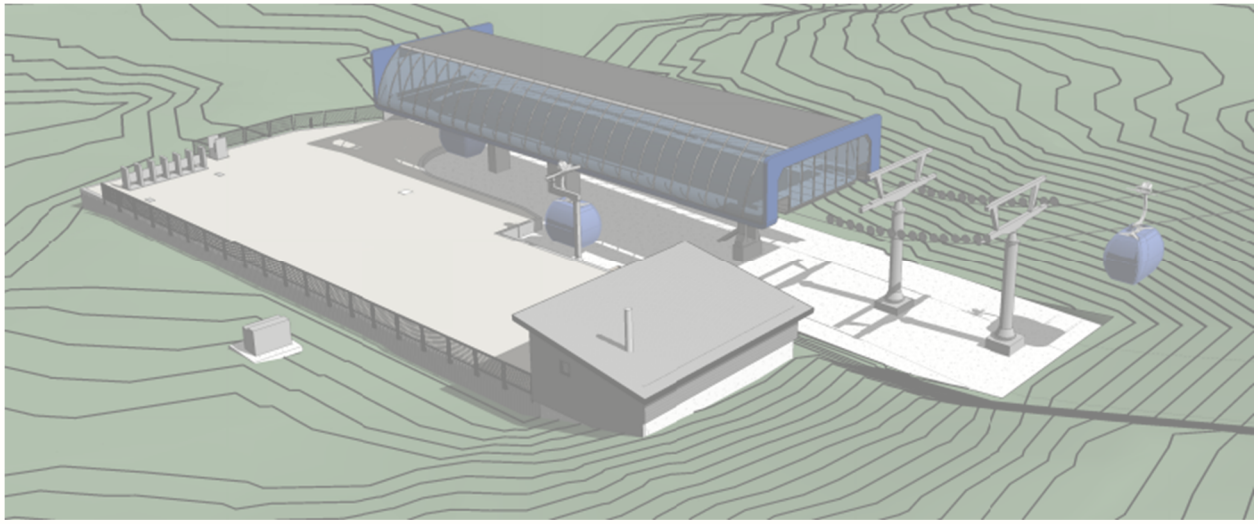
DRAFT

Drainage Letter and Stormwater Quality Plan



Wild Blue Gondola

Development Plan

Located in the SE ¼ and in the SE1/4 Section 22 and in the NE ¼ NW1/4 and in the NE1/4 Section 27, T6N, R84W, 6th P.M.

And Lot 2 Replat of Parcel D

Original Date: September 21, 2021

Prepared by: Deborah Spaustat, P.E.

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.

LANDMARK CONSULTANTS, INC.

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CERTIFICATION

I hereby affirm that this Drainage Letter and Stormwater Quality Plan for the Development Plan for Wild Blue Gondola was prepared by me (or under my direct supervision) for the owners thereof and is, to the best of my knowledge, in accordance with the provisions of the City of Steamboat Springs Storm 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.

Deborah Spaustat, P.E.
State of Colorado No. 0041286

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INTRODUCTION AND LOCATION

The purpose of this report is to estimate peak stormwater runoff, evaluate existing infrastructure and design required infrastructure to manage the existing stormwater experienced onsite and the incremental stormwater generated by the proposed Wild Blue Gondola (the Project). This report includes all the base data, methods, assumptions, and calculations used by Landmark Consultants, Inc. (Landmark) to design the stormwater management system for the project. It was prepared in conjunction with the Development Plan application.

The Wild Blue Gondola project proposes the construction of two gondola terminal stations in two different locations as shown on the attached Drainage Scope Overview exhibit. One Terminal is located at the base of the ski area in Lot 2 of the Parcel D replat and one is located in Lot 1 near the Greenhorn Ranch area.

The proposed development is unique from typical developments in the City of Steamboat and does not fit neatly into the categories of drainage and stormwater design contained in the City's Drainage Criteria. For the purposes of the drainage study for the Development Plan application, the project is studied as two separate sites, Upper Terminal (East) and Lower Terminal (West), although it is only one development.

The lower terminal will replace two existing chair lift terminals directly adjacent to the 78" Burgess Creek Culvert and Promenade disturbing approximately 0.76-acres.

The proposed improvements at the Upper Terminal site includes the redevelopment of an existing access road and the installation of the Wild Blue Gondola mid-station gondola terminal as well as a "sprung" structure disturbing a total area of 2.09-acres. A portion of the proposed improvements will take place on Forest Service Land.

The disturbed areas are considered the "sites" for purposes of the City's review of this drainage study.

The property is zoned open space and recreation and is currently used as a ski area and a summer recreation area. There is no proposed change in zoning or use.

Landmark prepared this report in accordance with City of Steamboat Springs Drainage Criteria for the purpose of designing the storm water infrastructure required by the project at the time of this report. This report may not be used by other parties without the express written consent of Landmark.

The facts and opinions expressed in this report are based on Landmark's understanding of the project and data gathered from:

- Site visits
- Steamboat Springs GIS data
- FEMA FIRM Map Number 08107C0883D and FIS Study
- LOMR 15-08-0994P
- NRCS soil maps
- Field survey by Landmark Consultants, Inc.
- Final Drainage Report for Steamboat Base Area Redevelopment by Drexel, Barrell & Co.
- Citywide Stormwater Masterplan by SHE

- The Gold Book – Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development
- References listed at the end of this report

The location of the project is shown on Figure 1: Vicinity Map.

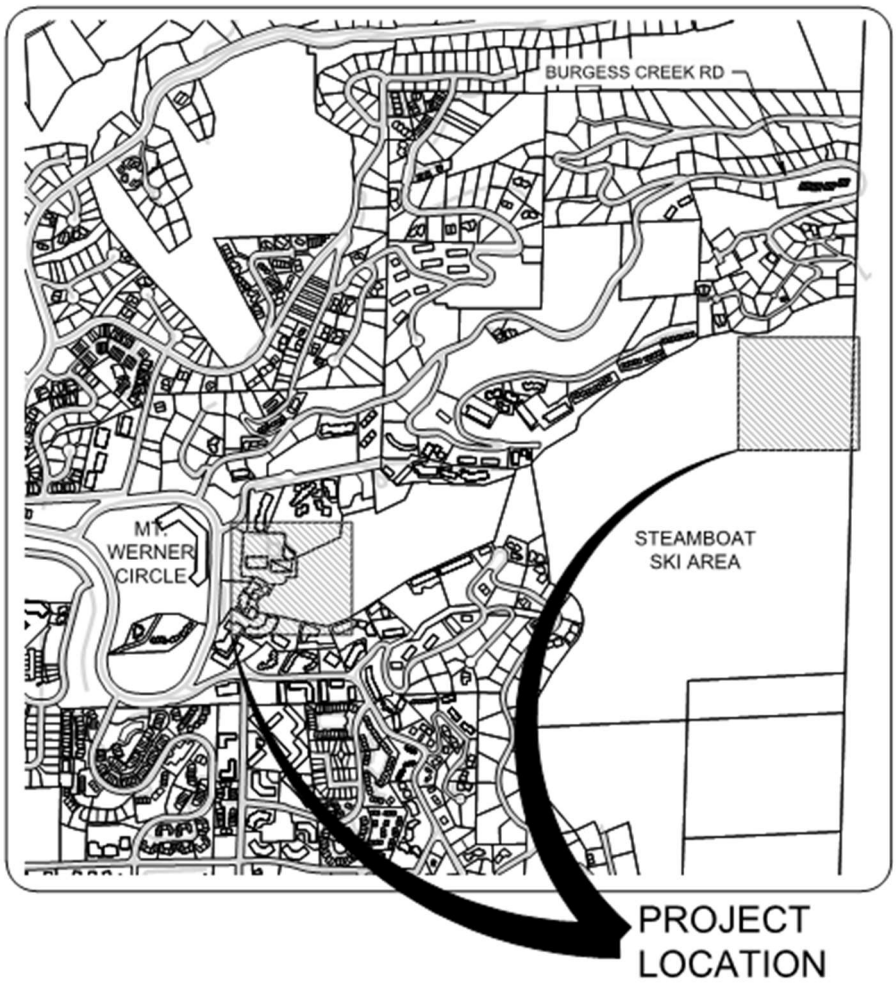


Figure 1- Vicinity Map

DRAINAGE CRITERIA AND METHODOLOGY

Landmark prepared this report in accordance with City of Steamboat Springs, Colorado Drainage Criteria, effective July 2019 and BLM. The methods used by Landmark are described below and the actual calculations are presented in the Appendices. The scope of this report is limited to flow determinations related to the described hydrological storm event. This report does not attempt to model subsurface flows nor is it intended to be used in the design of structure features including foundation drains and roof drains.

Design Rainfall and Runoff Frequency

Landmark used the Rational Method to determine peak runoff of small basins to design the on-site storm water runoff infrastructure associated with this project. The 5-year, 24 hour storm was used to analyze the minor storm event and the 100-year, 24 hour storm was used to analyze the major storm event.

Storm Sewer Design

Autodesk Storm and Sanitary Sewer Analysis was used to design and analyze the proposed storm sewer systems. The storm sewers were designed so that the HGL of the minor storm does not exceed ground elevation.

Swale Design

Swales are designed and evaluated using Hydraflow Express Extension for Autodesk Civil 3D. The channels are designed so that the Froude number is 0.80 or less and the velocity is less than 7-ft/sec.

Stormwater Quality

Lower Terminal – The project uses the WQCV design standard to provide stormwater quality treatment in the form of a sand filter designed per the parameters recommended in Volume 3 of the Mile High Flood District's Criteria Manual. This standard was chosen due to the expected low pollutant load and its widespread applicability.

Upper Terminal -

The Infiltration Standard (runoff reduction method) is used to treat basin D7a, which contains all the proposed impervious areas. This was applied per the methods described in the Mile High Flood Districts Urban Storm Drainage Criteria Manual Vol. 3.

EXISTING SITE CONDITIONS

In this report the term "historic condition" refers to the conditions of the site at the time of this report and may also be referred to as "pre-development condition" or "existing condition".

Lower Terminal

The site is currently developed containing the Christie Peak Express and the Preview chairlift terminals. These terminals are located next to a gravel road that abuts the daylighted Burgess Creek. The 78" culvert that conveys Burgess Creek across the property is located in this gravel road. A miniature golf course is located uphill of the site but in the same drainage basin. Another miniature golf course is located adjacent to the site but in a separate drainage basin.

The soils in project area are a Routt loam with 25 to 65 percent slopes and very stony (hydrologic soil group C).

There are numerous small diameter culverts put in place by Ski Area operations to manage nuisance runoff. Runoff is captured on the uphill side of the road in depressions or informal swales and directed to the 78" culvert. According to the Final Drainage Study for the Steamboat Base Area Redevelopment, the 78" RCP was sized to contain the 1% chance annual flood in Burgess Creek per the published flow in the Flood Insurance Study (FIS) for Routt County and Incorporated Areas, which is 399-cfs. The ultimate outfall for Burgess Creek is the Yampa River.

FEMA Floodplain – Lower Terminal

FEMA FIRM Number 08107C0883D dated February 4, 2005, was reviewed and no portions of the property are within a Floodway or SFHA. The LOMR dated 5/31/2016 confirms that the SFHA Zone AE (1% chance annual flood) is confined to the 78" culvert. The flow in the manmade creek was calculated to reach a max depth of 0.70-ft during the 1% chance annual flood and remains a SFHA zone X.

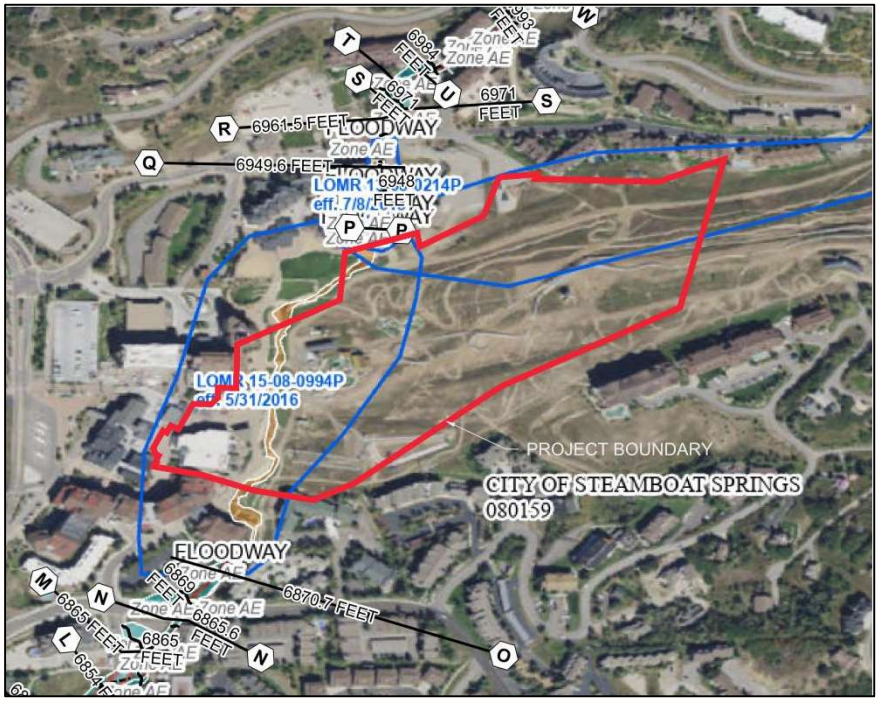


Figure 2a: Lower Terminal FEMA FIRM

The Citywide Master Stormwater Plan identifies several areas downstream on Burgess Creek in need of maintenance or replacement. This project does not propose to increase peak flows in Burgess Creek and will not affect downstream properties.

Easements – Lower Terminal

A 20' storm sewer easement is centered on the 78" Burgess Creek Culvert as shown in Figure 4: Lower Terminal Drainage Plan.

Drainage Basins – Lower Terminal

The lower site was broken into three drainage basins, H4, H5, and H6 as shown in Figure 4: Lower Terminal Existing Drainage Plan. Basin H4 currently drains to the low spot east of the Christie Express lift. Based on field observations, as-built storm sewer data, and anecdotal information, it is assumed that runoff is collected in an infiltration vault then conveyed to the 78" Culvert via a 12" storm pipe.

Basin H5 includes a portion of the area of proposed disturbance (pre-development) and the area downstream of it that drains to an existing type C inlet on the adjacent Torian Plum Condominiums property. This area is characterized by swales between bike trails. Basin H6 is the portion of the proposed disturbed area (pre-development) that flows south the Type C inlet just west of the miniature golf.

Design point 4 quantifies runoff to the 78" culvert from basins H4, H5 and H6 assuming all runoff to basin H4 is conveyed to the culvert with no reductions for infiltration.

Table 1 summarizes the historical hydrological conditions for the lower terminal site:

Table 1: Lower Terminal Historic Basin Summary

Basin	Total Area (acres)	%Imp	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
H4	1.30	30%	0.29	0.61	1.27	5.87
H5	0.19	13%	0.15	0.54	0.10	0.83
H6	0.08	53%	0.48	0.65	1.32	8.58

Upper Terminal

The upper terminal portion of the project proposes to disturb 2.09-acres with the majority on Ski Corps property and a small percentage on Forest Service property. For simplicity, the site is defined as the total area proposed to be disturbed on both properties and it is assumed the "existing conditions" is the completed state of the adjacent Green Horn Ranch Project. Currently there is a gravel access road and a smaller gravel maintenance road that serves the Bashor Lift wheelhouse. There are also two buildings, the Bashor pavilion and the Bashor restroom building.

The majority of the site slopes steeply to the west and south from a flat hilltop with Green Horn Ranch to the east. Aside from the roads and buildings the remainder of the site is covered in native vegetation

The soils in project area are a Dorpat-Reddles complex and a Haviland-Hollandlake families (both hydrologic soil group C .

Existing utilities onsite include potable water, sanitary sewer service, electric, telephone and snowmaking lines. Runoff flows south overland or in a roadside swale to the Bashor Branch of the unnamed Tributary to Burgess Creek. It eventually flows to Burgess Creek and then the Yampa River.

FEMA Floodplain – Upper Terminal

Several natural drainage channels descend from the mountain and join to form the "Unnamed Tributary to Burgess Creek", which runs from northeast to southwest along the Right-O-Way ski trail. It is confined to a large diameter storm sewer as it enters the base of the ski area and then discharges to the Burgess Creek Culvert at the creek diversion structure adjacent to Slopeside Grill. The eventual outfall is the Yampa River.

LOMR 18-08-0922P, effective July 29, 2019, revised FEMA FIRM Number 08107C0883D dated February 4, 2005 to remove a portion of the Tributary from the SFHA leaving approximately 1,670-

lineal feet of the tributary in the SFHA zone A. The effective floodplain limits are shown in Figure 2b: Upper Terminal FEMA FIRM.

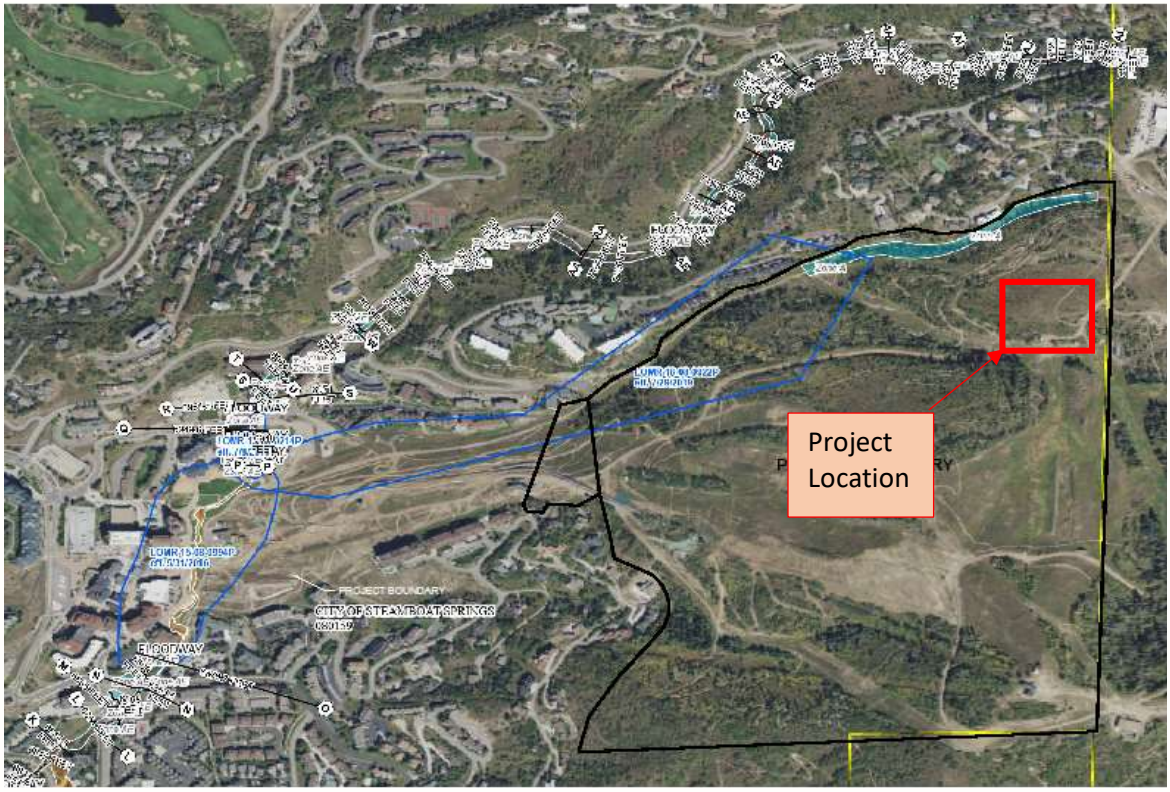


Figure 2b: Upper Terminal FEMA FIRM

Easements – Upper Terminal

There are no existing easements at the upper terminal site.

Drainage Basins – Upper Terminal

The upper site was evaluated as a single existing basin, H7, with design point 7 quantifying all runoff from the site to Bashor branch of the unnamed tributary. Table 2 summarizes the historical hydrological conditions for the upper terminal site:

Table 2: Upper Terminal Historic Basin Summery

Basin	Total Area (acres)	%Imp	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
H7	2.63	15%	0.17	0.50	1.32	8.58

PROPOSED SITE CONDITIONS

Lower Terminal

Proposed improvements at the lower terminal include the removal of both the Preview lift and Christie Express lift as well as their accessory buildings and decks. They will be replaced with the lower terminal building and paved maze area for a new gondola. An area on the east side of the

building will be graded lower than the surrounding area to allow the gondola sufficient clearance for existing the building. The lowest portion of this area will be covered in snowmelted concrete. This configuration of the low area on the uphill side (east side) of the gondola is consistent with what currently exists for the Preview and Christie lifts. The proposed disturbed area is 0.76-acres.

Two inlets will collect runoff from the bottom of the depression and connect directly to the existing 78" culvert. This will replace the current infiltration vault and will eliminate some of the groundwater from entering the pipe. A trench drain will be installed on the perimeter of the paved maze area and will drain to a sand filter before discharging to the 78" culvert.

Drainage Basins – Lower Terminal

The existing drainage basin H4 is divided into three subbasins, D4a, D4b, and D4c. Basin D4b continues to function like historic basin H4 collecting runoff from the hillside and subbasin D4a and discharging to the 78" culvert via a new 18" HDPE storm system. Basin D4c, which contains the majority of the impervious area, will drain to a sand filter to provide water quality treatment prior to discharging to the 78" culvert.

Basin D5 will be reduced by the proposed grading but bike trails and swales will be reestablished in the field to maintain historic drainage patterns. Basin D6 will continue to drain overland to the existing inlet to the south. Table 3 summarizes the proposed basin hydrology for the lower terminal:

Table 3: Lower Terminal Proposed Drainage Summary

Basin	Total Area (acres)	%Imp	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
D4a	0.30	16%	0.17	0.55	0.17	1.21
D4b	0.57	23%	0.23	0.58	0.46	2.51
D4c	0.40	61%	0.54	0.73	0.68	2.03
D5	0.17	15%	0.16	0.55	0.09	0.69
D6	0.15	17%	0.17	0.55	0.10	0.68

Table 4 summarizes and compares the historical to proposed hydrology at design point 4 for the lower terminal:

Table 4: Lower Terminal Design Point Summary

Design Point	Total Area (acres)	%Imp	Q_5 (cfs)	Q_{100} (cfs)	Total Area (acres)	%Imp	Q_5 (cfs)	Q_{100} (cfs)
4	1.58	29%	1.49	7.05	1.57	30%	1.49	7.04

The proposed project will not cause an increase in peak runoff for either the minor or major storm event. No detention is proposed.

Stormwater Quality – Lower Terminal

The unique grading requirements of the gondola terminal cause a sizeable depression in the landscape where water inherently will drain to, however the location is not suitable for collection or storage of water due to the concrete pad and lift tower locations. The designers exhausted all

options for providing effective water quality to the runoff to this location in an economical and practical manner. No solution was found that balanced these objectives.

Using the water quality capture volume standard, a sand filter was designed to treat runoff from basin D4c, which includes 68% of the proposed total impervious area on site and approximately 2,000-sf more than the proposed new impervious area. Table 5 summarizes the sand filter parameters:

Table 5: Sand Filter Summary

Basin	Sand Filter Area (ft^2)		WQCV (ft^3)	Total Volume (ft^3)
	Required	Provided	Required	Provided
Basin D4c	217	232	269	647

The WQCV depth will be 0.8-ft and the 0.6-ft of freeboard for a total depth of 1.4-ft. Calculations for the sand filter are provided in Appendix C.

87% of the area draining to basin D4b (including basin D4a) is from pervious areas; native vegetation of revegetated areas that were graded as part of this project. The potential pollutant load from these areas is limited to natural sediment and possibly pedestrian/skier trash. None of the areas contributing to this drainage are subject to vehicle traffic, snow removal, sanding or other chemical snowmelt. The most appropriate form of water quality is the proper stabilization and revegetation of the disturbed slopes to prevent erosion.

Upper Terminal

Proposed improvements at the upper terminal include the installation of the upper terminal building, a "sprung structure", which is considered a building for the purpose of this drainage report, a gravel maze area and the realignment of an existing gravel road and the maintenance access to the Bashor lift wheelhouse. The project will also remove the two existing buildings at the Bashor pavilion. The total disturbed area will be 2.09-acres.

Drainage Basins – Upper Terminal

The historic basin H7 was divided into two subbasins for the evaluation of the proposed drainage conditions. Subbasin D7a contains the proposed buildings and maze area and will drain to swales that will bring runoff to a level spreader for infiltration disbursement.

Subbasin D7b collects runoff from the realigned road and regraded hillside in roadside swales and connects to the existing swale that discharges to the Bashor branch of the unnamed tributary. Table 6 summarizes the Upper Terminal Proposed Drainage Basins:

Table 6: Upper Terminal Proposed Basin Summary

Basin	Total Area (acres)	%Imp	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
7a	1.39	57%	0.51	0.72	1.88	5.81
7b	1.24	20%	0.21	0.57	0.79	4.77

Table 7 summarizes and compares the historical to proposed hydrology at design point 7 for the lower terminal:

Table 7: Upper Terminal Proposed Design Point Summary								
Design Point	Total Area (acres)	%Imp	Q_5 (cfs)	Q_{100} (cfs)	Total Area (acres)	%Imp	Q_5 (cfs)	Q_{100} (cfs)
7	2.63	15%	1.32	9.50	2.63	40%	3.13	12.19

The project will increase the imperviousness of the site overall by 25%, however, this increase occurs entirely within basin D7a. As described in the next section, the Runoff Reduction Method is used to show that the entire WQCV will infiltrate once discharged onto the natural vegetation. The WQCV is greater than the required detention volumes for both the minor and major peak storms meaning that both of these differential volumes will infiltrate as well. Basin D7b will not increase in imperviousness. Table 8 below summarizes the Runoff Reduction for the Upper Terminal. No detention is proposed for the upper terminal.

Stormwater Quality – Upper Terminal

Stormwater quality for the impervious areas of the upper terminal will be provided by runoff reduction using the infiltration standard. Swales will collect runoff from basin D7b and convey it to a level spreader, which will disburse the flow down an undisturbed, naturally vegetated hillside. The Design Procedure Form for Runoff Reduction by the Mile High Flood District aided in the evaluation of the existing area showing that an area of 9,000-sf is required to infiltrate the WQCV from basin 7b on an average slope of 31% in C/D soils. These calculations are included in Appendix C. Table 8 summarizes the calculation:

Runoff Reduction Summary for Upper Terminal					
Basin	WQCV[1] (ft^3)	Detention[2] V_5 (ft^3)	Detention[2] V_{100} (ft^3)	Receiving Area[1] (ft^2)	
	Required			Required	Provided
Basin D7b	758	744	686	9,550	>9,550

1. Calculated per runoff reduction design procedure form, basin D7a only
2. Detention volumes calculated per FAA method for total site, D7a & D7b

The following are anticipated pollutant sources for the upper terminal:

1. Sediment
2. Ski Area operations vehicles
3. Trash.

Drainage patterns will be largely maintained with the intent to avoid diverting runoff from its historical basin to another. Temporary stormwater quality management such as slope stabilization will be implemented until vegetation is established.

TEMPORARY EROSION AND SEDIMENT CONTROL

The primary source of storm water contaminants in the City of Steamboat Springs are suspended sediments and are most susceptible during construction activities. Temporary erosion and sediment control during construction is the responsibility of the permit holder (including NPDES permitting). Appropriate best management practices (BMP's) for construction activities are detailed in Erosion and Sediment Control During Construction by Routt County, Colorado. It is the responsibility of the permit holder to identify and properly handle all materials that are potential pollution sources prior to mobilization. The following are some common examples of potential pollution sources:

- Stockpiling of materials that can be transported to receiving waterways
- Uncovered trash bins
- Exposed and stored soils, management of contaminated soils
- Off-site tracking of soils and sediment
- Loading and unloading operations
- Outdoor storage of building materials, chemicals, fertilizers, etc.
- Vehicle and equipment maintenance and fueling
- Significant dust or particulate generating processes
- Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc.
- On-site waste disposal practices (waste piles, dumpsters, etc.)
- Concrete truck/equipment washing.
- Non-industrial waste sources that may be significant, such as worker trash and portable toilets.

It is not possible to identify all materials that will be used or stored on the construction site. It is the sole responsibility of the permit holder to identify and properly handle all materials that are potential pollutant sources prior to mobilization.

Some temporary BMP's include, but are not limited to, straw bales, silt fences, ditch checks, berms, slope drains, seeding and mulching, pipes, and sediment basins. In order to prevent mud from being transported into public right of ways, vehicle tracking pads and wheel wash areas should be utilized. Temporary BMP's should be coordinated with the site's permanent erosion control measures to assure continuous and economical erosion control. Because different BMP's are required at different stages of construction, the site should be periodically reviewed by the permit holder to verify the proper BMP's are in place.

Temporary BMP's should be inspected at a minimum once every two weeks, after each significant storm event, and at 24 hour intervals during extended storm events. Repairs or reconstruction of temporary BMP's shall occur within two working days in order to ensure continued performance. It is the responsibility of the Construction Site Operator to conduct bi-weekly inspections, maintain BMP's, and keep records of site conditions and inspections.

Areas used for material storage which are exposed to precipitation, disturbed areas, the construction site perimeter, and all applicable/installed erosion and sediment control measures shall be inspected for evidence of, or the potential for, pollutants entering the drainage system.

Preventative maintenance of all temporary BMP's shall be provided in order to ensure continued performance. Maintenance activities and actions shall be noted and recorded during inspections. All temporary erosion control measures must be kept in place and maintained until the site has been sufficiently stabilized in accordance with permit requirements.

It is recommended that a Stormwater Management Plan (SWMP) be completed prior to commencement of any land disturbing activities. Additionally, all pertinent local, state, and federal permits should be obtained prior to construction.

CONCLUSIONS

The improvements proposed for The Wild Blue Gondola include constructing terminal buildings in two locations, the lower terminal by the base area and the upper terminal by Green Horn Ranch and the Thunderhead Lift. At the lower terminal, the project will not cause an increase in imperviousness and will maintain the current drainage pattern but discharging runoff from the vegetated hillside directly into the 78" Burgess Creek Culvert. Water quality for the majority of the impervious area is provided by a sand filter located in the drainage easement that already exists for the 78" culvert.

At the upper terminal, the project proposes to install a gondola terminal building as well as a "sprung structure" and a gravel maze area. It will also realign the existing gravel road and maintenance access to the Bashor wheelhouse. Swales will collect runoff from the upper site and direct it to a level spreader for disbursement to the undisturbed hillside. Roadside swales on the realigned road will collect runoff and discharge to the existing swales. Water quality will be provided by infiltration into the undisturbed hillside per the Runoff Reduction method and will treat 100% of the impervious area. This will also provide infiltration for the increase in peak runoff volumes per the FAA method.

The design contained herein largely complies with the criteria set forth in the City's Drainage Design Manual, with exception of the stormwater water quality facility guidelines. It is Landmark's opinion that providing a permanent facility to treat runoff from vegetated hillsides with very little pollutant potential is an inappropriate use of resources.

LIMITATIONS

This study is intended to estimate and analyze peak stormwater runoff volumes generated by hydrologic events to evaluate existing drainage infrastructure and design new infrastructure needed to manage these flows. It does not account for groundwater, springs, or seeps and is not intended to be used for the evaluation or design of foundation drains or roof drains.

Basin delineations, areas, and soil characteristics are based on the best available information listed in the INTRODUCTION AND LOCATION section of the report. Actual conditions may vary. Landmark's assumptions, recommendations and opinions are based on this information and the proposed site plan. If any of the data is found to be inaccurate or the proposed site plan is changed, Landmark should be contacted to review this report and make any necessary revisions.

The 100-year event is defined as the rainfall, runoff, or flooding event which has a probability of 1-percent of occurring in any given year based on available data. The 100-year event could occur in successive years or even multiple times in a single year. Events greater than the 100-year event or lesser events combined with malfunctioning drainage works can occur on rare occasion and may cause flooding damage.

The data, opinions, and recommendations of this report are applicable to the specific design elements and location that is the subject of this report. The report is not applicable to any other design elements or to any other locations. Any and subsequent users accept any and all liability resulting from any use or reuse of the data, opinions, and recommendation without the prior written consent of Landmark Consultants, Inc.

Landmark Consultants, Inc. has no responsibility for construction means, methods, techniques, sequences, or procedures, or for safety precautions or programs in connection with the construction, for the acts or omissions of the contractor, or any other person performing any of the construction, or for the failure of any of them to carry out the construction in accordance with the Final Construction Drawings and Specifications.

The only warranty or guarantee made by Landmark Consultants, Inc. in connection with the services performed for this project is that such services are performed with the care and skill ordinarily exercised by members of the profession practicing under similar conditions, at the same time, and in the same or similar locality. No other warranty, expressed or implied, is made or intended by rendering such services or by furnishing written reports of the findings.

This study is intended to estimate and analyze peak stormwater runoff volumes generated by hydrologic events in order to evaluate existing drainage infrastructure and design new infrastructure needed to manage these flows. It does not account for groundwater, springs, or seeps and is not intended to be used for the evaluation or design of foundation drains or roof drains.

REFERENCES

1. Section 5.0 Drainage Criteria, City of Steamboat Springs Department of Public Works, September 2007.

2. Drainage Criteria Manual (Volumes 1 – 3), Urban Drainage and Flood Control District, June 2001

3. Hydraulic Design of Highway Culverts (HDS-5), Federal Highway Administration, September 2001

4. Procedures for Determining Peak Flows in Colorado, Natural Resource Conservation Service, 1984

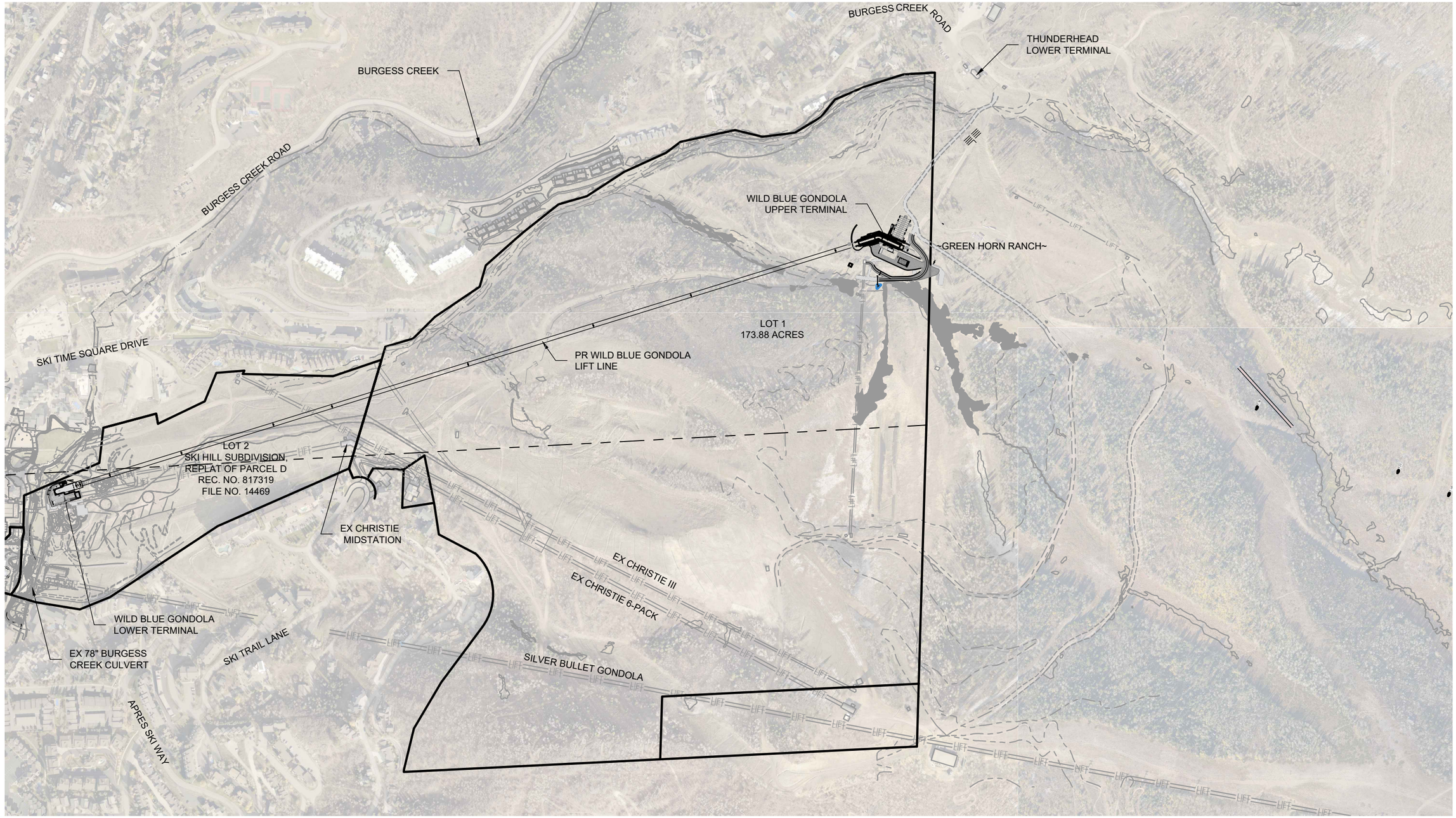
5. Urban Hydrology for Small Watersheds (TR-55), Natural Resource Conservation Service, June 1986

6. Final Drainage Report for Steamboat Base Area Redevelopment, Drexel, Barrell & Co., December 1, 2006.

7. Citywide Stormwater Master Plan for the City of Steamboat Spring, Colorado, SEH, March 2013.

8. The Gold Book, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, United States Department of the Interior Bureau of Land Management & United States Department of Agriculture Forest Service, 2007.

FIGURES



PROJECT:	1012-050	NO.	DATE:	BY:	DESCRIPTION:
DATE:	9/21/2021				REVIEW SET NOT FOR CONSTRUCTION XX/XX/XX
DRAWN BY:	DCS				
CHECKED BY:					

LANDMARK CONSULTANTS, INC.
CIVIL ENGINEERS | SURVEYORS
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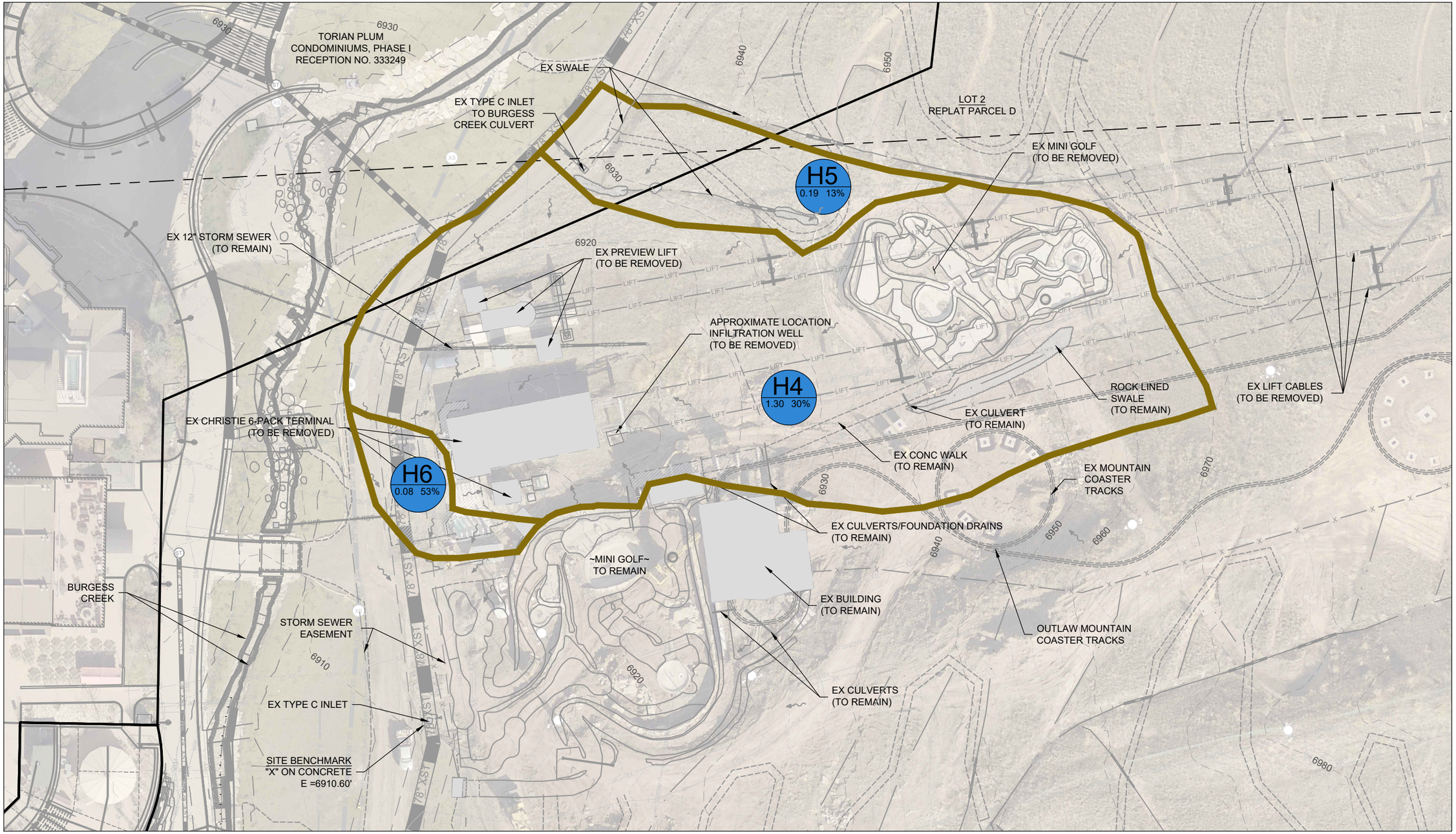
Wild Blue Gondola

Figure 3: Overall Site Plan

SHEET 1 Of 1 Sheets



LOWER TERMINAL EXISTING CONDITIONS

25 0 25 50

NORTH

PROJECT:	1012-050	NO.	DATE:	BY:	DESCRIPTION:	These drawings are instruments of service provided by Landmark Consultants, Inc. and are not to be used for any type of construction or contracting unless signed and sealed by a Professional Engineer in the employ of Landmark Consultants, Inc.	LANDMARK CONSULTANTS, INC.	CIVIL ENGINEERS | SURVEYORS 141 9th Street ~ P.O. Box 774943 Steamboat Springs, Colorado 80477 (970) 871-9494 www.LANDMARK-CO.com	Wild Blue Gondola Figure 4: Lower Terminal Existing Drainage Plan	SHEET 1 Of 1 Sheets
DATE:	9/21/2021				REVIEW SET NOT FOR CONSTRUCTION XX/XX/XX					
DRAWN BY:	DCS									
CHECKED BY:										

UPPER TERMINAL EXISTING CONDITIONS

25 0 25 50

NORTH

PROJECT:	1012-050	NO.	DATE:	BY:	DESCRIPTION:
DATE:	9/21/2021				REVIEW SET NOT FOR CONSTRUCTION XX/XX/XX
DRAWN BY:	DCS				
CHECKED BY:					

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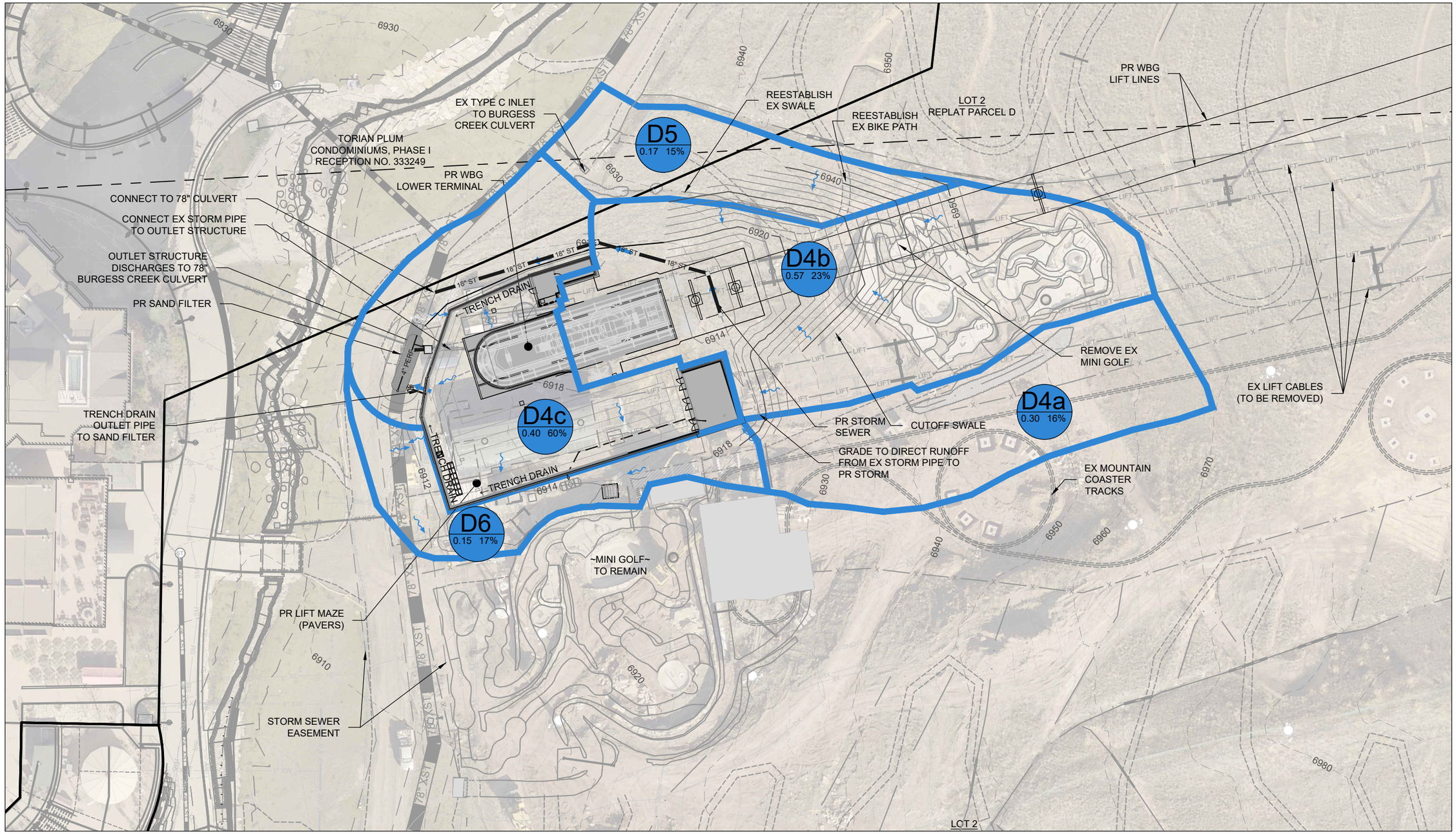
Wild Blue Gondola

Figure 5: Upper Terminal Existing Drainage Plan

SHEET 1 Of 1 Sheets

DRAWING FILENAME: P:\1012-050\Engineering\Drainage\1012-050 DRAIN-GONDOLA _recover000.dwg LAYOUT NAME: Fig 5 Upper EX DATE: Sep 21, 2021 - 6:07pm CAD OPERATOR: deb
LIST OF XREFS: [1012-050-xExist] [1012-050-xSite] [1012-050-xExist-Utilities] [1012-050-xBndy] [1012-047-xImage] [1012-048-Imagery] [1012-049-Imagery] [1012-050-xUtil]



LOWER TERMINAL PROPOSED CONDITIONS

25 0 25 50

NORTH

PROJECT:	1012-050	NO.	DATE:	BY:	DESCRIPTION:
DATE:	9/21/2021				REVIEW SET NOT FOR CONSTRUCTION XX/XX/XX
DRAWN BY:	DCS				
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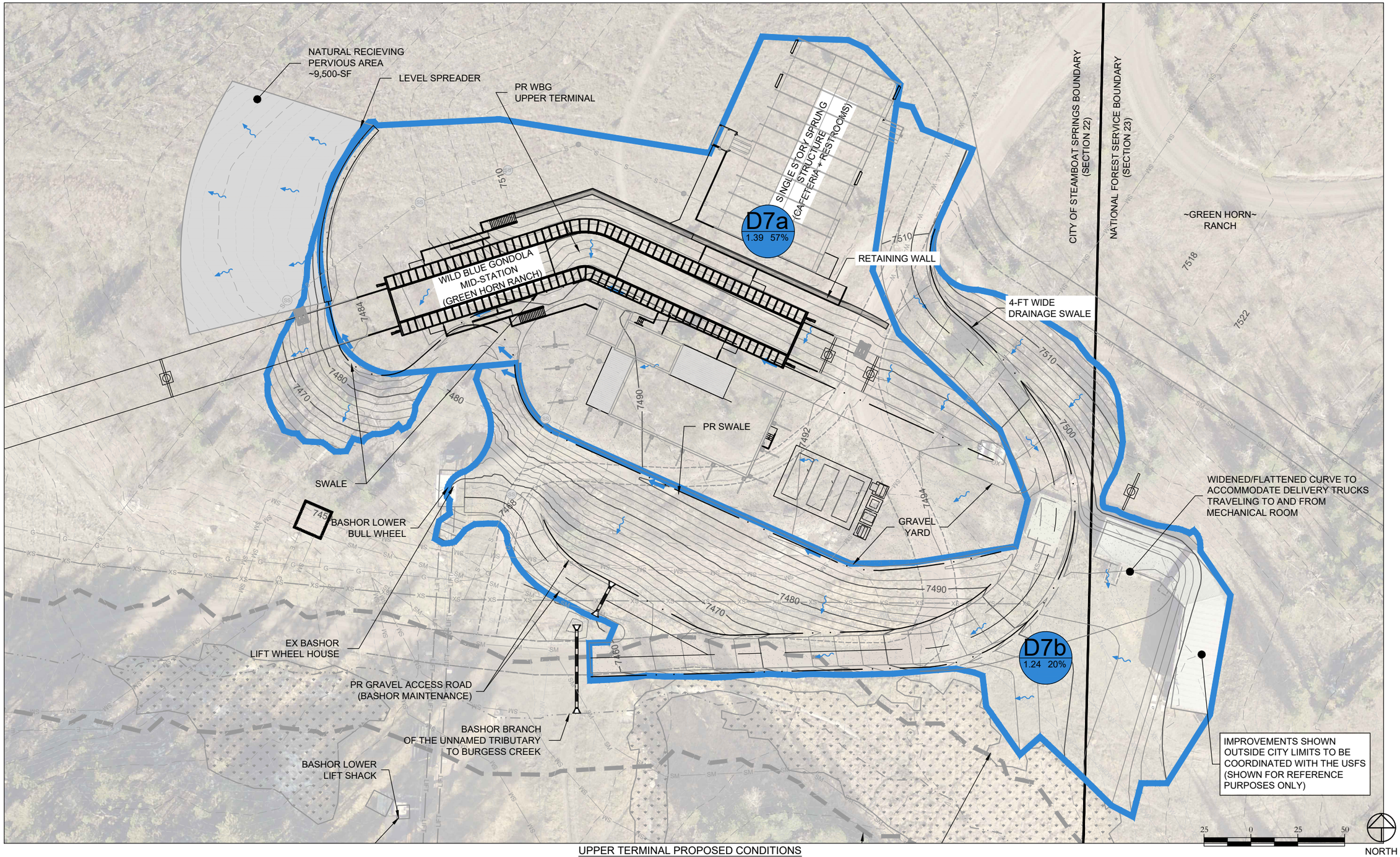
Wild Blue Gondola

Figure 6: Lower Terminal Proposed Drainage Plan

SHEET 1 Of 1 Sheets



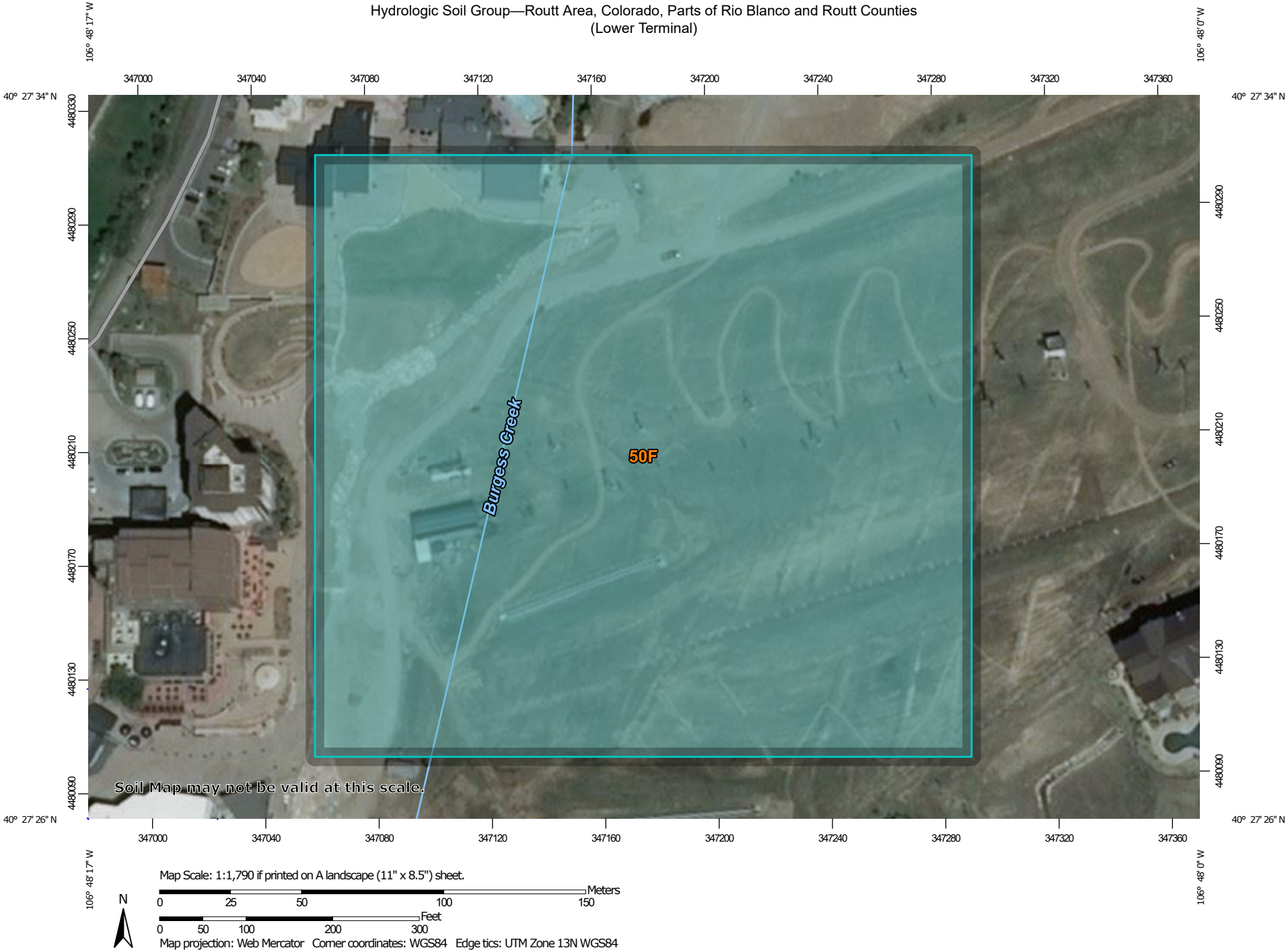
UPPER TERMINAL PROPOSED CONDITIONS

PROJECT:	1012-050	NO.	DATE:	BY:	DESCRIPTION:	These drawings are instruments of service provided by Landmark Consultants, Inc. and are not to be used for any type of construction or contracting unless signed and sealed by a Professional Engineer in the employ of Landmark Consultants, Inc.	LANDMARK CONSULTANTS, INC.	CIVIL ENGINEERS | SURVEYORS 141 9th Street ~ P.O. Box 774943 Steamboat Springs, Colorado 80477 (970) 871-9494 www.LANDMARK-CO.com	Wild Blue Gondola Figure 7: Upper Terminal Proposed Drainage Plan	SHEET 1 Of 1 Sheets
DATE:	9/21/2021				REVIEW SET NOT FOR CONSTRUCTION XX/XX/XX					
DRAWN BY:	DCS									
CHECKED BY:										

APPENDIX A

HYDROLOGIC CALCULATIONS

Hydrologic Soil Group—Routt Area, Colorado, Parts of Rio Blanco and Routt Counties
(Lower Terminal)



Map Scale: 1:1,790 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
50F	Routt loam, 25 to 65 percent slopes, very stony	C	12.2	100.0%
Totals for Area of Interest			**12.2**	**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.

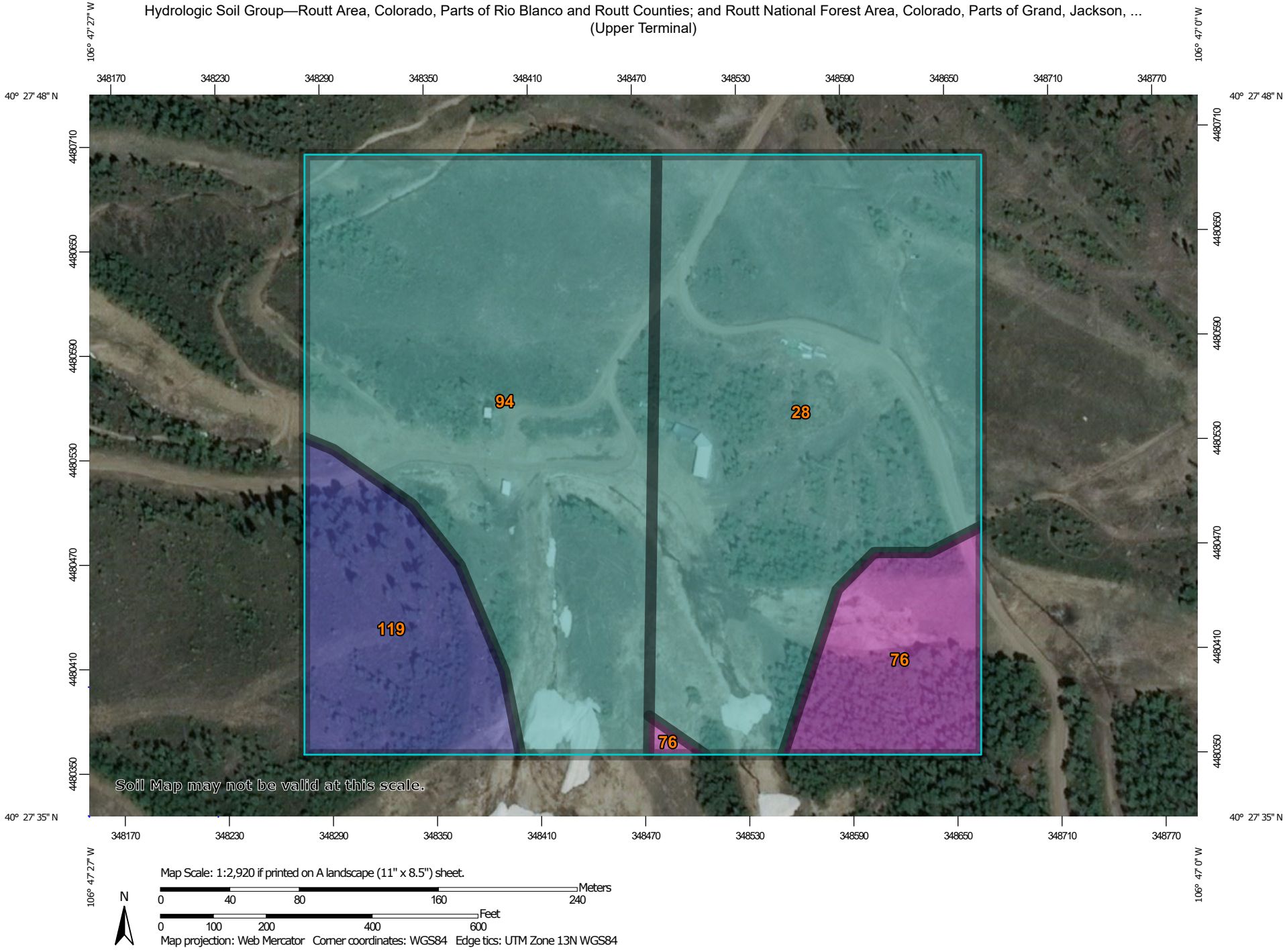
Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

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



Map Scale: 1:2,920 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 40 80 160 240

Feet
0 100 200 400 600

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: Routt Area, Colorado, Parts of Rio Blanco and Routt Counties
Survey Area Data: Version 10, Jun 5, 2020

Soil Survey Area: Routt National Forest Area, Colorado, Parts of Grand, Jackson, Moffat, and Routt Counties
Survey Area Data: Version 4, Jul 15, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
94	Dorpat-Reddles complex, 30 to 65 percent slopes	C	13.2	39.6%
119	Mine loam, 30 to 75 percent slopes	B	4.0	11.9%
Subtotals for Soil Survey Area			**17.2**	**51.5%**
Totals for Area of Interest			**33.4**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
28	Haviland-Hollandlake families, complex, 10 to 40 percent slopes, landslides	C	13.3	40.0%
76	Boatsteam-Storm family, very bouldery-Pineguest family complex, 30 to 55 percent slopes	A	2.8	8.5%
Subtotals for Soil Survey Area			**16.2**	**48.5%**
Totals for Area of Interest			**33.4**	**100.0%**

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PROJECT	Wild Blue Gondola
DESIGNER	Deb Spaustat
DATE	9/21/2021
LOCATION	Steamboat Springs, CO

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS

Character of Surface	Percent Impervious
Asphalt Parking and Walkways	100%
Gravel	40%
Roof	90%
Burgess Creek Basin	85%
Mini Golf	85%
Ski Slope	10%

IDF	Soil Type
Steamboat Springs NOAA	C

Basin ID	Basin Area (sq.ft.)	Basin Area (acres)	Area of Asphalt Parking and Walkways(sq.ft.)	Area of Asphalt Parking and Walkways (acres)	Area of Gravel Surfaces (sq.ft)	Area of Gravel Surfaces (acres)	Area of Roof (sq.ft.)	Area of Roof (acres)	Area of Mini Golf (sq.ft.)	Area of Mini Golf (acres)	Area of Ski Slope (sq.ft.)	Area of Ski Slope (acres)	Percent Impervious	5-year Composite Runoff Coefficient	100-year Composite Runoff Coefficient
H4	56818.04	1.30	1676.60	0.04	3942.63	0.09	4076.41	0.09	7382.68	0.17	39739.72	0.91	30%	0.289	0.611
H5	8472.53	0.19	0.00	0.00	946.95	0.02	0.00	0.00		0.00	7525.58	0.17	13%	0.150	0.541
H6	3321.34	0.08	0.00	0.00	2074.61	0.05	1011.26	0.02		0.00	235.47	0.01	53%	0.478	0.652
H7	114746.03	2.63	0.00	0.00	10564.37	0.24	3298.41	0.08	0.00	0.00	100883.25	2.32	15%	0.166	0.550
D4a	13025.03	0.30	669.76	0.02	578.98	0.01	0.00	0.00	0.00	0.00	11776.29	0.27	16%	0.166	0.550
D4b	24657.19	0.57	0.00	0.00	0.00	0.00	4126.53	0.09	0.00	0.00	20530.66	0.47	23%	0.232	0.582
D4c	17374.79	0.40	0.00	0.00	2391.16	0.05	10060.20	0.23	0.00	0.00	4923.43	0.11	60%	0.535	0.734
D5	7231.05	0.17	0.00	0.00	1128.54	0.03	0.00	0.00	0.00	0.00	6102.51	0.14	15%	0.158	0.546
D6	6317.97	0.15	0.00	0.00	1406.62	0.03	0.00	0.00	0.00	0.00	4911.35	0.11	17%	0.174	0.554
D7a	60651.93	1.39	28717.27	0.66	9815.09	0.23	0.00	0.00	0.00	0.00	22119.57	0.51	57%	0.511	0.722
D7b	53997.54	1.24	0.00	0.00	18223.92	0.42	0.00	0.00	0.00	0.00	35773.62	0.82	20%	0.207	0.570

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PROJECT	Wild Blue Gondola
DESIGNER	Deb Spaustat
DATE	9/21/2021

DEVELOPED TIME OF CONCENTRATION COMPUTATIONS
LOWER TERMINAL (WEST)

Overland Flow, Time of Concentration:

$$T_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{1/3}}$$ (Equation RO-3)

Gutter/Swale Flow, Time of Concentration:

T_t = L / 60V

T_c = T_i + T_t (Equation RO-2)

Intensity, i From Figures 3.3.1-2 (Area II)

Velocity (Gutter Flow), V = 20·$S^{½}$

Velocity (Swale Flow), V = 15·$S^{½}$

Rational Equation: Q = CiA (Equation RO-1)

	Overland Flow				Conveyance		Swale Flow 1				Time of Concentration		
Basin(s)	C_5	Length, L (ft)	Slope, S (%)	T_i (min)		K	Length, L (ft)	Slope, S (%)	Velocity, V (ft/s)	T_t (min)	Comp. T_c (min)	$\frac{L}{180}+10$	Actual T_c (min)
H4	0.29	97	21.00	5.31	illage/Fiel	5	214	17.00	8.25	1.73	7.04	11.73	7.04
H5	0.15	79	19.00	5.80	sed Wate	15	122	13.00	7.21	0.38	6.18	11.12	6.18
H6	0.48	30	3.00	4.33	y Bare Gr	10	50	5.00	4.47	0.37	4.70	10.44	5.00
H7	0.17	62	10.00	6.26	sed Wate	15	255	14.00	7.48	0.76	7.01	11.76	7.01
D4a	0.17	100	16.40	6.74	illage/Fiel	5	54	10.00	6.32	0.57	7.31	10.86	7.31
D4b	0.23	86	15.00	5.99	illage/Fiel	5	137	27.00	10.39	0.88	6.86	11.24	6.86
D4c	0.54	37	1.00	6.30	w Paved S	20	177	0.50	1.41	2.09	8.38	11.19	8.38
D5	0.16	79	19.00	5.75	sed Wate	15	175	5.00	4.47	0.87	6.62	11.41	6.62
D6	0.17		0.50	N/A	illage/Fiel	5		12.32	N/A	N/A	0.00	10.00	5.00
D7a	0.51	77	2.00	7.53	sed Wate	15	368	1.00	2.00	4.09	11.62	12.47	11.62
D7b	0.21	100	8.00	8.18	sed Wate	15	255	14.00	7.48	0.76	8.94	11.97	8.94

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PROJECT:	Wild Blue Gondola
DESIGNER:	Deb Spaustat
DATE:	9/21/2021

DIRECT RUNOFF COMPUTATIONS

Overland Flow, Time of Concentration:

$$T_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{1/3}}$$ (Equation RO-3)

Gutter/Swale Flow, Time of Concentration:

T_t = L / 60V

T_c = T_i + T_t (Equation RO-2)

Intensity, I from Fig. RA-2 (Equation RO-4)

Velocity (Gutter Flow), V = 20·$S^{½}$

Velocity (Swale Flow), V = 15·$S^{½}$

Rational Equation: Q = CiA (Equation RO-1)

Basin(s)	Area, A (acres)	T_c (min)	Imperv. %	C_5	C_{100}	Intensity, I_5 (in/hr)	Intensity, I_{100} (in/hr)	Flow, Q_5 (cfs)	Flow, Q_{100} (cfs)
H4	1.30	7.04	0.30	0.29	0.61	3.38	7.37	1.27	5.87
H5	0.19	6.18	0.13	0.15	0.54	3.60	7.86	0.10	0.83
H6	0.08	5.00	0.53	0.48	0.65	3.86	8.42	0.14	0.42
H7	2.63	7.01	0.15	0.17	0.55	3.38	7.37	1.48	10.67
D4a	0.30	7.31	0.16	0.17	0.55	3.38	7.37	0.17	1.21
D4b	0.57	6.86	0.23	0.23	0.58	3.48	7.60	0.46	2.51
D4c	0.40	8.38	0.60	0.54	0.73	3.18	6.94	0.68	2.03
D5	0.17	6.62	0.15	0.16	0.55	3.48	7.60	0.09	0.69
D6	0.15	5.00	0.17	0.17	0.55	3.86	8.42	0.10	0.68
D7a	1.39	11.62	0.57	0.51	0.72	2.65	5.78	1.88	5.81
D7b	1.24	8.94	0.20	0.21	0.57	3.09	6.74	0.79	4.77

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PROJECT	Wild Blue Gondola
DESIGNER	Deb Spaustat
DATE	9/21/2021

COMBINED RUNOFF COEFFICIENT CALCULATIONS

Character of Surface	Percent Impervious
Asphalt Parking and Walkways	100%
Gravel	40%
Roof	90%
Burgess Creek Basin	85%
Mini Golf	85%
Ski Slope	10%

Design Point	Combined Basin IDs	Basin Area (sq.ft.)	Basin Area (acres)	Area of Asphalt Parking and Walkways(sq.ft.)	Area of Asphalt Parking and Walkways (acres)	Area of Gravel Surfaces (sq.ft)	Area of Gravel Surfaces (acres)	Area of Roof (sq.ft.)	Area of Roof (acres)	Area of Mini Golf (sq.ft.)	Area of Mini Golf (acres)	Area of Ski Slope (sq.ft.)	Area of Ski Slope (acres)	Percent Impervious	5-year Composite Runoff Coefficient	100-year Composite Runoff Coefficient
H4	H4+H5+H6	68611.91	1.58	1676.60	0.04	6964.19	0.16	5087.67	0.12	7382.68	0.17	47500.77	1.09	29%	0.28	0.61
H7	H7	114746.03	2.63	0.00	0.00	10564.37	0.24	3298.41	0.08	0.00	0.00	100883.25	2.32	15%	0.17	0.55
D4	D4a+D4b+D4c+D4d+D5+D6	68606.03	1.57	669.76	0.02	5505.30	0.13	14186.73	0.33	0.00	0.00	48244.24	1.11	30%	0.28	0.61
D7	D7a+D7b	114649.47	2.63	28717.27	0.66	28039.01	0.64	0.00	0.00	0.00	0.00	57893.19	1.33	40%	0.36	0.65

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DESIGNER	Deb Spaustat
DATE	9/21/2021

COMBINED TIME OF CONCENTRATION COMPUTATIONS

Overland Flow, Time of Concentration:

$$T_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{1/3}}$$ (Equation RO-3)

Gutter/Swale Flow, Time of Concentration:

T_t = L / 60V

T_c = T_i + T_t (Equation RO-2)

Intensity, i From Figures 3.3.1-2 (Area II)

Velocity (Gutter Flow), V = 20·S$^{1/2}$

Velocity (Swale Flow), V = 15·S$^{1/2}$

Rational Equation: Q = CiA (Equation RO-1)

		Overland Flow				Conveyance		Swale Flow 1				Conveyance		Swale Flow 2				Time of Concentration		
Design Point	Basin(s)	C_5	Length, L (ft)	Slope, S (%)	T_i (min)		K	Length, L (ft)	Slope, S (%)	Velocity, V (ft/s)	T_t (min)		K	Length, L (ft)	Slope, S (%)	Velocity, V (ft/s)	T_t (min)	Comp. T_c (min)	$\frac{L}{180}+10$	Actual T_c (min)
H4	H4+H5+H6	0.28	97	21.00	5.36	Tillage/Field	5	214	17.00	8.25	1.73	Tillage/Field	5			N/A	N/A	7.09	11.73	7.09
H7	H7	0.17	62	10.00	6.26	Grassed Waterway	15	255	14.00	7.48	0.76	Tillage/Field	5			N/A	N/A	7.01	11.76	7.01
D4	D4a+D4b+D4c+D4d+D5+D6	0.28	100	16.40	5.91	Tillage/Field	5	54	10.00	6.32	0.57	Grassed Waterway	15	154	5.00	4.47	0.77	7.24	10.86	7.24
D7	D7a+D7b	0.36	100	8.00	6.76	Grassed Waterway	15	255	14.00	7.48	0.76	Grassed Waterway	15			N/A	N/A	7.51	11.97	7.51

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Steamboat Springs, Colorado 80477
(970) 871-9494
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PROJECT	Wild Blue Gondola
DESIGNER	Deb Spaustat
DATE	9/21/2021

COMBINED DIRECT RUNOFF COMPUTATIONS

Overland Flow, Time of Concentration:

$$T_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{1/3}}$$

Gutter/Swale Flow, Time of Concentration:

T_t = L / 60V

T_c = T_i + T_t (Equation RO-2)

Intensity, I from Fig. RA-2

Velocity (Gutter Flow), V = 20·$S^{½}$

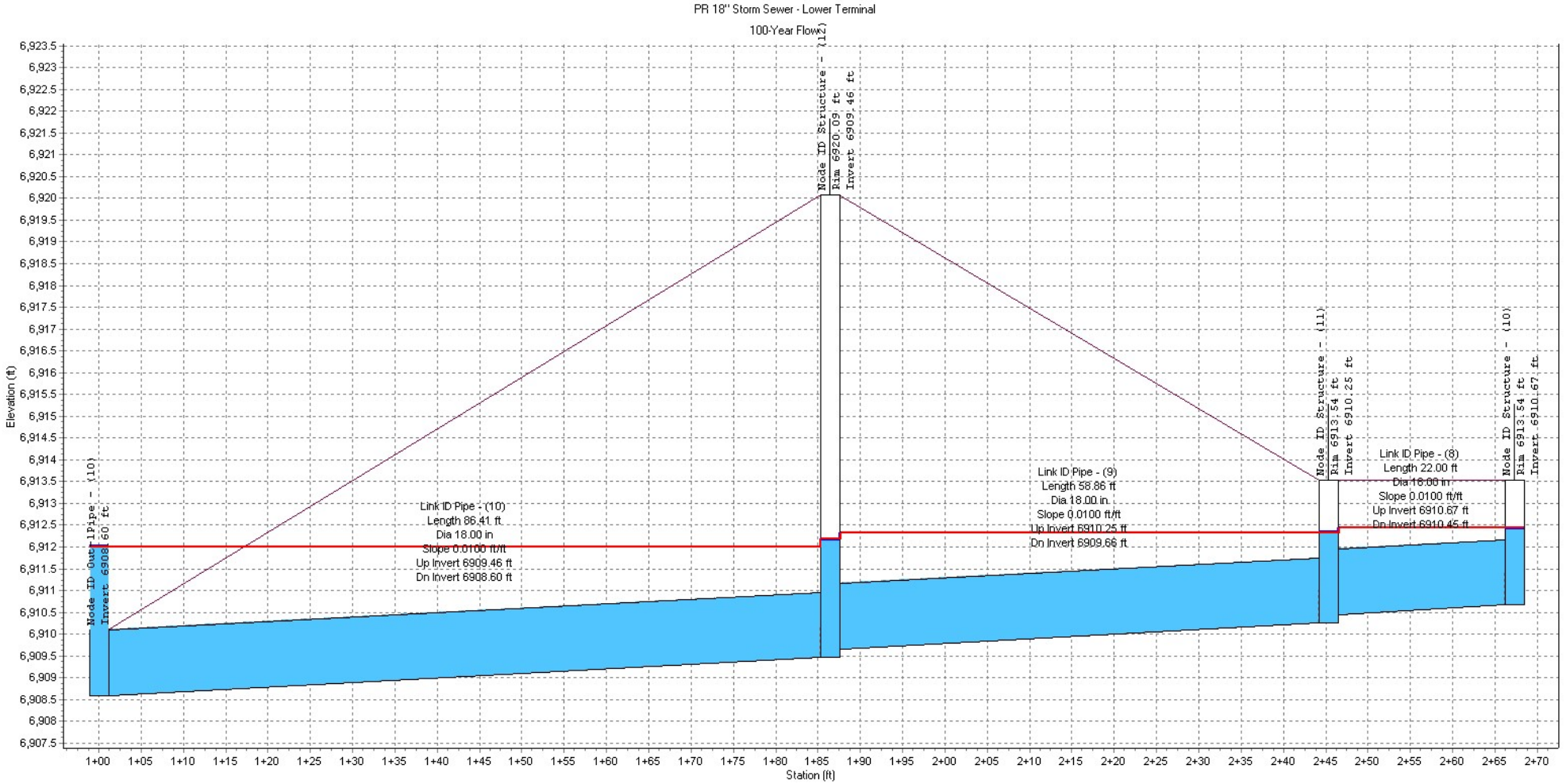
Velocity (Swale Flow), V = 15·$S^{½}$

Rational Equation: Q = CiA (Equation RO-1)

Design Point	Basin(s)	Area, A (acres)	T_c (min)	C_5	C_{100}	Intensity I_5 (in/hr)	Intensity I_{100} (in/hr)	Flow Q_5 (cfs)	Flow Q_{100} (cfs)
H4	H4+H5+H6	1.58	7.09	0.28	0.61	3.38	7.37	1.49	7.05
H7	H7	2.63	7.01	0.17	0.55	3.38	7.37	1.48	10.67
D4	D4a+D4b+D4c+D4d+D5+D6	1.57	7.24	0.28	0.61	3.38	7.37	1.49	7.04
D7	D7a+D7b	2.63	7.51	0.36	0.65	3.27	7.15	3.13	12.19

APPENDIX B

HYDRAULIC CALCULATIONS



Node ID:		Structure - (12)	Structure - (11)	Structure - (10)
Rim (ft):		6920.09	6913.54	6913.54
Invert (ft):	6908.60	6909.46	6910.25	6910.67
Min Pipe Cover (ft):		8.93	1.59	1.37
Max HGL (ft):	6912.00	6915.72	6913.54	6913.54

Link ID:	Pipe - (10)	Pipe - (9)	Pipe - (8)
Length (ft):	86.41	58.86	22.00
Dia (in):	18.00	18.00	18.00
Slope (ft/ft):	0.0100	0.0100	0.0100
Up Invert (ft):	6909.46	6910.25	6910.67
Dn Invert (ft):	6908.60	6909.66	6910.45
Max Q (cfs):	10.51	7.53	4.96
Max Vel (ft/s):	5.96	4.66	4.70
Max Depth (ft):	1.50	1.50	1.50

APPENDIX C

DETENTION/WATER QUALITY CALCULATIONS

LANDMARK CONSULTANTS, INC.

CIVIL ENGINEERS | SURVEYORS

141 9th Street ~ P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

PROJECT:	Wild Blue Gondola
DESIGNER:	D Spaustat
DATE:	9/21/2021
POND ID:	Basin D4.c

WQCV DESIGN CALCULATION - 12 HOUR DRAIN TIME

Sand Filter or Bioretention (Rain Garden)

REQUIRED STORAGE & SAND FILTER SIZE:

BASIN AREA (AC) =	0.40	<-- INPUT from impervious calcs
BASIN IMPERVIOUSNESS PERCENT =	62	<-- INPUT from impervious calcs
BASIN IMPERVIOUSNESS RATIO =	0.6244	<-- CALCULATED
d6 (in) =	0.34	<-- INPUT depth of average runoff producing storm
WQCV (watershed inches) =	0.15	<-- CALCULATED from MHFD Vol.3, Equation 3-1
V (ft^3) =	269	<-- CALCULATED from MHFD Vol.3, Equation 3-2
A_f, Minimum Flat Filter Area (ft^2) =	217	<-- CALCULATED from USCDM Vol.3, Equation B-2

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PROJECT: Wild Blue Gondola
DESIGNER: D. Spaustat
DATE: 9/21/2021
POND ID: Basin D4c

POND VOLUME PROVIDED

$$V = D^* \left(A_1 + A_2 + \sqrt{A_1 * A_2}\right) / 3$$

D = Depth between contours (ft.)
A_1 = Surface Area lower contour (ft^2)
A_2 = Surface Area upper contour (ft^2)

Elevation	Surface Area	Incremental Depth	Incremental Vol.	Total Vol.	Total Vol.	Stage
(ft)	(ft^2)	(ft)	(ft^3)	(ft^3)	(ac-ft)	
6914.50	232	0.00	0	0.0	0.00	
6914.60	260	0.10	25	24.6	0.00	
6914.70	290	0.10	28	52.1	0.00	
6914.80	321	0.10	31	82.6	0.00	
6914.90	352	0.10	34	116.3	0.00	
6915.00	385	0.10	37	153.1	0.00	
6915.10	419	0.10	40	193.3	0.00	
6915.20	453	0.10	44	236.9	0.01	
6915.30	489	0.10	47	284.0	0.01	WQCV
6915.40	526	0.10	51	334.8	0.01	
6915.50	563	0.10	54	389.2	0.01	
6915.60	603	0.10	58	447.5	0.01	
6915.70	643	0.10	62	509.8	0.01	
6915.80	685	0.10	66	576.2	0.01	
6915.90	727	0.10	71	646.8	0.01	

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PROJECT: Wild Blue Gondola
DESIGNER: D. Spaustata
DATE: 9/21/2021
LOCATION ID: Basin D7

FAA Method Detention Estimate

Per section 5.11.7.2 of the City of Steamboat Springs Drainage Criteria

$$V_i = (CiA)(T_c)(60\,\text{sec/min}) \qquad (5.11.1)$$

Where:

V_i = inflow volume (ft³)
C = Rational Method runoff coefficient for the major or minor storm
A = watershed area draining to the detention pond (acres)
T_c = Rational Method time of concentration (min)
i = design rainfall intensity (in/hr)

$$V_o = (Allowable\,Release Rate)(T_c)(60\,\text{sec/min}) \qquad (5.11.2)$$

Where:

V_o = outflow volume (ft³)
T_c = Rational Method time of concentration (min)
Allowable release rate shall be determined per this Section (cfs).

A (acres) =	2.63	<-- INPUT from impervious calcs
Tc (min) =	7.51	<-- INPUT from Tc calcs

Minor Storm (5-Year) Use Minor Storm for Detention only pond (No WQ)

C_5 =	0.36	<-- INPUT from impervious calcs
i (in/hr) =	3.27	<-- INPUT from runoff calcs
V_i (ft^3) =	1410	
Q_{A5} =	1.48	<-- INPUT from historic runoff calcs
V_o (ft^3) =	666	
V_{req} (ft^3) =	744	

Major Storm (100-Year)

C_{100}	0.65	<-- INPUT from impervious calcs
i (in/hr)	7.15	<-- INPUT from runoff calcs
V_i (ft^3)	5,496	
Q_{A100}	10.67	<-- INPUT from historic runoff calcs
V_o (ft^3)	4,809	
V_{req} (ft^3)	686	

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

Designer:	**D. Spaustat**
Company:	**Landmark Consultants, Inc.**
Date:	**September 21, 2021**
Project:	**Wild Blue Gondola, upper terminal**
Location:	**Steamboat Springs, CO**

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth: 0.25 inches

Depth of Average Runoff Producing Storm, d_6 = 0.34 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA											
Area ID	D7a											
Downstream Design Point ID	d7a											
Downstream BMP Type	None											
DCIA (ft^2)	--											
UIA (ft^2)	60,652											
RPA (ft^2)	9,550											
SPA (ft^2)	--											
HSG A (%)	0%											
HSG B (%)	0%											
HSG C/D (%)	100%											
Average Slope of RPA (ft/ft)	0.310											
UIA:RPA Interface Width (ft)	100.00											

CALCULATED RUNOFF RESULTS

Area ID	D7a											
UIA:RPA Area (ft^2)	70,202											
L / W Ratio	7.02											
UIA / Area	0.8640											
Runoff (in)	0.00											
Runoff (ft^3)	0											
Runoff Reduction (ft^3)	758											

CALCULATED WQCV RESULTS

Area ID	D7a											
WQCV (ft^3)	1998											
WQCV Reduction (ft^3)	1998											
WQCV Reduction (%)	100%											
Untreated WQCV (ft^3)	0											

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	d7a											
DCIA (ft^2)	0											
UIA (ft^2)	60,652											
RPA (ft^2)	9,550											
SPA (ft^2)	0											
Total Area (ft^2)	70,202											
Total Impervious Area (ft^2)	60,652											
WQCV (ft^3)	1,998											
WQCV Reduction (ft^3)	1,998											
WQCV Reduction (%)	100%											
Untreated WQCV (ft^3)	0											

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	70,202
Total Impervious Area (ft^2)	60,652
WQCV (ft^3)	1,998
WQCV Reduction (ft^3)	1,998
WQCV Reduction (%)	100%
Untreated WQCV (ft^3)	0

APPENDIX D

BMP MAINTENANCE PLAN

APPENDIX E

CITY CHECKLISTS

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.

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.

X. Appendices

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

Acknowledgements:

Standard Form No. 1 was prepared by: _____ 9/21/2021
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

September 07, 2021

Deborah Spaustat
PO Box 774943
Steamboat Springs, CO 80477

RE: Decision Notification for Preconsultation for Wild Blue Gondola (PL20210010)

Dear Deborah Spaustat,

On September 07, 2021, the Planning Director **Approved** planning application PL20210010.

The application was processed and is vested in accordance with the applicable provisions of Article 7 of the Community Development Code. Please be advised that this decision could be subject to appeal per Section 729 or Call Up per Section 702, as applicable. See applicable application type in Article 7 for Term and Effect of Approval.

If you have any questions or concerns regarding fulfillment of the conditions, please do not hesitate to contact me at (970) 871-8271 or via email at esoltis@steamboatsprings.net.

Sincerely,

Emrick Soltis, P.E.
Civil Engineer

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:	Wild Blue Gondola
Project location:	2305 Mt Werner Circle (Parcel ID Number 936271001) Lot 2 Parcel D Replat of Ski Hill Subdivision
Developer name/contact info:	Steamboat Ski & Resort Corp. Jim Schneider, 970-871-5381, jschneider@steamboat.com
Drainage engineer name/contact info:	Deborah Spaustat, P.E., Landmark Consultants, Inc. debs@landmark-co.com, 970-871-9494
Application Type:	Development Plan Public Hearing
Proposed Land Use:	Open Space & Recreation (OR); Ski Area

Project Site Parameters	
Total parcel area (acres):	2.10-acres (lower terminal), 2.37-acres (upper terminal)
Disturbed area (acres):	2.10-acres (lower terminal), 2.37-acres (upper terminal)
Existing impervious area (acres, if applicable):	0.67-acres (lower terminal), 0-acres (upper terminal)
Proposed new impervious area (acres):	0.05-acres (lower terminal), 1.31-acres (upper terminal)
Proposed total impervious area (acres):	0.61-acres (lower terminal), 1.31--acres (upper terminal)
Proposed number of project outfalls:	2 (lower terminal), 1 (upper terminal)
Number of additional parking spaces:	0
Description and site percentage of existing cover/land use(s):	OR - Open Space & Recreation (100%)
Description and site percentage of proposed cover/land use(s):	OR - Open Space & Recreation (100%)
Expected maximum proposed conveyance gradient (%):	Sheet flow slopes up to 50%
Description of size (acres) and cover/land use(s) of offsite areas draining to the site	none

Type of Study Required:

- [x] Drainage Letter
- [ ] Final Drainage Study
- [ ] Conceptual Drainage Study
- [x] Stormwater Quality Plan

Hydrologic Evaluation:

- [x] Rational Method
- [ ] CUHP/SWMM
- [ ] HEC-HMS
- [ ] Other_____

Project Drainage	
Number of subbasins to be evaluated:	5 (lower terminal), 2 (upper terminal)
Presence of pass through flow (circle)	YES (NO)
Description of proposed stormwater conveyance on site:	**lower** - maze drains to trench drains to sand filter, hill side drains to "terminal depression" to storm sewer to 78" BC culvert **upper** - terminal structure and gravel area drain to swale to level spreader, to infiltration on natural ground
Project includes roadway conveyance as part of design evaluation (circle):	YES (NO)
Description of conveyance of site runoff downstream of site, identify any infrastructure noted in Stormwater Master Plan noted as lacking capacity for minor or major storm event:	**lower -** is conveyed downstream in 78" BC culvert to BC to the Yampa **upper - infiltrated or access road drains to Unnamed Tributary to Burgess Creek** **No infrastructure is noted as lacking capacity**
Detention expected onsite(circle):	YES (NO)
Presence of Floodway or Floodplain on site (circle):	YES (NO)
Anticipated modification of Floodway or Floodplain proposed (circle):	YES (NO)
Describe culvert or storm sewer conveyance evaluative method:	Storm sewer evaluated using SSA

Permanent Stormwater Treatment Facility Design Standard (check all that apply with only one standard per tributary basin):

- [ ] WQCV Standard
- [ ] TSS Standard
- [x] Infiltration Standard
- [x] ~~Constrained Redevelopment WQCV Standard~~ Site not constrained. See 5.12.4.4.
- [ ] Constrained Redevelopment TSS Standard
- [ ] Constrained Redevelopment Infiltration Standard
- [x] ~~Does not Require Permanent Stormwater Treatment (attach Exclusion Tracking Form)~~

Site not excluded. See 5.12.3

Project Permanent Stormwater Treatment	
Justification of choice of proposed design standard, including how the site meets the constrained redevelopment standard, infiltration test results, etc.	See attached narrative Narrative not included
Concept-level permanent stormwater treatment facility design details (type, location of facilities, proprietary structure selection, treatment train concept, etc.):	~~**lower** - constrained site redevelopment, sand filter~~ ~~**upper** - exclusion of roadway redevelopment, runoff reduction w/ level spreader~~
Proposed LID measures to reduce runoff volume:	providing stormwater quality was a primary concern for the site design
Will treatment evaluation include off-site, pass through flow (circle):	YES NO

Approvals

	8/25/2021	970-871-9494
Prepared By: (Insert drainage engineer name & firm)	Date	Phone number

Approved By:

Printed Name: City Engineer	Date

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.

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).
- NA 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.

To be provided with Final Study

- _____ 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: _____ 9/21/2021

Date

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

PROJECT SHEET – BASE DESIGN STANDARDS (Site is not constrained)

Complete a Project Sheet for each project that includes Permanent Stormwater Treatment Facilities.

SITE INFORMATION

Project Name: Wild Blue Gondola	
Project Location: Lot 2, Replat of Parcel D, Ski Hill Subdivision, and Lot 1	
Submitted Date: 9/21/2021	Submitted By: Deb Spaustat Landmark Consutlants, Inc.
Acreage Disturbed: 0.76 (lower) 2.09 (upper)	
Existing Impervious: 0.16 (lower) 0 (upper)	New Net Impervious: 0.34 (lower) 0.66 (upper)
Review Date:	Reviewed By:

Preparer	City	Requirements
		Design Details are included for all Treatment Facilities
		List or include a description of any source controls or other non-structural practices: Lower Terminal - 87% of untreated area from vegetated slopes. Low pollutant load Upper Terminal - 67% of untreated area from vegetated slopes. Low pollutant load

DESIGN STANDARDS

Multiple Design Standards may be used on a site, as necessary, to meet the requirements, but only one Design Standard may be used for each treatment facility's tributary area. Evaluation of suitability of permanent stormwater treatment facilities is based on meeting the specified Design Standard and ease of long-term maintenance. Facilities must be designed in accordance with the most current versions of the City's Engineering Standards and Volume 3 of the USDCM and meet the specific requirements for each Design Standard used.

1. Indicate below, which Design Standard(s) will be used for the project, and
2. Complete a separate, corresponding Design Standards checklist for each facility (e.g., WQCV)

Design Standard	*Quantity*	*Tributary Area*	*Location/Identifying information*
WQCV	269-cf	0.40-acres	basin D4c
Pollutant Removal			
Runoff Reduction	100%	1.39-acres	basin D7a

DESIGN CHECKLIST – Water Quality Capture Volume (WQCV) Standard

WQCV STANDARD Criteria

Treatment facilities must be designed to provide treatment and/or infiltration of the WQCV for 100% of the site. Under certain conditions, up to 20% of the site may be excluded, not to exceed 1 acre. This may apply if it is not practicable to capture runoff from portions of the site and where it is not practicable to construct a separate treatment facility for those same portions of the site.

Complete checklist if using the WQCV Standard to meet Design Standard requirements.

Project Name: Wild Blue Gondola - Lower Terminal

Preparer	City	Requirements	
NO		Facilities provide treatment and/or infiltration of the WQCV for 100% of the site	
52%		% of site treated:	
		Facility Type: Sand Filter	Facility Location:
		See Drainage Report section: Stormwater Quality - Lower Terminal	

If less than 100% of the site is treated, complete the following:

Preparer	City	Requirements	
		% of site not treated by control measures (not to exceed 20% or 1 acre):	
		48 %	0.36-ACRES Size (acres)
		Provide explanation of why the excluded area is impractical to treat: 87% of the area draining to basin D4b (including basin D4a) is from pervious areas; native vegetation of revegetated areas that were graded as part of this project. The potential pollutant load from these areas is limited to natural sediment and possibly pedestrian/skier trash. None of the areas contributing to this drainage are subject to vehicle traffic, snow removal, sanding or other chemical snowmelt.	
		Provide explanation of why another facility is not practicable for the untreated area: The unique grading requirements of the gondola terminal cause a sizeable depression in the landscape where water inherently will drain to, however the location is not suitable for storage of water due to the concrete pad and lift tower locations.	

DESIGN CHECKLIST – Runoff Reduction (Infiltration) Standard

RUNOFF REDUCTION STANDARD Criteria

Treatment facilities must be designed to infiltrate 60% of the WQCV calculated for all the impervious area within the site. All runoff from the site shall be captured. This Standard can be met through practices such as Green Infrastructure and Low Impact Development practices. Under certain conditions, up to 20% of the site may be excluded, not to exceed 1 acre. This exclusion may apply if it is not practicable to capture runoff from portions of the site and it is not practicable to construct a separate treatment facility for those same portions of the site.

Complete checklist if using the Runoff Reduction Standard to meet Design Standard requirements.

Project Name: Wild Blue Gondola - Upper Terminal			
Preparer	**City**	**Requirements**	
yes		Control measure infiltrates at least 60% of WQCV for all impervious area	
		% treated through runoff reduction: 66% of total site, 100% of impervious areas	
		Facility Type:	Facility Location: Basin D7a
		See Drainage Report section: Stormwater Quality - Upper Terminal	

34% (0.70-acres) of the total site is not treated by infiltration

100% of basin D7b is pervious with 66% of that area from vegetated slopes. The potential pollutant load from these areas is low.

TABLES

LANDMARK CONSULTANTS, INC.

CIVIL ENGINEERS | SURVEYORS

141 9th Street ~ P.O. Box 774943
Steamboat Springs, Colorado 80477
(970) 871-9494
www.LANDMARK-CO.com

PROJECT	Wild Blue Gondola
DESIGNER	Deb Spaustat
DATE	9/21/2021

Hydrology Summary for Wild Blue Gondola

	Historic						Developed					
Basin	**Total Area (acres)**	**%Imp**	**C_5**	**C_{100}**	**Q_5 (cfs)**	**Q_{100} (cfs)**	**Total Area (acres)**	**%Imp**	**C_5**	**C_{100}**	**Q_5 (cfs)**	**Q_{100} (cfs)**
4	1.30	30%	0.29	0.61	1.27	5.87	NA	NA	NA	NA	NA	NA
4a	NA	NA	NA	NA	NA	NA	0.30	16%	0.17	0.55	0.17	1.21
4b	NA	NA	NA	NA	NA	NA	0.57	23%	0.23	0.58	0.46	2.51
4c	NA	NA	NA	NA	NA	NA	0.40	60%	0.54	0.73	0.68	2.03
5	0.19	13%	0.15	0.54	0.10	0.83	0.17	15%	0.16	0.55	0.09	0.69
6	0.08	53%	0.48	0.65	1.48	10.67	0.15	17%	0.17	0.55	0.10	0.68
7	2.63	15%	0.17	0.55	1.48	10.67	NA	NA	NA	NA	NA	NA
7a	NA	NA	NA	NA	NA	NA	1.39	57%	0.51	0.72	1.88	5.81
7b	NA	NA	NA	NA	NA	NA	1.24	20%	0.21	0.57	0.79	4.77

Design Point Summary for Wild Blue Gondola

	Historic				Developed			
Design Point	**Total Area (acres)**	**%Imp**	**Q_5 (cfs)**	**Q_{100} (cfs)**	**Total Area (acres)**	**%Imp**	**Q_5 (cfs)**	**Q_{100} (cfs)**
4	1.58	29%	1.49	7.05	1.57	30%	1.49	7.04
7	2.63	15%	1.48	10.67	2.63	40%	3.13	12.19

Sand Filter Summary for Wild Blue Gondola

Basin	**Sand Filter Area (ft^2)**		**WQCV (ft^3)**	**Total Volume (ft^3)**
	Required	Provided	Required	Provided
Basin D4c	217	232	269	647

Runoff Reduction Summary for Upper Terminal

Basin	**WQCV[1] (ft^3)**	**Detention[2] V_5 (ft^3)**	**Detention[2] V_{100} (ft^3)**	**Receiving Area[1] (ft^2)**	
	Required			Required	Provided
Basin D7b	758	744	686	9,550	>9,550

1. Calculated per runoff reduction design procedure form, basin D7a only
2. Detention volumes calculated per FAA method for total site, D7a & D7b