECKLIST

Instructions:

1. The applicant shall identify with a "check mark" if information is provided with letter. If applicant believes information is not required, indicate with "N/A" and attach separate sheet with explanation.
2. The reviewer will determine if information labeled "N/A" is required and whether additional information must be submitted.

I. General

- A. Typed and legible in 8½ x 11" format.
- B. Drawings that are 8½" x 11" or 11 x 17 bound within letter, larger drawings (up to 24 x 36) included in a pocket attached to the letter. Drawings shall be at an appropriate size and scale to be legible and include project area.

II. Title Page

- A. Type of Letter.
- B. Project Name, Subdivision, Original Date, Revision Date.
- C. Preparer's name, firm, address, and phone number.
- D. Certifications, PE stamp, signature and date from licensed Colorado PE (for FINAL letter).
- E. "DRAFT" for 1st Submittal and revisions; "FINAL" once approved.
- F. Note: City of Steamboat Springs plan review and approval is only for general conformance with City design criteria and the City code. The City is not responsible for the accuracy and adequacy of the design, dimensions, and elevations that shall be confirmed and correlated at the job site. The City of Steamboat Springs assumes no responsibility for the completeness or accuracy of this document.

III. Introduction

- A. Description of site location, size in acres, existing and proposed land use, and any pertinent background info.
- B. Identify drainage reports for adjacent development.

IV. Drainage Criteria and Methodology Used

- A. Identify design rainfall and storm frequency.
- B. Identify runoff calculation method used.

V. Existing Conditions (Pre-Development/Historic)

- A. Indicate ground cover, imperviousness, topography, and size of site (acres).
- B. Describe existing stormwater system (sizes, materials, etc.).
- C. Describe other notable features (canals, major utilities, etc.).
- D. Note site outfall locations and ultimate outfall location (typically Yampa River).
- E. Note capacity of existing system and identify any constraints.
- F. Identify NRCS soil type.
- G. Identify the FEMA Map reviewed, if site is in floodplain/way, and zone designation.

CITY OF STEAMBOAT SPRINGS ENGINEERING STANDARDS

VI. Proposed Conditions

- A. Indicate ground cover, imperviousness, topography, and disturbed area (acres).
- B. Describe proposed stormwater system (sizes, materials, etc.).
- C. Describe proposed outlets and indicate historic and proposed flow for each.
- D. Include calculations for all pipes, inlets, culverts, ditches, ponds, etc. in appendix.
- E. Include a summary table for the 5- and 100-year events showing historic flow and proposed flow for total site and each basin.
- F. Include a summary of proposed water quality measures to be constructed.

VII. Conclusions

- A. Provide general summary.
- B. Note if site does or does not comply with criteria and any variances to criteria.
- C. Indicate if peak proposed flow is less than, equal to, or greater than peak historic flow for each outfall, design point, and for the total site.
- D. Indicate proposed stormwater quality system.

VIII. References

- A. Provide a reference list of all criteria, master plans, drainage reports and technical information used.

IX. Figures

- A. Vicinity Map.
- B. Site Plan (include the horizontal and vertical datum used and all benchmarks).
- C. Existing conditions.
 - 1. Delineate existing basin boundaries.
 - 2. Show existing runoff flow arrows.
 - 3. Show existing topography.
 - 4. Show existing stormwater features (structures, sizes, materials, etc.).
 - 5. Show floodplain limits and information.
 - 6. For each basin, show bubble with basin number, acreage and percent impervious or provide information in summary table or figure.
 - 7. For each outlet show bubble with acreage and historic flow and proposed flow or provide information in summary table on figure.
- D. Proposed Conditions
 - 1. Delineate proposed basin boundaries.
 - 2. Show proposed runoff flow arrows.
 - 3. Show existing and proposed topography at an interval of at least 5-ft.
 - 4. For each basin show bubble with basin number, acreage and percent impervious or provide a summary table or figure.
 - 5. For each outlet show bubble with acreage, historic flow, and proposed flow or provide a summary table or figure.
 - 6. Show floodplain limits and information.
 - 7. Show proposed stormwater system (components, sizes, materials, & slopes).
 - 8. Show property lines and easements.
 - 9. Show any new easements required.

CITY OF STEAMBOAT SPRINGS ENGINEERING STANDARDS

X. Appendices

- A. Runoff Calculations
- B. Culvert Calculations
- C. Pond Calculations.
- D. Other Calculations

Acknowledgements:

Standard Form No. 1 was prepared by:

 7/15/21
Date

Include Attachment A – Scope Approval Form (see Standard Form No. 5)

Include Attachment B – Storm Water Quality Plan (see Standard Form No. 4)

CITY OF STEAMBOAT SPRINGS ENGINEERING STANDARDS

Standard Form No. 4 Stormwater Quality Plan Checklist

This list is not an exhaustive list of every possible item that may be required or requested in a Stormwater Quality Plan but provides a general guideline for preparation of the Stormwater Quality Plan.

Instructions:

1. The applicant shall identify with a “check mark” if information is provided within the Stormwater Quality Plan. If applicant believes information is not required, indicate with “N/A” and attach separate sheet with explanation. If information is included with the associated drainage letter or study, indicated with a “D.”
2. The reviewer will determine if information labeled “N/A” is required and whether additional information must be submitted.

I. General

- A. Report typed and legible in 8½” x 11” format.
- B. Report bound (comb, spiral, or staple – no notebook) and in digital PDF format.
- C. Drawings that are 11” x 17” bound within letter, larger drawings (up to 24” x 36”) included in a pocket attached to the letter, and a digital PDF copy. Drawings shall be at an appropriate size and scale to be legible and include project area.

II. Cover

- A. Report Type – Stormwater Quality Plan.
- B. Project Name, Subdivision or Development, Original Date, Revision Date.
- C. Preparer’s name, firm, address, and phone number.
- D. “DRAFT” for 1st submittal and revisions; “FINAL” once approved.

III. Title Sheet

- A. Table of Contents.
- B. Certification, PE Stamp, signature and date from licensed Colorado PE (for Final).
- C. Note: City of Steamboat Springs plan review and approval is only for general conformance with City design criteria and City code. The City is not responsible for the accuracy and adequacy of the design, dimensions, and elevations that shall be confirmed and correlated at the job site. The City of Steamboat Springs assumes no responsibility for the completeness or accuracy of this document.

IV. Introduction and Background

- A. Description of site location, study limits, size in acres, existing and proposed land use, soil data, permeability of the site, drainage patterns, and any pertinent background info.
- B. State purpose and goal of Stormwater Quality Plan and report along with any special requirements of the desired outcome.
- C. List any project stakeholders and/or requestors.
- D. Describe the background of the flooding source and any previous studies.

CITY OF STEAMBOAT SPRINGS ENGINEERING STANDARDS

V. Design Criteria and Methodology Used

- _____ A. Identify design rainfall and storm frequency used to design permanent stormwater treatment facilities.
- _____ B. Identify the runoff calculation method used to design permanent stormwater treatment facilities.
- _____ C. Identify the standard the design will meet and the means and methodologies by which it will use to meet the standard.
- _____ D. Provide all details supporting the use of the selected design standard.

VI. Proposed Conditions

- _____ A. Identify total site area, total site imperviousness, area to be treated, and impervious area to be treated. Include justification for treating less than the total site area.
- _____ B. Describe potential site contaminant sources including sediment.
- _____ C. Identify source and quantity of on-site and off-site stormwater flows that need to be managed and how they will be managed.
- _____ D. For each permanent treatment facility, identify the design standard, MDCIA level (if applicable), area treated (& percentage of total), imperviousness of area treated, C values of area treated, soil types, and all pertinent data for design.
- _____ E. Volume based facilities: Provide total storage pond volume, WQCV, drain time, release rate, sediment storage, outlet & overflow structures, area and depth of pond, micropool, forebays, etc. (include all calculations in the appendix).
- _____ F. Flow based facilities: Provide design flow rate and all treatment calculations and how flows larger than the water quality design flow rate will be handled. If proprietary facilities are proposed, provide the justification and sizing requirements from manufacturer.
- _____ G. If stormwater detention is provided, discuss how water quality is provided within the detention facility. No underground detention is allowed.

VII. Operation and Maintenance Plan Requirements

See template O&M plan and guidance document.

- _____ A. Describe general project information, facility description, ROW and access information, vegetation management, hydraulic design parameters, environmental permitting, snow and ice control, and additional pertinent information in the notes.
- _____ B. Indicate, describe, and detail the permanent stormwater treatment facilities.
- _____ C. Include section details where necessary of the permanent treatment facilities.
- _____ D. Provide an inspection and maintenance schedule and procedure of permanent treatment facilities and who is responsible for them.
- _____ E. Identify design specifications for construction.

Acknowledgements

Standard Form No. 4 prepared by: _____

Date

**Include appropriate Project Sheet(s) and Design Checklist(s) (See Section 5.12)
Include this form as part of the Stormwater Quality Plan.**

CITY OF STEAMBOAT SPRINGS ENGINEERING STANDARDS

Standard Form No. 5 Drainage and Stormwater Treatment Scope Approval Form

Prior to starting a development plan and before the first drainage submittal, a Drainage and Stormwater Treatment Scope Approval Form must be submitted for review and signed by the City Engineer. A signed form shall also be included in every drainage submittal as Attachment A. This Scope Approval Form is for City requirements only. Values may be approximate. The City encourages supporting calculations and figures to be attached.

Project Information	
Project name:	
Project location:	
Developer name/contact info:	
Drainage engineer name/contact info:	
Application Type:	
Proposed Land Use:	
Project Site Parameters	
Total parcel area (acres):	
Disturbed area (acres):	
Existing impervious area (acres, if applicable):	
Proposed new impervious area (acres):	
Proposed total impervious area (acres):	
Proposed number of project outfalls:	
Number of additional parking spaces:	
Description and site percentage of existing cover/land use(s):	
Description and site percentage of proposed cover/land use(s):	
Expected maximum proposed conveyance gradient (%):	
Description of size (acres) and cover/land use(s) of offsite areas draining to the site	

CITY OF STEAMBOAT SPRINGS ENGINEERING STANDARDS

Project Permanent Stormwater Treatment	
Justification of choice of proposed design standard, including how the site meets the constrained redevelopment standard, infiltration test results, etc.:	
Concept-level permanent stormwater treatment facility design details (type, location of facilities, proprietary structure selection, treatment train concept, etc.):	
Proposed LID measures to reduce runoff volume:	
Will treatment evaluation include off-site, pass through flow (circle):	YES NO

Approvals

Prepared By: _____ Date _____ Phone number _____
 (Insert drainage engineer name & firm)

Approved By:

Printed Name: _____ Date _____
~~City Engineer~~
For Ben Beall

GRASS BUFFER WATER QUALITY FEATURE FOR RICHEY CONSTRUCTION OUTDOOR STORAGE OWNERSHIP AND MAINTENANCE PLAN

1. GENERAL PROJECT INFORMATION

1. 1716 COPPER RIDGE SPUR, STEAMBOAT SPRINGS, ROUTT COUNTY, COLORADO.

2. GENERAL FACILITY DESCRIPTION

THIS FACILITY IS A GRASS BUFFER WATER QUALITY (WQ) FEATURE THAT IS CAPABLE OF TREATING RUNOFF FOR TOTAL SUSPENDED SOLIDS (TSS) AND OTHER POLLUTANTS THAT COMMONLY ORIGINATE FROM VEHICLES AND MOTORIZED EQUIPMENT.

3. INSPECTION & MAINTENANCE FREQUENCY & PROCEDURE

THE FOLLOWING TABLE PROVIDES A MAINTENANCE SCHEDULE FOR THE PROPOSED GRASS BUFFER:

Grass Swale, Grass Buffer	
Activity	Required Frequency
Inspection for uniform cover, sediment accumulation, fill and gully development, and impacts from foot or vehicle traffic; maintain as necessary. Debris and litter removal.	Twice annually
Aeration	Annually
Mowing	As needed to maintain ~6" height
Irrigation and application of fertilizer, herbicide, and pesticide	As needed to maintain vegetative health

4. EQUIPMENT, STAFFING AND VEGETATION MANAGEMENT

A. GENERAL LANDSCAPING TOOLS SUCH AS LAWMOWER, WEED WHACKER

B. STAFFING: TBD BY OWNER

C. SEEDING: TBD

D. MOWING: VEGETATION HEALTH SHOULD BE MAINTAINED IN THE BUFFER AREA WITH REGULAR MOWING AND/OR WEDEATING. THE REQUIRED MOW AREA POST-CONSTRUCTION WAS ESTIMATED TO BE 0.01 ACRES.

E. UNDESIRABLE VEGETATION AND WEEDS: UNDESIRABLE VEGETATION AND NOXIOUS WEEDS SHOULD BE REMOVED REGULARLY BY THE LANDSCAPING STAFF. WEEDS SHOULD BE MOWED OR REMOVED.

5. SNOW AND ICE CONTROL

THE GRASS BUFFER MAY SERVE AS A SNOW STORAGE AREA DURING THE WINTER MONTHS. SNOW CAN BE PLOWED INTO THE BUFFER PLOW OPERATORS SHALL TAKE CARE NOT TO DAMAGE THE GRASS BUFFER..

6. RIGHT-OF-WAY, ADJACENT OWNERSHIP & ACCESS

A. ACCESS INFORMATION AND DETAILS: ACCESS FROM COPPER RIDGE SPUR.

B. MAINTENANCE OPERATIONS WILL REQUIRE TEMPORARY OBSTRUCTION OF THE COPPER RIDGE SPUR RIGHT OF WAY WITHIN THE CUL-DE-SAC FOR MAINTENANCE OPERATIONS. A RIGHT-OF-WAY PERMIT SHOULD NOT BE REQUIRED FOR TEMPORARY OBSTRUCTIONS. MAINTENANCE CREWS SHOULD PLACE MUTCD APPROVED TRAFFIC CONTROL DEVICES (ORANGE CONES AND/OR BARRICADES) AROUND ALL VEHICLES AND EQUIPMENT THAT ARE TEMPORARILY WITHIN THE RIGHT OF WAY.

7. HYDRAULIC DESIGN

A. FLOWRATES (CFS)

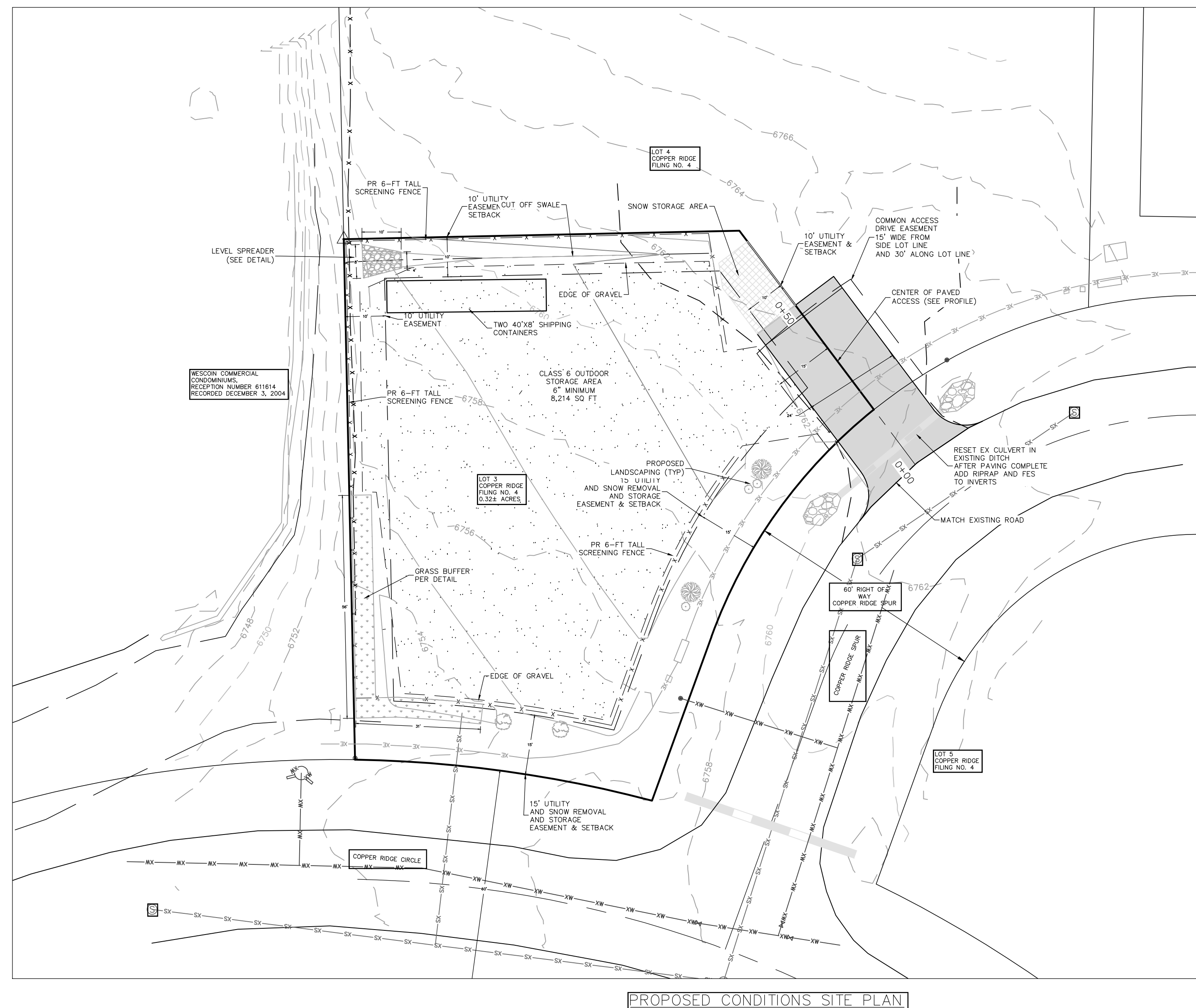
A.A. DESIGN EVENT (1.25 YEAR)	0.24	CFS
A.B. MINOR EVENT (5-YEAR)	0.11	CFS
A.C. MAJOR EVENT (100-YEAR)	0.97	CFS

8. SENSITIVE AREA, WETLANDS & PERMITS

A. NO SENSITIVE AREAS OR WETLANDS ARE PRESENT.

9. MISCELLANEOUS INFORMATION

A. PROJECT SURVEY: EXISTING CONDITIONS AND TOPOGRAPHIC SURVEY WAS PREPARED BY FOUR POINTS SURVEYING & ENGINEERING.



PROPOSED CONDITIONS SITE PLAN

GRASS BUFFER OPERATION AND MAINTENANCE NOTES AND REFERENCES

IRRIGATION

"Grass buffer should be equipped with irrigation systems to promote establishment and survival in Colorado's semi-arid environment. Systems may be temporary or permanent, depending on the type of grass selected. Irrigation practices have a significant effect on the function of the grass buffer. Overwatering decreases the permeability of the soil, reducing the infiltration capacity of the soil and contributing to nuisance baseflows. Conversely, under watering may result in delays in establishment of the vegetation in the short term and unhealthy vegetation that provides less filtering (straining) and increased susceptibility to erosion and riling over the long term." - UDFCD USDCM MANUAL VOL. 3

SUGGESTED O&M: THE GRASS BUFFER SHOULD BE REGULARLY WATERED AS NECESSARY IN ORDER TO ESTABLISH AND SUSTAIN GROWTH THROUGHOUT THE SPRING/SUMMER PERIODS. APPLY FERTILIZER IF NECESSARY.

MAINTENANCE

"Weed the area during the establishment of vegetation by hand or mowing. Mechanical weed control is preferred over chemical weed killer." - UDFCD USDCM MANUAL VOL. 3"

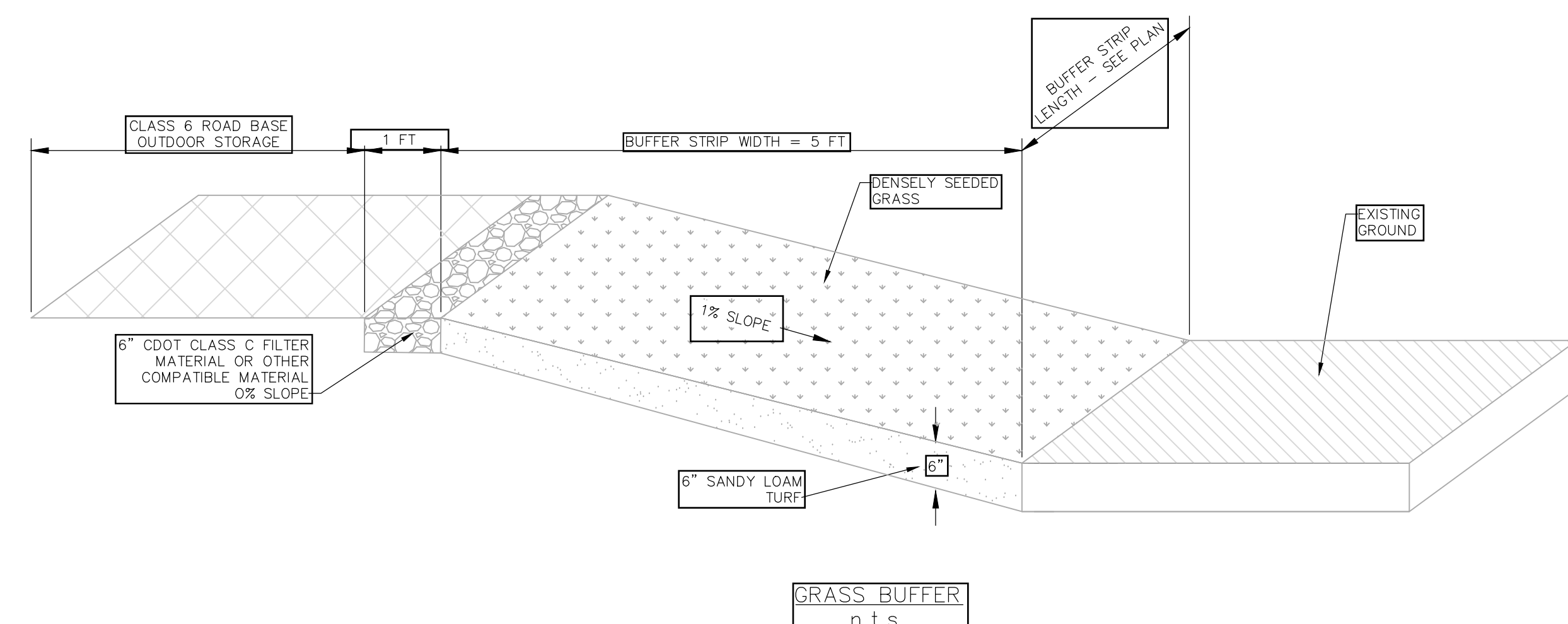
SUGGESTED O&M: INSPECT GRASS BUFFER SEMI-ANNUALLY FOR INTRUSIVE WEEDS AND REMOVE BY HAND. REMOVE ANY FOREIGN DEBRIS PRESENT E.G. ROCKS AND STICKS. MOW GRASS BUFFER WITH A HIGH CUTTING SETTING AS NECESSARY. LONGER GRASS PROVIDES BETTER STORM WATER TREATMENT AND IS MORE DROUGHT TOLERANT.

PROTECTION

SUGGESTED O&M: PROTECT BUFFER FROM FUTURE CONSTRUCTION ACTIVITIES. KEEP BUFFER FREE OF OBSTRUCTIONS AND EXCESSIVE USE.

NOTE:

THE PROPERTY OWNER OR MANAGER SHALL BE RESPONSIBLE FOR OPERATION AND MAINTENANCE ACTIVITIES.

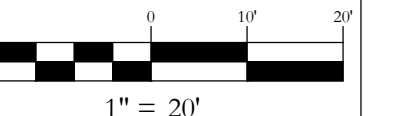


440 S. Lincoln Ave, Suite 4A
P.O. Box 775966
Steamboat Springs, CO 80487
(970)-871-6772
www.fourpointse.com

No.	DATE	REVISIONS	INT	MDM	MDM
1	9/20/2021				
2	11/16/2021				

RICHEY CONSTRUCTION
OUTDOOR STORAGE
 1716 COPPER RIDGE SPUR
 STEAMBOAT SPRINGS, CO 80487

Horizontal Scale



Contour Interval = 2 ft

DATE: 7-15-2021
JOB #: 1647-007
DRAWN BY: MDM
DESIGN BY: MDM
REVIEW BY: FPSE

IF THIS DRAWING IS PRESENTED IN A FORMAT OTHER THAN A4 X 36", THE GRAPHIC SCALE SHOULD BE UTILIZED.

OPERATIONS AND
MAINTENANCE PLAN

SHEET #

OM