ERO

Consultants in Natural Resources and the Environment

Wetland and Stream Mitigation Plan
Chimney Hollow Reservoir
Larimer County, Colorado

Prepared for—

Municipal Subdistrict
Northern Colorado Water Conservancy District
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Introduction

Construction of the proposed Chimney Hollow Reservoir, a component of the Windy Gap Firming Project (WGFP), is estimated to cause a loss of 1.3 acres[1] of wetlands and 1.7 acres[2] of intermittent and ephemeral drainages determined to be waters of the U.S. This revised and updated Compensatory Mitigation Plan (Plan) proposes actions to provide compensatory mitigation for unavoidable permanent impacts on these resources and addresses the 12 fundamental components required for compensatory mitigation plans. This Plan conforms to the 404(b)(1) Guidelines and the Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (2008 Mitigation Rule) (73 Fed. Reg. 19594 (April 10, 2008)). Consistent with those rules, the level of detail in this Plan is commensurate with the scope and scale of these impacts. This Plan was requested by the U.S. Army Corps of Engineers (Corps) Denver Regulatory Office (DRO) subsequent to issuance of the Final Environmental Impact Statement (EIS) for the WGFP (Bureau of Reclamation (Reclamation) 2011) and Reclamation's Record of Decision (ROD) (Reclamation 2014).

Objectives

Wetlands

Compensatory mitigation for wetland losses at the proposed Chimney Hollow Reservoir site will be provided through purchase of mitigation bank credits based on previous discussions with the DRO and a commitment in the WGFP EIS (Section 3.25, Table 3-164) and the Section 404(b)(1) Analysis (Table C-3, Appendix C) (Reclamation 2011). The Municipal Subdistrict, Northern Colorado Water Conservancy District (Subdistrict) will purchase 1.95 mitigation bank credits from the Middle South Platte River Wetland Mitigation Bank. The purchase of 1.95 mitigation bank credits is based on a 1.5 (credits) to 1 (impact) ratio because the impacts occur within the secondary service area of the Middle South Platte River Wetland Mitigation Bank. The remainder of this Plan focuses on compensatory mitigation for the estimated losses of ephemeral and intermittent drainages determined to be waters of the U.S. at the proposed Chimney Hollow Reservoir site.

Drainages

An estimated 29,519 linear feet and 1.7 acres of ephemeral and intermittent drainages determined by the Corps to be waters of the U.S. (Corps 2017) would be lost with the construction of Chimney Hollow Reservoir (Table 1).

[1] The WGFP Final EIS (Table 3-131) estimated a loss of 1.6 acres of wetlands and was based on delineations performed in 2002 and 2003 (ERO 2003). The 2016 Updated Wetland Delineation Report (Table 2) estimated a loss of 1.27 acres of wetlands (ERO 2016). The Corps based its approved jurisdictional determination on the 2016 Updated Wetland Delineation Report. This Plan uses 1.3 acres of wetland lost because it is the most recent estimate of loss.

[2] The WGFP Final EIS (Table 3-132) estimated a loss of 1.3 acres of waters of the U.S. and was based on delineations performed in 2002 and 2003 (ERO 2003). The 2016 Updated Wetland Delineation Report (Table 1) estimated a loss of 1.687 acres of waters of the U.S. (ERO 2016). The Corps based its approved jurisdictional determination on the 2016 Updated Wetland Delineation Report. This Plan uses 1.7 acres of loss of waters of the U.S. because it is the most recent estimate of loss.

Table 1. Permanent impacts on waters of the U.S. associated with Chimney Hollow Reservoir.

Drainage	Length (feet)	Area (acres)
Chimney Hollow Creek	15,696	1.17
Tributary 6	4,409	0.08
Tributary 7	6,291	0.25
Tributary 8	404	0.03
Tributary 10	2,719	0.16
Total	29,519	1.69

Source: ERO 2016.

The following objectives have been established for compensatory mitigation for impacts on drainages determined by the Corps to be waters of the U.S. at the proposed Chimney Hollow Reservoir site.

1. Compensate for the lost functions provided by drainages at the Chimney Hollow Reservoir site by funding actions that will restore riverine functions at selected reaches of the Little Thompson River severely damaged by floods in fall 2013.
2. Focus the funding of restoration on projects identified as high-priority projects for the Little Thompson River watershed.
3. Work with organizations in the Little Thompson River watershed to leverage funds to most effectively provide river restoration that will benefit the watershed.

The restoration measures proposed in this Plan are consistent with "restoration" as it is defined in the 2008 Mitigation Rule. The proposed restoration measures are designed to return natural and historic functions to river reaches degraded by the 2013 flood through reestablishment and rehabilitation. This Plan sets forth an approach to compensate for the functions lost at the Chimney Hollow Reservoir site associated with drainages determined to be waters of the U.S. As described in this Plan, some of these lost functions will be provided on-site by Chimney Hollow Reservoir. Other lost functions, not provided on-site by Chimney Hollow Reservoir, will be provided through the functional lift of restoration at two selected sites on the nearby Little Thompson River.

The Little Thompson River was severely damaged by record floods in September 2013. The flood destroyed almost the entire riparian corridor through surges of scour, deposition, or both. The lower reaches experienced deposition of debris and sediment to such an extent that much of the riparian vegetation was buried beyond natural recovery. Based on the visual assessments, more than half the reaches have sustained flood-related damage to the wetted channels and floodplain instabilities. The lost and degraded functions in these reaches form the basis of much of the recommended restoration. Strategies include channel reconstruction, typically requiring redefinition or reestablishment of a low-flow channel; various levels of bank protection, depending on the degree of damage or risk; and floodplain stabilization of the large, devegetated, and exposed bars and benches within the floodplain (Tetra Tech 2014).

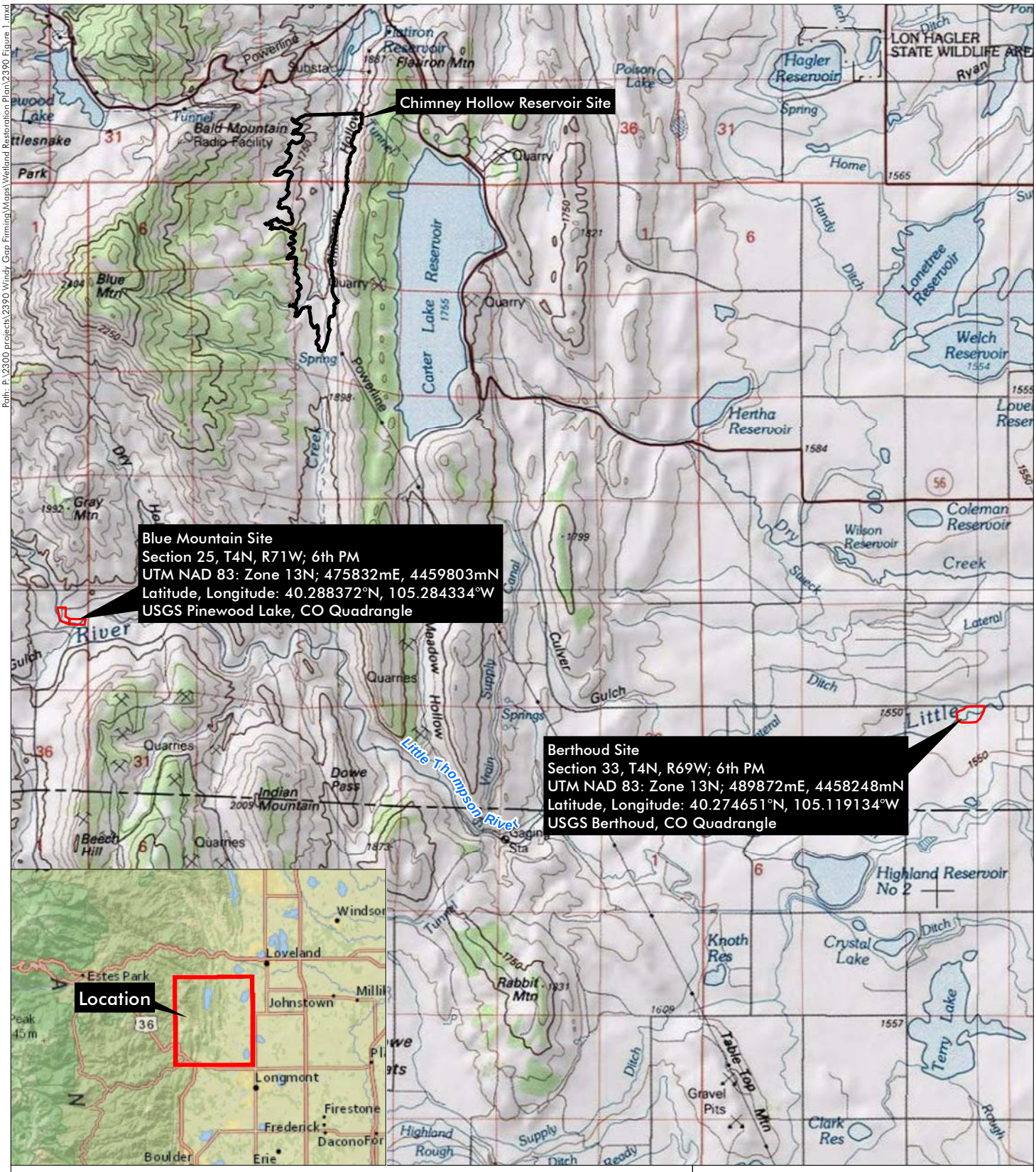
Site Selection

Chimney Hollow Creek is a tributary of the Big Thompson River. The upper end of Chimney Hollow Creek is about 5,830 feet north of the Little Thompson River. Chimney Hollow Creek and the Little Thompson River are both tributaries to the Big Thompson River. The Subdistrict has coordinated with the Little Thompson Watershed Coalition(LTWC) to determine which river restoration projects are high priorities for the watershed and in need of funding to enable implementation. This approach is consistent with Section 230.93(j)(2) of the 2008 Mitigation Rule (73 Fed. Reg. 19676 (April 10, 2008)).

A master plan was prepared for the Little Thompson River watershed restoration (Tetra Tech 2014). Potential river restoration projects were developed based on the master plan and were first screened by LTWC. LTWC identified 15 specific river restoration projects, all with landowner commitment letters. The rankings of the proposed restoration projects were determined by consensus of the LTWC board of directors, an advisory committee, the Natural Resources Conservation Service, and LTWC staff. Priorities included restoring habitat connectivity and ecological integrity between the three major ecological zones of the watershed (plains, foothills, and montane). The overarching criteria for site selection were consideration of post-flood watershed needs and the ability to provide resiliency to the river reaches restored. LTWC currently lacks funding to implement aspects of certain high-priority projects. The Subdistrict has assessed these highly ranked restoration projects for their potential to compensate for functions associated with the drainages that would be lost at the proposed Chimney Hollow Reservoir site.

From this process, the following proposed river restoration projects were selected for potential funding by the Subdistrict. These proposed restoration projects on the Little Thompson River (Figure 1) are high priorities for the watershed and LTWC. The Subdistrict's funding is integral to implementing the restoration element identified as compensatory mitigation for permanent impacts on drainages at the Chimney Hollow Reservoir site.

- Foothills Blue Mountain Reach (Lewis Property/Blue Mountain site) - Bank stabilization, overbank grading to repair headcuts and remove sediment deposits, and major revegetation to improve the function of a new alluvial fan area to slow waters before reaching narrow canyons downstream.
- Plains Berthoud Reach (County Road 4/Berthoud site) - Reestablish a low-flow channel, remove sediment deposits, and revegetate riparian areas to reestablish agricultural buffers that can improve instream water quality.



Windy Gap Firming Project Compensatory Mitigation Sites

Larimer County, Colorado

0 3,500 7,000 Feet

N

Figure 1
Vicinity Map

Prepared for: Municipal Subdistrict Northern Colorado Water Conservancy District
File: 2390 Figure 1.mxd (GS)
February 6, 2017

ERO Resources Corp.

Baseline Information

Portions of the Chimney Hollow drainages and the proposed restoration areas were assessed relative to four categories depending on the expected flooding interval of the respective portions:

- Channel Zone – stream or river below the low-flow channel.
- Zone 1 – the area elevated above the low-flow channel and below the bankfull level. The areas in this zone range from bare to sparsely vegetated, due to scouring and sediment deposition, to scattered wetland vegetation.
- Zone 2 – this area occurs between the bankfull elevation and the 5-year flood event. This zone is characterized by cottonwood (*Populus* sp.*)* and willow (*Salix* sp.*)* woodlands with an understory of herbaceous species and scattered shrubs – chokecherry (*Padus virginiana melanocarpa*) and wild plum (*Prunus americana*).
- Zone 3 – the transitional area above the 5-year flood event. The vegetation in this zone ranges from upland grasslands, sometimes with an overstory of mature cottonwoods or conifers, to shrublands of chokecherry and wild plum.

Chimney Hollow Drainages


Chimney Hollow Creek

The ephemeral and intermittent drainages at the proposed Chimney Hollow Reservoir site and the functions they provide are discussed in Section 3.11.1.5 of the Final EIS for the WGFP and the 2003 delineation report for the proposed Chimney Hollow Reservoir site (ERO 2003). Chimney Hollow Creek, the main drainage at the proposed reservoir site, is an intermittent, often dry, channel. Four ephemeral/intermittent tributaries, determined to be waters of the U.S., connect to Chimney Hollow Creek. These tributaries and Chimney Hollow Creek are a combination of the Channel Zone and Zone 1, as described above. Chimney Hollow Creek is bordered by a riparian corridor that ranges in width from about 30 to 300 feet. The four ephemeral/intermittent tributaries determined to be waters of the U.S. have a narrower riparian corridor ranging in width from about 5 to 25 feet. Only a fringe or scattered stretches of Zone 2 occur along the tributaries and Chimney Hollow Creek because they are small ephemeral or intermittent drainages. Most of the riparian vegetation surrounding Chimney Hollow Creek and its tributaries meets the description for Zone 3.

Functions were assessed for the Final EIS using the Montana Wetland Assessment Method (Montana method; Berglund 1999) for Chimney Hollow Creek and two representative tributaries of Chimney Hollow Creek (Table 2). The functions for general fish habitat, flood attenuation, sediment/nutrient/toxicant retention and removal, and dynamic surface water storage are rated low,

due in part to the lack of a perennial water flow for these drainages. An updated delineation of wetlands and waters of the U.S. for the Chimney Hollow Reservoir site was provided to the DRO in November 2016 (ERO 2016), and a final jurisdictional determination was approved by the DRO on January 24, 2017 (Corps 2017).

Tributaries 5 and 7 were determined to be representative of all of the tributaries and were assessed for functions in the Final EIS. Functions for Tributaries 6, 8, and 10 were not separately assessed for the Final EIS due to their similarity. Tributary 5 has been determined to not be a water of the U.S. (Corps 2017). The functional ratings for Tributary 7 are presented in this Plan as representative of the functions provided by Tributaries 6, 7, 8, and 10 that have been determined to be waters of the U.S.

Table 2. Functional ratings for Chimney Hollow Creek and Tributary 7.

Function	Chimney Hollow Creek		Tributary 7
General Wildlife Habitat	Moderate		Moderate
General Fish Habitat	Low		Low
Flood Attenuation and Storage	Low		Low
Sediment/Nutrient/Toxicant Retention and Removal	Low		Low
Sediment/Shoreline Stabilization	Moderate		Low
Production Export/Food Chain Support	Moderate		Low
Ground Water Discharge/Recharge	High		Low
Dynamic Surface Water Storage	N/A		N/A

Source: ERO 2003.

Tributary 7.

Restoration Reaches

The following is an overview of restoration within the overall reach in which the Subdistrict's compensatory mitigation element would occur.

Blue Mountain Site

Based on knowledge of the area and historical imagery, it is assumed that prior to the 2013 flood, the Blue Mountain site had a densely vegetated riparian corridor, ranging from 100 to 150 feet wide and consisting of cottonwoods and willows, most of which were removed by the flood. The river is generally canyon-bound, setting the sinuosity and river corridor alignment. Significant scour and high velocities occurred in this reach from the 2013 flood (Tetra Tech 2014). Restoration work within the entire 2,700 feet of the Blue Mountain site would involve removing overbank sediment deposits and grading the floodplain to reconnect the riparian corridor and reestablish riparian, wetland, and upland vegetation, as shown on the Blue Mountain Neighborhood Floodplain Rehabilitation Concept Design (Tetra Tech 2016a).

The Subdistrict is proposing to fund the downstream 900 feet of this restoration project for compensatory mitigation (Figure 2). The upstream 1,800 feet is already funded separately and is not considered compensatory mitigation. The Subdistrict-funded portion is needed to complete the proposed restoration for the entire 2,700 feet. Although not included in the functional gain estimated

for the compensatory mitigation site for crediting purposes under this Plan, the channel and riparian restoration performed by the LTWC upstream of the compensatory mitigation site will complement the overall functional gains of the compensatory mitigation site.

Berthoud Site

Based on knowledge of the area and historical imagery, it is assumed that prior to the 2013 flood, the Berthoud site had a moderately dense vegetated riparian corridor, ranging from 100 to 250 feet wide, but with localized floodplain areas expanding the width by as much as 400 feet. The vegetation consisted of cottonwoods, willows, and other riparian species, many of which were removed by the flood. Examples of the woody riparian corridor can be seen on Figure 3 upstream of the proposed Berthoud site restoration area. Flood flows caused some significant bank scour and deposited significant amounts of sediment and debris along the channel and floodplain as flood flows were backed up and slowed by the Mountain River Road Bridge. Sedimentation and bank erosion are the dominant flood impacts in this reach. Adjacent land uses include agriculture, rural development, and roads (Tetra Tech 2014).

Overall restoration would occur within approximately 2,700 feet of the Berthoud site from County Road 4 to upstream of the Mountain River Road Bridge, as shown approximately in the Berthoud Neighborhood Floodplain Rehabilitation Assessment Design Report (Tetra Tech 2016b). The Subdistrict's compensatory mitigation component of the restoration focuses on 1,100 feet of the Berthoud site. The Subdistrict's compensatory mitigation component is integral to the overall restoration because the channel restoration performed by the Subdistrict will support the Zone 2 and Zone 3 riparian restoration performed by the LTWC. The restoration work includes regrading and constructing the river channel and adjacent banks, adding woody material to the channel banks, removing sediment, grading the overbank floodplain, and revegetating the site. The channel alignment is designed to transport flows and sediment as efficiently as possible through the channel and the existing Mountain River Road Bridge, while working within the constraint of the bridge itself and the overall grade and elevations of the current channel above and below the site. In addition, the alignment and overbank grading minimizes disturbance to the existing vegetation, where possible. These activities will increase flood conveyance capacity and reduce flood elevations, particularly upstream of Mountain River Road Bridge; minimize debris accumulation at the Mountain River Road Bridge; and redefine the channel.

Windy Gap Firming Project Compensatory Mitigation Sites

Approximate Project Boundary

Functional Assessment Area

Image Source: Google Earth©, September 2016

0 100 200 Feet

N

Figure 2
Blue Mountain Site

Prepared for: Municipal Subdistrict Northern Colorado Water Conservancy District
File: 2390 Figures 2 & 3.mxd (GS)
March 16, 2017

ERO Resources Corp.

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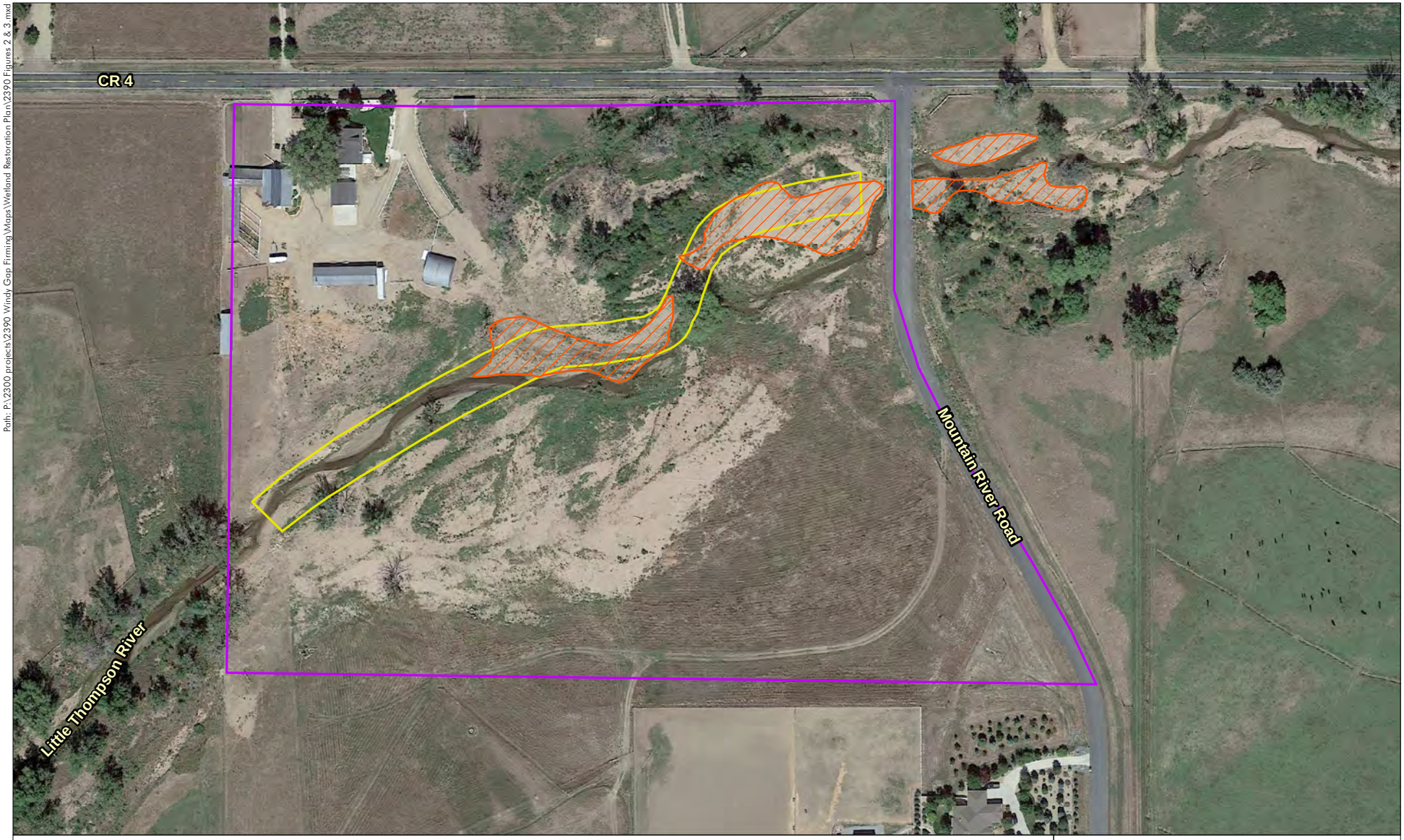

Windy Gap Firming Project Compensatory Mitigation Sites

Approximate Project Boundary

Functional Assessment Area

Mountain River Ranch Estates Conservation Development

Image Source: Google Earth©, September 2016

0 100 200 Feet

N

Figure 3
Berthoud Site

Prepared for: Municipal Subdistrict Northern
Colorado Water Conservancy District
File: 2390 Figures 2 & 3.mxd (GS)
March 16, 2017

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Functional Ratings for the Restoration Sites

Functions were assessed for the Blue Mountain and Berthoud sites using the Montana method (Berglund 1999; Table 3; Appendix B). The assessment area (Figure 2 and Figure 3) focused on the portions of the restoration sites that were representative of the damaged post-flood conditions that were likely candidates for post-flood restoration (e.g., areas of sediment deposition and scour).

Table 3. Functional ratings for Little Thompson River restoration sites.

Function	Blue Mountain and Berthoud Sites
General Wildlife Habitat	Low
General Fish Habitat	Moderate
Flood Attenuation and Storage	Low
Sediment/Nutrient/Toxicant Retention and Removal	Low
Sediment/Shoreline Stabilization	Moderate
Production Export/Food Chain Support	Moderate
Ground Water Discharge/Recharge	High

Proposed Restoration Activities

The following sections describe the compensatory mitigation component of the Blue Mountain and Berthoud sites that the Subdistrict is proposing to fund (Appendix C). A total of approximately 3 acres of restoration to serve as compensatory mitigation is proposed at the two restoration sites (Table 4).

Table 4. Mitigation areas (in acres) by zone and compensatory mitigation site.

Site	Channel Zone	Zone 1	Zone 2	Total
Blue Mountain	0.45	0.33	0.69	1.47
Berthoud	0.85	0.39	0.31	1.55

Blue Mountain Site

- Project boundaries – The entire Blue Mountain site extends 1,400 feet upstream and 1,300 feet downstream from the Stagecoach Trail crossing along the Little Thompson River. The proposed compensatory mitigation area is situated in the lower 900 feet of this reach (Figure 2).
- Construction methods – Minor regrading will be performed with small equipment, where possible, to minimize disturbance to the existing vegetation and root mass, which have developed in some localized areas since the 2013 flood.
- Timing/sequencing – The 80 percent design is to be completed by March 2017; construction for the Emergency Watershed Protection (EWP) portion is to be completed by December 2017. The Subdistrict portion will be constructed concurrently or soon after the EWP portion, once approved by the Corps.
- Hydrology – The Channel Zone and Zone 1 will contain up to the 2-year storm event, and Zone 2 will be supported by the 2- to 5-year storm events. Alluvial ground water would provide additional hydrological support to these riparian areas.
- Revegetation/planting – Zone 1 areas will be planted with willow shrubs as shown in Table 5 and seeded with the Blue Mountain Zone 1 seed mix (Table 6) in specified locations. Zone 2 areas will be planted with woody vegetation (Table 5) and the Zone 2 seed mix (Table 7). The trees and shrubs in Zone 2 will be planted in clusters to emulate natural vegetation patterns.

Table 5. Blue Mountain – Zones 1 and 2 woody vegetation.

Common Name	Scientific Name	Planting Type	Zone 1 Numbers	Zone 2 Numbers
Bluestem willow	*Salix irrorata*	Stakes	200	50
Chokecherry	*Prunus virginiana melanocarpa*	D60	0	40
Golden currant	*Ribes aureum*	D60	0	40
Plains cottonwood	*Populus deltoides monilifera*	Pole cuttings	0	15
Narrowleaf cottonwood	*Populus angustifolia*	Pole cuttings		15
Sandbar willow	*Salix exigua*	Stakes	1,250	250
Western snowberry	*Symphoricarpos occidentalis*	D60	0	40
Wild plum	*Prunus americana*	D60	0	40
Woods' rose	*Rosa woodsii*	D60	0	40

Table 6. Zone 1 seed mix.

Scientific Name	Common Name	Desired Mix %
Elymus canadensis	Canada wildrye	10
Elymus trachycaulus trachycaulus	Slender wheatgrass	10
Glyceria striata	Fowl mannagrass	15
Juncus balticus (arcticus)	Baltic rush	15
Panicum virgatum	Switchgrass	15
Pascopyrum smithii	Western wheatgrass	10
Poa palustris	Fowl bluegrass	15
Spartina pectinata	Prairie cordgrass	10
	Total	**100**

Table 7. Zone 2 seed mix.

Scientific Name	Common Name	Desired Mix %
Elymus canadensis	Canada wildrye	10
Elymus trachycaulus trachycaulus	Slender wheatgrass	20
Iris missouriensis	Rocky Mountain iris	10
Juncus balticus (arcticus)	Baltic rush	10
Oenothera elata	Hooker's evening primrose	5
Panicum virgatum	Switchgrass	10
Pascopyrum smithii	Western wheatgrass	10
Solidago canadensis	Canada goldenrod	15
Sporobolus crytandrus	Sand dropseed	10
	Total	**100**

- Grading – Channel reshaping is designed to restore and improve channel conveyance and preserve and connect existing and planted vegetation. Overbank grading is proposed to repair headcuts and remove sediment deposits. The Zone 1 areas will be graded with native channel material with a cobble substrate at a slope of 2H:1V. Zone 2 areas are graded as a floodplain bench with varying slopes to tie into existing ground elevations.
- Erosion control/bank stabilization – Erosion-control methods will follow the Best Management Practices (BMPs) included in the state Stormwater Management Plan that will be prepared for this project. The BMPs will include silt fencing, dust control, and use of certified weed-free hay or mulch during restoration activities.
- Weed control – A weed management plan will be prepared to guide weed control during and after site restoration and target state-listed noxious weeds.

Berthoud Site

- Project boundaries – The Berthoud site extends about 1,110 feet upstream of the existing Green Bridge at Mountain River Road and includes the channel restoration, Zone 1, and the streamside edge of Zone 2 (Figure 3). The entire Berthoud site extends another 1,530 feet downstream (not shown on the figure).
- Construction methods – Minor regrading, including sediment removal, will be performed with small equipment where possible to minimize disturbance to the existing vegetation and root mass, which have developed in some localized areas since the 2013 flood. More significant grading will be performed using construction methods consistent with similar rehabilitation projects funded by the EWP.
- Timing/sequencing –The 80 percent design is to be completed by March 2017; construction for the EWP portion is to be completed by December 2017. The Subdistrict portion will be constructed concurrently with the EWP portion, once approved by the Corps.
- Hydrology – An undulating channel bottom will be constructed as shown in Appendix C. Generally, Zone 1 will contain up to the 2-year storm event. Zone 2 will contain the 2- to 5-year storm events.
- Revegetation/planting – Zone 1 consists of the sandbar willow community and the zone will be planted with 1,450 sandbar willow stakes. Herbaceous plugs (Table 8) will be planted on the banks, and the Zone 1 seed mix (Table 6) will be planted on top of the banks. Zone 2 will be a riparian community and will be planted with the Zone 2 seed mix (Table 7), along with scattered cottonwood and peachleaf willow trees and various riparian shrubs (Table 8).

Table 8. Berthoud site - Zones 1 and 2 plantings

Common Name	Scientific Name	Planting Type	Zone 1 Numbers	Zone 2 Numbers
Herbaceous vegetation				
Baltic rush	*Juncus balticus (arcticus)*	10ci	200	0
Fowl bluegrass	*Poa palustris*	10ci	200	0
Giant mannagrass	*Glyceria grandis*	10ci	100	0
Nebraska sedge	*Carex nebrascensis*	10ci	100	0
Spikerush	*Eleocharis palustris*	10ci	50	0
Torrey's rush	*Juncus torreyi*	10ci	200	0
Woolly sedge	*Carex pellita*	10ci	150	0
Total Herbaceous Vegetation			**1000**	**0**
Woody Vegetation				
Chokecherry	*Prunus virginiana melanocarpa*	D60	0	45
Common snowberry	*Symphoricarpos occidentalis*	D60	0	90
Golden currant	*Ribes aureum*	D60	0	75
Narrowleaf cottonwood	*Populus angustifolia*	Cuttings	0	20
Peachleaf willow	*Salix amygdaloides*	Cuttings	0	10
Plains cottonwood	*Populus deltoides*	Cuttings	0	20
Sandbar willow	*Salix exigua*	Cuttings	1,450	**0**
Wood's rose	*Rosa woodsii*	D60	0	90
Total Woody Vegetation			**1,450**	350

- Grading – Reshaping is designed to improve channel conveyance and preserve and connect existing vegetation. Overbank grading is proposed to repair headcuts and remove sediment deposits.

- Erosion control/bank stabilization – Erosion-control methods will follow the BMPs included in the state Stormwater Management Plan that will be prepared for this project. The BMPs will include erosion-control blankets on the banks, silt fencing, dust control, and use of certified weed-free hay or mulch during restoration activities.
- Weed control – A weed management plan will be prepared to guide weed control during and after site restoration and target state-listed noxious weeds.

Maintenance, Long-Term Management, and Adaptive Management

The Little Thompson River restoration projects have been designed to be resilient and function with the dynamics of the river. The Subdistrict is committed to establishing a maintenance fund equal to an additional 10 percent of its funding contribution for implementation of the river restoration projects to be used for corrective actions, adaptive management, and long-term maintenance. Annual monitoring reports will identify any need for corrective actions and/or adaptive management.

An Operations and Maintenance (O&M) Plan will be developed for the restoration sites. The O&M Plan will be implemented generally following EWP guidelines, including annual site inspections and maintenance following spring runoff after flows recede and following significant flow events. The inspections will include checking (and repairing as necessary) bank treatment, installed structures, scour or excessive erosion, vegetation and plantings, weed control, soils, fences, and debris to increase restoration success.

The restoration design for the compensatory mitigation is based on stability criteria of the channel features for events that are equal to or less than the 4 percent Association of Civil Engineers (ACE) event (25-year flood). The Subdistrict is committed to providing funds for needed repairs and corrective actions for events that are equal to or less than the design criteria.

Performance Standards

The focus of restoration is to return the channel and stream bank areas to conditions that provide their pre-flood functions and to be resilient given the dynamics of the river. Therefore, the performance standards focus on the establishment of stream bank vegetation and channel function. The restoration plans for compensatory mitigation cover a total of 3 acres of channel and riparian restoration to provide at least 2.3 acres of restored channel and associated riparian area that will provide the needed functional lift discussed in *Mitigation Crediting* below.

Sustainable vegetation will be considered successfully established within the compensatory mitigation areas when the following performance standards have been met:

- The vegetation cover in Zones 1 and 2 is 70 percent.
- 80 percent of the planted trees and shrubs, including volunteers, are living and not stressed.
- No List A noxious weeds (as defined by the State of Colorado noxious weed program) occur within the mitigation area. No more than 5 percent of List B species occurs within the mitigation area.

- Evidence of erosion will be documented by survey and photos at the locations and frequency specified in the *Monitoring Requirements* section below.

Channel restoration will be monitored once a year for 5 years, generally following spring runoff (after flows recede) and following significant flow events to determine if performance standards are being met. Performance standards are based on stability criteria of the channel features for events that are equal to or less than the 4 percent ACE event (25-year flood) and include the following elements:

- Bank protections are functioning as intended.
- Scour or excessive erosion of stream banks, beds, and crossings has not occurred to the point that impedes the hydraulic capacity of the river.

Monitoring Requirements

A 5-year monitoring plan is proposed to evaluate project success in establishing vegetation and geomorphic improvements for the compensatory mitigation sites. The vegetation monitoring will be conducted annually during the growing season for 5 years or until the above vegetation performance standards have been met.

For the Blue Mountain site, three monitoring sites will be established – two near each end of the reach (Sta 9+00 and Sta 1+00) and one near the middle of the reach. For the Berthoud site, three monitoring sites will be established – two near the project site limits (Sta 5+00 and Sta 25+00) and one immediately upstream of the Mountain River Road Bridge. The monitoring of both compensatory mitigation sites will involve:

- *Vegetation*: Vegetation and riparian planting monitoring will be performed using an appropriate point-intercept or transect methodology by a qualified biologist with experience using these protocols. Methodology, including transect locations, shall be determined after construction and will be documented in the first annual monitoring report.
- *Geomorphology*: Cross-section surveys will be collected at each of the three monitoring sites to compare changes in channel bed and banks. An ocular survey will be conducted to identify areas with notable erosion, scour, and/or deposition.
- *Photo Points*: Each monitoring station will have photo points as appropriate for qualitative evaluation of restoration success. The photos will be taken at permanent markers or documented global positioning system (GPS) points.
- *Reporting:* An annual monitoring report describing site conditions, comparisons with performance standards, and recommendations on corrective measures (as needed) will be submitted to the Corps. Photos taken at permanent photo points established during the first year of monitoring will be included in the annual monitoring reports.

Financial Assurances

The Subdistrict is a political subdivision of the State of Colorado. The Subdistrict is a permanent entity with access to adequate funds to cover the mitigation monitoring and any necessary remedial actions. The Subdistrict's budget includes routine maintenance, which includes mitigation monitoring and maintenance. This ensures adequate funding is available for compensatory mitigation monitoring and maintenance. The Subdistrict believes that its past performance under other Corps permits demonstrates its financial ability and commitment to assure that projects approved by the Corps, including compensatory mitigation, are fully implemented and maintained by the Subdistrict. No federal funds will be applied to the restoration credited for compensatory mitigation.

Site Protection

The Subdistrict, LTWC, and landowners have developed agreements regarding the compensatory mitigation sites (Appendix A). The agreements address nondisturbance of project improvements, the ability to monitor and repair project improvements, access of the sites by the Corps and authorized parties, and funding obligations of the Subdistrict for implementation of the restoration and any needed corrective measures. Appendix A also presents residual land restrictions for the Blue Mountain and Berthoud sites that affords additional protection of the restoration from future development.

Determination of Mitigation Credits

As discussed above, the compensatory mitigation proposed for permanent impacts on ephemeral and intermittent drainages at the proposed Chimney Hollow Reservoir site focuses on functions provided by these drainages and functional lift that will be provided by the Little Thompson River restoration projects selected to serve as compensatory mitigation. Accurately determining mitigation crediting is challenging. The ephemeral and intermittent drainages that would be lost at the proposed Chimney Hollow Reservoir site lack perennial flow and are relatively narrow, with an average width of about 4 to 5 feet for Chimney Hollow Creek and about 1 to 2 feet for the tributaries. The proposed compensatory mitigation sites are located on the Little Thompson River with perennial flow and an average width of about 30 to 32 feet at the Blue Mountain site and 41 to 43 feet at the Berthoud site (see Photo Log)

The 2008 Mitigation Rule recognizes that it can be challenging to provide in-kind compensation for losses of ephemeral channels and the 2008 Mitigation Rule provides flexibility to use out-of-kind compensatory mitigation (73 Fed. Reg. 19632 (April 10, 2008)). The 2008 Mitigation Rule also has an objective of replacing lost functions (73 Fed. Reg. 19609, 19673 (April 10, 2008)). Basing compensatory mitigation on functions lost and gained is an appropriate approach for determining the amount of impact and compensatory mitigation needed when comparing resources.

The DRO requested that the functional assessment method performed for the WGFP EIS also be used for this Plan. The functional ratings for the Little Thompson River compensatory mitigation sites were assessed using the Montana method (Berglund 1999). The functional ratings are based on the post-

flood conditions of the assessment area and the degree to which functions in the restored assessment area are estimated to return to pre-flood conditions (i.e., functional lift). For example, the 2013 flood stripped the reaches proposed for restoration of most of the woody riparian vegetation that provided general wildlife habitat and production export/food chain support. These reaches currently provide these functions to a low degree due to the lack of vegetation but, once restored, will provide these functions to a moderate to high degree. An increase in functional lift associated with restoration is anticipated to be greatest with functions driven in part by reestablished woody riparian vegetation and linked to channel conveyance (general wildlife habitat and production export/food chain support).

The Montana method provides for the calculation of functional units to facilitate assessing project impacts, mitigation needs, mitigation plans, or the success of constructed projects. For each function, variables that influence the performance of that function are assessed and assigned a score. That score equates to a rating for the function (high, moderate, or low) and functional points, which range from 1.0 (high) to 0.1 (low). Functional units are calculated by multiplying functional points by the total existing or expected (post-project) acreage associated with the function assessed. Functional units can be calculated in total (i.e., summing all of the functional points for all of the functions assessed and multiplying by the acreage), or can be calculated on a function-by-function basis (Berglund 1999).

Acreage is used as the impact and mitigation metric for this Plan because the Montana method uses acreage to calculate functional units. Functional units are calculated on a function-by-function basis for this Plan because Chimney Hollow Reservoir will replace, on-site, several of the functions currently provided by the intermittent and ephemeral drainages at the Chimney Hollow Reservoir site (Table 9, Table 10, and Table 11). Additionally, calculating functional units on a function-by-function basis (as opposed to summing all of the functional points for all of the functions assessed and multiplying by the acreage) eliminates averaging the functions over the assessment area or making assumptions regarding the degree to which a gain in one function can replace or offset the loss of a different function.

Table 9. Functional units for Chimney Hollow Creek and tributaries.

Function	Chimney Hollow Creek 1.17 acres		Tributaries 6, 8, and 10 0.3 acre[1]		Tributary 7 0.2 acre		Total Functional Units
	Functional Points	Functional Units	Functional Points	Functional Units	Functional Points	Functional Units	
General Wildlife Habitat	0.5	0.585	0.4	0.120	0.4	0.080	0.785
General Fish Habitat	0.2	0.234	0.1	0.030	0.1	0.200	0.464
Flood Attenuation and Storage	0.1	0.117	0.1	0.030	0.1	0.200	0.347
Sediment/ Nutrient/ Toxicant Retention and Removal	0.1	0.117	0.1	0.030	0.1	0.200	0.347
Sediment/ Shoreline Stabilization	0.7	0.819	0.1	0.030	0.1	0.200	1.049
Production Export/Food Chain Support	0.5	0.585	0.1	0.030	0.1	0.200	0.815
Ground Water Discharge/ Recharge	1.0	1.170	0.1	0.030	0.1	0.200	1.400
Dynamic Surface Water Storage	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1]The functional points for Tributaries 6, 8, and 10 are based on the functional assessment for Tributary 7, which is similar to Tributaries 6, 8, and 10.
Source: ERO 2003.

Table 10. Projected functional points gained for the Little Thompson River mitigation sites.

Function	Baseline Functional Points	Post-Restoration Functional Points	Functional Points Gained
General Wildlife Habitat	0.3	0.8	0.5
General Fish Habitat	0.5	0.6	0.1
Flood Attenuation and Storage	0.1	0.3	0.2
Sediment/Nutrient/Toxicant Retention and Removal	0.2	0.3	0.1
Sediment/Shoreline Stabilization	0.7	1.0	0.3
Production Export/Food Chain Support	0.4	0.8	0.4
Ground Water Discharge/Recharge	1.0	1.0	0.0

Table 11. Projected functional units gained for Chimney Hollow Reservoir and Little Thompson River mitigation sites.

Function	Chimney Hollow Reservoir			Blue Mountain Mitigation Site			Berthoud Mitigation Site			Total Functional Units Gained
	Functional Points Gained	Acres	Functional Units Gained	Functional Points Gained	Acres	Functional Units Gained	Functional Points Gained	Acres	Functional Units Gained	
General Wildlife Habitat	N/A	N/A	N/A	0.5	1.31	0.655	0.5	1.69	0.845	1.50
General Fish Habitat	0.8	742	593.6	0.1	1.31	0.131	0.1	1.69	0.169	593.90
Flood Attenuation and Storage	0.6	742	445.2	0.2	1.31	0.262	0.2	1.69	0.338	445.80
Sediment/ Nutrient/ Toxicant Retention and Removal	0.6	742	445.2	0.1	1.31	0.131	0.1	1.69	0.169	445.50
Sediment/ Shoreline Stabilization	0.5	11.48 *	5.74	0.3	1.31	0.393	0.3	1.69	0.507	6.64
Production Export/Food Chain Support	N/A	N/A	N/A	0.4	1.31	0.524	0.4	1.69	0.676	1.20
Ground Water Discharge/ Recharge	1.0	742	742.00	0.0	1.31	0.0	0.0	1.69	0.0	742.0
Dynamic Surface Water Storage	1.0	742	742.00	N/A	N/A	N/A	N/A	N/A	N/A	742.0

*Acres were estimated based on a shoreline of 50,000 linear feet and a width of 10 feet subject to wave action.

Functions Evaluated

Functions are self-sustaining properties of an aquatic ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values (Corps 1995). The functions assessed for impacts and mitigation are listed in Table 9, Table 10, and Table 11. The Montana method also evaluates other functions, characteristics, and values of aquatic sites that were not used in the comparison of impacts and mitigation for this Plan as described below:

- Habitat diversity – not a function, but a characteristic of the area evaluated and is captured in general wildlife habitat. The Montana method does not provide functional points for habitat diversity.
- Habitat for federally listed, proposed, or candidate threatened or endangered plants and animals – addressed separately in the WGFP EIS.
- Habitat for plant or animals rated S1, S2, or S3 by the Colorado Natural Heritage Program – addressed separately in the WGFP EIS.
- Uniqueness – not a function and does not help to distinguish the impacts or proposed mitigation in this Plan.
- Recreation/education potential – not a function.

The following is a brief summary of the functions evaluated at the Chimney Hollow Reservoir and compensatory mitigation sites. Information on functional descriptions and variables assessed is from guidance for implementing the Montana method (Berglund 1999).

General Wildlife Habitat

General wildlife habitat was assessed based upon evidence of wildlife use and habitat features. Variables assessed include structural diversity, evenness of vegetated classes, duration of surface water in at least 10 percent of the assessment area, and degree of disturbance. The duration of surface water, whether perennial or intermittent, plays an important role in the general wildlife habitat function. Generally, the longer surface water is present during the year, the more available it is for wildlife use at a variety of life stages. Assessment areas with high habitat diversity, open water, and a diversity of substantial wildlife use receive high ratings for general wildlife habitat.

Chimney Hollow Creek and its tributaries were rated moderate (0.4-0.5) for general wildlife habitat (Table 9) because vegetation associated with the drainages supports a variety of terrestrial wildlife. Functional ratings were not higher due to lack of water. For this assessment, it was conservatively assumed that Chimney Hollow Reservoir would not provide general wildlife habitat (Table 11), although the reservoir would provide habitat for waterfowl and shoreline birds.

The restoration sites were rated low (0.3) for general wildlife habitat (Table 10) because the assessment areas were sparsely vegetated (low structural diversity) with a high degree of habitat disturbance related to sediment deposition and vegetation removal associated with the 2013 flood.

General Fish Habitat

General fish habitat was assessed based upon duration of surface water; useable hiding, resting, or escape cover; and presence or absence of thermal cover.

Chimney Hollow Creek and its tributaries were rated low (0.1-0.2) for general fish habitat (Table 9) due to the lack of perennial water to support fish habitat.

Chimney Hollow Reservoir was rated high (0.8) for general fish habitat (Table 11) because of its ability to support native and introduced game fish and provide a large permanent water source for fish.

The restoration sites were rated moderate (0.5) for general fish habitat (Table 10) because of the perennial water source and low cover due to scour from the 2013 flood. The Little Thompson River supports a native fishery, and riparian restoration will help restore thermal cover and food chain support for the fishery.

Flood Attenuation and Storage

Flood attenuation and storage assesses the capability of the assessment area to slow in-channel or overbank flow during high water events. Variables used to assess this function are: the area subject to periodic flooding, percent composition of woody vegetation in the assessment area, and the presence/absence of a restricted outlet.

Chimney Hollow Creek and its tributaries were rated low (0.1) for flood attenuation and storage (Table 9) because of the lack of a restricted outlet and the small area subject to potential flooding.

Chimney Hollow Reservoir was rated high (0.6) for flood attenuation and storage (Table 11) because it has a restricted outlet and a large capacity to attenuate and store floodwaters.

The restoration sites were rated low (0.1) for flood attenuation (Table 10) because the assessment area subject to periodic flooding is relatively small, because of sparse vegetation cover by woody vegetation, and due to an unrestricted outlet.

Sediment/Nutrient/Toxicant Retention and Removal

Sediment/nutrient/toxicant retention and removal assesses the ability of the assessment area to retain sediments and retain and remove excess nutrients and toxicants, and is sometime referred to as the "water quality improvement" function. Assessment areas with permanent water that are densely vegetated are rated as high.

Chimney Hollow Creek and its tributaries were rated low (0.1) for sediment/nutrient/toxicant retention (Table 9) and removal due to the lack of a perennial water source and moderate percent cover of rooted vegetation.

Chimney Hollow Reservoir was rated high (0.6) for sediment/nutrient/toxicant retention and removal (Table 11) due to its large perennial water body and anticipated areas of rooted vegetation along portions of the shoreline subject to wave action.

The restoration sites were rated moderate (0.4) for sediment/nutrient/toxicant retention and removal (Table 10) because of major sedimentation within the assessment area related to sediment deposition from the 2013 flood, sparse vegetation cover within the assessment area, and estimated frequency of flooding.

Sediment/Shoreline Stabilization

Sediment/shoreline stabilization assesses the ability of the assessment area to dissipate flow or wave energy, reducing erosion. Variables used to assess this function are: percent cover of stream bank or shoreline by species with deep binding root masses and duration of surface water adjacent to rooted vegetation.

Chimney Hollow Creek and its tributaries were rated low to moderate (0.1-0.7) for sediment/shoreline stabilization (Table 9). The lack of perennial water tended to lower the functional rating.

Chimney Hollow Reservoir was rated moderate (0.5) for sediment/shoreline stabilization (Table 11) depending on the future development of shoreline vegetation.

The restoration sites were rated moderate (0.7) for sediment/shoreline stabilization (Table 10) because of the perennial water source. The rating was influenced on the low side by sparse vegetation cover within the assessment area adjacent to the Little Thompson River.

Production Export/Food Chain Support

Production export/food chain support assesses the potential of the assessment area to produce and export food/nutrients for both terrestrial and aquatic organisms. Variables used to assess this function are: vegetated area, level of biological activity (synthesis of general fish habitat and general wildlife habitat functions), outlet presence or absence, duration of surface water, and presence of a vegetated upland buffer. Perennial surface water is considered superior to seasonal-intermittent or temporary-ephemeral regimes. In addition, opportunities for breakdown and export of organic materials to downstream aquatic habitats via surface water are generally greater for assessment areas containing water for longer, rather than shorter, durations.

Chimney Hollow Creek and its tributaries were rated low to moderate (0.1-0.4) for production export/food chain support (Table 9). The lack of perennial water tended to lower the functional rating.

For this assessment, it was conservatively assumed that Chimney Hollow Reservoir would not contribute to production export/food chain support , although the reservoir will support aquatic organisms and waterfowl and shoreline birds that will provide prey for area wildlife.

The restoration sites were rated moderate (0.4) for production export/food chain support (Table 10) because of their low structural diversity and sparse vegetation cover. The presence of perennial water adjacent to the assessment areas helped to increase the rating.

Ground Water Discharge/Recharge

Ground water discharge/recharge assesses the potential of the assessment area for ground water discharge and recharge. The indicators used to assess this function include the duration of inundation or soil saturation in the upper 12 inches of the soil profile attributed to: 1) ground water discharging from the assessment area, or 2) surface water that is determined or reasonably estimated to be recharging the water table.

Chimney Hollow Creek and its tributaries were rated low to high (0.1-1.0) for ground water discharge/recharge (Table 9). Ratings were influenced by permeable substrate present without an underlying impeding layer (high), vegetation growing during the dormant season/drought (high), and lack of any discharge/recharge indicators (low).

Chimney Hollow Reservoir was rated high (1.0) for ground water discharge/recharge (Table 11) because the assessment area would be permanently flooded during drought periods and reservoirs are known for contributing to ground water and creating ground water “mounds.”

The restoration sites were rated high (1.0) for ground water discharge/recharge (Table 10) because the assessment area had permeable sediments throughout or discharge indicators were observed.

Dynamic Surface Water Storage

Dynamic surface water storage assesses the potential of the assessment area to capture, retain, and make available surface water originating from flooding, precipitation, upland surface (sheetflow), or

subsurface (ground water) flow. Variables used to assess this function are: estimated maximum acre-feet of water contained in the assessment area subject to flooding or ponding, duration of surface water, and flood frequency.

Chimney Hollow Creek and its tributaries were rated N/A for dynamic surface water storage (i.e., this function is not provided by Chimney Hollow Creek and its tributaries).

Chimney Hollow Reservoir was rated high (1.0) for dynamic surface water storage (Table 10) due to the size and frequency of the area flooded by the reservoir. Chimney Hollow Reservoir would provide the dynamic surface water storage function not currently provided by Chimney Hollow Creek and its tributaries.

The restoration sites were not assessed for dynamic surface water storage.

Mitigation Crediting

Chimney Hollow Reservoir will provide a sizable perennial aquatic resource with an estimated shoreline of 50,000 linear feet, 742 surface acres, and a volume of 90,000 acre-feet when full. This sizable aquatic resource was originally recognized by the DRO in the Section 404(b)(1) Analysis and by Reclamation in its ROD (Reclamation 2014) when both agencies considered impacts on waters of the U.S. along Chimney Hollow Creek to be mitigated by the creation of a large open-water reservoir. As shown in Table 11, Chimney Hollow Reservoir will more than replace, on-site, the functional units for general fish habitat, flood attenuation and storage, sediment/nutrient/toxicant retention and removal, sediment/shoreline stabilization, and ground water discharge/recharge currently associated with Chimney Hollow Creek and its tributaries. Additionally, the reservoir will provide dynamic surface water storage, a function not provided by Chimney Hollow Creek and its tributaries. Although the reservoir would also provide some functional units for general wildlife habitat and production export/food chain support, for this analysis of needed functional units for mitigation, it was conservatively assumed that Chimney Hollow Reservoir would not contribute to these functions. Therefore, 0.785 functional units of general wildlife habitat and 0.815 functional units of production export/food chain support need to be provided by the Little Thompson River restoration sites (Table 9).

General wildlife habitat had a baseline functional point score of 0.3 and a projected post-restoration functional point score of 0.8 (the mid-range of a high rating) (Table 10). The difference between the baseline functional point score and the projected post-restoration functional point score is 0.5. With an estimated functional point score lift of 0.5, 1.57 acres of channel and riparian restoration will be needed to compensate for the 0.785 functional units of general wildlife habitat lost (calculated as 0.5 points of functional lift x 1.57 acres = 0.785 functional units).

Production export/food chain support had a baseline functional point score of 0.4 and a projected post-restoration functional point score of 0.8 (low end of a high rating) (Table 10). The difference between the baseline functional point score and the projected post-restoration functional point score is 0.4. With an estimated functional point score lift of 0.4, 2.04 acres of channel and riparian restoration will be

needed to compensate for the 0.815 functional units lost (calculated as 0.4 points of functional lift x 2.04 acres = 0.815 functional units).

The same restoration areas will provide the general wildlife habitat and production export/food chain support functional units. Therefore, assuming the estimated functional lift is fully achieved by the proposed restoration, about 2.0 acres of channel and riparian restoration at the Little Thompson River mitigation sites will compensate for the aquatic functions lost at the Chimney Hollow Reservoir site. The restoration plans have been developed to provide up to 3 acres of channel and riparian restoration (Table 4) that will provide a gain (functional lift) of at least 0.785 functional units for general wildlife habitat and 0.815 functional units of production export/food chain support.

Based on discussions with the DRO, weights were applied to the proposed restoration activity acres for crediting (Table 12). The weights range from 0.25 for Zone 2 plantings to 0.75 for the reconstruction of the river channel at the Berthoud site. The weights reflect the degree to which the restoration activity is likely to contribute to offsetting the impacts. For example, Zone 2 revegetation (with a weight of 0.25) is located further from the channel than Zone 1 (with a weight of 0.5); and the Channel Zone for the Berthoud site (with a weight of 0.75) will have a series of shallow pools and riffles compared with the Blue Mountain site (with a weight of 0.5) that will not be reconstructed with a series of shallow pools and riffles. Applying the weights to the proposed restoration activity acres results in the proposed restoration activities at the sites providing 1.49 acres of compensatory (Table 12). Based on the unweighted functional analysis above, 2.0 acres of compensatory is needed to replace the functions estimated to be lost with the construction of Chimney Hollow Reservoir. Subtracting the weighted acres from the unweighted 2.0 acres leaves a deficit of 0.51 acre of needed compensatory mitigation.

Based on discussions with the DRO, this 0.51-acre deficit in stream compensatory acreage will be offset by the purchase of at least 1.0 acre of mitigation bank credits from the Middle South Platte River Wetland Mitigation Bank. The purchase of 1.0 bank credit is based on a 2 (credits) to 1 (impact) ratio because the impacts occur within the secondary service area of the Middle South Platte River Wetland Mitigation Bank and the bank credits are out-of-kind when compared with the impacts.

Table 12. Weighted acres of restoration for mitigation crediting.

Mitigation Sites	Acres	Weight	Weighted Acres
Blue Mountain			
Channel Zone	0.45	0.5	0.23
Zone 1	0.33	0.5	0.17
Zone 2	0.69	0.25	0.17
Berthoud			
Channel Zone	0.85	0.75	0.64
Zone 1	0.39	0.5	0.20
Zone 2	0.31	0.25	0.08
Total Weighted Acres			1.49

The determination of mitigation credits has been conservatively estimated as follows:

- The estimated functional lift provided by restoration at the compensatory mitigation sites was in the low- to mid-range of a high rating.
- Contributions of Chimney Hollow Reservoir to the general wildlife habitat and production export/food chain support functions were not included in estimates of functional units gained (Table 11).
- Compensatory mitigation was designed to include 3.0 acres of channel and riparian restoration, about 1.0 acre more than the estimated 2.0 acres needed to compensate for functions lost (Table 9)
- The acres of proposed restoration were weighted (i.e., none of the proposed restoration acres were credited at 1:1).
- Functional units for each function were viewed independently and not totaled. Thus, large gains in one function (e.g., general fish habitat) were not used to offset losses in other functions (Table 11).

Summary of Compensatory Mitigation

Table 13 provides a summary of the proposed compensatory mitigation for impacts to jurisdictional wetlands and waters associated with the construction of Chimney Hollow Reservoir.

Table 13. Compensatory mitigation for impacts on jurisdictional wetlands and waters at Chimney Hollow Reservoir.

Aquatic Resource	Impacts (acres)	Compensatory Mitigation
Wetlands	1.3	The Subdistrict will purchase 1.95 mitigation bank credits from the Middle South Platte River Wetland Mitigation Bank.
Intermittent and Ephemeral Drainages	1.7	At least 2.0 acres (3.0 acres are proposed) of river and riparian restoration – 1.47 acres at the Blue Mountain site and 1.55 acres at the Berthoud site – will be funded by the Subdistrict. Additionally, the Subdistrict will purchase 1.0 mitigation bank credits from the Middle South Platte River Wetland Mitigation Bank in addition to the 1.95 mitigation bank credits for compensatory mitigation for wetlands stated above.

Water Rights

Securing water rights in support of the compensatory mitigation is not one of the 12 fundamental components of the 2008 Mitigation Rule. However, the DRO has requested information on water rights in support of the proposed restoration of the Little Thompson River compensatory mitigation sites. The Middle South Platte River Wetland Mitigation Bank has water rights that support the wetlands created and maintained by the bank, so information on these rights is not provided as part of this Plan.

When considering the need for water rights for the proposed restoration at the Little Thompson River compensatory mitigation sites, it is important to remember that the objective of this Plan is to fund actions that will restore riverine functions at selected reaches of the Little Thompson River severely damaged by floods in fall 2013. The focus of this Plan is on restoration of preexisting aquatic resources, not creation of additional aquatic resources. Restoring the mitigation sites to their pre-flood conditions will not result in an increase in consumptive use of Little Thompson River water above or beyond what naturally occurred prior to the 2013 flood. Channel restoration will involve returning the channel to its pre-flood natural characteristics of an undulating channel bottom. Channel restoration will not involve

the creation of deep ponded pools or other impediments to stream flow. The State of Colorado does not require a water right for the restoration work that is proposed (Appendix D).

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Appendix A Agreement and Landowner Authorization, Consent, and Limited License for Implementation and Construction

Draft
3-08-17

Agreement and Landowner Authorization, Consent, and Limited License for Implementation and Construction _____ Property

This Agreement and Landowner Authorization, Consent, and Limited License ("this **Agreement**") is entered into as of this _____ day of _____, 2017 by and between _____ ("the **Landowner**"), the Little Thompson Watershed Coalition ("the **Watershed Coalition**"), and the Municipal Subdistrict, Northern Colorado Water Conservancy District ("the **Subdistrict"**), collectively "**the Parties**," for the purposes and subject to the terms and conditions stated below.

1. Background.

a. The Landowner represents and warrants that the Landowner is the owner in fee simple of the real property described on Exhibit A attached hereto ("the **Property**").

b. The Property is located along the _____ reach and either (i) sustained damage during the September 2013 flood and/or (ii) has been identified by the Watershed Coalition as a location for mitigation work that may provide resiliency and/or lessen the impact of future flooding events. [*Tailor this sentence to circumstances of specific Property*]

c. The Watershed Coalition has received or is in the process of receiving funding for the implementation of the restoration/mitigation/resiliency activities on, involving, or otherwise affecting the Landowner and the Property as generally described in preliminary plans and designs that the Watershed Coalition has provided to the Landowner ("**Implementation Project**").

d. The Landowner desires to have the Implementation Project completed on the Property pursuant and subject to the terms and conditions of this Agreement.

e. Work to be done pursuant to the Implementation Project may be conducted by the Watershed Coalition, its employees, its volunteers, and/or third parties hired by and acting on behalf of the Watershed Coalition, each of whom is referred to in this Agreement as an "**Authorized Party**."

f. Work to be done pursuant to the Implementation Project will also serve as compensatory mitigation for impacts on waters of the U.S. associated with a Clean Water Act ("**CWA**") Section 404 permit issued by the U.S. Army Corps of Engineers ("the **Corps**") for the construction of the proposed Chimney Hollow Reservoir ("**Compensatory Mitigation**"). The portion of the Property in which the Compensatory Mitigation will occur is shown on Exhibit B.

2. Agreement, Authorization, Consent, and Limited License with respect to the Implementation Project.

a. The Watershed Coalition agrees to design and develop the Implementation Project upon receipt of advance funding for completion of the Project in accordance with Exhibit C hereto.

b. The Subdistrict will provide funding for the Compensatory Mitigation component of the Implementation Project in accordance with the payment schedule in Exhibit C attached hereto. The Subdistrict's funding obligation is subject to the conditions in paragraph 3 below.

c. The Landowner hereby authorizes, consents to, and grants to the Watershed Coalition a nonexclusive, limited, and temporary license for the following purposes in connection with the Implementation Project, in accordance with the following:

    i. The Landowner shall retain the right to review, approve, request changes to, or reject the Work Plan (including the time schedule for the work to be performed) and specific project designs of the Implementation Project as prepared by the Watershed Coalition up to the point of a 30% design plan for the Implementation Project. Any changes that may be requested by the Landowner will be subject to the consent and approval of the Watershed Coalition and Subdistrict. The Landowner's right to approve, request changes to, or reject the Work Plan pursuant to this paragraph 2.c.i is in the Landowner's sole discretion. The Watershed Coalition's and Subdistrict's right to withhold their consent and approval of requested changes shall also be in the Watershed Coalition's and Subdistrict's respective sole discretion. The final Work Plan for Compensatory Mitigation will be subject to review and approval by the Corps. Funding by the Subdistrict and implementation of the Compensatory Mitigation is subject to the conditions in paragraph 3 below.

    ii. Authorized Parties may from time to time, as reasonably necessary, enter onto the Property to survey, map, and conduct limited impact soil testing and sampling; assess wildlife, botanical, riparian, and hydrological conditions; and perform such other activities as may be reasonably necessary in order for the Watershed Coalition to complete the planning and design of the Implementation Project, including a specific Work Plan with respect to the Property.

    iii. It is understood and agreed by the Parties that the Implementation Project shall be subject to the Parties obtaining any and all necessary licenses, permits, and approvals from all applicable governmental authorities. The Watershed Coalition, Subdistrict, and the Landowner shall not be under any obligation to pay for or proceed with the Implementation Project until all necessary licenses, permits, and approvals have been secured to the satisfaction of the Parties. No representations or warranties are made by any party as to the ability of the Parties to obtain such licenses, permits, and approvals.

    iv. Once the Work Plan and specific project designs have been agreed upon to the satisfaction of the Parties (which agreement may be withheld in the sole discretion of any party up to the point of a 30% Design Plan per paragraph 2.c.i above), the Landowner will be requested to provide final approval and consent for the Implementation of the Project on the "Landowner Authorization to Proceed" form, which is attached hereto as Exhibit D. This final approval will include approval for Authorized Parties to, from time to time as reasonably necessary, enter onto the Property to perform all necessary or appropriate earthmoving, construction, planting, stream modification, changes to the contours of the property, and other activities reasonably necessary for the Watershed Coalition to complete the Work Plan in accordance with the specific project designs of the Implementation Project and the Work Plan.

v. The Watershed Coalition and/or Subdistrict may document, publish, and disclose the work performed on the Property to the Landowner, the Corps, other affected parties, and/or to funding sources in such manner as the Watershed Coalition and/or Subdistrict may determine to be necessary or appropriate, including monitoring.

vi. Work pursuant to this authorization, consent, and limited license with respect to the Implementation Project shall be completed within six (6) months of the expected completion date as stated in the Work Plan and agreed upon by the Parties, or such longer period as may be permitted with the written consent of the Landowner, which consent may be withheld by the Landowner in the Landowner's sole discretion; and the license granted pursuant to this paragraph 2 shall terminate and cease to exist at the end of such six months or the extended period as specified in such written consent, if any. Notwithstanding the above, the monitoring of, and any corrective measures to, the work performed pursuant to this authorization, consent, and limited license with respect to the Implementation Project shall continue to proceed beyond the above timeframes pursuant to paragraphs 3 and 4.

vii. Work performed pursuant to this paragraph 2 shall be done in a reasonable manner consistent with ordinary and customary standards and practices. Notwithstanding the foregoing, the Landowner understands and agrees that no warranty is made by the Watershed Coalition or Subdistrict, any Authorized Party, or any other person or entity as to the effectiveness of any work in preventing damage from any future flooding event to the Property or any improvements on the Property.

viii. The Work Area will be limited to that area described in the Work Plan. Construction access routes outside of the stream bed and bank will be identified and agreed upon by the Landowner in advance of construction and will be restored to preconstruction conditions. If the Watershed Coalition or its contractor damage any property or improvements outside the Work Area, the Watershed Coalition or its contractor will restore the property or improvements to substantially the same condition (or improved condition as agreed upon by the Landowner) as prior to entry on the property. Preconstruction conditions will be documented through photos taken prior to construction. Geomorphic and vegetation monitoring cross-sections will also be set up at strategic location(s) to document preconstruction conditions.

3. Funding. The Subdistrict shall contribute funding to the Watershed Coalition in accordance with the payment schedule in Exhibit C attached hereto, subject to the following conditions:

a. The Subdistrict's funding obligation is contingent upon prior assurance from the Corps, to the Subdistrict's satisfaction, that implementation of the Project will serve as Compensatory Mitigation in support of the Section 404 permit described in paragraph 1.f above.

b. Payments under this Agreement shall be made by the Subdistrict through the Windy Gap Firming Project Enterprise Fund, and no other fund or funds of the Subdistrict or its parent District (Northern Colorado Water Conservancy District) shall be obligated, used, or impacted in any manner whatsoever by this Agreement.

c. As reflected in Exhibit C, the Subdistrict shall pay an additional amount up to 10% of the cost of the Implementation Project, for use by the Watershed Coalition if needed to maintain, repair, or correct any improvement or work performed as part of the Implementation

Project and Compensatory Mitigation. Said amount shall be payable within 30 days of written notice from the Watershed Coalition stating the reasons necessitating such work and the estimated costs associated with such work.

d. As reflected in Exhibit C, the Subdistrict shall fund all monitoring and reporting of the Implementation Project related to Compensatory Mitigation.
e. The financial obligations of the Subdistrict payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available.
f. In the event the Subdistrict has provided funding pursuant to this Agreement, but the Implementation Project does not move forward for any reason, the Watershed Coalition shall return any unencumbered funds to the Subdistrict within 30 days of a written request by the Subdistrict requesting return of such funds.

4. **Ownership, Maintenance, and Nondisturbance of Improvements Made Pursuant to the Implementation Project.** The Parties agree as follows:
    a. The Watershed Coalition and Subdistrict will not own or assert any financial rights in any improvements made to the Property pursuant to the Implementation Project. Instead, such improvements will become part of the Property and, as such, will be owned by the Landowner.
    b. The Watershed Coalition and Subdistrict will have the right to conduct annual monitoring, repair, or maintain any such improvements for a period after completion or until the Corps has determined that the Compensatory Mitigation is successful. (LTWC is responsible for the 3 years of monitoring of the project, except for the Compensatory Mitigation component; the Subdistrict is responsible for 5 years of monitoring or until the Corps has determined that the Compensatory Mitigation is successful for the Compensatory Mitigation component of the project.)
    c. Nothing contained in this Agreement shall obligate the Watershed Coalition or the Landowner to maintain or repair any improvement or work performed as part of the Implementation Project.
    d. Except under emergency conditions threatening life or property, the Landowner shall not purposefully or materially destroy, remove, or alter any improvement or work performed as part of the Implementation Project without the prior written consent of the Watershed Coalition or Subdistrict, which consent may be delayed, withheld, or conditioned in the Watershed Coalition's and Subdistrict's sole discretion.

5. **Authorization, Consent, and Limited License with respect to Monitoring of, and/or Corrective Measures to, Improvements Made Pursuant to the Implementation Project.** The Landowner does hereby authorize, consent to, and grant to the Watershed Coalition and Subdistrict a limited license for the following purposes in connection with monitoring of, and/or corrective measures to, any improvements made to the Property pursuant to the Implementation Project:
    a. Authorized Parties, including the Corps, may from time to time, as reasonably necessary, enter onto the Property to monitor or assess the ongoing condition of and effectiveness of any improvements or changes made on, affecting or otherwise involving the Property pursuant to the Implementation Project and Compensatory Mitigation. It is anticipated that such monitoring visits will occur no more frequently than on an annual basis or, more frequently in the event of needed repairs or corrective measures, flooding conditions, or the occurrence of a flooding event.

b. The Watershed Coalition and Subdistrict may publish and disclose the results of its monitoring assessments to the Landowner, other affected parties, the Corps, and/or to funding sources as the Watershed Coalition and Subdistrict may determine to be necessary or appropriate.
c. The license created pursuant to this paragraph 5 shall continue for 5 years or until the Corps has determined that the Compensatory Mitigation is successful, in order to monitor the condition and effectiveness of the Implementation Project. The Subdistrict, per the terms and conditions of their Section 404 CWA permit from the Corps, will be responsible for any required corrective measures for the Compensatory Mitigation. Implementation of any required corrective measures may require access to the property beyond five years or beyond when the Corps has determined that the Compensatory Mitigation is successful. When the Watershed Coalition and Subdistrict determine that continued monitoring and the likelihood of corrective measures are no longer necessary, they will prepare, execute, and record a termination of this license.

6. **Waiver and Release.** It is understood and agreed that the Landowner authorizes access to the described property to the Watershed Coalition, Subdistrict, the Corps, and Authorized Parties for the purposes set forth above. The Watershed Coalition will require its contractors to carry liability insurance. Moreover, the Landowner is not liable for any for damage, injury, or accident that may occur as a result of any activity undertaken on behalf of the Watershed Coalition or Subdistrict.

7. **Binding Effect.** This Agreement shall be binding upon and inure to the benefit of the Parties hereto, their heirs, personal representatives, successors, and assigns. The obligations of the Landowner under this Agreement shall be considered a covenant running with the Property. The Watershed Coalition and Subdistrict are authorized to record this Agreement with the Office of the Clerk and Recorder, Larimer County, Colorado.

8. **Force Majeure**. A Party shall be excused from performing its obligations under this Agreement during the time and to the extent that it is prevented from performing by a cause beyond its control, provided that such nonperformance is beyond the reasonable control of and is not due to the fault or negligence of the Party not performing.

9. **Third-Party Beneficiaries.** Enforcement of this Agreement and all rights and obligations hereunder are reserved solely to the Parties and not to any third party. Any services or benefits which third parties receive as a result of this Agreement are incidental to the Agreement and do not create any rights for such third parties.

10. **Governmental Immunity and Limitations**. No term or condition of this Agreement shall be construed or interpreted as a waiver, expressed or implied, of any of the immunities, rights, benefits, protections, or other provisions of the Colorado Constitution including TABOR, Colo. Const. art.X, § 20; the Governmental Immunity Act, C.R.S. § 24-10-101 *et seq*.; or the Federal Tort Claims Act, 28 U.S.C. §§ 1346(b) and 2671 *et seq*., as applicable now and hereafter amended.

11. **Governing Law.** This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado.

12. Entire Agreement. This Agreement contains the entire understanding of the Landowner, the Watershed Coalition, and Subdistrict with respect to the items referred to herein and shall not be modified or amended except in writing executed by all Parties to this Agreement.

IN WITNESS WHEREOF, the Parties have executed this Agreement, to be effective as of the day and year first above written, notwithstanding the actual date of execution.

LANDOWNER:
_____

_____
_____

STATE OF COLORADO)
) ss:
COUNTY OF LARIMER)

The foregoing instrument was acknowledged before me this ____ day of _____, 20___ by _____.

Witness my hand and official seal.

_____
Notary Public

WATERSHED COALITION
Little Thompson Watershed Coalition

By: _____,
Deirdre Daly, President

STATE OF COLORADO)
) ss:
COUNTY OF BOULDER)

The foregoing instrument was acknowledged before me this ____ day of _____, 20___ by _____.

Witness my hand and official seal.

_____
Notary Public

MUNICIPAL SUBDISTRICT, NORTHERN COLORADO CONSERVANCY DISTRICT

By: _____,
_____

STATE OF COLORADO)
) ss:
COUNTY OF LARIMER)

The foregoing instrument was acknowledged before me this ____ day of _____, 20___ by _____.

Witness my hand and official seal.

_____
Notary Public

Exhibit A—Legal Description of the Property

Property address: _____

Larimer County tax parcel number(s): _____

Full legal description: _____

Exhibit B—Location of Compensatory Mitigation on the Property

Exhibit C—Funding Obligations of Municipal Subdistrict, Northern Colorado Water Conservancy District to Watershed Coalition

Exhibit D—Landowner Authorization to Proceed

Berthoud Site Land Development Restrictions

Berthoud Site Land Development Restrictions

Foley's property (both parcels) are part of the MOUNTAIN RIVER RANCH ESTATES CONSERVATION DEVELOPMENT. Although this is not a conservation easement, the covenants that control the subdivision act very much like a CE. Foley owns Residual Lot A and B (in two parcels) that are protected by the covenant. This encumbrance limited the development to one building envelope and dictates what kinds of land use can occur on the property.

Perhaps your contacts at the county could provide us with the covenant document (reception # 2002005936), the agreement with Larimer County(#20020052933), the plat (#2002052932) and the findings/resolution of the commissioners (#20030106454).

Here is what is pertinent in the agreement:

3. Residual Land Restrictions

Residual Lot A and Residual Lot B will be maintained and protected from future development in perpetuity in accordance with this Development Agreement and the attached Management Plan for Mountain River Ranch Estates Conservation Development. As a condition of final approval of the Final Plat, Developer covenants and agrees and does hereby dedicate in perpetuity the use of Residual Lot A to one single-family residence within the 2.4 acre building envelope. Developer also hereby covenants and agrees and does hereby dedicate in perpetuity the use of Residual Lot A (outside of the building envelope) and Residual Lot B to agricultural purposes including the cultivation of soil, the production of crops, the raising and grazing of livestock, and in varying degrees the preparation of agricultural products for human use and their disposal, all as contemplated in a farming and ranching agricultural operation. This restrictive covenant shall and does hereby preclude development, single family residences, buildings and structures on Residual Lots A and B, except for the residence within the building envelope on Residual Lot A and except for agricultural outbuildings, which are clearly necessary and incidental to the use of Residual Lots A & B for agricultural purposes.

Residual Lot A and Residual Lot B shall not be used for feed-yards, poultry farms, horse boarding and breeding operations or other commercial or industrial type uses, unless the owner(s) of Residual Lot A and Residual Lot B have received approval for such uses from the Larimer County Board of County Commissioners. The owner(s) of Residual Lot A and Residual Lot B shall maintain Residual Lot A and Residual Lot B in accordance with the approved Management Plan on file at the Larimer County Planning Department.

These restrictions are covenants running with Residual Lot A and Residual Lot B, and are binding on Developer, its successors and assigns, all successor owners and transferees of Residual Lot A and Residual Lot B. These restrictions may be enforced by the County or by any owner of Lots 1 through 7 or Residual Lot A or Residual Lot B.

Tim Wellman
Watershed Coordinator
Little Thompson Watershed Coalition
435 High St. #201

2

Blue Mountain Site Declaration of Covenants, Conditions, and Restrictions

(1)

RCPTN # 96024746 04/09/96 14:23:00 # PAGES - 8 FEE - $41.00
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DECLARATION OF RIVER CORRIDOR CONSERVATION AREA COVENANTS, CONDITIONS, AND RESTRICTIONS

THIS DECLARATION OF RIVER CORRIDOR CONSERVATION AREA COVENANTS, CONDITIONS, RESTRICTIONS AND RECIPROCAL EASEMENTS (the "Declaration") is made as of the 4th day of April, 1996, by William M. Browning and Paula L. Browning (collectively, "Declarant").

RECITALS

A. Declarant is the record owner of certain real property located in Larimer County, Colorado, consisting of approximately 109 acres, as more particularly described on Exhibit A attached hereto and made a part hereof (the "Property"). The Property consists of six (6) contiguous homesite parcels (each, a "Parcel," and collectively, the "Parcels"). Each of the Parcels contains a portion of the Little Thompson River corridor.

B. Declarant desires to protect and enhance the relatively natural, scenic, wildlife habitat and other similar features and values of certain river corridor portions of the Property, including certain portions of the Parcels, as more particularly described on Exhibit B attached hereto and made a part hereof (the "Conservation Area"). The Conservation Area is set forth on the Browning Amended Exemption Plat, described below. Specifically, Declarant intends that, within the Conservation Area, native plant and animal species and communities, wildlife and wildlife habitat features and values, the land's natural contours and features, and the hydrologic, wetland and other natural functions of the Little Thompson River will remain largely undisturbed. Such natural features, values and functions are hereinafter collectively referred to as the "Conservation Values."

C. The Larimer County Commissioners, by their approval of the X Bar Seven Amended Plat and the Browning Amended Exemption Plat, both filed of record in Larimer County on January 23, 1996, at Reception Nos. 96005118 and 96005117, have endorsed Declarant's efforts to protect and enhance the Conservation Values of the Property.

D. In furtherance of Declarant's desire to protect and enhance the Conservation Values, Declarant hereby subjects the Conservation Area, the Property and each of the Parcels to, and burdens and benefits each and all of the Parcels with, the following covenants, conditions, and restrictions.

Return to Browning ✓
Box 316
Hygiene, Co 80533

TERMS AND PROVISIONS

1. BUILDINGS, STRUCTURES AND IMPROVEMENTS. No buildings, structures, roads or other improvements of any kind or nature shall be erected, placed, constructed or maintained anywhere within the Conservation Area; provided, however, that (i) an existing water well located within the portion of X Bar Seven Amended Plat Lot 1 lying within the Conservation Area, together with a reasonable and customary, low-impact surface or subsurface water delivery pipe may be (installed, with respect to such water delivery pipe,) maintained, repaired and used solely to provide water to residential dwellings to be constructed outside the Conservation Area on the Property; and (2) smooth wire perimeter agricultural fencing, consistent with existing smooth wire fencing on the Property as of the date hereof, which does not inhibit wildlife movement, may be maintained along those common boundary lines of the Parcels indicated on Exhibit B attached hereto and made a part hereof which lie within the Conservation Area.

2. USE AND DEVELOPMENT OF THE PARCELS. The design and construction of all structures and improvements on each Parcel, and the use of each Parcel by the owners and occupants thereof, shall be conducted in a manner which reasonably minimizes impacts on the Conservation Area and the Conservation Values.

3. NO TOPOGRAPHICAL CHANGES; MINING; EXCAVATION. No excavating, grading, cutting, filling, berming, riprap, riverbank alteration or stabilization, channelization, stream-widening, dredging, damming, mining, extraction of soil, sand, gravel, rock or other mineral substances, or other similar material man-made topographical changes shall be permitted within the Conservation Area, except as may be certified in writing by a qualified hydrologist as reasonably necessary to preserve or restore the Conservation Values following a severe flood or other natural event, or to mitigate significant erosional or other impacts of activities occurring outside the Property.

4. DISTURBANCE OF TREES AND VEGETATION; NON-NATIVE SPECIES. No removal, destruction or cutting down of trees, shrubs or other native vegetation shall be permitted within the Conservation Area. No non-native species may be planted, cultivated or otherwise intentionally introduced into the Conservation Area.

5. WEED CONTROL. The control of noxious weeds as required by state law, or otherwise to control the spread of non-native plant species, shall be permitted within the Conservation Area; provided, however, that all weed control techniques shall be applied in a manner which reasonably minimizes impacts on the

Conservation Values, including, without limitation, native species, wildlife and the water quality of the Little Thompson River; specifically, the use of herbicides shall be minimized, and the aerial or other general application of herbicides shall be prohibited.

6. NO LIVESTOCK; PETS. No livestock (including, without limitation, cattle and horses) or livestock grazing, loafing or watering shall be permitted within the Conservation Area; provided, however, that horses may be led or ridden across the Conservation Area if at all times under direct human control. The owner of any Parcel on which cattle, horses or other livestock are maintained outside the Conservation Area shall be responsible for constructing and maintaining livestock fencing adequate to exclude all such livestock at all times from the Conservation Area. Domestic dogs, cats and other pets shall be allowed in the Conservation Area only of accompanied at all times by their owners; in no event shall such domestic dogs, cats or other pets be allowed to roam freely in the Conservation Area.

7. NO VEHICLES OR MACHINERY. No motorized or non-motorized vehicles or machinery, including, without limitation, trucks, automobiles, four-wheelers and other off-road vehicles, motorcycles, dirt bikes, bicycles, farm machinery, earth-moving equipment, mobile homes and trailers, shall be permitted within the Conservation Area. Use of and access to the Conservation Area shall be strictly limited to low-impact foot traffic.

8. DUMPING; HAZARDOUS MATERIALS; WATER QUALITY. No dumping, disposal, storage or accumulation of any trash, rubbish, refuse, equipment, vehicles or other similar substances or materials, or of any toxic or hazardous substances or materials, shall be permitted within the Conservation Area. Without limiting the generality of the foregoing, no such uses or activities shall be permitted anywhere on the Property to the extent such uses or activities may, or threaten to, result in any material impact on or degradation of the Conservation Values, including, without limitation, water quality.

9. HUNTING AND FISHING; FIREARMS. No hunting or discharge of firearms or other weapons shall be permitted within the Conservation Area. Fishing in the Conservation Area shall be permitted only on a catch-and-release basis, limited to the use of barbless hooks and employment of other customary catch-and-release fishery conservation practices.

10. COVENANTS RUNNING WITH THE LAND. This Declaration, every provision hereof and every covenant, condition and restriction contained herein, shall run with and bind, and be appurtenant to, the Property and each of the Parcels,

respectively, and shall inure to the benefit of and be binding on and enforceable (at law or in equity) by Declarant and/or by the owner of any Parcel, and their heirs, personal representatives, successors and assigns as owners thereof. The acceptance of any deed or other instrument conveying any interest in any Parcel shall be deemed such grantee's, for itself and all such heirs, personal representatives, successors and assigns, acceptance of and agreement to be bound by all the terms and provisions of this Declaration.

11. MONITORING AND ENFORCEMENT; SEVERABILITY. Declarant shall have the right, from time to time and upon reasonable prior notice to the then owners of the respective Parcels, to inspect such Parcels as may be reasonably necessary to confirm compliance with, or to identify actual or imminent violations of, the terms and provisions of this Declaration. Any actual or imminent violation of the terms or provisions of this Declaration may be remedied by Declarant and/or by any owner of any Parcel (i) by written notice to the alleged violator setting forth the nature of the alleged violation, upon receipt of which the alleged violator shall immediately discontinue any activity or land use which could increase or expand the alleged violation until an appropriate correction of such alleged violation can be agreed to by the parties, or, in the absence of such agreement, (ii) by application to a court of competent jurisdiction seeking appropriate legal or equitable relief, including, without limitation, injunctive relief or monetary damages. In the event of any such enforcement action, the prevailing party shall be awarded its reasonable attorneys' fees and costs in connection therewith. The failure or delay by any party with the right to do so to enforce any provision of this Declaration shall in no event be deemed a waiver thereof or of the right to enforce that or any other provision of this Declaration with respect to any other or subsequent violations of any term hereof; nor shall any party be liable for failure to enforce any provision hereof. All of the terms and provisions contained in this Declaration shall be construed together; however, in the event that any one or more of such provisions is held by any court of competent jurisdiction to be void or unenforceable, all of the remaining provisions hereof shall continue unimpaired and shall remain in full force and effect.

12. TERM; MODIFICATIONS. All of the covenants, conditions, restrictions and easements set forth herein and/or created hereby shall run with and bind the Property and Parcels, and are perpetual in nature. No term or provision of this Declaration

may be amended or modified except only by written instrument, properly executed and acknowledged by Declarant and by all of the owners of the Parcels and delivered by them for recording in the Office of the Clerk and Recorder of Larimer County, Colorado.

13. DECLARANT'S RIGHT TO ASSIGN DECLARANT'S RIGHTS UNDER THIS DECLARATION. Declarant shall have the right to assign all of its rights under this Declaration, including, without limitation, Declarant's rights to monitor and enforce the terms hereof, only to a qualified non-profit land conservation organization. Such assignment may take the form of a grant of a conservation easement, in form qualifying under applicable Colorado law, consistent in all material respects with the terms of this Declaration, as the same may have been amended or modified in accordance with the terms hereof.

IN WITNESS WHEREOF, this Declaration has been executed as of the date first set forth above.

DECLARANT:

William M. Browning

Paula L. Browning

DECLARATION OF COVENANTS,
CONDITIONS AND RESTRICTIONS
Page 6

STATE OF COLORADO)
) ss.
COUNTY OF Boulder

The foregoing instrument was acknowledged before me this 5 day of April, 1996, by William M. Browning and Paula L. Browning.

Witness my hand and official seal.

My commission expires: 11-16-1999

Notary Public

DECLARATION OF COVENANTS,
CONDITIONS AND RESTRICTIONS
Page 7

EXHIBIT A

DESCRIPTION OF THE PROPERTY

ALL OF THAT REAL PROPERTY LOCATED IN THE COUNTY OF LARIMER, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Lots 1, 2 and 3, BROWNING AMENDED EXEMPTION;

Lots 1 and 2, X BAR SEVEN AMENDED PLAT OF LOTS 7, 8 and 9 OF THE X BAR SEVEN SUBDIVISION and A PORTION OF LOT 1 OF BROWNING MINOR LAND DIVISION #S-110-87; and

Lot 10, X BAR SEVEN SUBDIVISION.

46/4

DECLARATION OF COVENANTS,
CONDITIONS AND RESTRICTIONS
Page 8

EXHIBIT B

DESCRIPTION OF THE CONSERVATION AREA

A tract of land located in the NE 1/4 of Section 25, T4N, R71W, and in the NW 1/4 of Section 30, T4N, R70W, of the 6th P.M., in Larimer County, Colorado, said tract being more particularly described as follows:

Beginning at a point on the West line of the NW 1/4, Section 30 from whence the West Quarter corner of said Section 30 bears S00°38'07"W, 808.61 feet and with all other bearings contained herein relative thereto; thence S30°32'59"W, 160.63 feet; thence S33°22'42"W, 206.58 feet; thence S60°30'48"W, 194.01 feet; thence S84°51'31"W, 193.06 feet; thence N23°51'59"E, 199.25 feet; thence N36°50'13"E, 134.80 feet; thence N36°52'17"E, 122.04 feet; thence N37°16'26"E, 537.84 feet to a point on the East line of the NE 1/4, Section 25; thence N61°44'37"E, 217.01 feet to a point on the East line of Lot 1, Browning Amended Exemption; thence N62°09'41"E, 275.57 feet; thence N63°11'52"E, 75.91 feet; thence S70°38'25"E, 109.42 feet; thence S70°57'01"E, 113.06 feet; thence S70°23'53"E, 127.37 feet; thence S41°45'40"E, 79.14 feet; thence S73°59'54"E, 169.27 feet to a point on the East line of Lot 2, Browning Amended Exemption; thence S00°38'07"W, 253.45 feet along said East line of Lot 2 to a point on the approximate centerline of Little Thompson River; thence S22°04'50"W, 59.68 feet; thence N66°18'56"W, 95.43 feet; thence N68°02'45"W, 104.34 feet; thence N70°25'17"W, 182.85 feet; thence S78°33'08"W, 152.46 feet; thence S77°41'52"W, 131.29 feet; thence S62°25'23"W, 149.34 feet to a point on the West line of Lot 3, Browning Amended Exemption; thence S61°57'23"W, 294.90 feet to the Point of Beginning,

Appendix B Montana Method Functional Evaluation Data Forms for Compensatory Mitigation Sites

MDT Montana Wetland Assessment Form (revised 5/25/1999)

1. Project Name: Chimney Hollow R. Mitigation 2. Project #: 2390 Control #:

3. Evaluation Date: Mo. 1 Day 13 Yr. 17 4. Evaluator(s): S. Dougherty 5. Wetlands/Site #(s) Blue Mtn - Lewis Prop

6. Wetland Location(s): I. Legal: T ____ N or S; R ____ E or W; S ____; T ____ N or S; R ____ E or W; S ____;
40° 16' 30" N 105° 7' 5" W
II. Approx. Stationing or Mileposts: ____

III. Watershed: ____ GPS Reference No. (if applies): ____
Other Location Information:

7. a. Evaluating Agency: ____;
b. Purpose of Evaluation:
1. ____ Wetlands potentially affected by MDT project
2. X Mitigation wetlands; pre-construction
3. ____ Mitigation wetlands; post-construction
4. ____ Other

8. Wetland size: (total acres) ____ (visually estimated)
____ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 1 ac (visually estimated)
____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA (HGM according to Brinson, first col.; USFWS according to Cowardin [1979], remaining cols.)

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
Riverine	Riverine	Lower Perennial	Uncon. Shore	Int. Flooded	Mineral	

(Abbreviations: System: Palustrine(P)/ Subsyst.: none/ Classes: Rock Bottom (RB), Unconsolidated bottom (UB), Aquatic Bed (AB), Unconsolidated Shore (US), Moss-lichen Wetland (ML), Emergent Wetland (EM), Scrub-Shrub Wetland (SS), Forested Wetland (FO)/ System: Lacustrine (L)/ Subsyst.: Limnetic (2)/ Classes: RB, UB, AB/ Subsystem: Littoral (4)/ Classes: RB, UB, AB, US, EM/ System: Riverine (R)/ Subsyst.: Lower Perennial (2)/ Classes: RB, UB, AB, US, EM/ Subsystem: Upper Perennial (3)/ Classes: RB, UB, AB, US/ Water Regimes: Permanently Flooded (H), Intermittently Exposed (G), Semipermanently Flooded (F), Seasonally Flooded (C), Saturated (B), Temporarily Flooded (A), Intermittently Flooded (J) Modifiers: Excavated (E), Impounded (I), Diked (D), Partly Drained (PD), Farmed (F), Artificial (A) HGM Classes: Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, Lacustrine Fringe

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)
(Circle one) Unknown Rare Common (Abundant)
Comments:

12. General condition of AA:
I. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

Conditions within AA	Predominant conditions adjacent to (within 500 feet of) AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	high disturbance	(high disturbance)	high disturbance

Comments: (types of disturbance, intensity, season, etc.): Disturbance of AA related to 2013 flood.
II. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) Verbascum thapsus

III. Provide brief descriptive summary of AA and surrounding land use/habitat:

13. Structural Diversity: (based on number of "Cowardin" *vegetated* classes present [do not include unvegetated classes], see #10 above)

# of "Cowardin" vegetated classes present in AA (see #10)	≥ 3 vegetated classes (or ≥ 2 if one is forested)	2 vegetated classes (or 1 if forested)	≤ 1 vegetated class
Rating (circle)	High	Moderate	(Low)

Comments:
AA is sparsely vegetated

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT of Area to be Restored

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals: Not Assessed

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D S	_____
Incidental habitat (**list species**)	D S	_____
No usable habitat	D S	_____

II. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.9 (H)	.8 (M)	.7 (M)	.5 (L)	.3 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions): Not Assessed

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D S	_____
Incidental habitat (**list species**)	D S	_____
No usable habitat	D S	_____

II. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.8 (H)	.7 (M)	.6 (M)	.2 (L)	.1 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

I. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- __ observations of abundant wildlife #'s or high species diversity (during any period)
- __ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ presence of extremely limiting habitat features not available in the surrounding area
- __ interviews with local biologists with knowledge of the AA

Low (based on any of the following [check]):
- __ few or no wildlife observations during peak use periods
- __ little to no wildlife sign
- __ sparse adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- __ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☒ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☒ adequate adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (working from top to bottom, circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms].)

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1 (E)	.9 (H)	.8 (H)	.7 (M)
Moderate	.9 (H)	.7 (M)	.5 (M)	.3 (L)
Minimal	.6 (M)	.4 (M)	.2 (L)	.1 (L)

Comments:

14D. General Fish/Aquatic Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted ih the comments.)

i. Habitat Quality (circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) quality rating.

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10%
Shading - >**75%** of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	E	E	H	H	H	M	M	M	M
Shading – **50 to 75%** of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading - < **50%** of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality (Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level [E = H, H = M, M = L, L = L]). *Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?* Y (N) Modified habitat quality rating = (circle) E H (M) L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Types of fish known or suspected within AA	*Modified Habitat Quality (ii)*			
	Exceptional	High	Moderate	Low
Native game fish	1 (E)	.9 (H)	.7 (M)	.5 (M)
Introduced game fish	.9 (H)	.8 (H)	.6 (M)	.4 (M)
Non-game fish	.7 (M)	.6 (M)	(.5 (M))	.3 (L)
No fish	.5 (M)	.3 (L)	.2 (L)	.1 (L)

Comments: Transitional nature Fish

14E. Flood Attenuation: (applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle NA here and proceed to next function.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Estimated wetland area in AA subject to periodic flooding	≥ 10 acres			<10, >2 acres			≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1(H)	.9(H)	.6(M)	.8(H)	.7(H)	.5(M)	.4(M)	.3(L)	.2(L)
AA contains **unrestricted outlet**	.9(H)	.8(H)	.5(M)	.7(H)	.6(M)	.4(M)	.3(L)	.2(L)	.1(L)

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA (circle)? (Y) N
Comments:

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			<5, >1 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	1(H)	.9(H)	.8(H)	.8(H)	.6(M)	.5(M)	.4(M)	.3(L)	.2(L)
Wetlands in AA flood or pond < **5 out of 10 years**	.9(H)	.8(H)	.7(M)	.7(M)	.5(M)	.4(M)	.3(L)	.2(L)	.1(L)

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding or ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1 (H)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
AA contains **unrestricted outlet**	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	(.2 (L))	.1 (L)

Comments: Based on current high levels of available Sediment in AA

14H Sediment/Shoreline Stabilization: (applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If does not apply, circle NA here and proceed to next function)

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses	*Duration of surface water adjacent to rooted vegetation*		
	permanent / perennial	seasonal / intermittent	Temporary / ephemeral
≥ 65%	1 (H)	.9 (H)	.7 (M)
35-64%	.7 (M)	.6 (M)	.5 (M)
< 35%	.3 (L)	.2 (L)	.1 (L)

Comments: Reduced tree and shrub cover due to 2013 flood event

14I. Production Export/Food Chain Support:

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Factor A = acreage of vegetated component in the AA; Factor B = structural diversity rating from #13; Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P = permanent/perennial; S/I = seasonal/intermittent; T/E /A= temporary/ephemeral or absent [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.9H	.9H	.8H	.8H	.7M	.9H	.8H	.8H	.7M	.7M	.6M	.7M	.6M	.6M	.4M	.4M	.3L
S/I	.9H	.8H	.8H	.7M	.7M	.6M	.8H	.7M	.7M	.6M	.6M	.5M	.6M	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.7M	.7M	.6M	.6M	.5M	.7M	.6M	.6M	.5M	.5M	.4M	.5M	.4M	.4M	.2L	.2L	.1L

Comments: AA is sparsely vegetated

14J. Groundwater Discharge/Recharge: (Check the indicators in i & ii below that apply to the AA)

I. Discharge Indicators

- X Springs are known or observed
- ___ Vegetation growing during dormant season/drought
- ___ Wetland occurs at the toe of a natural slope
- X Seeps are present at the wetland edge
- ___ AA permanently flooded during drought periods
- ___ Wetland contains an outlet, but no inlet
- X Other Water is open in this reach when other reaches are frozen

II. Recharge Indicators

- ___ Permeable substrate present without underlying impeding layer
- ___ Wetland contains inlet but no outlet
- ___ Other

III. Rating: Use the information from i and ii above and the table below to arrive at [circle] the functional points and rating [H = high, L = low] for this function.

Criteria	*Functional Points and Rating*
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments: Discussions with landowner

14K. Uniqueness: Not Assessed

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MNHP			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	.6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments:

14L. Recreation/Education Potential: I. Is the AA a known rec./ed. site: (circle) Y N (If yes, rate as [circle] High [1] and go to ii; if no go to iii)

II. Check categories that apply to the AA: ___ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___ Other

III. Based on the location, diversity, size, and other site attributes, is there strong potential for rec./ed. use? Y N
(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

iv. Rating (use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Ownership	*Disturbance at AA (#12i)*		
	low	moderate	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L)	.1 (L)

Comments: Not Assessed

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	N/A		1	
B. MT Natural Heritage Program Species Habitat	N/A		1	
C. General Wildlife Habitat	L	0.3	1	
D. General Fish/Aquatic Habitat	M	0.5		
E. Flood Attenuation	L	0.1		
F. Short and Long Term Surface Water Storage	M	0.7		
G. Sediment/Nutrient/Toxicant Removal	L	0.2		
H. Sediment/Shoreline Stabilization	M	0.7		
I. Production Export/Food Chain Support	M	0.4	1	
J. Groundwater Discharge/Recharge	H	1.0	1	
K. Uniqueness	N/A		1	
L. Recreation/Education Potential	N/A		1	
Totals:				

OVERALL ANALYSIS AREA (AA) RATING: (Circle appropriate category based on the criteria outlined below) I II III IV

Category I Wetland: (Must satisfy **one** of the following criteria; if does not meet criteria, go to Category II)

___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; if not satisfied, go to Category IV)

___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
___ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)

___ "Low" rating for Uniqueness; **and**
___ "Low" rating for Production Export/Food Chain Support; **and**
___ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

MDT Montana Wetland Assessment Form (revised 5/25/1999)

1. Project Name: Chimney Hollow R. Mitigation 2. Project #: 2390 Control #:

3. Evaluation Date: Mo. 1 Day 13 Yr. 17 4. Evaluator(s): S. Dougherty 5. Wetlands/Site #(s) CR4-Little Thompson R

6. Wetland Location(s): i. Legal: T ___ N or S; R ___ E or W; S ___; T ___ N or S; R ___ E or W; S ___;
40°16'30"N 105°7'5"W
ii. Approx. Stationing or Mileposts: ___

iii. Watershed: Little Thompson R GPS Reference No. (if applies): ___
Other Location Information:

7. a. Evaluating Agency: ___;
b. Purpose of Evaluation:
1. ___ Wetlands potentially affected by MDT project
2. X Mitigation wetlands; pre-construction
3. ___ Mitigation wetlands; post-construction
4. ___ Other

8. Wetland size: (total acres) ___ (visually estimated)
___ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 2 ac (visually estimated)
___ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA (HGM according to Brinson, first col.; USFWS according to Cowardin [1979], remaining cols.)

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
Riverine	Riverine	Lower Perennial	Unkn, Shore	Int. Flooded	Mixed	

(Abbreviations: System: Palustrine(P)/ Subsyst.: none/ Classes: Rock Bottom (RB), Unconsolidated bottom (UB), Aquatic Bed (AB), Unconsolidated Shore (US), Moss-lichen Wetland (ML), Emergent Wetland (EM), Scrub-Shrub Wetland (SS), Forested Wetland (FO)/ System: Lacustrine (L)/, Subsyst.: Limnetic (2)/ Classes: RB, UB, AB/ Subsystem: Littoral (4)/ Classes: RB, UB, AB, US, EM/ System: Riverine (R)/ Subsyst.: Lower Perennial (2)/ Classes: RB, UB, AB, US, EM/ Subsystem: Upper Perennial (3)/ Classes: RB, UB, AB, US/ Water Regimes: Permanently Flooded (H), Intermittently Exposed (G), Semipermanently Flooded (F), Seasonally Flooded (C), Saturated (B), Temporarily Flooded (A), Intermittently Flooded (J) Modifiers: Excavated (E), Impounded (I), Diked (D), Partly Drained (PD), Farmed (F), Artificial (A) HGM Classes: Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, Lacustrine Fringe

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)
Colo
(Circle one) Unknown Rare Common (Abundant)
Comments:

12. General condition of AA:
I. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

Conditions within AA	Predominant conditions adjacent to (within 500 feet of) AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	high disturbance	(high disturbance)	high disturbance

Comments: (types of disturbance, intensity, season, etc.): Disturbance is primarily related to 2013 flood. ag & mowing
II. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) Verbascum thapsus, Conyza canadensis, Phalaris arundinacea
III. Provide brief descriptive summary of AA and surrounding land use/habitat:
Disturbed by 2013 flood. Surrounding area is ag., mowed, hayed lightly grazed. AA is deposited sediment and areas of scour with sparse veg. cover & area to be restored

13. Structural Diversity: (based on number of "Cowardin" vegetated classes present [do not include unvegetated classes], see #10 above)

# of "Cowardin" vegetated classes present in AA (see #10) Based on AA	≥ 3 vegetated classes (or ≥ 2 if one is forested)	2 vegetated classes (or 1 if forested)	≤ 1 vegetated class
Rating (circle)	High	Moderate	(Low)

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT *for Areas to be Restored.*

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals: *Not Assessed*

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (list species)	D S	_____
Secondary habitat (list species)	D S	_____
Incidental habitat (list species)	D S	_____
No usable habitat	D S	_____

II. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.9 (H)	.8 (M)	.7 (M)	.5 (L)	.3 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (list species)	D S	_____
Secondary habitat (list species)	D S	_____
Incidental habitat (list species)	D S	_____
No usable habitat	D S	_____

Not Assessed

II. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.8 (H)	.7 (M)	.6 (M)	.2 (L)	.1 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

I. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- ___ observations of abundant wildlife #'s or high species diversity (during any period)
- ___ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ___ presence of extremely limiting habitat features not available in the surrounding area
- ___ interviews with local biologists with knowledge of the AA

Low (based on any of the following [check]):
- ___ few or no wildlife observations during peak use periods
- ___ little to no wildlife sign
- ___ sparse adjacent upland food sources
- ___ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- ___ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- X common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- X adequate adjacent upland food sources
- ___ interviews with local biologists with knowledge of the AA

II. Wildlife habitat features (working from top to bottom, circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms].)

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

III. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1 (E)	.9 (H)	.8 (H)	.7 (M)
Moderate	.9 (H)	.7 (M)	.5 (M)	.3 (L)
Minimal	.6 (M)	.4 (M)	.2 (L)	.1 (L)

Comments: *Areas for potential restoration assessed*

14D. General Fish/Aquatic Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted ih the comments.)

i. Habitat Quality (circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) quality rating.

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10%
Shading - >75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	E	E	H	H	H	M	M	M	M
Shading – 50 to 75% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading - < 50% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality (Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level [E = H, H = M, M = L, L = L]). *Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?* Y (N) Modified habitat quality rating = (circle) E H (M) L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Types of fish known or suspected within AA	*Modified Habitat Quality (ii)*			
	Exceptional	High	(Moderate)	Low
Native game fish	1 (E)	.9 (H)	.7 (M)	.5 (M)
Introduced game fish	.9 (H)	.8 (H)	.6 (M)	.4 (M)
Non-game fish	.7 (M)	.6 (M)	.5 (M)	.3 (L)
No fish	.5 (M)	.3 (L)	.2 (L)	.1 (L)

Comments: Plains stream native fish

14E. Flood Attenuation: (applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle NA here and proceed to next function.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Estimated wetland area in AA subject to periodic flooding	≥ 10 acres			<10, >2 acres			≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	1(H)	.9(H)	.6(M)	.8(H)	.7(H)	.5(M)	.4(M)	.3(L)	.2(L)
AA contains unrestricted outlet	.9(H)	.8(H)	.5(M)	.7(H)	.6(M)	.4(M)	.3(L)	.2(L)	.1(L)

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA (circle)? (Y) N

Comments:

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			<5, >1 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	1(H)	.9(H)	.8(H)	.8(H)	.6(M)	.5(M)	.4(M)	.3(L)	.2(L)
Wetlands in AA flood or pond < 5 out of 10 years	.9(H)	.8(H)	.7(M)	.7(M)	.5(M)	.4(M)	.3(L)	.2(L)	.1(L)

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding or ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains no or restricted outlet	1 (H)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
AA contains unrestricted outlet	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)	.1 (L)

Comments: Based on current high levels of sediment in the AA

14H Sediment/Shoreline Stabilization: (applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If does not apply, circle NA here and proceed to next function)

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses	*Duration of surface water adjacent to rooted vegetation*		
	permanent / perennial	seasonal / intermittent	Temporary / ephemeral
≥ 65%	1 (H)	.9 (H)	.7 (M)
35-64%	.7 (M)	.6 (M)	.5 (M)
< 35%	.3 (L)	.2 (L)	.1 (L)

Comments: AA is sparsely vegetated due to sediment deposition & scour

14I. Production Export/Food Chain Support:

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Factor A = acreage of vegetated component in the AA; Factor B = structural diversity rating from #13; Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P = permanent/perennial; S/I = seasonal/intermittent; T/E /A= temporary/ephemeral or absent [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.9H	.9H	.8H	.8H	.7M	.9H	.8H	.8H	.7M	.7M	.6M	.7M	.6M	.6M	.4M	.4M	.3L
S/I	.9H	.8H	.8H	.7M	.7M	.6M	.8H	.7M	.7M	.6M	.6M	.5M	.6M	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.7M	.7M	.6M	.6M	.5M	.7M	.6M	.6M	.5M	.5M	.4M	.5M	.4M	.4M	.2L	.2L	.1L

Comments: AA is sparsely vegetated

14J. Groundwater Discharge/Recharge: (Check the indicators in i & ii below that apply to the AA)

I. Discharge Indicators

___Springs are known or observed
___Vegetation growing during dormant season/drought
___Wetland occurs at the toe of a natural slope
___Seeps are present at the wetland edge
___AA permanently flooded during drought periods
___Wetland contains an outlet, but no inlet
___Other

II. Recharge Indicators

_X_Permeable substrate present without underlying impeding layer
___Wetland contains inlet but no outlet
___Other

III. Rating: Use the information from i and ii above and the table below to arrive at [circle] the functional points and rating [H = high, L = low] for this function.

Criteria	*Functional Points and Rating*
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments: Permeable sediments throughout AA

14K. Uniqueness:

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MNHP			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	.6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments: Not Assessed

14L. Recreation/Education Potential: I. Is the AA a known rec./ed. site: (circle) Y N (If yes, rate as [circle] High [1] and go to ii; if no go to iii)

II. Check categories that apply to the AA: ___ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

III. Based on the location, diversity, size, and other site attributes, is there strong potential for rec./ed. use? Y N
(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

Iv. Rating (use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Ownership	*Disturbance at AA (#12i)*		
	low	moderate	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L)	.1 (L)

Comments: Not Assessed

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	N/A		1	
B. MT Natural Heritage Program Species Habitat	N/A		1	
C. General Wildlife Habitat	L	0.3	1	
D. General Fish/Aquatic Habitat	M	0.5		
E. Flood Attenuation	L	0.1		
F. Short and Long Term Surface Water Storage	M	0.7		
G. Sediment/Nutrient/Toxicant Removal	L	0.2		
H. Sediment/Shoreline Stabilization	M	0.4		
I. Production Export/Food Chain Support	M	0.4	1	
J. Groundwater Discharge/Recharge	H	1.0	1	
K. Uniqueness	N/A		1	
L. Recreation/Education Potential	N/A		1	
Totals:				

OVERALL ANALYSIS AREA (AA) RATING: (Circle appropriate category based on the criteria outlined below) I II III IV

Category I Wetland: (Must satisfy one of the following criteria; if does not meet criteria, go to Category II)
- ___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ___ Score of 1 functional point for Uniqueness; **or**
- ___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; if not satisfied, go to Category IV)
- ___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ___ Score of .9 functional point for Uniqueness; **or**
- ___ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)
- ___ "Low" rating for Uniqueness; **and**
- ___ "Low" rating for Production Export/Food Chain Support; **and**
- ___ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

Appendix C Compensatory Mitigation Sites Plans

Blue Mountain Site

Blue Mountain – Planting Plan Details

Planting Zones

Planting Zone	Recommendation	Areas	Materials and Quantities[1]
Bank (Zone 1)	Willow stakes, Zone 1 seed mix	0.33 acre (14,375 sq. ft.)	1,250 willow stakes, 136 Pure Live Seed (PLS) lbs Zone 1 seed mix[2]
Overbank (Zone 2)	Zone 2 seed mix, woody shrub containers, cottonwood/willow cuttings	0.69 acre (30,056 sq. ft.)	146 PLS lbs Zone 2 seed mix[2], 200 woody shrub containers, 330 cottonwood/ willow cuttings, 2,000 lbs wood straw mulch

Notes:
[1] Soil amendments may be needed; to be determined after soil testing.
[2] PLS amount based on broadcast seeding only.

Typical Planting Palette for all Planting Zones

Species Name	Common Name	Container Type	Planting Zones			
			Zone 1		Zone 2	
			% in Palette	Spacing (on-center)	% in Palette	Spacing (on-center)
Woody Container						
Prunus americana	American plum	D60			20	6’
Prunus virginiana melanocarpa	Chokecherry	D60			20	6’
Rosa woodsii	Woods’ rose	D60			20	6’
Ribes aureum	Golden currant	D60			20	6’
Symphoricarpos occidentalis	Western snowberry	D60			20	6’
Cuttings/Stakes						
Populus angustifolia	Narrow-leaf cottonwood	Cuttings			5	13’
Populus deltoides ssp. *monilifera*	Plains cottonwood	Cuttings			5	13’
Salix exigua	Sandbar willow	Cuttings	85	4’	75	6’
Salix irrorata	Bluestem willow	Cuttings	15	4’	15	6’

Site Preparation – Weed Management

1. Pre-treat the project site to remove invasive and noxious weed species.

2. Hand pull, dig up, and spot treat weeds before seeding to prevent weed spread. In areas with heavy weed infestations, treat weeds with U.S. Environmental Protection Agency-approved aquatic glyphosate herbicide in mid-April to mid-June – carefully following label instructions as required by law.

3. Mow weeds prior to seed set in spring/early summer and again prior to fall planting to limit weed seed production.

Willow/Cottonwood Cuttings Harvest and Planting Instructions

1. Harvest willows and cottonwoods while still dormant in the early spring and 7 to 14 days prior to the desired planting time. Appropriate harvest locations shall be identified well before planned harvest dates and in consultation with the project vegetation ecologist.

2. Harvesters must be able to identify the different willows based on stem and bud characteristics. The invasive crack willow is prevalent in the project area and should not be harvested for restoration.

3. Limit harvest to no more than 20% of the branches from any single plant and no more than 30% of the overall stand.

4. Select healthy stems that are 2 to 7 years old with green cores. Harvested stems should be between pinky finger and thumb width in diameter. Stems should be at least 4 feet long for willows and 5 to 7 feet long for cottonwoods.

5. Cut stems with a clean diagonal cut at the base of the stem, leaving terminal buds until installation. For cottonwoods, leave a few upper branches on the stems. The rest of the branches should be cut close to the stem.

6. Bundle stems in groups of 50 or less by species and soak the bundles by submerging the bottom 80% or more in water horizontally for at least 24 hours and up to 2 weeks prior to planting.

7. When planting, space willow cuttings approximately four to six feet apart in clusters and cottonwood cuttings approximately 13 feet apart.

8. When planting, ensure the top of the cutting is oriented upward. The top of the cutting will have the terminal buds and will generally be smaller in diameter than the bottom of the cutting.

9. Ensure the lower 7 to 8 inches of the cutting reaches below the expected dry season water table.

10. Approximately two-thirds of the cutting should be below ground, with the remaining third aboveground. For sandbar willows, cut the aboveground length appropriately. For cottonwoods, leave the terminal buds and a few branches.

11. Water after planting and tamp down soil to remove air pockets.

Plantings

1. Pre-flag the site hydrology to facilitate revegetation by proper riparian planting zones.

2. Woody and herbaceous containers shall be planted in the appropriate zone in spring (preferred) or fall. If planting in summer, supplemental irrigation may be necessary.

3. Substitutions must be approved by the project vegetation ecologist.

4. Hand dig the planting holes for containerized stock and dig holes to the depth of the plant root ball.

5. Water holes before planting. After planting, water and tamp down soil to remove air pockets.

6. Mulch around containerized plantings.

Seedbed Preparation

1. Prior to soil preparation, a soil test shall be conducted to determine if an amendment is needed to provide sufficient nutrients to grow native vegetation and not promote weeds.

2. Seedbed should be prepped before seeding by decompacting the soil (if necessary), adding a soil amendment (if needed), and firming the soil surface prior to seeding.

3. Slopes flatter than 2:1 shall be filled into an even and loose seed bed 4 inches deep. Slopes 2:1 or steeper shall be left in a roughened condition. Slopes shall be free of rocks, clods, or other debris more than 4 inches in diameter.

4. If a soil amendment is needed – incorporate a slow release organic soil amendment with a moderate level of total nitrogen (such as Biosol) into the top 4 inches of soil.

Seeding

1. No substitutions of species or rates are allowed without written permission from the project vegetation ecologist. Use only native seed – preferably of a local ecotype.

2. The seed mixes shall have no noxious weed as verified by the seed tag. Seed tags should be provided to the project vegetation ecologist before seeding.

3. Broadcast Zone 1 seed mix at 136 PLS per square foot and Zone 2 seed mix at 146 PLS per square foot. Only broadcast seed in Zone 1. If drill seeding in Zone 2, halve the rate.

4. Seeding will be conducted either between spring thaw to June 1, or from September 15 until consistent ground freeze. Spring thaw and consistent ground freeze is defined in the technical specifications. Fall seeding is preferred.

5. Ensure that broadcast seeding will be buried in at least 1/4 inch of soil followed by raking the seed into the soil. If drill seeding in Zone 2, the drilling rate should be ¼ to ¾ inch deep and the drill seeder should be of a type for native/range seeding with multiple boxes for different types of seeds.

6. Cover 75% of the soil surface with mulch – preferably weed straw – at a rate of 3,000 pounds per acre (lb/acre). Use biodegradable 24-month erosion-control blankets (e.g., June fiber) on stream banks. Follow all manufacturers' instructions.

7. Supplemental watering (TBD) may be needed, depending on the weather conditions.

Seed Mixes

Zone 1

Common Name	Scientific Name	Desired Mix %
Elymus canadensis	Canada wildrye	10
Elymus trachycaulus trachycaulus	Slender wheatgrass	10
Glyceria striata	Fowl mannagrass	15
Juncus balticus (arcticus)	Baltic rush	15
Panicum virgatum	Switchgrass	15
Pascopyrum smithii	Western wheatgrass	10
Poa palustris	Fowl bluegrass	15
Spartina pectinata	Prairie cordgrass	10
Total		100

Zone 2

Common Name	Scientific Name	Desired Mix %
Elymus canadensis	Canada wildrye	10
Elymus trachycaulus trachycaulus	Slender wheatgrass	20
Iris missouriensis	Rocky Mountain iris	10
Juncus arcticus (balticus)	Mountain rush	10
Oenothera elata	Hooker's evening primrose	5
Panicum virgatum	Switchgrass	10
Pascopyrum smithii	Western wheatgrass	10
Solidago canadensis	Canada goldenrod	15
Sporobolus crytandrus	Sand dropseed	10
Total		100

LIMIT OF CONSTRUCTION

LIMIT OF CONSTRUCTION

EWP PROJECT LIMITS

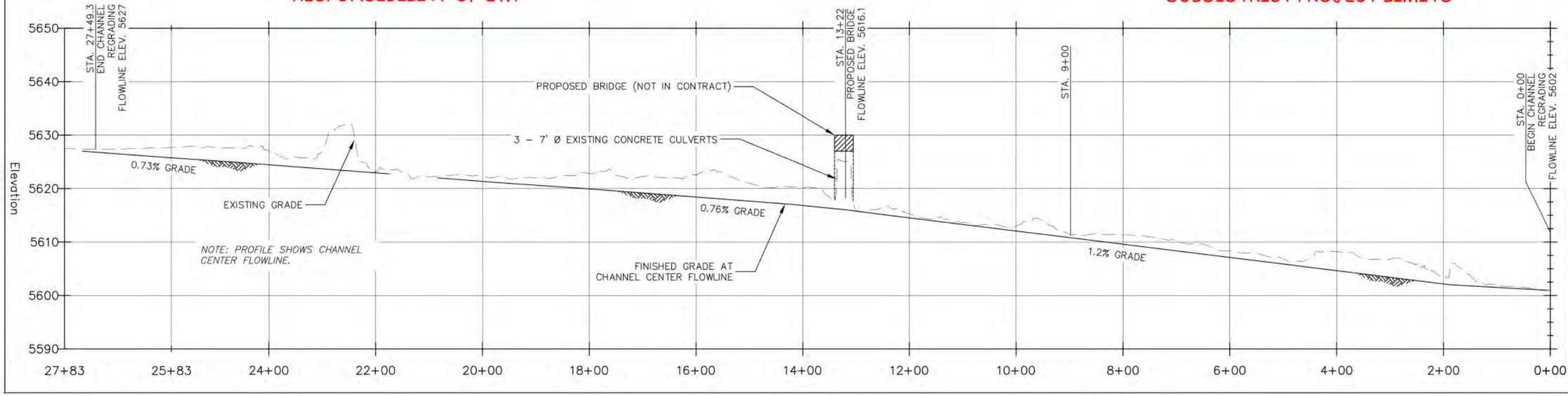
SUBDISTRICT PROJECT LIMITS

EXISTING CONDITIONS MAPPING IS APPROXIMATE, DEVELOPED WITH A COMBINATION OF AERIAL MAPPING AND CROSS SECTION SURVEYS FOR TOPOGRAPHY. THE AERIAL MAPPING DEPICTS EXISTING SITE FEATURES SUCH AS ROADS, BUILDINGS, VEGETATION, ETC. HOWEVER, CONTRACTOR SHALL NOT RELY ON AERIAL MAPPING FOR ACCURATE LOCATIONS OF SITE FEATURES. ALL SITE FEATURES WILL REQUIRE FIELD VERIFICATION TO ACCURATELY IDENTIFY LOCATIONS.
BASEMAP: GoogleEarth IMAGERY

0 100 200 Feet

RESPONSIBILITY OF EWP

SUBDISTRICT PROJECT LIMITS



PLAN AND PROFILE
FLOODPLAIN REHABILITATION
FIGURE 1

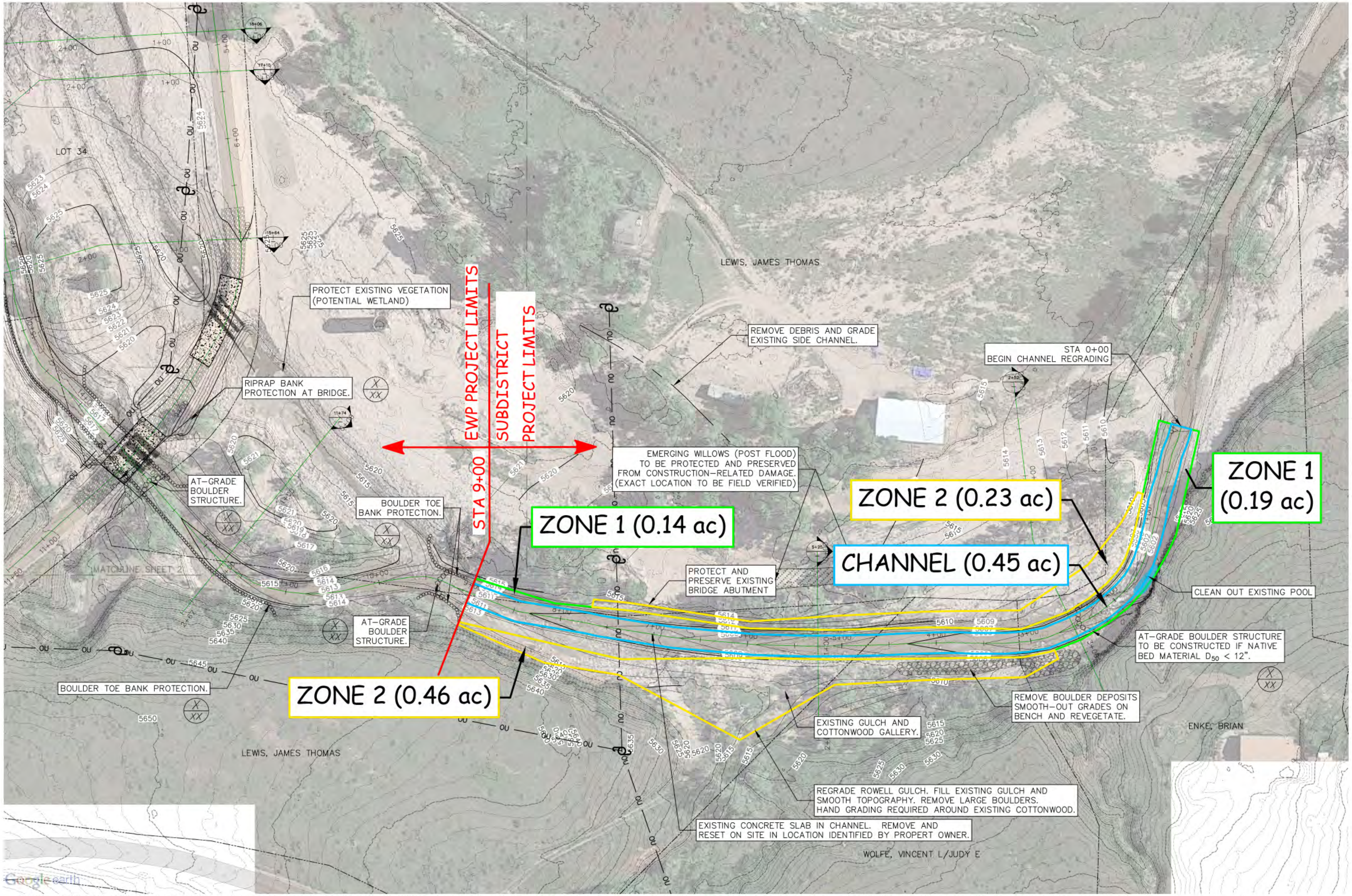
BLUE MOUNTAIN NEIGHBORHOOD

PMB
BAT
SCT

SET-T39951
February 22, 2017

TETRA TECH
3801 AUTOMATION WAY, SUITE 100
FORT COLLINS, COLORADO 80525
PHONE (970) 223-9600 FAX (970) 223-7171
www.tetratech.com

435 HIGH STREET, SUITE 201
P.O. BOX 413
LYONS, CO 80540
(303) 823-2370


PROTECT EXISTING VEGETATION (POTENTIAL WETLAND)
RIPRAP BANK PROTECTION AT BRIDGE.
AT-GRADE BOULDER STRUCTURE.
BOULDER TOE BANK PROTECTION.
EWP PROJECT LIMITS
SUBDISTRICT PROJECT LIMITS
STA 9+00
REMOVE DEBRIS AND GRADE EXISTING SIDE CHANNEL.
LEWIS, JAMES THOMAS
STA 0+00 BEGIN CHANNEL REGRADING
EMERGING WILLOWS (POST FLOOD) TO BE PROTECTED AND PRESERVED FROM CONSTRUCTION-RELATED DAMAGE. (EXACT LOCATION TO BE FIELD VERIFIED)
ZONE 1 (0.19 ac)
ZONE 2 (0.23 ac)
ZONE 1 (0.14 ac)
CHANNEL (0.45 ac)
PROTECT AND PRESERVE EXISTING BRIDGE ABUTMENT
CLEAN OUT EXISTING POOL
AT-GRADE BOULDER STRUCTURE.
AT-GRADE BOULDER STRUCTURE TO BE CONSTRUCTED IF NATIVE BED MATERIAL D_{50} < 12".
BOULDER TOE BANK PROTECTION.
ZONE 2 (0.46 ac)
REMOVE BOULDER DEPOSITS SMOOTH-OUT GRADES ON BENCH AND REVEGETATE.
EXISTING GULCH AND COTTONWOOD GALLERY.
ENKE, BRIAN
LEWIS, JAMES THOMAS
LOT 34
MATCHLINE SHEET 2
REGRADE ROWELL GULCH. FILL EXISTING GULCH AND SMOOTH TOPOGRAPHY. REMOVE LARGE BOULDERS. HAND GRADING REQUIRED AROUND EXISTING COTTONWOOD.
EXISTING CONCRETE SLAB IN CHANNEL. REMOVE AND RESET ON SITE IN LOCATION IDENTIFIED BY PROPERT OWNER.
WOLFE, VINCENT L/JUDY E
Google earth
0 50 100 Feet

EXISTING CONDITIONS MAPPING IS APPROXIMATE, DEVELOPED WITH A COMBINATION OF AERIAL MAPPING AND CROSS SECTION SURVEYS FOR TOPOGRAPHY. THE AERIAL MAPPING DEPICTS EXISTING SITE FEATURES SUCH AS ROADS, BUILDINGS, VEGETATION, ETC. HOWEVER, CONTRACTOR SHALL NOT RELY ON AERIAL MAPPING FOR ACCURATE LOCATIONS OF SITE FEATURES. ALL SITE FEATURES WILL REQUIRE FIELD VERIFICATION TO ACCURATELY IDENTIFY LOCATIONS.
BASEMAP: GoogleEarth IMAGERY

SITE AND GRADING PLAN
FLOODPLAIN REHABILITATION
FIGURE 2

BLUE MOUNTAIN NEIGHBORHOOD

Sheet Revisions

Project #: SET-T39951
Date: February 22, 2017
File Name:
Designed: PMB
Drawn: BAT
Approved: SCT

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SITE AND GRADING PLAN
FLOODPLAIN REHABILITATION

FIGURE 3

BLUE MOUNTAIN NEIGHBORHOOD

EWP PROJECT; NOT RESPONSIBILITY OF SUBDISTRICT

LEWIS, JAMES THOMAS

STA XX TO XX CONCRETE DIP

STA 6+75 TO 10+50 REGRADE ROAD

REMOVE EXISTING CULVERTS FILL AND COMPACT. INSTALL FRENCH DRAIN.

RIPRAP BANK PROTECTION AT BRIDGE.

RIPRAP BANK PROTECTION AT BRIDGE.

AT-GRADE BOULDER STRUCTURE

BOULDER TOE BANK PROTECTION.

EXISTING CULVERT

WADLOW, DONALD D/JANE E

VEHICLE MAINTENANCE AND ACCESS PAD. COMPACTED GRAVEL SURFACE.

FIRE TRUCK TURN AROUND. COMPACTED GRAVEL SURFACE. TOP OF BANK ELEV. 5637

PODOLEFSKY, RONNIE LYNN

STA 27+49.3
END CHANNEL REGRADING

R = 32'

MATCHLINE SHEET 3

MATCHLINE SHEET 2

BOULDER TOE BANK PROTECTION.

ROOTWAD AND BOULDER PROTECTION NEAR CISTERN.

20 FT WIDE FIRE TRUCK ACCESS; GRAVEL SURFACE.

STACKED BOULDER BANK PROTECTION AT FIRETRUCK ACCESS BANK.

KUPFNER, STEVEN L/PATRICIA S

BOULDER TOE BANK PROTECTION.

SCHOPEN, DAVID F

LOWER OVERBANKS APPROXIMATELY 2–3 FT. (HAND GRADING REQUIRED).

LOWER OVERBANKS APPROXIMATELY 2–3 FT. (HAND GRADING REQUIRED)

BOULDER TOE BANK PROTECTION.

REMOVE SEDIMENT FROM EXISTING POOL.

REPLACEMENT OF EXISTING CULVERTS WITH SINGLE SPAN BRIDGE. BRIDGE IS N.I.C. THIS INFORMATION IS SHOWN HERE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO MODIFICATION PENDING PRELIMINARY AND FINAL DESIGN OF THE BRIDGE.

BULPETT, JESSE L
RICHMOND NICOLE EUGENIA

MENNARE, LAURA J

Google Earth

EXISTING CONDITIONS MAPPING IS APPROXIMATE, DEVELOPED WITH A COMBINATION OF AERIAL MAPPING AND CROSS SECTION SURVEYS FOR TOPOGRAPHY. THE AERIAL MAPPING DEPICTS EXISTING SITE FEATURES SUCH AS ROADS, BUILDINGS, VEGETATION, ETC. HOWEVER, CONTRACTOR SHALL NOT RELY ON AERIAL MAPPING FOR ACCURATE LOCATIONS OF SITE FEATURES. ALL SITE FEATURES WILL REQUIRE FIELD VERIFICATION TO ACCURATELY IDENTIFY LOCATIONS.
BASEMAP: GoogleEarth IMAGERY

0 50 100 Feet

Sheet Revisions			
No.	Date	Comments	Init.

Designed PMB
Drawn BAT
Approved SCT

Project # SET-T39951
Date February 22, 2017
File Name

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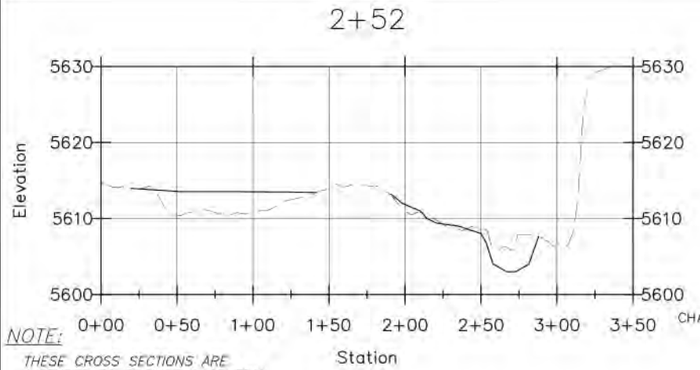
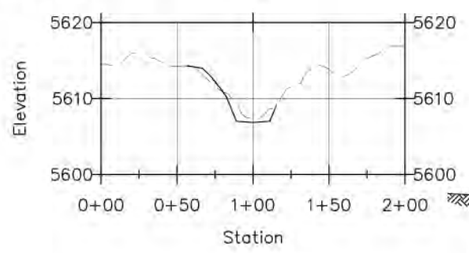
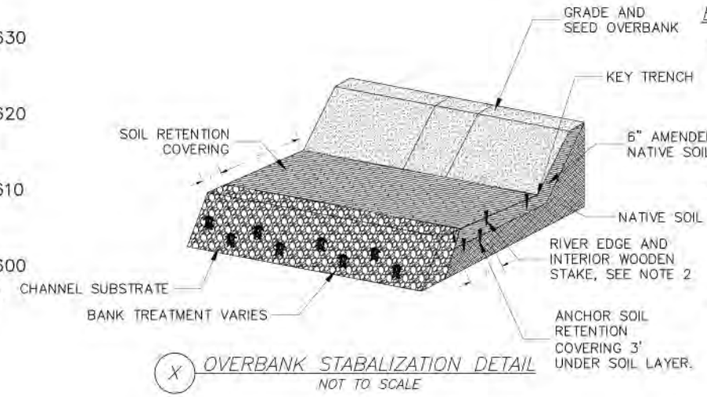


NOTE:

THESE CROSS SECTIONS ARE INTENDED TO PROVIDE A GENERAL OVERVIEW OF THE EXTENT OF OVERBANK GRADING.

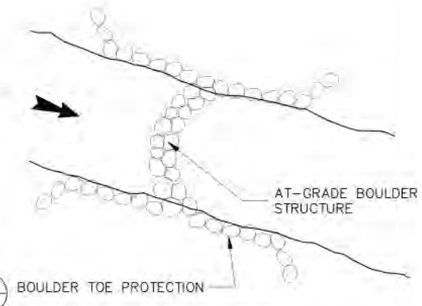




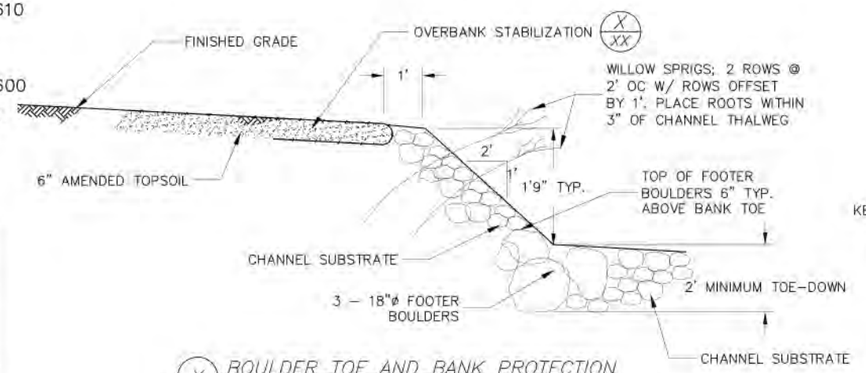
X OVERBANK STABALIZATION DETAIL
NOT TO SCALE

BANK STABALIZATION NOTES:

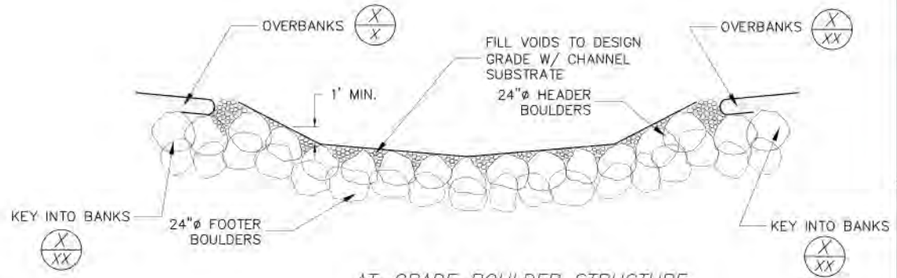
1. PLACE 3 FT SOIL RETENTION COVERING ON TOP OF NATIVE SOIL TO ANCHOR. PLACE 6 INCHES OF AMENDED NATIVE SOIL ON TOP OF ANCHOR AND COMPACT TO 85%. APPLY SEED MIX, WRAP AND STAKE SOIL RETENTION COVERING USING WOODEN STAKES IN PATTERN AND SPACING AS SHOWN OR AS RECOMMENDED BY MANUFACTURER.
2. UPSTREAM AND DOWNSTREAM ENDS OF THE COVERING SHALL BE TIED INTO STABLE AND CONSOLIDATED MATERIALS USING STAKES AT 4-FT O.C. OR AS RECOMMENDED BY THE MANUFACTURER. TIE-IN AND OVERLAPS SHALL BE CONSTRUCTED IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. LANDWARD END OF COVERING SHALL BE SECURED WITH A KEY TRENCH 1.5 FEET WIDE AND 1 FOOT DEEP ALONG THE EDGE OF THE COVERING LAYER, PARALLEL TO THE CHANNEL BANK. SECURE COVERING IN THE TRENCH. BACKFILL THE KEY TRENCH WITH AMENDED NATIVE SOILS. GRADE AND APPLY SEED MIX.



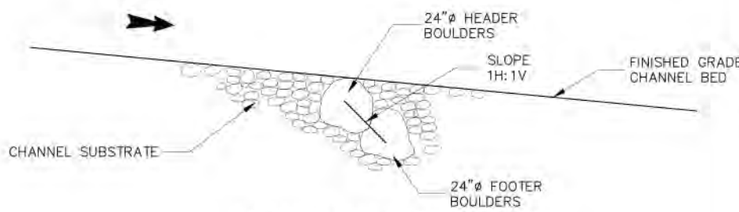
X TYPICAL AT-GRADE BOULDER STRUCTURE PLANVIEW
NOT TO SCALE



X BOULDER TOE AND BANK PROTECTION DETAIL
NOT TO SCALE



AT-GRADE BOULDER STRUCTURE SECTION VIEW
NOT TO SCALE



AT-GRADE BOULDER STRUCTURE PROFILE VIEW
NOT TO SCALE

Channel Substrate Gradation	
Intermediate Stone Dimension (inches)	% Smaller Than By Weight
6	90 - 100
3	70 - 90
2	50 - 70
1.5	30 - 50
< 1	30

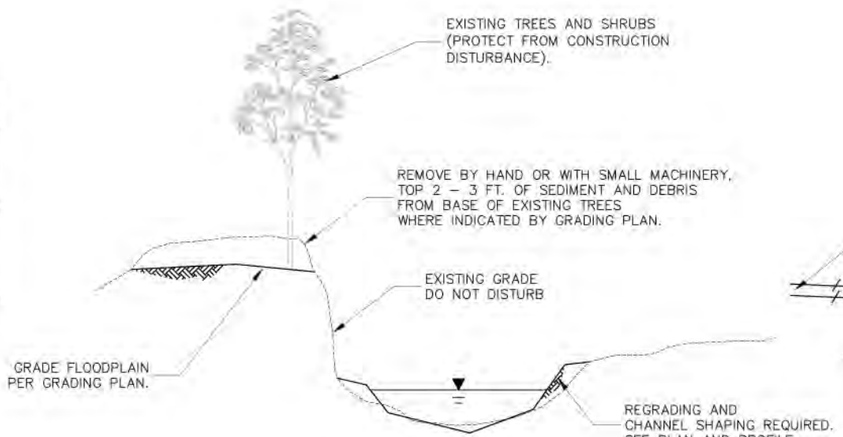
Bedding Material For bedding under 24" stacked boulders	
Intermediate Stone Dimension (inches)	% Smaller Than By Weight
12	90 - 100
10	70 - 90
9	50 - 70
5	30 - 50
4	< 30

Bank Material Gradation			
Stone Designation	Intermediate Stone Dimension (inches)	% Smaller Than By Weight	D50 (inches)
BANK MATERIAL (UDFCD Type VL*)	12	70 - 100	6
	9	50 - 70	
	6	35 - 50	
	2	2 - 10	

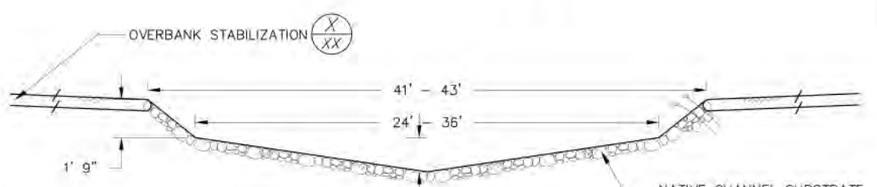
*Rounded to semi-rounded stone shall be used for Bank Material.

NOTE:

NATIVE MATERIAL IS ACCEPTABLE IF IT MEETS CHANNEL SUBSTRATE GRADATION AND MATERIAL SPECIFICATIONS.



X BANK RESTORATION DETAIL
NOT TO SCALE



X CHANNEL
NOT TO SCALE

CROSS SECTIONS
FLOODPLAIN REHABILITATION
FIGURE 4

BLUE MOUNTAIN NEIGHBORHOOD

PMB
BAT
SCT

SET-T39951
February 22, 2017

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Berthoud Site

Berthoud Site – Planting Plan Details

Planting Zones

Planting Zone	Recommendation[1]	Areas	Materials and Quantities[2]
Bank (Zone 1)	Willow stakes, herbaceous plugs, and Zone 1 seed mix	0.39 acre (16,099 sq. ft.)	1,450 willow stakes, 1,000 herbaceous plugs, 136 Pure Live Seed (PLS) lbs Zone 1 seed mix[3], 600 lbs wood straw mulch (seeded area only)
Overbank (Zone 2)	Zone 2 seed mix, woody shrub containers, cottonwood/willow tree cuttings	0.31 acre (13,504 sq. ft.)	146 PLS lbs Zone 2 seed mix[3], 300 woody shrub containers, 50 cottonwood/willow tree cuttings

Notes:
[1] Herbaceous plugs to be planted on lower banks and Zone 1 seed mix will be used on top of banks under the direction of the project vegetation ecologist.
[2] Soil amendments may be needed; to be determined after soil testing.
[3] PLS amount based on broadcast seeding only.

Typical Planting Palette for all Planting Zones

Species Name	Common Name	Container Type	Planting Zones			
			Zone 1		Zone 2	
			% in Palette	Spacing (on-center)	% in Palette	Spacing (on-center)
Woody Container						
Prunus americana	American plum	D60			15	6’
Rosa woodsii	Woods’ rose	D60			30	6’
Ribes aureum	Golden currant	D60			25	6’
Symphoricarpos occidentalis	Western snowberry	D60			30	6’
Herb Container						
Carex nebrascensis	Nebraska sedge	10 cubic inches (ci)	10	3’		
Carex pellita	Woolly sedge	10 ci	15	3’		
Eleocharis palustris	Common spikerush	10 ci	5	3’		
Glyceria grandis	American mannagrass	10 ci	10	3’		
Juncus arcticus	Mountain rush	10 ci	20	3’		
Juncus torreyi	Torrey’s rush	10 ci	20	3’		
Poa palustris	Fowl bluegrass	10 ci	20	3’		
Cuttings/Stakes						
Populus angustifolia	Narrow-leaf cottonwood	Cuttings			40	13’
Populus deltoides ssp. *monilifera*	Plains cottonwood	Cuttings			40	13’
Salix amygdaloides	Peachleaf willow	Cuttings			20	13’
Salix exigua	Sandbar willow	Cuttings	100	4’		

Site Preparation – Weed Management

1. Pre-treat the project site to remove invasive and noxious weed species.

2. Hand pull, dig up, and spot treat weeds before seeding to prevent weed spread. In areas with heavy weed infestations, treat weeds with U.S. Environmental Protection Agency-approved aquatic glyphosate herbicide in mid-April to mid-June – carefully following label instructions as required by law.

3. Mow weeds prior to seed set in spring/early summer and again prior to fall planting to limit weed seed production.

Willow/Cottonwood Cuttings Harvest and Planting Instructions

1. Harvest willows and cottonwoods while still dormant in the early spring and 7 to 14 days prior to the desired planting time. Appropriate harvest locations shall be identified well before planned harvest dates and in consultation with the project vegetation ecologist.

2. Harvesters must be able to identify the different willows based on stem and bud characteristics. The invasive crack willow is prevalent in the project area and should not be harvested for restoration.

3. Limit harvest to no more than 20% of the branches from any single plant and no more than 30% of the overall stand.

4. Select healthy stems that are 2 to 7 years old with green cores. Harvested stems should be between pinky finger and thumb width in diameter. Stems should be at least 4 feet long for willows and 5 to 7 feet long for cottonwoods.

5. Cut stems with a clean diagonal cut at the base of the stem, leaving terminal buds until installation. For cottonwoods, leave a few upper branches on the stems. The rest of the branches should be cut close to the stem.

6. Bundle stems in groups of 50 or less by species and soak the bundles by submerging the bottom 80% or more in water horizontally for at least 24 hours and up to 2 weeks prior to planting.

7. When planting, space willow cuttings approximately 4 feet apart in clusters and cottonwood cuttings approximately 13 feet apart.

8. When planting, ensure the top of the cutting is oriented upward. The top of the cutting will have the terminal buds and will generally be smaller in diameter than the bottom of the cutting.

9. Ensure the lower 7 to 8 inches of the cutting reaches below the expected dry season water table.

10. Approximately two-thirds of the cutting should be below ground, with the remaining third aboveground. For sandbar willows, cut the aboveground length appropriately. For cottonwoods, leave the terminal buds and a few branches.

11. Water after planting and tamp down soil to remove air pockets.

Plantings

1. Pre-flag the site hydrology to facilitate revegetation by proper riparian planting zones.
2. Woody and herbaceous containers shall be planted in the appropriate zone in spring (preferred) or fall. If planting in summer, supplemental irrigation may be necessary.
3. Substitutions must be approved by the project vegetation ecologist.
4. Hand dig the planting holes for containerized stock and dig holes to the depth of the plant root ball.
5. Water holes before planting. After planting, water and tamp down soil to remove air pockets.
6. Mulch around containerized plantings.

Seedbed Preparation

1. Prior to soil preparation, a soil test shall be conducted to determine if an amendment is needed to provide sufficient nutrients to grow native vegetation and not promote weeds.
2. Seedbed should be prepped before seeding by decompacting the soil (if necessary), adding a soil amendment (if needed), and firming the soil surface prior to seeding.
3. Slopes flatter than 2:1 shall be filled into an even and loose seed bed 4 inches deep. Slopes 2:1 or steeper shall be left in a roughened condition. Slopes shall be free of rocks, clods, or other debris more than 4 inches in diameter.
4. If a soil amendment is needed, incorporate a slow release organic soil amendment with a moderate level of total nitrogen (such as Biosol) into the top 4 inches of soil.

Seeding

1. No substitutions of species or rates are allowed without written permission from the project vegetation ecologist. Use only native seed – preferably of a local ecotype.
2. The seed mixes shall have no noxious weed as verified by the seed tag. Seed tags should be provided to the project vegetation ecologist before seeding.
3. Broadcast Zone 1 seed mix at 136 PLS per square foot and Zone 2 seed mix at 146 PLS per square foot. Only broadcast seed in Zone 1. If drill seeding in Zone 2, halve the rate.
4. Seeding will be conducted either between spring thaw to June 1, or from September 15 until consistent ground freeze. Spring thaw and consistent ground freeze is defined in the technical specifications. Fall seeding is preferred.
5. Ensure that broadcast seeding will be buried in at least 1/4 inch of soil followed by raking the seed into the soil. If drill seeding in Zone 2, the drilling rate should be ¼ to ¾ inch deep and the

drill seeder should be of a type for native/range seeding with multiple boxes for different types of seeds.

6. Cover 75% of the soil surface with mulch – preferably weed straw – at a rate of 3,000 pounds per acre (lb/acre). Use biodegradable 24-month erosion-control blankets (e.g., June fiber) on stream banks. Follow all manufacturers' instructions.

7. Supplemental watering (TBD) may be needed, depending on the weather conditions.

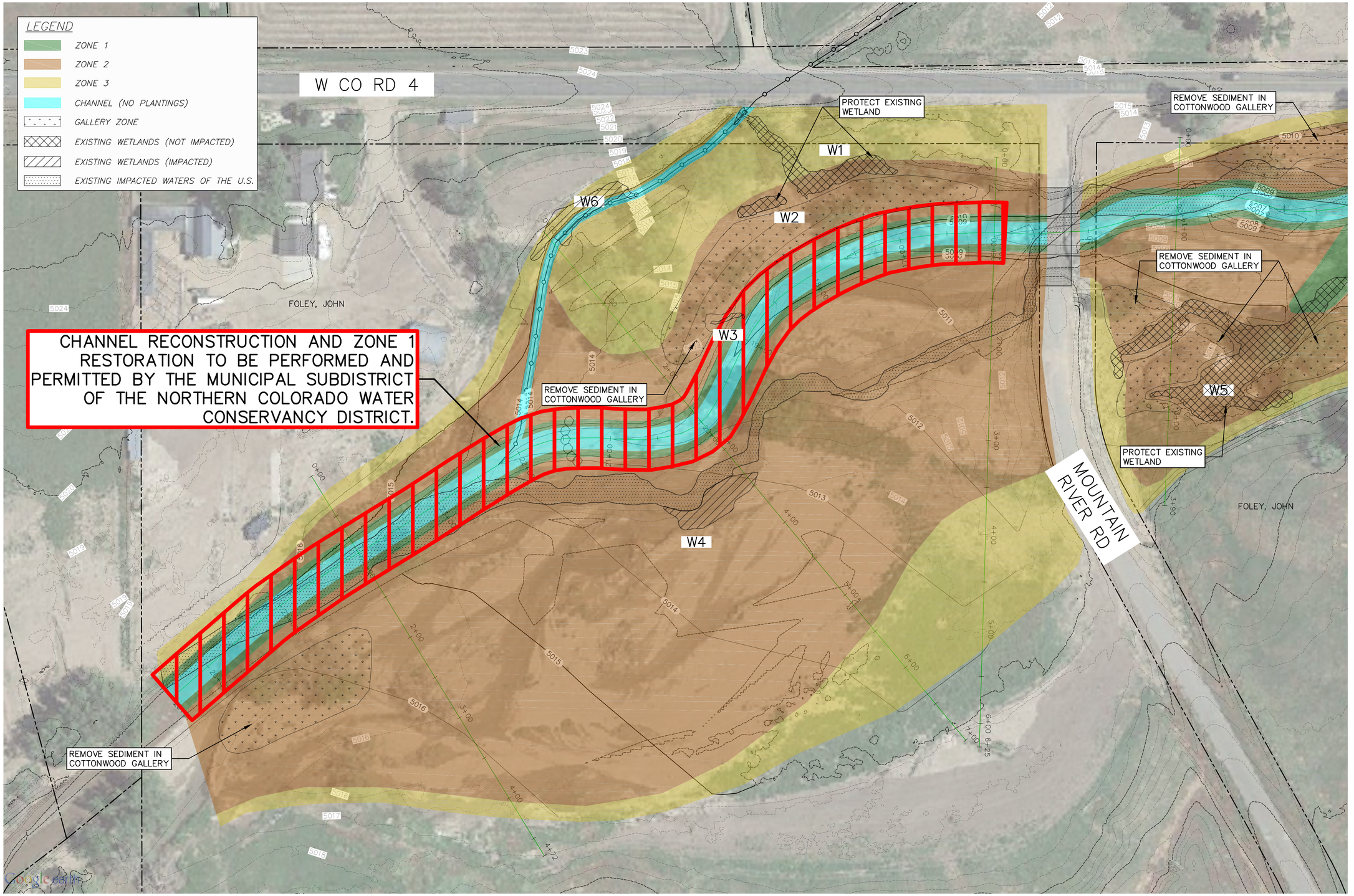
Seed Mixes

Zone 1

Common Name	Scientific Name	Desired Mix %
Elymus canadensis	Canada wildrye	10
Elymus trachycaulus trachycaulus	Slender wheatgrass	10
Glyceria striata	Fowl mannagrass	15
Juncus balticus (arcticus)	Baltic rush	15
Panicum virgatum	Switchgrass	15
Pascopyrum smithii	Western wheatgrass	10
Poa palustris	Fowl bluegrass	15
Spartina pectinata	Prairie cordgrass	10
Total		100

Zone 2

Common Name	Scientific Name	Desired Mix %
Elymus canadensis	Canada wildrye	10
Elymus trachycaulus trachycaulus	Slender wheatgrass	20
Iris missouriensis	Rocky Mountain iris	10
Juncus arcticus (balticus)	Mountain rush	10
Oenothera elata	Hooker's evening-primrose	5
Panicum virgatum	Switchgrass	10
Pascopyrum smithii	Western wheatgrass	10
Solidago canadensis	Canada goldenrod	15
Sporobolus crytandrus	Sand dropseed	10
Total		100



BASEMAP: GoogleEarth IMAGERY – EXISTING CONDITIONS MAPPING, DEVELOPED WITH A COMBINATION OF AERIAL MAPPING AND CROSS SECETION SURVEYS FOR TOPOGRAPHY. THE AERIAL MAPPING DEPICTS EXISTING SITE FEATURES SUCH AS ROADS, BUILDINGS, VEGETATION, ETC. HOWEVER, CONTRACTOR SHALL NOT RELY ON AERIAL MAPPING FOR ACCURATE LOCATIONS OF SITE FEATURES. ALL SITE FEATURES WILL REQUIRE FIELD VERIFICATION TO ACCURATELY IDENTIFY LOCATIONS.

0 50 100 Feet

PLANTING PLAN
FLOODPLAIN REHABILITATION
FIGURE 1

BERTHOUD NEIGHBORHOOD

Sheet Revisions

Init.	Date:	Comments

Project #: SET-T39950
Date: February 27, 2017
File Name:

Designed: PMB
Drawn: BAT
Approved: SCT

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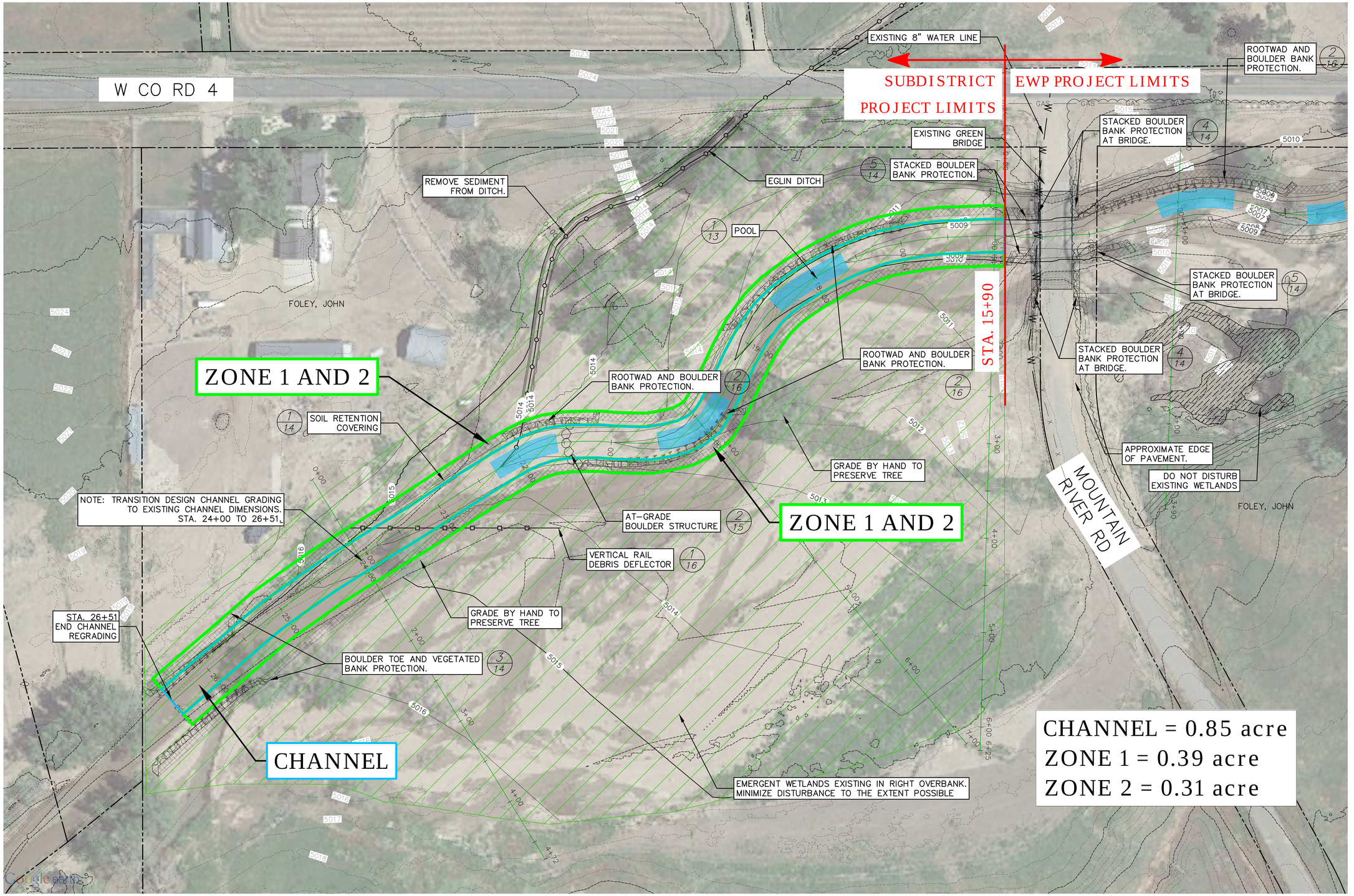

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BASEMAP: GoogleEarth IMAGERY

0 50 100 Feet

SITE AND GRADING PLAN
FLOODPLAIN REHABILITATION
FIGURE 2

BERTHOUD NEIGHBORHOOD

Sheet Revisions	Date:	Comments	Init.

Designed: PMB
Drawn: BAT
Approved: SCT

Project #: SET-T39950
Date: March 13, 2017
File Name:

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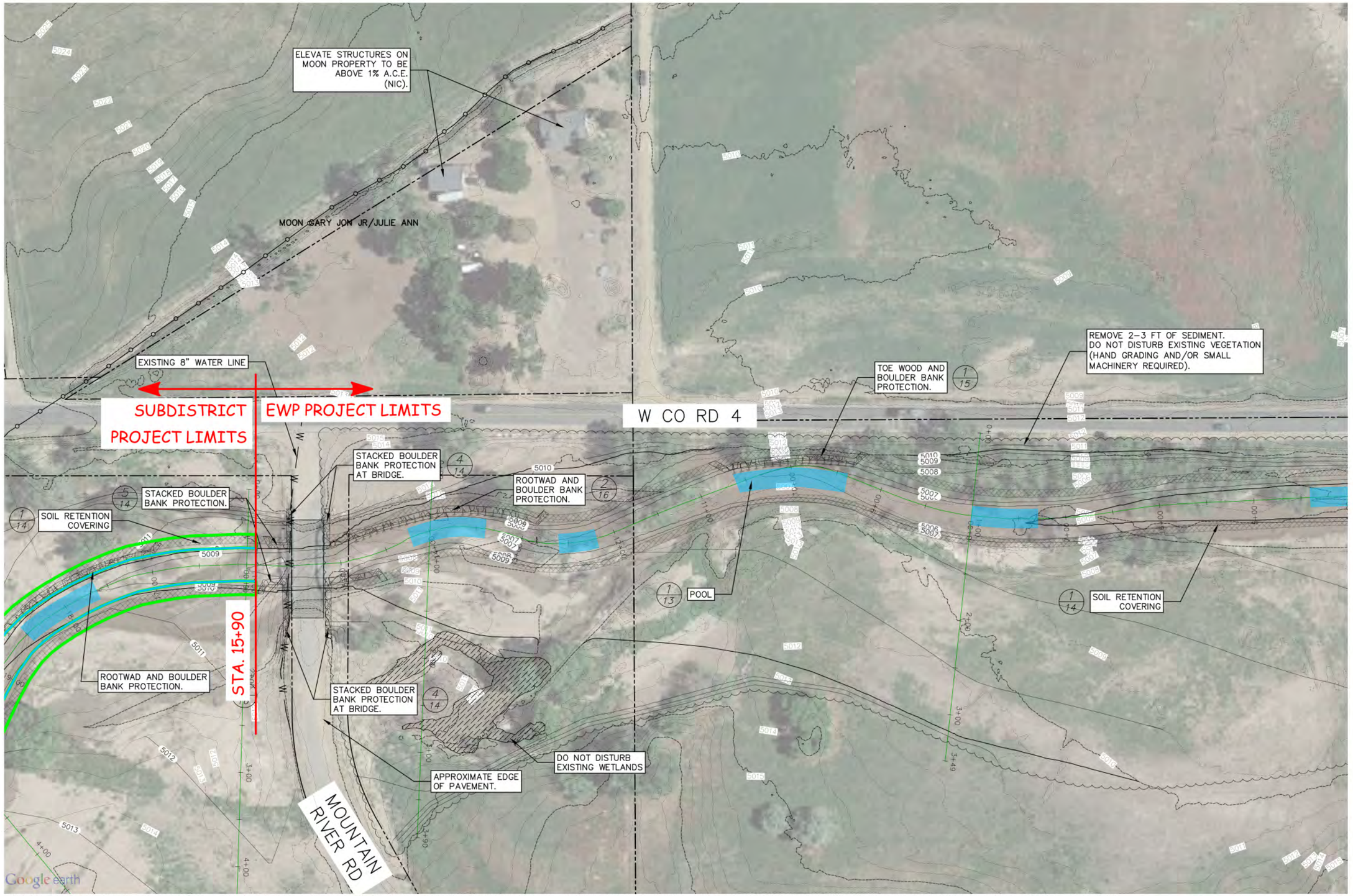

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0 50 100 Feet

SITE AND GRADING PLAN
FLOODPLAIN REHABILITATION
FIGURE 3

BERTHOUD NEIGHBORHOOD

Sheet	Revisions	Date	Comments	Init.

Designed: PMB
Drawn: BAT
Approved: SCT

Project #: SET-T39950
Date: February 22, 2017
File Name:

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SITE AND GRADING PLAN FLOODPLAIN REHABILITATION

FIGURE 4

BERTHOUD NEIGHBORHOOD

Sheet Revisions

No.	Date	Comments	Init.

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Drawn BAT
Approved SCT

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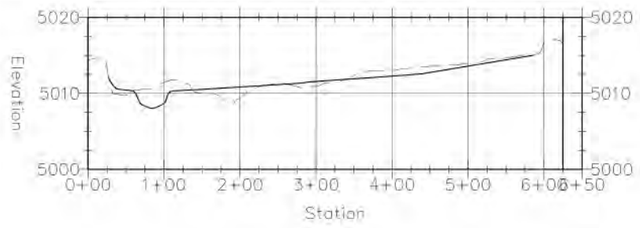

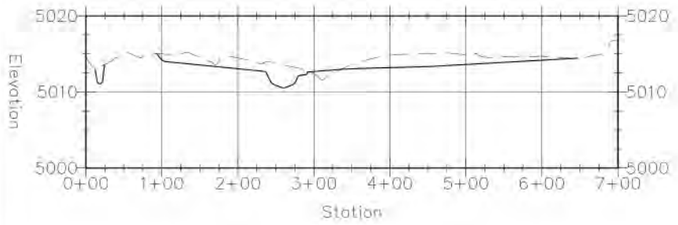

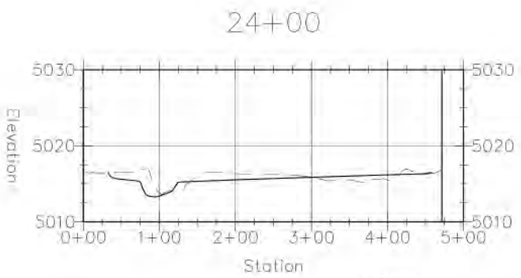

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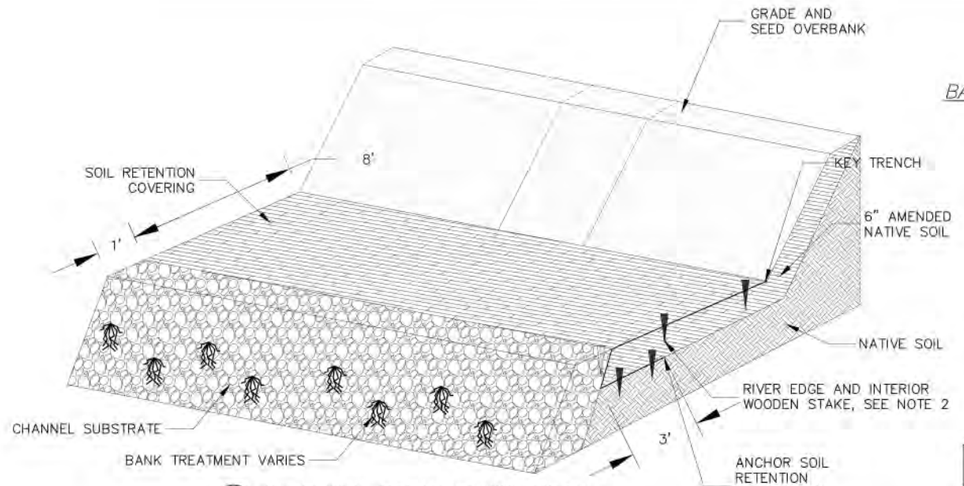

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Channel Substrate Gradation	
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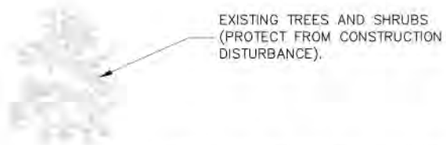
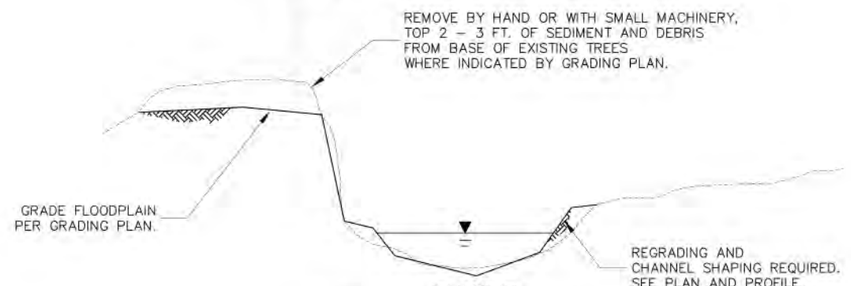
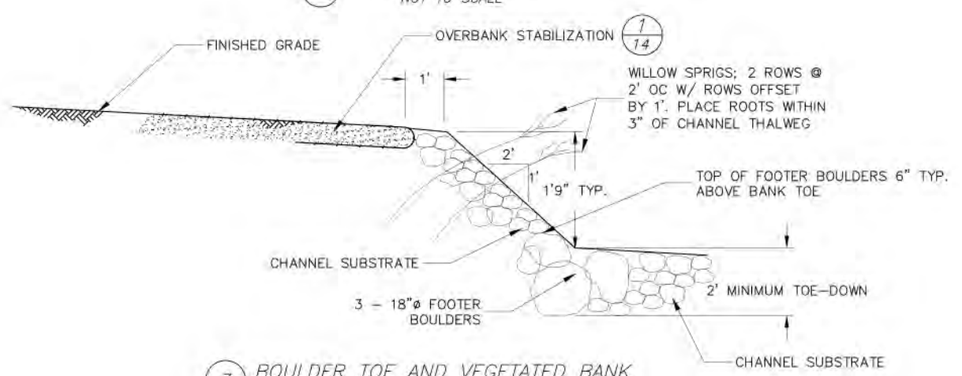
NATIVE MATERIAL IS ACCEPTABLE IF IT MEETS CHANNEL SUBSTRATE GRADATION AND MATERIAL SPECIFICATIONS.





2 *CHANNEL RESTORATION DETAIL*
NOT TO SCALE

Bedding Material For bedding under 24" stacked boulders	
Intermediate Stone Dimension (inches)	% Smaller Than By Weight
12	90 - 100
10	70 - 90
9	50 - 70
5	30 - 50
4	< 30



3 *BOULDER TOE AND VEGETATED BANK PROTECTION DETAIL*
NOT TO SCALE

CROSS SECTIONS
FLOODPLAIN REHABILITATION
FIGURE 5

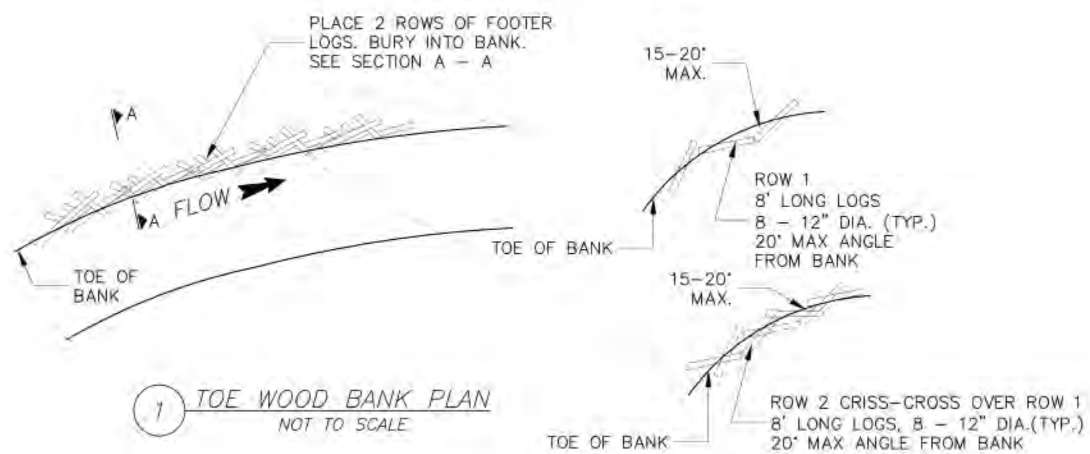
BERTHOUD NEIGHBORHOOD

PMB
BAT
SCT

SET–T39950
February 22, 2017

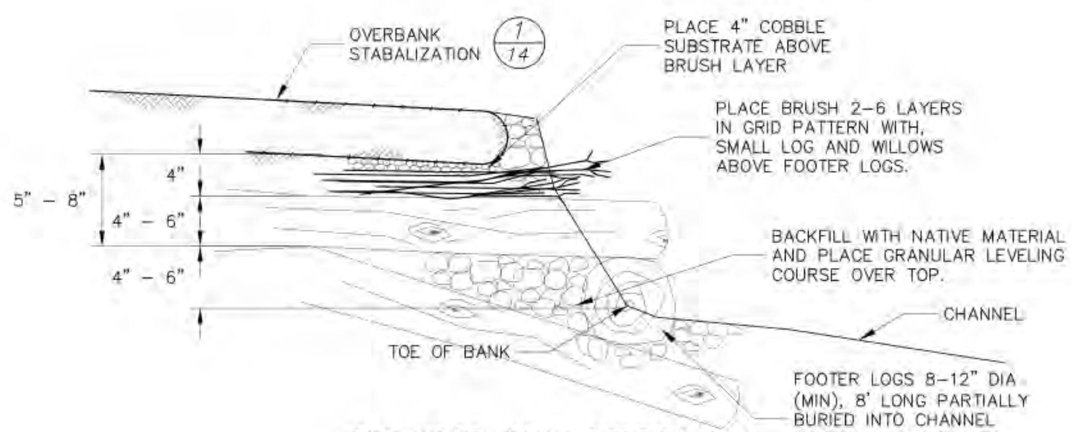
TETRA TECH
3801 AUTOMATION WAY, SUITE 100
FORT COLLINS, COLORADO 80525
PHONE (970) 223-9600 FAX (970) 223-7171
www.tetratech.com

435 HIGH STREET, SUITE 201
P.O. BOX 413
LYONS, CO 80540-0413
(303) 823-2370



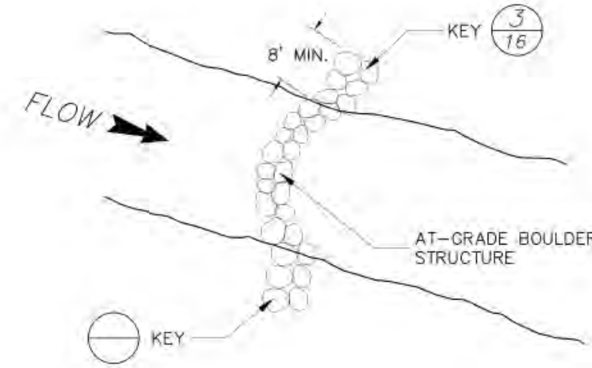
1 TOE WOOD BANK PLAN

NOT TO SCALE



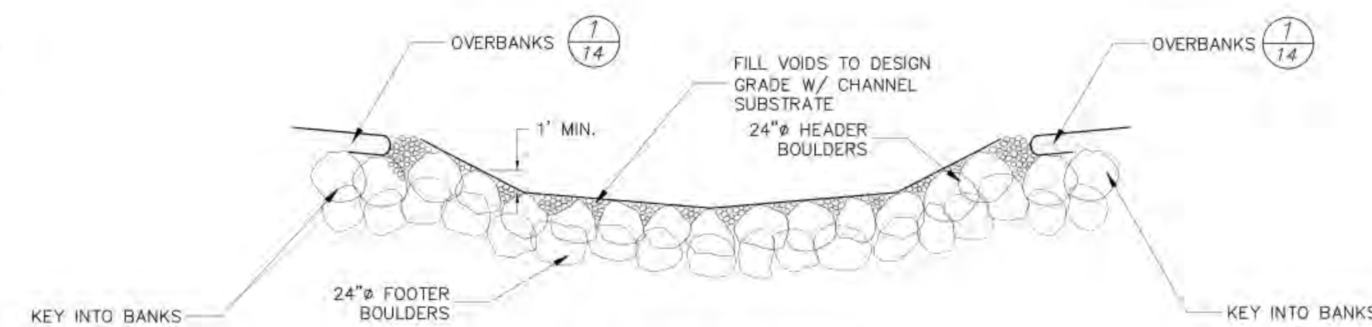
TOE WOOD BANK SECTION A–A

NOT TO SCALE



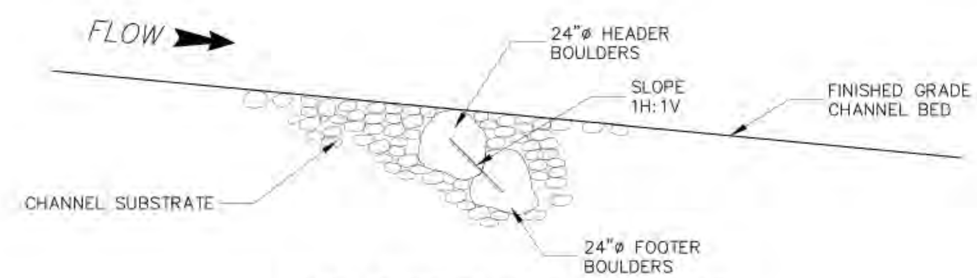
2 TYPICAL AT-GRADE BOULDER STRUCTURE PLANVIEW

NOT TO SCALE



AT-GRADE BOULDER STRUCTURE SECTION VIEW

NOT TO SCALE



AT-GRADE BOULDER STRUCTURE PROFILE VIEW

NOT TO SCALE

CROSS SECTIONS

FLOODPLAIN REHABILITATION

FIGURE 6

BERTHOUD NEIGHBORHOOD

PMB

BAT

SCT

SET-T39950

February 22, 2017

TETRA TECH

Appendix D Colorado Division of Water Resources Letter

COLORADO
Division of Water Resources
Department of Natural Resources

February 17, 2017

Mr. Jeff Drager
Deputy Manager Engineering Division
Municipal Subdistrict
Northern Colorado Water Conservancy District
220 Water Avenue
Berthoud, CO 80513

RE: Little Thompson Stream Channel Restoration

Dear Mr. Drager:

I have reviewed your letter dated February 10, 2017 requesting an opinion related to any water rights impacts of proposed stream channel restoration work on two section of the Little Thompson River. This work is being undertaken to restore the Plains Berthoud Reach and Foothills Blue Mountain Reach to their pre-2013 flood condition. Northern Colorado Water Conservancy District (NCWCD) would help fund these restoration efforts and this funding would be considered by the U.S. Army Corps of Engineers (COE) in the Section 404 process as compensatory mitigation for stream drainages inundated by the proposed Chimney Hollow Reservoir.

The Colorado Division of Water Resources (DWR) generally does not consider stream channel restoration work to need water rights or have any water rights impacts. The two exceptions to this general consideration would be if the restoration work exposed groundwater to the atmosphere or created an impediment to stream flow. The information provided in your letter indicates that the proposed restoration work in the Plains Berthoud Reach and Foothills Blue Mountain Reach will not involve either of the two exceptions just mentioned. **Therefore, DWR finds that there will be no water rights needed or water right impacts from the proposed stream channel restoration work as described in your letter.**

Please do not hesitate to contact me if you have any questions or need further clarification related to this letter.

Regards,

David L. Nettles, P.E.
Division Engineer

ec: Jean Lever, District 4 Water Commissioner
Mike Hein, Assistant Division Engineer
WDID File (0400000)

Photo Log

Photo 1 - Streambank scour, removal of woody riparian vegetation and sediment deposition following 2013 flood. Photo taken 4/24/2014.

Photo 2 - In 2017, large areas of scour and deposition remain sparsely vegetated. Photo taken 1/13/2017.

Photo 3 - Large areas of sediment deposits following the 2013 floods.
Photo taken 4/30/2014.

Photo 4 - Large areas of sparsely vegetated sediments remain in 2016.
Photo taken February 2016.

Photo 5 - In 2017, large area of sparsely vegetated sediments continue to remain.
Photo taken 1/13/2017.