

# Aquatic Resources Delineation Report Bridge I-15-T

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FINAL

**January 2021**



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## Executive Summary

Stanley Consultants, Inc. (Stanley) has prepared an aquatic resources delineation for the proposed replacement of a concrete box culvert on US Highway 24 east of Florissant, Colorado, known as the I-15-T Bridge Replacement Project (Project). The purpose of the delineation is to identify any potential waters of the U.S. (WOTUS), including wetlands, with the potential to be impacted by Project activities. The delineation was conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010).

This delineation reports on the finding at the CDOT bridge I-15-T surveyed area (1.04 acres), where the OHWM for a tributary to Twin Creek (Tributary 1; 0.04 acres and 120 linear ft). Tributary 1 is a smaller, potentially intermittent channel that supports riparian habitats. No wetlands were found within the area of potential Project impacts.

The delineation findings presented in this report will be used to assess potential Project impacts to surface water resources. The findings may be used to develop Project designs that minimize or avoid impacts to WOTUS or, if impacts to WOTUS are unavoidable, to understand the total anticipated impacts that would need to be approved or permitted by the USACE. Depending on the level of impacts, the Project would likely require permitting under the Nationwide Permit (NWP) program. The NWP program is available for projects with relatively minor impacts (the exact nature of the impacts and acreage thresholds depend on the applicable NWP), while Individuals Permits (IPs) are required for projects with larger impacts and can involve a lengthy permitting process.

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## **Acronyms and Abbreviations**

CDOT	Colorado Department of Transportation
CWA	Clean Water Act
IP	Individual Permit
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWP	Nationwide Permit
NWPL	National Wetland Plant List
OHWM	ordinary high water mark
PIA	Potential Impact Area
PSS	palustrine scrub-shrub
ROW	right-of-way
SH	State Highway
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WOTUS	water of the United States

# 1. Introduction

On behalf of the Colorado Department of Transportation (CDOT), Stanley Consultants, Inc. (Stanley) has prepared an aquatic resources delineation for the proposed replacement of a concrete box culvert on U.S. Highway (US) 24 northeast of Florissant, Colorado, known as the I-15-T Bridge Replacement Project (Project). The purpose of the delineation is to identify any potential waters of the U.S. (WOTUS), including wetlands, present within the within the area of potential Project impacts.

The presence of wetlands and other waters were assessed within the vicinity of the proposed Project construction. The boundaries of potential WOTUS were then delineated to determine the extent of waters subject to regulation under the Clean Water Act within the area of potential Project impacts. The purpose of this delineation report is to facilitate efforts to:

- Avoid or minimize impacts to aquatic resources during the design process.
- Document aquatic resource boundary determinations for review by regulatory authorities.

Field investigations were conducted on August 29, 2020, by wetland biologists for Stanley Consultants, Inc.

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## 2. Location and Project Description

### 2.1 Location

The surveyed Potential Impact Area (the PIA) is approximately 1.04 acres, is completely contained within the CDOT right-of-way (ROW) along US 24, and includes an existing concrete box culvert that currently allows traffic to cross a branch of Twin Creek. The existing concrete box culvert is located approximately 1.9 miles east of the town center of Florissant, Colorado (38.947936/-105.258143), in Section 6 of Township 13 South, Range 70 West (6<sup>th</sup> Principal Base and Meridian). A map of the PIA is located in the Aquatic Resources Delineation Map in Appendix A, Figure 2.

### 2.2 Purpose and Need

The concrete box culvert at I-15-T was built in 1937 along US 24, a key corridor connecting residents and tourists from Colorado Springs and southern Colorado to the recreational activities in the Rocky Mountains. The concrete structure has severe deterioration that requires frequent inspection and repair for issues such as heavy deterioration of the bottom slab, head walls, and wing walls. When the bridge was constructed, river stones were used in the concrete mix, which does not meet current construction standards. This form of aggregate does not have the bonding ability of crushed stones and the use of this material has accelerated the formation of the numerous concrete defects.

This bridge is well past its replacement life and is not up to current construction and safety standards and must be replaced to prevent potential failure.

### 2.3 Project Description

The CDOT Region 2 Bridge Bundle Design Build Project consists of the replacement of a total of nineteen (19) structures bundled together as a single design-build project. These structures are rural bridges on essential highway corridors (US 350, US 24, Colorado State Highway [SH] 239 and SH 9) in southeastern and central Colorado. These key corridors provide rural mobility, intra- and interstate commerce, movement of agricultural products and supplies, and access to tourist destinations. The design build project has two funding sources; Bridge I-15-T will be jointly funded by the USDOT FHWA Competitive Highway Bridge Program grant and the Colorado Bridge Enterprise (Project No. 23558).

Bridge I-15-T is located on US 24 at mile 271.3, approximately 2 miles east of Florissant, Colorado (Figure 1). The bridge is a double cell box culvert (two 10-foot [ft] by 8-ft cells, 41 ft long) with four concrete wingwalls (approximately 22.5 ft long) at each corner. Flows from a seasonal tributary of Twin Creek (labeled as Tributary 1 in this delineation) cross through the culverts to discharge to the main Twin Creek channel located immediately downstream to the west of the structure.

The proposed Project plan includes replacing the concrete box culvert with a two-cell concrete box culvert. No roadway bypass is currently planned for during the construction

of the new structure at this location; therefore, the area of disturbance will be restricted to the limits of the ROW. Once the bridge is complete and ready for use, any disturbed areas will be restored to original contours and reseeded.

All Project-related water use for activities such as dust control will be required to be brought in via water tanks. All concrete production will be required to be made at a batch plant with clean, treated water. No water will be extracted directly from the nearest water source, Twin Creek, as a part of Project activities.

## 2.4 Directions to the Site

The PIA is accessible from Colorado Springs, Colorado, by taking US 24 west towards Woodland Park, Colorado. From Woodland Park, continue west on US 24 for approximately 13 miles before reaching the Project bridge. The Project bridge is located adjacent to an unnamed road immediately west of where Signal Rock Ranch Road meets the right side (north-bound side) of US 24, approximately 1.9 miles east of Florissant, Colorado. There is space to park along the unnamed road.

# 3. Methods

## 3.1 Regulatory Context

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredged or fill material into WOTUS and is administered by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA). The definition of WOTUS has been in flux in recent years, with the latest definition published by the EPA in the Navigable Waters Protection Rule, which went into effect on June 22, 2020, in 49 states. Due to an injunction issued by a federal court in Colorado, the Navigable Waters Protection Rule has not gone into effect in Colorado, and instead the state remains under the post-*Rapanos v. United States* (Rapanos) guidance (USACE and EPA 2008). The potential for waters of the U.S. within the PIA therefore will be evaluated per the definition in the the Rapanos guidance. Since the WOTUS definition under Rapanos is more expansive than the Navigable Waters Protection Rule, assessing the PIA under Rapanos ensures that no additional reevaluation is likely to be required in the event CWA applicability changes in Colorado during the period of Project construction.

The Rapanos guidance defines waters of the U.S. as traditional navigable waters (TNWs), relatively permanent waters, and their adjacent wetlands.<sup>1</sup> Additionally, the Rapanos guidance includes all tributaries with a bed and bank or ordinary highwater mark (OHWM) that have a significant nexus to a Traditionally Navigable Water, as well as wetlands, ponds, impoundments, and lakes located adjacent to said tributaries. Under Section 404 of the CWA, the OHWM defines the lateral extent of federal jurisdiction in non-tidal WOTUS (absent adjacent wetlands) (33 U.S.C. 1251). Per the regional guidance developed by the Corps (Mersel and Lichvar 2014), OHWM in Colorado is considered to be the “physical and biological signature established and maintained at the boundaries of

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<sup>1</sup> Adjacent is defined as “bordering, contiguous, or neighboring” in the Rapanos guidance.

the active channel.” Mersel and Lichvar (2014) state the OHWM identification in non-perennial streams is based on three primary physical or biological indicators—topographic break in slope, change in sediment characteristics, and change in vegetation characteristics.

### 3.2 Wetland Delineation

The wetland delineation was conducted in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the Regional Supplement to the *Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010). The entire PIA was assessed by the biologists to determine the presence or absence of wetland features. Any location that contained some potential as a wetland based on the National Wetland Inventory (NWI) mapping (Appendix B) or observed surface conditions, such as the presence of dominant hydrophytic vegetation or surface hydrology, was investigated more closely with a sampling point containing a soil pit that was recorded in a delineation field form with photo documentation (Appendix C).

Sources of information used in this investigation include:

- Web Soil Survey (USDA/NRCS 2020) – See Appendix B, Custom Soil Resource Report.
- Aerial photography of the PIA from the National Agriculture Imagery Program (NAIP) taken in 2017, and from aerial drone photography collected by Stanley.
- National Wetland Plant List, version 3.4 (USACE 2018)
- Munsell Soil-Color Charts (Munsell Color 2009)
- NWI Map (U.S. Fish and Wildlife Service [USFWS] 2020) – See Appendix B, NWI Mapping

### 3.3 Non-Wetland Waters Delineation

The PIA was examined for any potential OHWM supporting features, such as root exposure, water staining, silt deposits, litter removal, etc. (Mersel and Lichvar 2014, USACE 2005), that might provide information interpreting recent flow levels (e.g., drift/wrack deposits or headcutting) or that might eliminate or reinforce potential OHWM locations. Stanley also examined aerial photography and hydrologic data to support the Section 404 CWA assessment. The boundaries of any non-wetland water features were identified by the OHWM indicators and recorded using a Trimble sub-meter GPS antenna connected to a tablet or smart phone, and were also surveyed using the same sub-meter GPS unit.

## 4. Existing Conditions

### 4.1 Topography

The PIA is located within the valley containing the main channel of Twin Creek, surrounded by steep mountain slopes, rocky hillsides, and the river terraces and slopes. The elevation at the site is approximately 8,490 feet (ft) above mean sea level (AMSL). Short segments of the main channel of Twin Creek were realigned during the construction of the original bridge in 1937 and the adjacent road.

Land use in the vicinity of the PIA predominantly consists of the US 24 transportation corridor, rural residential homes and roads, and ranching activities. The area immediately surrounding the Project consists entirely of privately-owned lands. No other structures or residences are located in the vicinity of the PIA.

### 4.2 Climate

The PIA has an average maximum temperature of 57° F and average minimum temperature of 22° F (U.S. Climate Data 2020). The average annual precipitation is 16.88 inches of rain (U.S. Climate Data 2020). The monthly precipitation average for August is 3.38 inches; however, during this past August (when field surveys were conducted), the rainfall was measured at 2.54 inches, which is slightly below normal (Weather Underground 2020).

### 4.3 NWI Mapping

The National Wetlands Inventory (NWI) has mapped three different wetland classifications within the PIA: one riverine wetland (R4SBA) and two freshwater forested/shrub wetlands (PSS1A and PSS1C). See Appendix B, Supporting Maps, NWI Mapping.

### 4.4 Plant Communities

The plant communities in the PIA consists of riparian scrub-shrub and disturbed roadway edges. The mesic riparian areas are dominated by yellow willow (*Salix lutea*) with minor components such as the narrow-leaf willow (*S. exigua*) in the deep-rooted woody stratum. Herbaceous vegetation is dominated by Canada thistle (*Circum arvense*) and smooth brome (*Bromus inermis*) with minor components of Baltic rush (*Juncus balticus*) and a few other lesser components of forbs. Rushes (*Carex sp.*) were observed along edges and within the OHWM of Tributary 1, but did not extend to the top of the banks.

### 4.5 Hydrology

The dominant hydrological feature in the area is the branch of Twin Creek that crosses through the I-15-T structure and discharges into the main channel of Twin Creek immediately downstream (west) of the PIA. Once flows exit the PIA into Twin Creek, they northwest until the stream's confluence with the South Fork of the South Platte River below the Lake George Reservoir. From this point the South Platte River flows southeast, then turns northeast towards Denver, then east where it joins the North Platte River. From this location, flows continue east to the Missouri River and south to the Gulf of Mexico.

The primary hydrology input in the PIA is Twin Creek Tributary 1 (Tributary 1), with other minor inputs that include groundwater and surface runoff from the adjacent hillsides and the highway.

No potential fens are recorded within the vicinity of the PIA (OTIS 2020).

#### 4.6 Soils

Only one soil was identified in the PIA (See Appendix B, Soil Resource Report). The soil mapped within the PIA is a Rofork very gravelly sandy loam categorized as a nonhydric soil.

The Project team dug soil test pits within the PIA, but no hydric soils were observed within the top 18 inches soil.

## 5. Aquatic Resource Results

Delineation results reflect the conditions as observed at the time of investigation and were used to determine the OHWM boundaries shown in Appendix A (Figure 2). Associated photos of the sample points can be found in Appendix C. The following subsection summarize the results of the delineation, including a description of the delineated OHWM and justification for the boundaries. Feature details are summarized in Table 1 (Aquatic Resources within the PIA).

**Table 1. Aquatic Resources within the PIA**

Name	Cowardin Classification	Location (Lat/Long)	Size (ac)	Length (ft)
<b><i>Non-wetland Waters</i></b>				
Twin Creek Tributary 1	<b>R4SBA</b>	38.947936/-105.258143	0.04	120
<b>Totals</b>			<b>0.04</b>	<b>120</b>

All portions of the PIA were examined for their potential to support wetlands. Deep-rooted riparian shrub vegetation was observed throughout the PIA, but soil test pits revealed no hydric soils present within the PIA.

#### 5.1 Twin Creek – Tributary 1

Twin Creek Tributary 1 is a small branch of Twin Creek (120 ft, 0.04 acres) that discharges into the main channel of Twin Creek approximately 85 ft downstream (west) of the bridge. Upstream of the bridge Tributary 1 is narrow and fairly shallow within the PIA. Immediately downstream of the bridge, the channel splits and the OHWM becomes less distinct. The OHWM for Tributary 1 becomes more distinct again downstream of the PIA and remains distinct until the tributary meets with the main channel of Twin Creek approximately 30 ft downstream of the PIA's western boundary. The OHWM was determined by evidence of scour, debris wracking, and change in vegetation composition.

## 6. Interstate Commerce

Federal authority to regulate waters within the United States is primarily derived from the Commerce Clause, which gives Congress the power to regulate interstate commerce. Section 404 of the Clean Water Act defines the limits of jurisdiction as encompassing navigable waters and waters of the U.S. including, among other water bodies, “waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce” (40 CFR § 120.2(1)(i)).

The section of the stream intersecting the PIA possibly intermittent and does not appear to support interstate commerce. In the event that it does support interstate commerce, however, the replacement of the existing bridge with an updated structure to meet CDOT standards will not affect water flows or alter the ability of the stream to support any future interstate commerce.

## 7. Summary

One tributary (totaling 0.04 acres and 120 linear feet) was identified and delineated within the PIA. No wetlands were identified within the PIA.

### 7.1 Anticipated Impacts

In the event that the selected Project design will impact any potential waters of the U.S. delineated in this report, the impacts to these resources would need to be approved or permitted by the USACE. Depending on the level of impacts, the Project would likely require permitting under the Nationwide Permit (NWP) program or through an Individual Permit. The NWP program is available for projects with relatively minor impacts (the exact nature of the impacts and acreage thresholds depend on the applicable NWP), while Individual Permits are required for projects with larger impacts and can involve a lengthy permitting process.

### 7.2 Avoidance and Mitigation Measures

Measures to avoid, minimize, or mitigate for potential impacts to wetlands and other WOTUS include:

- Tailoring design to avoid or minimize impacts as much as possible given structural constraints.
- Having construction methods and equipment that can avoid or minimize temporary impacts by reducing footprint of machines used or accessing work from roadway fill or other uplands.

- Developing compensatory mitigation measures, if permanent impacts are not avoidable. These measures would be a part of the permitting process with the USACE or would be conducted through CDOT, depending on the final jurisdiction determination.
- Developing a detailed and thorough construction plan which includes best management practices. An example is a Stormwater Pollution Prevention Plan that incorporates measures to protect sensitive resources such as stormwater run-off, pollutants, etc. due to construction activities.

## 8. References

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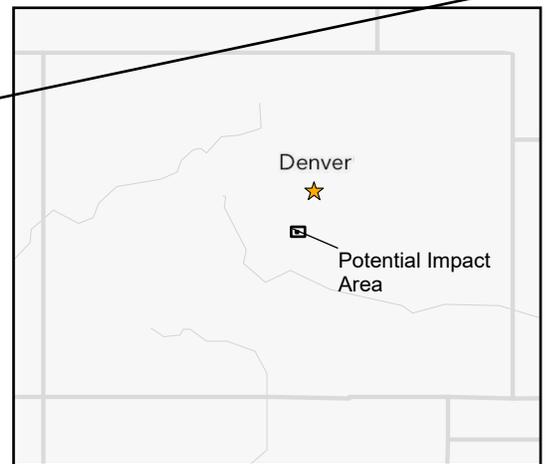
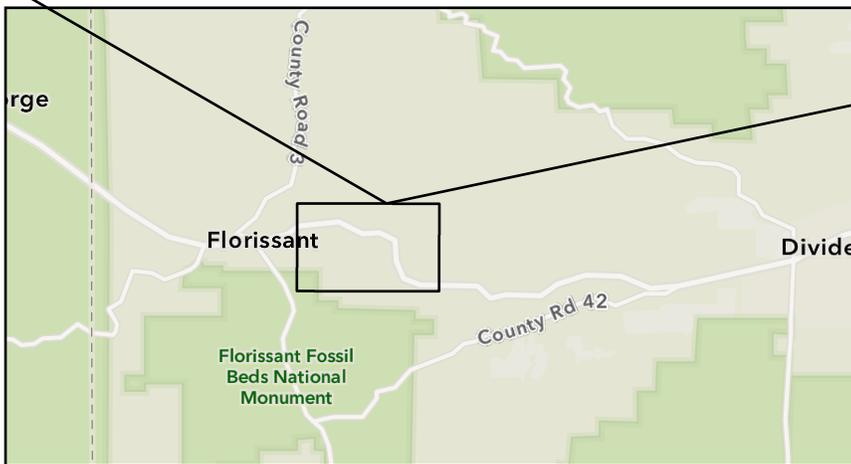
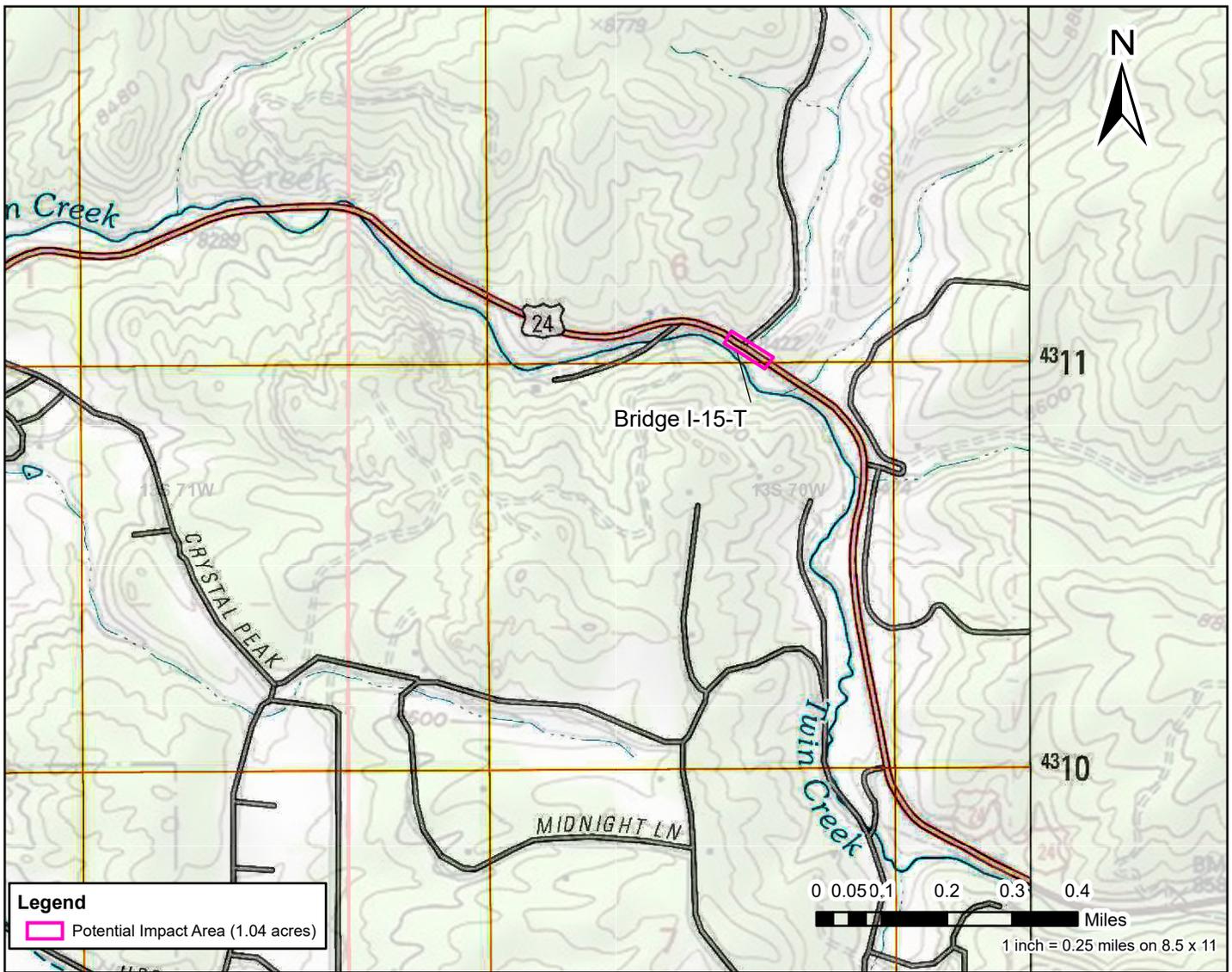
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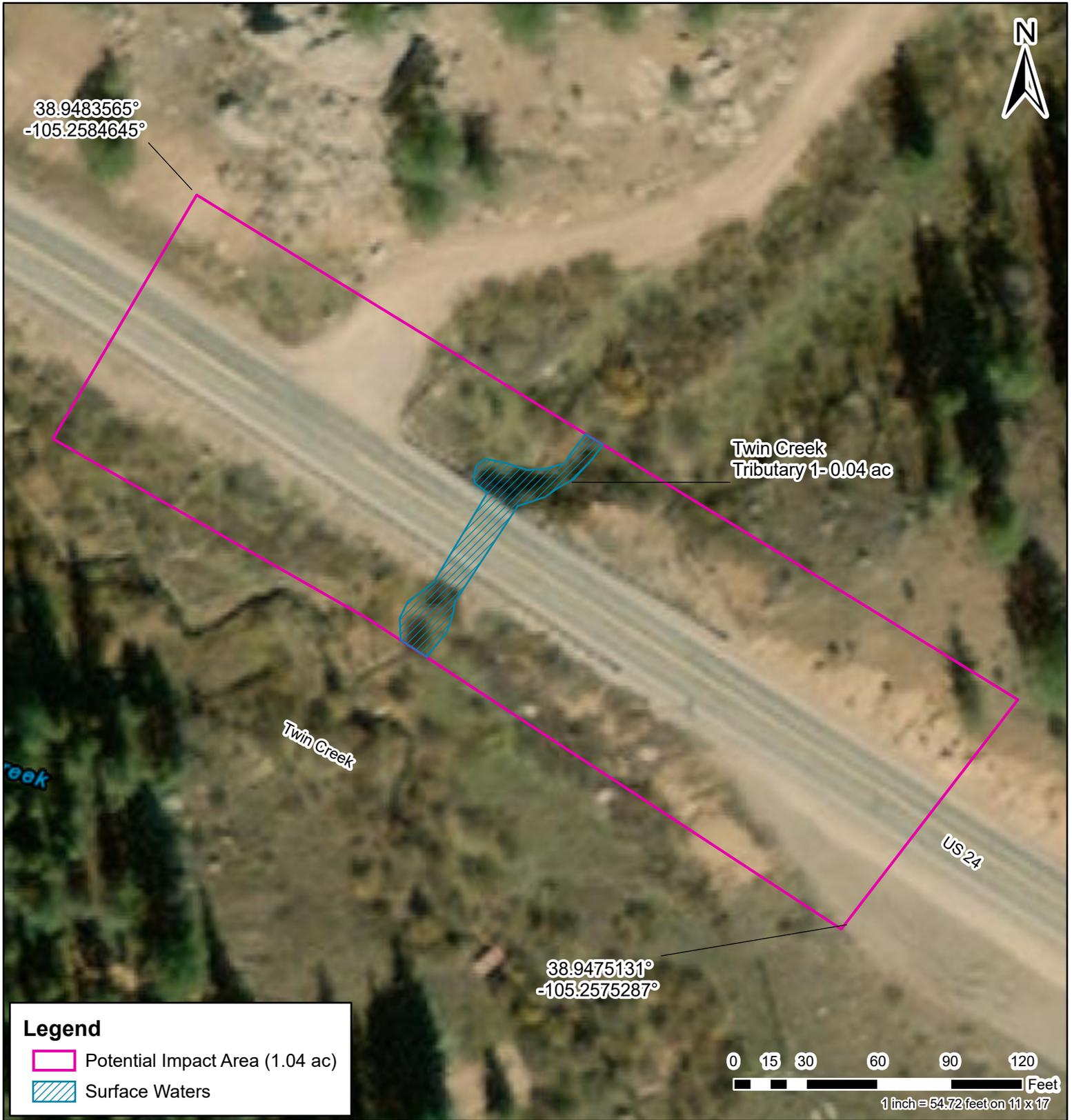
## **Appendix A**

### **Aquatic Resources Delineation Maps**



**COLORADO DEPARTMENT OF TRANSPORTATION  
Region 2 Bridge Rebuild Project - Bridge I-15-T  
Aquatic Resources Delineation Report**

**Figure 1  
Vicinity Map**



COLORADO DEPARTMENT OF TRANSPORTATION  
Region 2 Bridge Rebuild Project - Bridge I-15-T  
Aquatic Resources Delineation Report

**Figure 2**  
Aquatic Resources Delineation Map



Stanley Consultants INC.

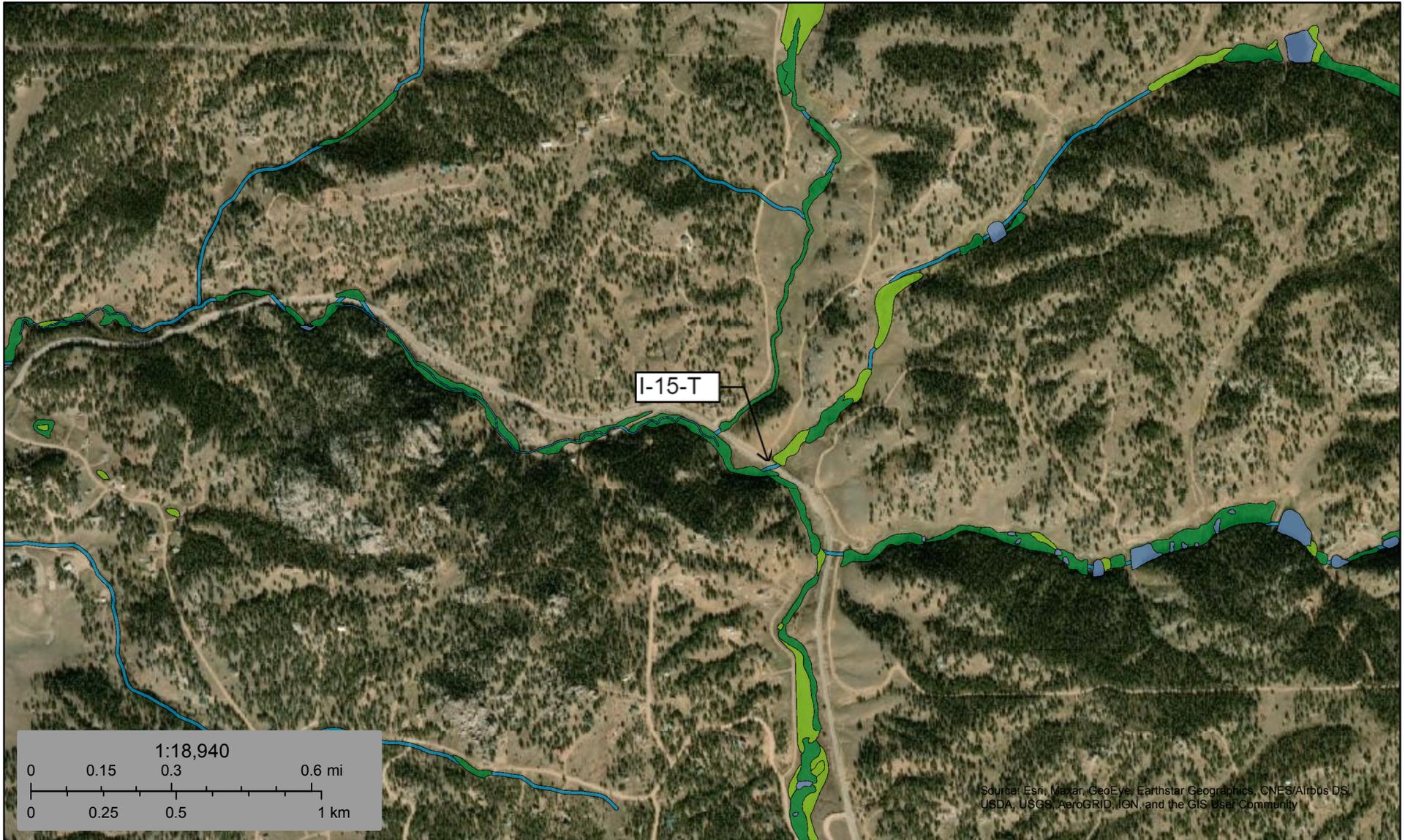
Data Source: Stanley Consultants, Inc., CDOT  
Image Source: ArcGIS Online, World Imagery

Date Exported: 12/7/2020 3:22 PM

Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 Feet  
Datum: North American 1983

## **Appendix B**

### Supporting Maps and Documents



December 1, 2020

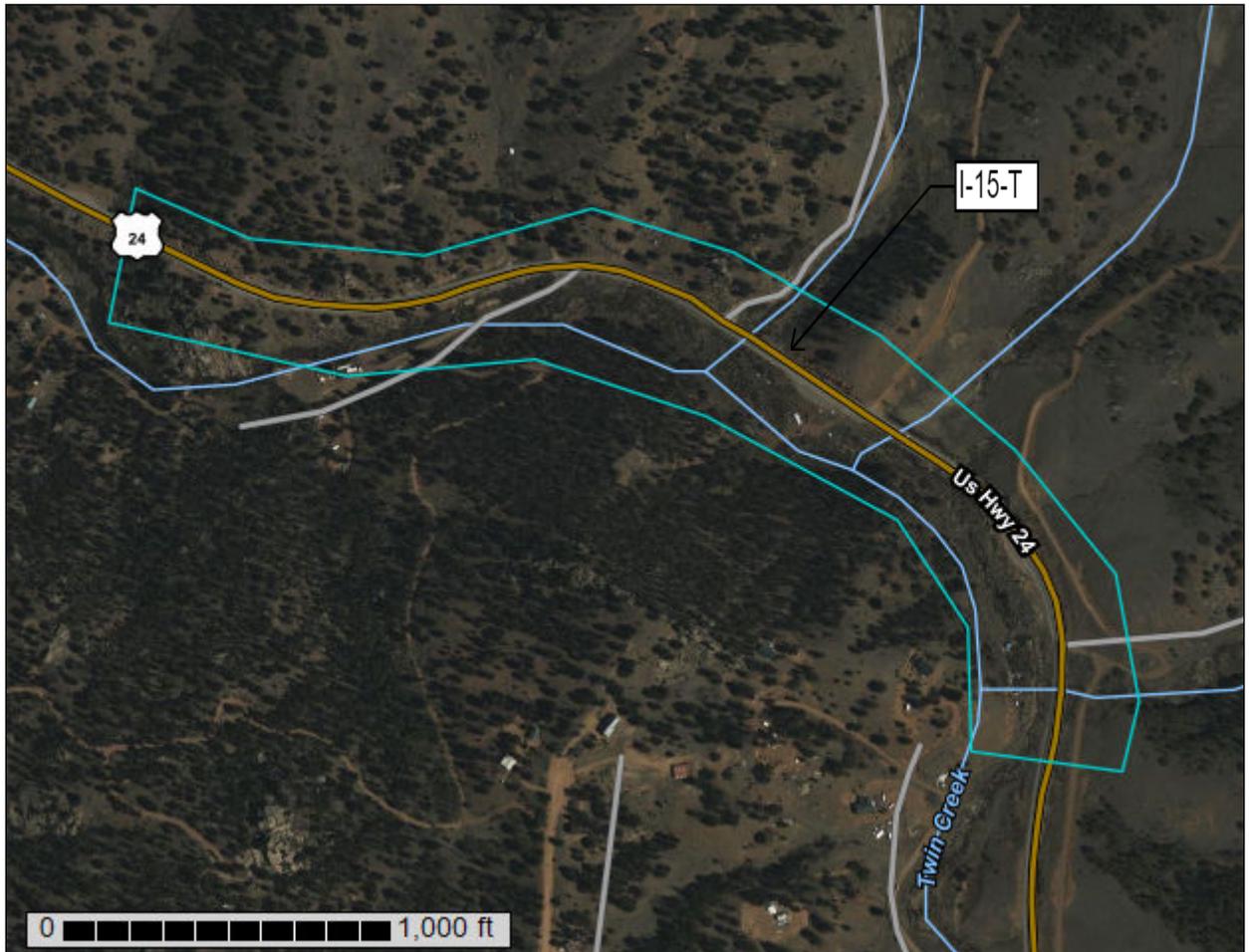
**Wetlands**

- Estuarine and Marine Deepwater
- Freshwater Emergent Wetland
- Lake
- Estuarine and Marine Wetland
- Freshwater Forested/Shrub Wetland
- Other
- Freshwater Pond
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

# Custom Soil Resource Report for Teller-Park Area, Colorado, Parts of Park and Teller Counties

I-15-T



# Preface

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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](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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# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

## Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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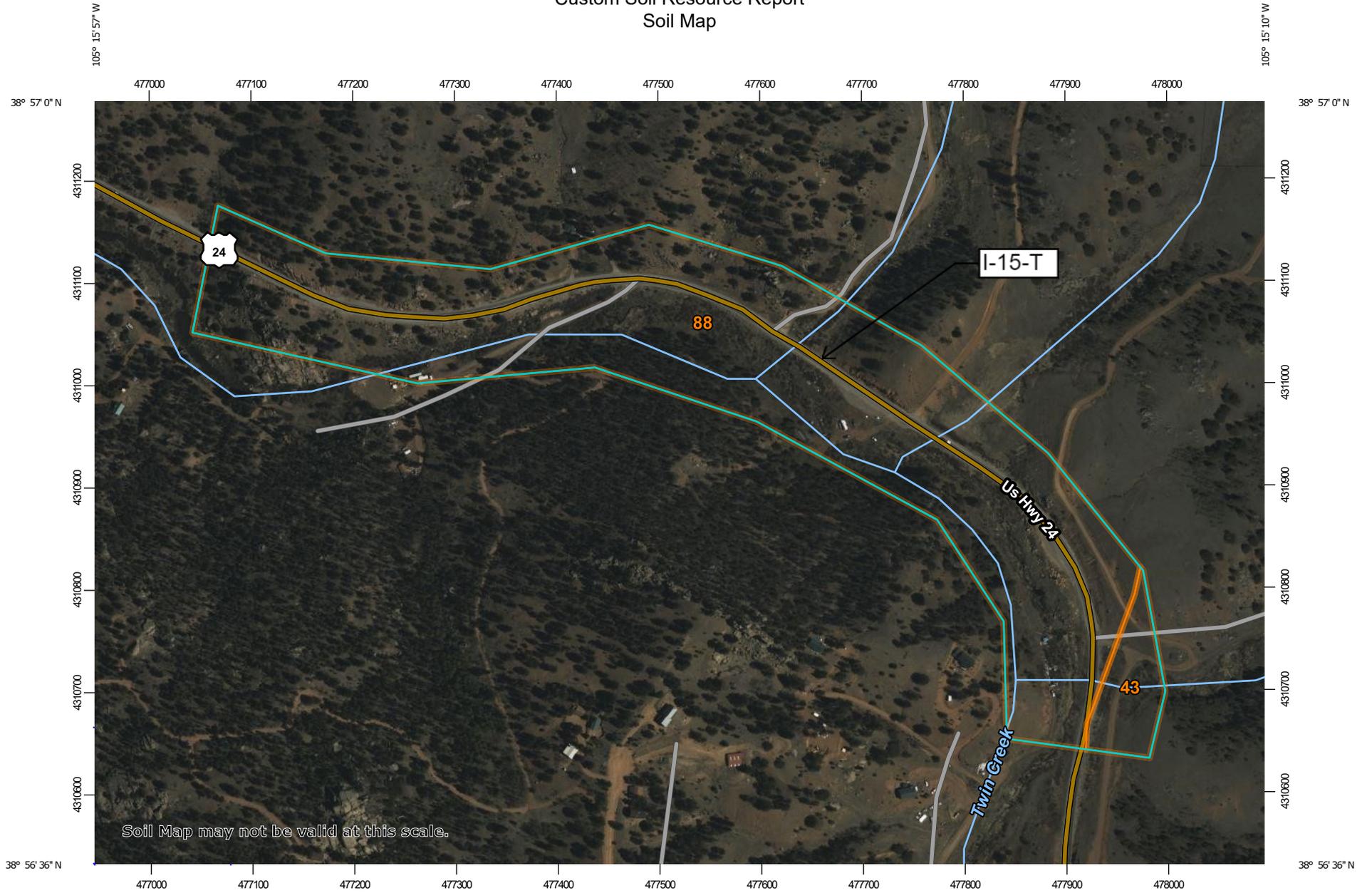
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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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: 1:5,260 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300 Meters

0 250 500 1000 1500 Feet

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: Teller-Park Area, Colorado, Parts of Park and Teller Counties  
 Survey Area Data: Version 12, 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 18, 2020—May 21, 2020

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
43	Guffey-Rofork association, 5 to 50 percent slopes	2.0	5.5%
88	Rofork very gravelly sandy loam, 5 to 55 percent slopes	34.3	94.5%
<b>Totals for Area of Interest</b>		<b>36.2</b>	<b>100.0%</b>

## 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,

## Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

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.

## Teller-Park Area, Colorado, Parts of Park and Teller Counties

### 43—Guffey-Rofork association, 5 to 50 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2n84h  
*Elevation:* 8,300 to 9,500 feet  
*Mean annual precipitation:* 14 to 20 inches  
*Mean annual air temperature:* 38 to 40 degrees F  
*Frost-free period:* 50 to 80 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Guffey and similar soils:* 50 percent  
*Rofork and similar soils:* 25 percent  
*Minor components:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Guffey

##### Setting

*Landform:* Mountains  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Colluvium over residuum weathered from granite

##### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*E1 - 1 to 8 inches:* very gravelly coarse sandy loam  
*E2 - 8 to 13 inches:* very gravelly coarse sandy loam  
*Bt - 13 to 27 inches:* very gravelly clay loam  
*Cr - 27 to 60 inches:* bedrock

##### Properties and qualities

*Slope:* 5 to 50 percent  
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water capacity:* Very low (about 1.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* C  
*Other vegetative classification:* Douglas-fir/kinnikinnick-common juniper (PSME/ARUV-JUCO6) (C1219)  
*Hydric soil rating:* No

## Description of Rofork

### Setting

*Landform:* Mountains

*Landform position (three-dimensional):* Mountaintop, mountainflank

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Slope alluvium derived from granite and gneiss over residuum weathered from granite and gneiss

### Typical profile

*A1 - 0 to 5 inches:* very gravelly sandy loam

*A2 - 5 to 9 inches:* extremely gravelly sandy loam

*AC - 9 to 14 inches:* extremely gravelly coarse sand

*Cr - 14 to 24 inches:* bedrock

### Properties and qualities

*Slope:* 5 to 50 percent

*Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock

*Drainage class:* Well drained

*Runoff class:* Very high

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 0.7 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Ecological site:* R048AY240CO

*Other vegetative classification:* Ponderosa pine/Arizona fescue (PIPO/FEAR2) (C1109), Mountain muhly - Arizona fescue (MUMO/FEAR2) (G2602)

*Hydric soil rating:* No

## Minor Components

### Typic haplustolls

*Percent of map unit:* 10 percent

*Landform:* Mountains

*Ecological site:* R048AY222CO

*Hydric soil rating:* No

### Rock outcrop

*Percent of map unit:* 5 percent

*Landform:* Knobs, hills

*Landform position (three-dimensional):* Crest, nose slope

*Hydric soil rating:* No

### Adderton

*Percent of map unit:* 5 percent

*Landform:* Flood plains

*Ecological site:* R048AY222CO

*Hydric soil rating:* No

**Catamount**

*Percent of map unit:* 5 percent  
*Landform:* Mountains  
*Hydric soil rating:* No

**88—Rofork very gravelly sandy loam, 5 to 55 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2n84f  
*Elevation:* 8,100 to 10,000 feet  
*Mean annual precipitation:* 14 to 24 inches  
*Mean annual air temperature:* 36 to 41 degrees F  
*Frost-free period:* 50 to 80 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Rofork and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Rofork**

**Setting**

*Landform:* Mountains  
*Landform position (three-dimensional):* Mountaintop, mountainflank  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Slope alluvium derived from granite and gneiss over residuum weathered from granite and gneiss

**Typical profile**

*A1 - 0 to 5 inches:* very gravelly sandy loam  
*A2 - 5 to 9 inches:* extremely gravelly sandy loam  
*AC - 9 to 14 inches:* extremely gravelly coarse sand  
*Cr - 14 to 24 inches:* bedrock

**Properties and qualities**

*Slope:* 5 to 55 percent  
*Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* Very high  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 0.7 inches)

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### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Ecological site:* R048AY240CO

*Other vegetative classification:* Ponderosa pine/Arizona fescue (PIPO/FEAR2)  
(C1109), Mountain muhly - Arizona fescue (MUMO-FEAR2) (G2602)

*Hydric soil rating:* No

### Minor Components

#### Typic haplustolls

*Percent of map unit:* 5 percent

*Landform:* Mountains

*Ecological site:* R048AY222CO

*Hydric soil rating:* No

#### Adderton

*Percent of map unit:* 3 percent

*Landform:* Flood plains

*Ecological site:* R048AY222CO

*Hydric soil rating:* No

#### Rock outcrop

*Percent of map unit:* 2 percent

*Landform:* Hills, knobs

*Landform position (three-dimensional):* Crest, nose slope

*Hydric soil rating:* No

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# **Appendix C**

Photopages



**Feature:** Twin Creek Tributary 1

**Date:** 8/29/2020

**Photo Location:** Top of bridge, facing upstream (northeast)

**Description:** Riparian vegetation within the drainage is predominantly composed of moderately dense to dense scrub-shrub.



**Feature:** Twin Creek Tributary 1

**Date:** 8/29/2020

**Photo Location:** Upstream side of bridge, facing upstream (northeast)

**Description:** Drainage is narrow (~1-2 feet) and fairly shallow at the time of survey.

## Appendix C

CDOT BRIDGE I-15-T REBUILD PROJECT  
Aquatic Resources Delineation Report  
Photopage 1



**Feature:** Twin Creek Tributary 1

**Date:** 8/29/2020

**Photo Location:** Bottom of bridge, facing downstream  
(southwest)

**Description:** Flows were only observed through the southern of the two-celled box culvert. Dense vegetation and soil build up on the northern side of the culvert suggests that flows do not reach the northern culvert except during the largest of storm-events.

### Appendix C

CDOT BRIDGE I-15-T REBUILD PROJECT  
Aquatic Resources Delineation Report  
Photopage 2



**Feature:** Twin Creek Tributary 1

**Date:** 8/29/2020

**Photo Location:** Bottom of bridge, facing downstream (southwest)

**Description:** During the site visit, channel flows were very limited despite several small but recent storm events in the area. However, staining on the culvert walls suggest some periods of high flow.



**Feature:** Twin Creek Tributary 1

**Date:** 8/29/2020

**Photo Location:** Downstream of bridge, facing downstream (southwest)

**Description:** Drainage pattern immediately downstream of the bridge is a fairly braided mixture of channels and sheet flow. The most distinct channel (visible on the left side of the photo) is approximately 2-3 feet wide. This channel becomes more distinct with deeper banks downstream of the PIA.

## Appendix C

CDOT BRIDGE I-15-T REBUILD PROJECT  
Aquatic Resources Delineation Report  
Photopage 3



**Feature:** Twin Creek Tributary 1

**Date:** 8/29/2020

**Photo Location:** Downstream of bridge, facing upstream (northeast)

**Description:** Vegetation on the downstream side of the bridge is comprised of a patchy mixture of dense scrub-shrub and grasses and rushes.

## **Appendix D**

### **Signed Property Access Letter**

(not included; needs to be obtained prior to permitting efforts)