FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

All sections must be addressed, or the application will be considered invalid

I. APPLICANT INFORMATION

A. Applicant Name: Trout Unlimited (TU), Ben LaPorte

Mailing Address: 312 N Higgins Ave

City: Missoula State: MT Zip: 59802

Telephone: 303-808-5611 E-mail: benjamin.laporte@tu.org

B. Contact Person (if different than applicant):

Address:

City: State: Zip:

Telephone: E-mail:

C. Landowner and/or Lessee Name (if different than applicant): Beaverhead-Deerlodge National Forest, Jennifer Mickelson

Mailing Address: 420 Barrett Street

City: Dillon State: MT Zip: 59725

Telephone: 406-683-3900 E-mail: Jennifer.mickelson@usda .gov

II. PROJECT INFORMATION

A. Project Name: Upper Storm Lake Creek Diversion Improvement Project

River, stream, or lake: Storm Lake Creek

Location: Township: 5 N Range: 13 W Section: 27

Latitude: 46.15081 Longitude: -113.21447 *Within project (decimal degrees)*

County:

B. Purpose of Project: *(high level, focus on why the project is important)*

The purpose of this project is to reconstruct a defunct wooden pin-and-plank diversion structure between Storm Lake Creek and Silver Lake to reduce native fish losses associated with high-flow entrainment events. Currently, fish—including ESA-listed bull trout—are swept into the historic and disconnected Storm Lake Creek channel during peak flows and become stranded as water recedes. The proposed project will replace the failing structure with a fixed, concrete overflow weir and a series of step pools in the overflow channel to facilitate upstream volitional movement during receding flows, improving survival for entrained fish.

C. Brief Project Description (attach additional information to end of application). Please include the anticipated construction schedule:

The Upper Storm Lake Creek Diversion Improvement Project will reconstruct a failing wooden diversion structure on Storm Lake Creek to reduce entrainment-related fish mortality and improve aquatic connectivity. Located entirely on United States Forest Service (USFS) managed land in the Beaverhead-Deerlodge National Forest (BDNF) and within designated bull trout critical habitat, the site currently allows water to spill into a disconnected historic channel during high flows, where native fish—including ESA-listed bull trout—can become stranded with no return access to the main channel.

The project will remove the deteriorating pin-and-plank diversion structure and construct a new fixed 8-inch concrete overflow weir structure. Downstream of the concrete weir, the overflow channel will be regraded, and a series of rock-step structures will be constructed to facilitate volitional upstream movement of entrained fish during receding flows. The project design includes features for improved hydraulic performance, fish passage function, and long-term structural integrity. Step pool dimensions, streambed material gradation, and channel slope have been tailored to accommodate typical and peak flows, while maintaining safe conditions for fish re-entry. Great West Engineering has completed the final stamped design (attached).

Biologists from Montana Fish, Wildlife & Parks (MFWP) and the U.S. Fish and Wildlife Service (USFWS) identified this site as a concern due to observed fish entrainment and stranding during high-flow conditions. In 2018, MFWP conducted an electrofishing survey and confirmed the presence of juvenile bull trout in the overflow channel, validating the biological risk associated with the failing structure.

Construction is anticipated for late summer 2025 or early spring 2026 and will follow bull trout conservation work windows, with in-stream activity expected between July 16 and September 14 or March 16 to May 14. Final construction timing will be coordinated with project partners to reflect biological and operational needs. Construction tasks include demolition of the existing structure, excavation, concrete installation, step-pool construction, and restoration of temporary access routes. The engineer’s cost estimate is $72,950. In-kind and cash contributions from Butte-Silver Bow (BSB) and construction oversight by TU will support efficient project delivery.

This project directly complements a broader effort to reconnect native trout habitat throughout the Warm Springs Creek watershed and improve fish management within the Silver Lake Water System. In spring 2025, TU, USFS, USFWS, MFWP, NRDP, and BSB completed the installation of three selective fish traps at key diversion points—Meyers Dam on Warm Springs Creek, Twin Lakes Creek (below Twin Lakes Dam), and at the outlet of Storm Lake Creek (into Silver Lake). These traps are designed to improve native fish passage while preventing the upstream movement of non-native species.

The Upper Storm Lake Creek Entrainment Reduction Project is essential to the success of this system-wide effort. By stabilizing the known low point in the ditch system, this project ensures high flows are safely managed and routed through a controlled outlet—preventing uncontrolled avulsions and maintaining the functionality of the new selective trap located just downstream. The USFS funded the design through a participating agreement with TU as part of its broader commitment to native fish recovery under the Collaborative-Based, Aquatic-Focused, Landscape-Scale Restoration (CALR) initiative.

D. What was the cause of habitat degradation and how will the project correct the cause?

In the early 1900s, Storm Lake Creek was diverted into Silver Lake to support industrial operations in the Anaconda-Butte area. Historically, the diversion structure may have been used to manage flows seasonally between Silver Lake and the original creek channel, but active management ceased decades ago. As a result, the natural Storm Lake Creek channel has been abandoned, and now all of the flow is routed through a constructed ditch system (technically Storm Lake Creek). This project will rebuild the diversion structure to allow native fish that become entrained in the overflow channel during high-flow events to volitionally return to the main creek as flows recede.

E. Length of stream or size of lake that will be treated (project extent): 125 ft

Length/size of impact, if larger than project extent (e.g., stream miles opened): 11 miles

F. Project Budget Summary:

Grant Request (Dollars):	**$**	**60,439.84**
Matching Dollars:	**$**	**49,530.00**
Matching In-Kind Services:*	**$**	**5,700.00**

**salaries of government employees are not considered matching contributions*

Other Contributions (not used as match)	**$**	**2,118.00**
Total Project Cost:	**$**	**117,787.84**

G. Attach itemized (line item) budget – *see budget template*

H. Attach project location map(s) that include:

- [x] Extent of the project, including context (relation to major landmark or town)
- [x] Indication of public and private property
- [ ] Riparian buffer locations and widths (if applicable) and grazing locations

I. Attach project plans:

- [x] Detailed sketches or plan views with the location and proposed restoration
- [x] Pre-project photographs (GPS location strongly recommended)
- [ ] If water leasing or water salvage is involved, attach a supplemental questionnaire (*https://myfwp.mt.gov/getRepositoryFile?objectID=36110*)

J. Attach support letters or statements of (e.g., landowner consent, community or public support). For FWP statement, attach provided template. List any other project partners:

Caleb Uerling FWP Statement attached. Letters of support are from USFS, BSB, and USFWS.

III. MAINTENANCE AND MONITORING (attach additional information to end of application):

A. A 20-year maintenance commitment is required*. Please confirm that you will ensure this protection and describe your approach. Attach any relevant maintenance plans. Yes [x] No [ ]

**If it is a water leasing project, describe the length of the agreement.*

BSB is the owner of the diversion infrastructure and will retain full responsibility for maintaining the completed structure over the long term. Trout Unlimited will continue to coordinate with BSB following project completion to ensure the structure is functioning as intended. A 20-year maintenance commitment will be included as part of the project agreement with BSB.

B. Will grazing be part of or adjacent to the project? If so, describe or attach land management plans, including short term and long term grazing regimes. If the landowner is not the applicant, please describe their involvement in the project. *If you want assistance with grazing plan development, note your need.*

Grazing is not part of this project. The site is located on USFS land within the Beaverhead-Deerlodge National Forest, with no active grazing allotments near the diversion site.

C. Will the project be monitored to determine if goals were met? If so, what are the short-term and long-term plans to assess benefits and lessons learned? Were pre-project data collected? Will monitoring information be shared with FWP?

Yes, post-project monitoring will be led by Caleb Uerling (MFWP Upper Clark Fork Fisheries Biologist) and Dan Brewer (USFWS Bull Trout Recovery Coordinator). Monitoring is expected to include visual inspections and/or electrofishing to assess the presence and condition of entrained fish in the overflow channel, and to evaluate whether the reconstructed structure allows volitional return to the main channel as flows recede. If feasible, additional methods such as PIT tagging may be considered. TU will support MFWP and USFWS with monitoring activities as needed and assist with coordination and data sharing.

In 2018, MFWP conducted an electroshocking survey and confirmed the presence of juvenile Bull Trout in the overflow channel, validating concerns about high-flow entrainment.

IV. PROJECT BENEFITS (attach additional information to end of application):

A. What species of fish will benefit from this project?

This project will improve recruitment of bull trout and westslope cutthroat trout (WCT) to both Storm Lake Creek and Silver Lake, helping to preserve and enhance two important native species and a cutthroat sport fishery. This project will also benefit other non-game species in Strom Lake Creek and Silver Lake.

B. How will the project protect or enhance wild fish habitat?

This project will improve the resilience of native fish populations in Storm Lake Creek through reduced entrainment-related mortality and improved connectivity back to the main channel during high flow events. This project will directly address the incidental take of a listed species, Bull Trout, by reducing entrainment-related losses at a known problem area.

It will also help reduce mortality for all native species present in the system, including WCT. Entrainment risk at this site is influenced by both the proportion of flow diverted and the density of fish present during high flows, making it a critical location for improving habitat connectivity and fish survival. By mitigating these risks in a designated critical habitat stream reach, the project supports the long-term persistence of native fish populations in the Upper Clark Fork basin.

C. What is the expected improvement to fish populations, both short term and long term? How might the project translate to angler success?

This project will improve survival and connectivity for native fish by reducing entrainment-related losses and increasing access to spawning and rearing habitat. While bull trout are not a target species for angling, and access to Silver Lake is limited, anglers may benefit over time from increased presence and condition of WCT in Storm Lake Creek itself.

D. Will the project increase public fishing opportunity for wild fish and, if so, how? Is public fishing allowed onsite? Is it allowed by permission? If not, describe how the public would benefit.

Public fishing is allowed on Storm Lake Creek, which is located on USFS land. This project is anticipated to improve angling opportunity over time by enhancing the survival and condition of native fish, particularly WCT.

E. Aside from angling, what local or large-scale public benefits will be realized from this project?

This project will reduce the risk of structural failure at a known low point in the Storm Lake Creek creek/ditch system, where flow can be safely and predictably managed. By creating a stable and engineered overflow outlet at this location, the project helps prevent uncontrolled avulsions or new points of failure downstream. If the aging structure fails during a high-flow event, it could result in an uncontrolled breach into the historic Storm Lake Creek channel, potentially causing downstream flooding and damage to homes, roads, and other infrastructure. By providing an engineered and stable outlet, the project protects public safety, reduces liability risk, and protects natural an built resources in the Storm Lake Creek drainage.

F. Will the project interfere with water or property rights of adjacent landowners? (explain):

No water or property rights of adjacent landowners will be affected by this project. The project is located entirely on the BDNF, and all of BSB's water rights will remain the same.

G. Will the project result in the development of commercial recreational use on the site (including paid access)? Explain:

No.

H. Is this project associated with the reclamation of past mining activity?

Yes and no. While the Storm Lake Creek diversion was originally constructed to support historical mining and smelting operations in the Anaconda-Butte area, this project is not a formal mine reclamation effort. It is more focused on improving habitat and infrastructure function at a legacy diversion site.

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

V. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: Ben LaRonte Date: 5/15/2025

Submittal: **Applications must be signed and received on or before November 15 and May 15 to be considered for the subsequent funding period**. Late or incomplete applications will be rejected.

Mail to:	FWP Future Fisheries Fish Habitat Bureau PO Box 200701 Helena, MT 59620-0701	Email:	Future Fisheries Coordinator FWPFFIP@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov and send to mmcgree@mt.gov

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for clarification.

PROJECT COSTS					GRANT REQUEST AND FUNDING			
Work Items (Itemize by Category)	**Number of Units**	**Unit Description***	**Cost/Unit**	**Total Cost**	**FUTURE FISHERIES REQUEST**	**Matching Contributions (Cash or In-Kind)*** **	**Other Contributions (Funds not used as match)**	**Total Funding**
**Units = feet, hours, cubic yards, etc. Do not use lump sum unless necessary.*								
Personnel								
Great West Engineering: Desgin and Cost Estimate	1	LS	$29,530.00	$ 29,530.00		29,530.00		$ 29,530.00
TU Permitting	8	HR	$54.71	$ 437.68	437.68			$ 437.68
USFS BDNF Watershed Program Manager: Permitting/NEPA and Site Visits	3	Days	$556.00	$ 1,668.00			1,668.00	$ 1,668.00
USFS Special Use Permit Administrator:NEPA	1	Days	$450.00	$ 450.00			450.00	$ 450.00
TU Bidding and Contracting	16	HR	$54.71	$ 875.36	875.36			$ 875.36
TU Oversight	80	HR	$54.71	$ 4,376.80	4,376.80			$ 4,376.80
Engineering Firm Site Stakeout and Preconstruction Meeting	8	HR	$212.50	$ 1,700.00	1,700.00			$ 1,700.00
Engineering Firm Oversight	24	HR	$212.50	$ 5,100.00	5,100.00			$ 5,100.00
Maintenance**				$ -				$ -
			Sub-Total	$ 44,137.84	$ 12,489.84	$ 29,530.00	$ 2,118.00	$ 44,137.84
Travel								
Mileage	1000	Miles	$0.70	$ 700.00		700.00		$ 700.00
Per diem				$ -				$ -
			Sub-Total	$ 700.00		$ 700.00	$ -	$ 700.00
Construction Materials								
Furnish and Install 1-inch Minus Bedding Material	2	CY	$200.00	$ 400.00	400.00			$ 400.00
Furnish and Install Cast-In-Place Concrete	4	CY	$2,500.00	$ 10,000.00		10,000.00		$ 10,000.00
Supply Rock Step Rocks	10	CY	$100.00	$ 1,000.00		1,000.00		$ 1,000.00
				$ -				$ -
			Sub-Total	$ 11,400.00	$ 400.00	$ 11,000.00	$ -	$ 11,400.00
Equipment, Labor, and Mobilization								
Mobilization, Bonding and General Requirements	1	LS	$7,500.00	$ 7,500.00	7,500.00			$ 7,500.00
Construct Access Road	1	LS	$4,000.00	$ 4,000.00		4,000.00		$ 4,000.00
Soil Erosion and Pollution Control	1	LS	$1,000.00	$ 1,000.00		1,000.00		$ 1,000.00
Dewatering	1	LS	$7,500.00	$ 7,500.00	7,500.00			$ 7,500.00
Clearing and Grubbing	1	LS	$2,000.00	$ 2,000.00	2,000.00			$ 2,000.00
Remove and Dispose Existing Timber Diversion Structure	1	LS	$4,000.00	$ 4,000.00		4,000.00		$ 4,000.00
Construct Upper Storm Lake Creek Channel	86	LF	$200.00	$ 17,200.00	17,200.00			$ 17,200.00
Construct Overflow Channel	39	LF	$150.00	$ 5,850.00	5,850.00			$ 5,850.00
Construct Rock Step Structure	3	EA	$3,000.00	$ 9,000.00	4,000.00	5,000.00		$ 9,000.00
Hydraulic Excavator with Thumb	4	HR	$250.00	$ 1,000.00	1,000.00			$ 1,000.00
Decommission Access Road	1	LS	$2,500.00	$ 2,500.00	2,500.00			$ 2,500.00
				$ -				$ -
			Sub-Total	$ 61,550.00	$ 47,550.00	$ 14,000.00	$ -	$ 61,550.00
			OVERALL TOTALS	$ 117,787.84	$ 60,439.84	$ 55,230.00	$ 2,118.00	$ 117,787.84

OTHER REQUIREMENTS:

**For projects that include a maintenance request, it cannot exceed 10% of the total project cost.

***Match can include in-kind materials or labor. Justification for in-kind labor (e.g. hourly rates used) can be noted below. Do not use government salaries as match.

BSB has offered to supply the footer and sill rocks needed to build the rock steps and clear and construct the access road. Cost estimates were provided by GWE.

Additional budget detail:

APPLICATION MATCHING CONTRIBUTIONS

Total should equal match listed above; do not include requested funds

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Butte-Silver Bow Water Utility		$ 15,000.00	$ 15,000.00	N
Butte-Silver Bow Water Utility (Access Route Construction and Rock Suppy)	$ 5,000.00		$ 5,000.00	Y
USFS Beaverhead -Deerlodge National Forest (Final Desgins)	$ -	$ 29,530.00	$ 29,530.00	Y
USFS Beaverhead -Deerlodge National Forest CALR (Construct Rock Step Structures)(	$ -	$ 5,000.00	$ 5,000.00	Y
Trout Unlimted	$ 700.00	$ -	$ 700.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ 5,700.00	$ 49,530.00	$ 55,230.00	

OTHER CONTRIBUTIONS

Total should equal other contributions listed above; these are funds not specically matched to the Future Fisheries application

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
USFS Beaverhead -Deerlodge National Forest (NEPA and Site Visits)	$ 2,118.00		$ 2,118.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ 2,118.00	$ -	$ 2,118.00	

MONTANA FISH, WILDLIFE & PARKS

Future Fisheries Improvement Program

Appendix: FWP Statement

Project Title: Storm Lake Creek Diversion Project

Please describe the potential impact of the project, including the priorities of the Fisheries Division and the importance to Montana's anglers.

The Storm Lake Creek drainage is unique in that it begins at a high mountain reservoir (Storm Lake) in its headwaters and terminates in a reservoir (Silver Lake) with 11 miles of stream channel between the two. The drainage supports adfluvial bull trout populations in both reservoirs that use the stream channel in between as spawning and rearing habitat. The Storm Lake Creek bull trout population makes up a significant portion of the bull trout population in the larger Warm Springs Creek drainage. Storm Lake Creek also supports westslope cutthroat trout throughout the drainage, including popular fisheries in both reservoirs.

The entirety of Storm Lake Creek is diverted year-round 4.5 miles upstream of Silver Lake to take the water to Silver Lake. This has been the orientation of the lower 4.5 miles of the creek for over a century, originally as part of water supply to the Anaconda Smelter and more recently to Butte-Silver Bow. The historic and natural channel has atrophied to a point where it no longer exists in any meaningful capacity, and the 4.5 miles of ditch have become naturalized and function as the natural stream channel. However, the ditched portion does have a maximum volume of water it can transport and when flows in the creek exceed this volume water spills over the aging diversion and down the valley bottom where the historic channel used to be. The spilling water is generally a small amount and terminates into the ground somewhere downstream of the diversion.

Fish, Wildlife and Parks monitoring at the diversion shows that bull trout and westslope cutthroat trout are entrained when water spills over the diversion. Entrained fish cannot return to the stream with the current configuration of the diversion and are ultimately lost from the population. Additionally, the current infrastructure is aging and at risk of a full failure. Failure of the current structure would be catastrophic for the bull trout population in Strom Lake Creek. This proposed project will rebuild the diversion so that there will be less water spilling and a key-way that allows fish to return if they are entrained. This project will improve recruitment of bull trout and westslope cutthroat trout to both Storm Lake Creek and Silver Lake, helping to preserve and enhance two important native species and a cutthroat sport fishery. With these benefits in mind, I urge you to consider this funding request. Please feel free to reach out with any questions as you evaluate this project for funding.

Caleb Uerling
Montana Fish, Wildlife & Parks
Fisheries Biologist - Upper Clark Fork River
caleb.uerling@mt.gov 406-493-2694

Name of FWP Biologist Caleb Uerling Date: 5/8/2025

Please attach to the FFIP application and materials and submit according to listed deadlines.

United States Department of the Interior
Fish and Wildlife Service
Montana Ecological Services Office
585 Shepard Way, Suite 1
Helena, Montana 59601-6287
Phone: (406) 449-5225; Fax: (406)
449-5339

Ben LaPorte
Trout Unlimited
Upper Clark Fork Project Manager
312 N Higgins Ave
Missoula, MT 59802

May 15, 2025

Dear Mr. LaPorte

The U.S. Fish and Wildlife Service (Service) appreciates the opportunity to provide comments on the proposed *Upper Storm Lake Creek Diversion Improvement Project*. As you are aware, bull trout (*Salvelinus confluentus*) were listed as threatened under the Endangered Species Act (ESA) in 1998, and critical habitat was designated in 2010. The Storm Lake Creek watershed supports designated critical habitat for a migratory population of bull trout and is considered a high-priority watershed for species recovery. The Service, along with the U.S. Forest Service, Montana Fish, Wildlife and Parks (MTFWP), Trout Unlimited, and Butte-Silver Bow City/County, has been working collaboratively to address several fish passage barriers in both the Storm Lake Creek watershed and the broader Warm Springs Creek system. Storm Lake Creek supports one of the few remaining migratory populations of bull trout within the Upper Clark Fork Recovery Area and plays a vital role in meeting the conservation and recovery goals for the species (USFWS 2015).

The diversion of Storm Lake Creek into Silver Lake in the late 1800s created an adfluvial bull trout population dependent on this system. Currently, bull trout can become stranded during flow events when the historic Storm Lake Creek channel is rewatered, and the existing diversion structure is non-functional and deteriorating. The proposed project to replace this structure and construct step-pools designed to facilitate volitional upstream fish passage represents a significant and positive step toward restoring connectivity and improving habitat function.

The Service believes this project will meaningfully contribute to bull trout conservation by reducing the risk of individual loss due to entrainment and improving access to essential habitat. Furthermore, it aligns directly with identified recovery actions outlined in the *Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout*, which highlights minimizing entrainment in Storm Lake Creek as a high-priority conservation action (USFWS 2015, pp. D-55–D-56).

We fully support the proposed improvements and commend your continued commitment to

native fish conservation. We anticipate that this project will contribute to increased abundance and resilience of the Storm Lake Creek local population, and ultimately, to the broader recovery of bull trout in the region. If you have any questions or would like to discuss the project further, please do not hesitate to contact me. Thank you for your ongoing efforts to restore and protect these important aquatic systems.

Sincerely,

Daniel Brewer

Daniel Brewer
Bull Trout Recovery Coordinator, Montana

References

U.S. Fish and Wildlife Service. 2015. Columbia headwaters recovery unit implementation plan for bull trout (*Salvelinus confluentus*). U.S. Fish and Wildlife Service, Portland, Oregon.

THE CITY-COUNTY OF
Butte-Silver Bow

Public Works Department
Jim Keenan, Water Plant Superintendent
Ph: 406-723-9429 E-Mail: jkeenan@bsb.mt.gov

May 15th, 2025

Dear Future Fisheries Improvement Program Review Panel,

Water released from Storm Lake flows approximately 5.75 miles down Storm Lake Creek until it reaches the Upper Storm Lake Creek Diversion. At this location, the entirety of Storm Lake Creek is diverted my means of a badly deteriorated wooden structure into the ditch that feeds Storm Lake water to Silver Lake for storage.

The Butte-Silver Bow Water Utility Division has made a budget request for funding to improve or replace the existing structure. There is exciting potential for Butte-Silver Bow to work cooperatively with Trout Unlimited on their proposed project which would address both the poor condition of the diversion structure as well as benefit Bull Trout during times of high flows.

I respectfully urge you to seriously consider funding this worthwhile project.

Sincerely,

Jim Keenan
Water Plant Superintendent

USDA United States Department of Agriculture | Forest Service | Beaverhead-Deerlodge National Forest | Pintler Ranger District | 88 Business Loop, Philipsburg, MT 59858 | 406-859-3211

File Code: 2670
Date: May 9, 2025

Future Fisheries Improvement Program
FWP Fisheries Division
P.O. Box 200701
Helena, MT 59620

Dear Future Fisheries Improvement Program Review Panel:

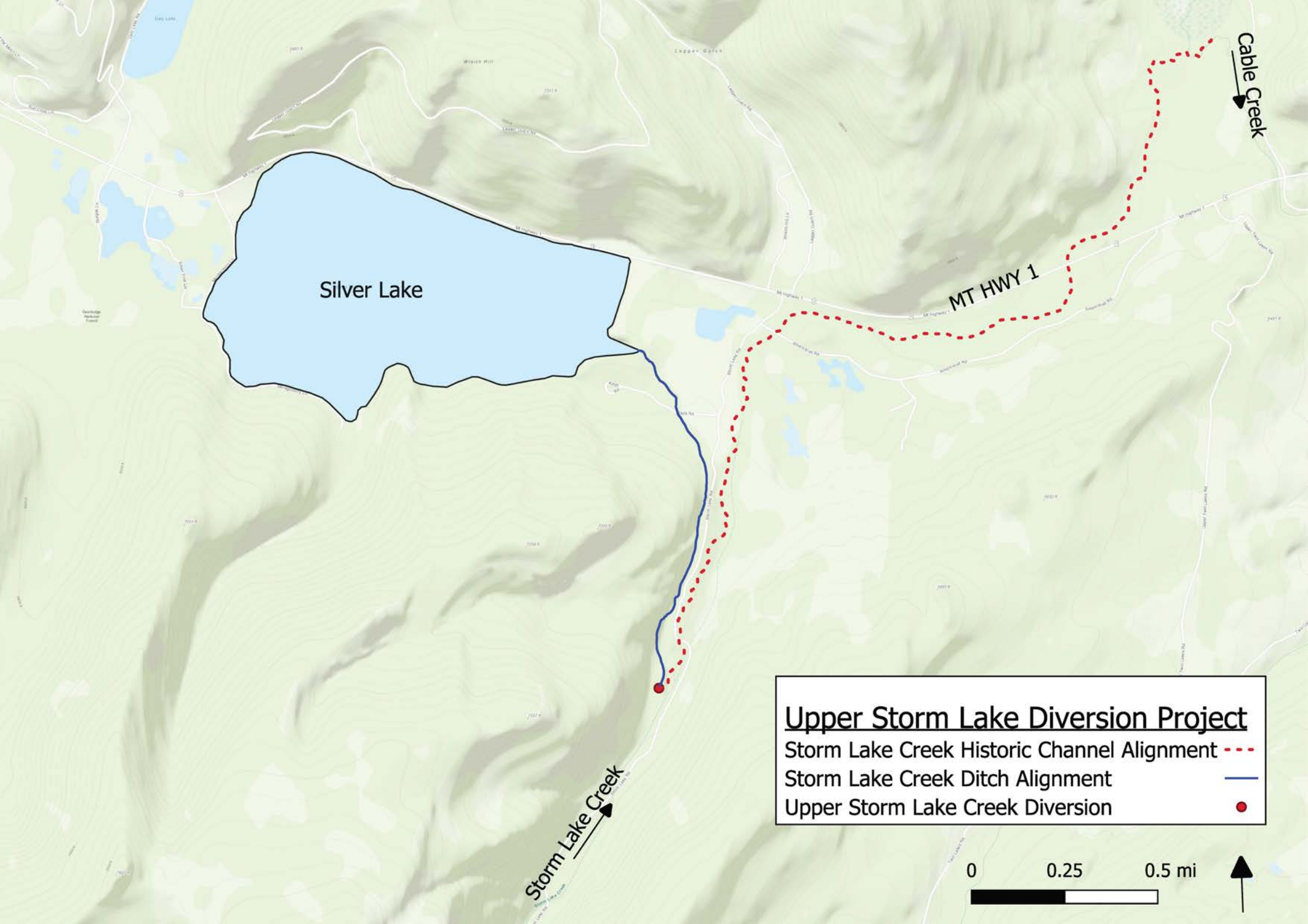
The Pintler Ranger District of the Beaverhead-Deerlodge National Forest would like to express our support for the proposed Upper Storm Lake Creek Diversion Improvement Project. This project will reconstruct a deteriorating wooden pin-and-plank diversion structure between Storm Lake Creek and Silver Lake to reduce native fish losses associated with high-flow entrainment events.

This project directly complements a broader effort to reconnect native trout habitat throughout the Warm Springs Creek watershed and improve fish management within the Silver Lake Water System. In spring 2025, TU, USFS, USFWS, MFWP, NRDP, and BSB completed the installation of three selective fish traps at key diversion points—Meyers Dam on Warm Springs Creek, Twin Lakes Creek (below Twin Lakes Dam), and at the outlet of Storm Lake Creek (into Silver Lake). These traps are designed to improve native fish passage while preventing the upstream movement of non-native species. This project is located entirely on USFS managed land. The Upper Storm Lake Creek project is essential to the success of this system-wide effort.

To date, the Forest Service has contributed over $700,000 in Collaborative Aquatic Landscape Restoration funds to improving fish passage in the Warm Springs Creek watershed. We appreciate your consideration of this project. Implementation will provide benefits to bull trout and westslope cutthroat trout on the Pintler Ranger District. If I can provide any further information regarding this project, please contact me at 406-859-3211.

Sincerely,

CAMERON L RASOR
District Ranger


Silver Lake
MT HWY 1
Cable Creek
Storm Lake Creek
Upper Storm Lake Diversion Project
Storm Lake Creek Historic Channel Alignment
Storm Lake Creek Ditch Alignment
Upper Storm Lake Creek Diversion
0
0.25
0.5 mi


Silver Lake
MT HWY 1
Cable Creek
Storm Lake Creek
Upper Storm Lake Diversion Project
Storm Lake Creek Historic Channel Alignment
Storm Lake Creek Ditch Alignment
Upper Storm Lake Creek Diversion
USFS BDNF
Private
0
0.25
0.5 mi

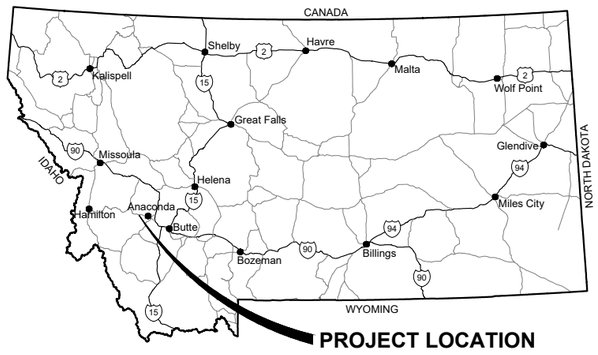
Upper Storm Lake Creek Entrainment Reduction: Photos

Figure 1. Existing conditions of the old wooden diversion structure, looking upstream.

Figure 2. Existing conditions of the old wooden diversion. The red arrow shows the stop logs that lead into the overflow channel (historic channel). These stop logs are no longer in use and create a barrier to fish migrating back into the main channel after being swept into it.

Figure 3. Storm Lake Creek (ditch) immediately downstream of the old diversion structure. This photo illustrates an example of similar low points on the stream bank right (red arrow) that have the potential to overtop and entrain fish at high flows. This bank will be raised with this project.

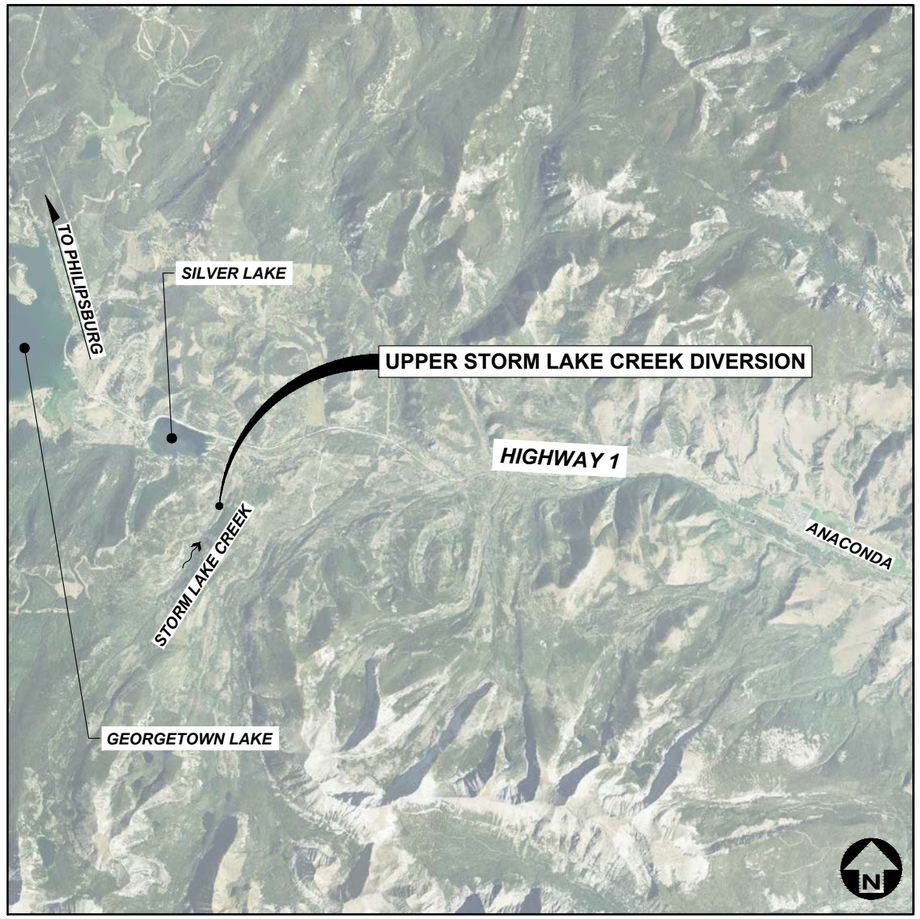
Figure 4. Existing overflow channel downstream of the wooden structure, where entrained native fish become stranded during high-flow events. A portion of this channel will be regraded with step pools so fish can access the mainstem as water recedes.



TROUT UNLIMITED

UPPER STORM LAKE CREEK DIVERSION

SECTION 27, TOWNSHIP 5 NORTH, AND RANGE 13 WEST
LATITUDE: 46°09'02.90" N, LONGITUDE: 113°12'52.10" W



NOT TO SCALE

SHEET INDEX

PROJECT: 1-23244
DATE: MAY 9, 2025

PLANS PREPARED FOR:

TROUT UNLIMITED (TU)

APPROVED BY:

JUSTIN EVERTZ, P.E.
GREAT WEST ENGINEERING

MONTANA
JUSTIN DAVID EVERTZ
75305PE
5-2-2025
LICENSED
PROFESSIONAL ENGINEER

PLANS PREPARED BY:

BEN WINDAUER, E.I.

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HELENA, MT 59601
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NO.	REVISION DESCRIPTION	BY	DATE
1			
2			
3			
4			
5			
6			

SET NO.

SHEET NO.
1

ABBREVIATIONS

@	AT
Δ	ANGLE OF DEFLECTION, DELTA ANGLE
<PT	ANGLE POINT
AB	ANCHOR BOLT
ABDN	ABANDON
AC	ASBESTOS CONCRETE
ADDN	ADDITIONAL
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATE
APVD	APPROVED
ARCH	ARCHITECTURE, ARCHITECTURAL
ASPH	ASPHALT
AVE	AVENUE
AVG	AVERAGE
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BLK	BLOCK
BLVD	BOULEVARD
BM	BEAM, BENCHMARK
BOT	BOTTOM
BRG	BEARING
BRKT	BRACKET
BVC	BEGIN VERTICAL CURVE
C–C	CENTER TO CENTER
CHAN	CHANNEL
CHK	CHECK
CI	CAST IRON
CIPC	CAST–IN–PLACE CONCRETE
CIRC	CIRCULAR
CJ	CONSTRUCTION JOINT, CONTROL JOINT
℄	CENTER LINE
CLR	CLEAR, CLEARANCE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNITS
CO	CLEANOUT
COL	COLUMN
CONC	CONCRETE
CONSTR	CONSTRUCTION
CONT	CONTINUE, CONTINUED, CONTINUOUS
CONTR	CONTRACTOR
COORD	COORDINATE
CP	CONTROL PANEL, CONTROL POINT
CPLG	COUPLING
CTR	CENTER
CTV	CABLE TELEVISION
CU	CUBIC, COPPER
CF	CUBIC FEET
CULV	CULVERT
CY	CUBIC YARD
DET	DETAIL
DI	DUCTILE IRON, DRAIN INLET
DIA, ø	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DR	DRIVE
DWG	DRAWING
E	EAST
EA	EACH
EL, ELEV	ELEVATION
ELB	ELBOW
ELEC	ELECTRIC, ELECTRICAL
ENCL	ENCLOSE
ENGR	ENGINEER
EOP	EDGE OF PAVEMENT
EQ	EQUAL, EQUALLY
EQ SP	EQUALLY SPACED
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
EVC	END VERTICAL CURVE
EW	EACH WAY
EXC	EXCAVATE
EXP	EXPANSION
EXP JT	EXPANSION JOINT
EXST	EXISTING
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FDN	FOUNDATION
FES	FLARED END SECTION
FET	FLARED END TERMINAL
FF	FINISHED FLOOR
FG	FINISH GRADE
FHYD	FIRE HYDRANT
FJ	FLANGE JOINT
FL	FLOW LINE
FLEX	FLEXIBLE
FM	FORCEMAIN
FT	FOOT, FEET
FO	FIBER OPTIC
FTG	FOOTING, FITTING
G	NATURAL GAS
GA	GAGE, GAUGE
GAL	GALLON
GALV	GALVANIZED
GND	GROUND
GVL	GRAVEL
HB	HOSE BIB
HDPE	HIGH DENSITY POLYETHYLENE
HOR, HORIZ	HORIZONTAL
HWY	HIGHWAY
HYD	HYDRANT
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH
INV	INVERT
JB	JUNCTION BOX
JT	JOINT
K	RATE OF VERTICAL CURVATURE
LBS	POUNDS
LF	LINEAR FEET
LN	LANE
LPG	LIQUID PROPANE GAS
LT	LEFT
MAX	MAXIMUM
MD	MEASURE DOWN
MFD	MANUFACTURED
MFR	MANUFACTURE, MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MOV	MOTOR OPERATED VALVE
MPWSS	MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
N	NORTH
NE	NORTHEAST
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
NW	NORTHWEST
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OVERFLOW
OH	OVERHEAD
OHP	OVERHEAD POWER
OHT	OVERHEAD TELEPHONE
OPNG	OPENING
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PE	PLAIN END, POLYETHYLENE
PERP	PERPENDICULAR
PI	POINT OF INTERSECTION
P℄	PROPERTY LINE
PNL	PANEL
PRC	POINT OF REVERSE CURVATURE
PREFAB	PREFABRICATED
PRELIM	PRELIMINARY
PREP	PREPARE, PREPARATION
PROP	PROPERTY
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT, POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
R, RAD	RADIUS
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDCR	REDUCER
REBAR	REINFORCEMENT BAR
REF	REFERENCE
REINF	REINFORCE
REQD	REQUIRED
RR	RAILROAD
RST	REINFORCING STEEL
RT	RIGHT
R/W	RIGHT–OF–WAY
S	SOUTH, SANITARY SEWER
SAN	SANITARY
SCH	SCHEDULE
SD	STORM DRAIN
SDWK	SIDEWALK
SE	SOUTHEAST
SECT	SECTION
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SLP	SLOPE
SPEC	SPECIFICATION
SQ	SQUARE
SSTL	STAINLESS STEEL
STA	STATION
SS	SANITARY SEWER SERVICE
STD	STANDARD
ST	STREET
STL	STEEL
STRUCT	STRUCTURE
SW	SOUTHWEST
SYM	SYMMETRICAL
TB	THRUST BLOCK
TBC	TOP BACK OF CURB
TBM	TEMPORARY BENCH MARK
TEL	TELEPHONE
TEMP	TEMPORARY
THRU	THROUGH
TYP	TYPICAL
UG	UNDERGROUND
UGP	UNDERGROUND POWER
UGT	UNDERGROUND TELEPHONE
UTIL	UTILITY
V	VALVE, VOLT
VB	VALVE BOX
VERT	VERTICAL
VOL	VOLUME
W	WEST, WATER
WTR	WATER
WD	WOOD
W/	WITH
W/O	WITHOUT
WL	WETLAND
WM	WIRE MESH, WATER METER
WS	WATERSTOP, WATER SURFACE, WATER SERVICE
WT	WEIGHT
WV	WATER VALVE
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
XFMR	TRANSFORMER
X–ING	CROSSING
XS	CROSS SECTION
YD	YARD

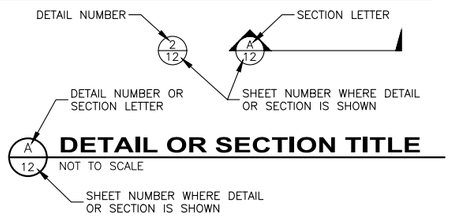
LEGEND

EXISTING	PROPOSED	DESCRIPTION
		MAJOR CONTOUR
		MINOR CONTOUR
OHT	OHT	OVERHEAD TELEPHONE
UGT	UGT	UNDERGROUND TELEPHONE
CTV	CTV	CABLE TELEVISION
FO	FO	FIBER OPTIC
G	G	NATURAL GAS
OHP	OHP	OVERHEAD POWER
UGP	UGP	UNDERGROUND POWER
S	S	SANITARY SEWER
SS	SS	SANITARY SEWER SERVICE
FM	FM	SANITARY SEWER FORCEMAIN
SD	SD	STORM DRAIN
		STORM CULVERT
W	W	WATER
WS	WS	WATER SERVICE
		CHAINLINK FENCE
X	X	BARBED WIRE FENCE
		WOOD FENCE
		PAVED ROAD
		GRAVEL ROAD
		PROPERTY/LOT LINE
		PROPERTY EASEMENT
		PROPERTY SETBACK
		RIGHT–OF–WAY
		CITY LIMIT/DISTRICT BOUNDARY
		RAILROAD
		DITCH
		WATER EDGE
WL		WETLAND
		BUILDING
		BENCHMARK
		CONTROL POINT
		PROPERTY PIN
		BORING
		MONITORING WELL
		TEST PIT
		BOLLARD
		MAIL BOX
		SIGN

GENERAL NOTES:

1. THIS IS A STANDARD LEGEND AND ABBREVIATION LIST. THEREFORE, NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE USED ON THIS PROJECT.
2. THIS PROJECT IS ASSUMED TO BE COMPLETED BY A CONTRACTOR WITH ASSISTANCE FROM BUTTE–SILVER BOW (BSB) AND OVERSIGHT FROM TROUT UNLIMITED (TU) STAFF.
3. BSB WILL CONSTRUCT ACCESS ROAD AND SUPPLY ROCK NEEDED FOR ROCK STEP STRUCTURES.
4. THE SITE IS LOCATED ON BEAVERHEAD–DEERLODGE NATIONAL FOREST. TROUT UNLIMITED WILL ACT AS THE OWNER.
5. ALL IN–CHANNEL WORK IS REQUIRED TO BE COMPLETED BETWEEN THE BULL TROUT WORK WINDOW OF MARCH 16 – MAY 14 OR JULY 16 TO SEPTEMBER 14.

GENERAL DESIGN DESIGNATIONS:



PROJECT NOTES:

1. EXISTING VEGETATION AT THE PROJECT SITE IS CRITICAL FOR LONG–TERM STABILITY. CONTRACTOR TO UTILIZE CARE TO AVOID DAMAGING TREES, SHRUBS, GRASSES AND OTHER VEGETATION DURING CONSTRUCTION ACTIVITIES (OTHER THAN IDENTIFIED CONSTRUCTION LIMITS SHOWN ON THE PLANS).
2. CONTRACTOR SHOULD ANTICIPATE WATER INFILTRATING INTO EXCAVATIONS. ALL WORK IN THE CHANNEL AND BELOW ORDINARY HIGH WATER SHALL TAKE PLACE IN ACCORDANCE WITH APPLICABLE PERMITS. METHODS AND MEANS OF DEWATERING TO BE DETERMINED BY THE CONTRACTOR.
3. CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY ASSOCIATED WITH THE WORK UNDER THIS PROJECT AND WITH COMPLIANCE WITH ALL FEDERAL, STATE, AND LOCAL HEALTH AND SAFETY LAWS, CODES, REGULATIONS, AND ORDINANCES INCLUDING BUT NOT LIMITED TO THOSE CURRENTLY MANDATED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).
4. PROJECT STAKING AS SHOWN ON THE STAKING TABLE ON SHEET 5 WILL BE PROVIDED BY THE OWNER. ALL OFFSET STAKING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. 1"–MINUS BEDDING MATERIAL SHALL MEET THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENTAGE PASSING (BY WEIGHT)
1"	100
¾"	90–100
⅜"	20–55
No. 4	0–10
No. 10	0–5

DEWATERING NOTES:

1. DEWATERING IS THE RESPONSIBILITY OF THE CONTRACTOR AND CONTRACTOR SHALL SUBMIT A DEWATERING PLAN TO THE OWNER FOR APPROVAL. SHEET 3 ILLUSTRATES GENERIC DEWATERING REQUIREMENTS AND POSSIBLE METHODS AND EQUIPMENT AND IS NOT CONSIDERED ADEQUATE FOR THIS PROJECT. CONTRACTOR SHALL DEVELOP THEIR OWN PROJECT SPECIFIC DEWATERING PLANS AND SHALL INCLUDE DRAWINGS AND A WRITTEN OUTLINE ILLUSTRATING AND DESCRIBING PROPOSED LAYOUT, METHODS, EQUIPMENT, AND ANTICIPATED STREAM FLOW VOLUMES. APPROVAL OF THE DEWATERING PLAN BY THE OWNER DOES NOT RELIEVE THE CONTRACTOR FROM COMPLETING THE WORK AS SPECIFIED. IF CONTRACTOR'S IDENTIFIED DEWATERING METHODS ARE NOT PRODUCING DESIRED RESULTS, CONTRACTOR SHALL RE–EVALUATE AND SUBMIT ANOTHER PLAN TO THE OWNER FOR APPROVAL. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS WORK. ALL WORK RELATING TO THE STREAM DIVERSION IS PAID UNDER THE DEWATERING BID ITEM.
2. CONTRACTOR IS RESPONSIBLE FOR SIZING ALL PUMPS, DAMS, BYPASS PIPES, OPEN CHANNELS, ETC. AND WILL NEED TO MAINTAIN PUMPING CAPACITY OF THE INFLOW DURING THE DURATION OF THE PROJECT. PUMPS TO BE PLACED IN LOCATION OR WITHIN SECONDARY CONTAINMENT TO PREVENT FUEL/OIL FROM SPILLING INTO THE STREAM. CONTRACTOR TO BE RESPONSIBLE FOR CLEANUP OF ANY FUEL/OIL SPILL.
3. SOIL EROSION AND SEDIMENT CONTROL MEASURES SPECIFIC TO THE DEWATERING PLAN SHALL BE INCLUDED AND SHALL BE IN CONFORMANCE WITH PROJECT PERMITS.
4. INSTALL SEDIMENTATION BARRIER DOWNSTREAM OF WORK. THE BARRIER MAY CONSIST OF EITHER ONE OR A COMBINATION OF THE FOLLOWING: STRAW BALES OR SILT FENCE. INSTALL BARRIER PRIOR TO COMMENCEMENT OF WORK. THE LOCATION OF THE BARRIER WILL BE LOCATED BY THE CONTRACTOR AND APPROVED BY THE OWNER. THIS WORK IS PAID UNDER THE DEWATERING BID ITEM.
5. CONTRACTOR SHALL GIVE 2 DAYS NOTICE BEFORE DEWATERING. DEWATERING SHALL TAKE PLACE FIRST THING IN THE MORNING AND NO IN–STREAM WORK OR WORK NEARBY SHALL TAKE PLACE FOR THE REST OF THE DAY. REWATERING WILL ALSO BE DONE SLOWLY IN A MANNER TO REDUCE SEDIMENTATION.
6. CLEARING LIMITS WILL VARY DEPENDING ON THE DIVERSION PLAN SUBMITTED BY THE CONTRACTOR. CONTRACTOR TO SUBMIT PROPOSED CLEARING LIMITS WITH DIVERSION PLAN.
7. PUMP SCREEN OPENINGS SHALL NOT EXCEED 3/32" OR 0.0938" (2.38mm). IF THE DIVERSION INLET IS NOT SCREENED, THE DIVERSION OUTLET WILL BE PLACED IN A LOCATION THAT FACILITATES SAFE RE–ENTRY OF FISH INTO THE STREAM CHANNEL.

CAST-IN-PLACE CONCRETE NOTES:

1. ALL VERTICAL WALLS SHALL HAVE AN 8" THICKNESS AND ALL HORIZONTAL SLABS SHALL HAVE A 9" THICKNESS, UNLESS OTHERWISE NOTED.
2. PROVIDE A MIN. CLEARANCE OF 3" FROM THE EDGE OF CONCRETE FOR ALL REBAR, UNLESS OTHERWISE NOTED.
3. ALL EXPOSED CONCRETE EDGES TO INCLUDE ¾" CHAMFER.
4. CONCRETE SHALL BE f'c OF 4,000 PSI AT 28 DAYS. CONCRETE SHALL BE CLASS "STRUCTURE" AS OUTLINED IN THE MONTANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS. CONTRACTOR TO SUBMIT PROPOSED MIX DESIGN TO OWNER FOR APPROVAL PRIOR TO PLACING CONCRETE.
5. BACKFILL SHALL NOT BE PLACED AGAINST CONCRETE WALLS UNTIL THE CONCRETE HAS OBTAINED SPECIFIED 28–DAY COMPRESSIVE STRENGTH.

RE-VEGETATION NOTES:

1. CONTRACTOR SHALL SALVAGE VEGETATED SOIL MATS, OTHER RIPARIAN VEGETATION, AND TOP SOIL PRIOR TO CLEARING AND GRUBBING AS DIRECTED BY THE OWNER. VEGETATION WILL BE PLACED ON THE STREAM BANKS ABOVE BANKFULL AS DIRECTED BY THE OWNER. THIS WORK IS PAID UNDER ITEM 104.
2. TO OPTIMIZE TRANSPLANT SUCCESS, OVER–EXCAVATE A DIVOT FOR SOIL MAT OR OTHER RIPARIAN VEGETATION. PLACE FILL MATERIAL IN DIVOT HOLE SURROUNDING PLANT TO NATURAL CONTOUR. COMPACT THOROUGHLY. WATER IMMEDIATELY WITH EXCAVATOR BUCKET.

NO.	REVISION DESCRIPTION	BY	DATE
1			
2			
3			
4			
5			

PROJECT: 1-23244
DESIGNED: BMW
DRAWN: BMW
CHECKED: JDE
APPROVED: JDE
DATE: MAY 9, 2025

GreatWestern ENGINEERING
2501 BELT VIEW DRIVE
HELENA, MT 59601
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TROUT UNLIMITED
UPPER STORM LAKE CREEK DIVERSION
LEGEND AND GENERAL NOTES

SHEET NO.
2
OF 6

\\EgnyteDrive\greatwestern\Shared\Helena Projects\1-23244-TU-Upper Storm Lake Creek Diversion\CADD 1-23244\Sheets\1-23244-2-Legend and General Notes.dwg

GENERAL NOTES:

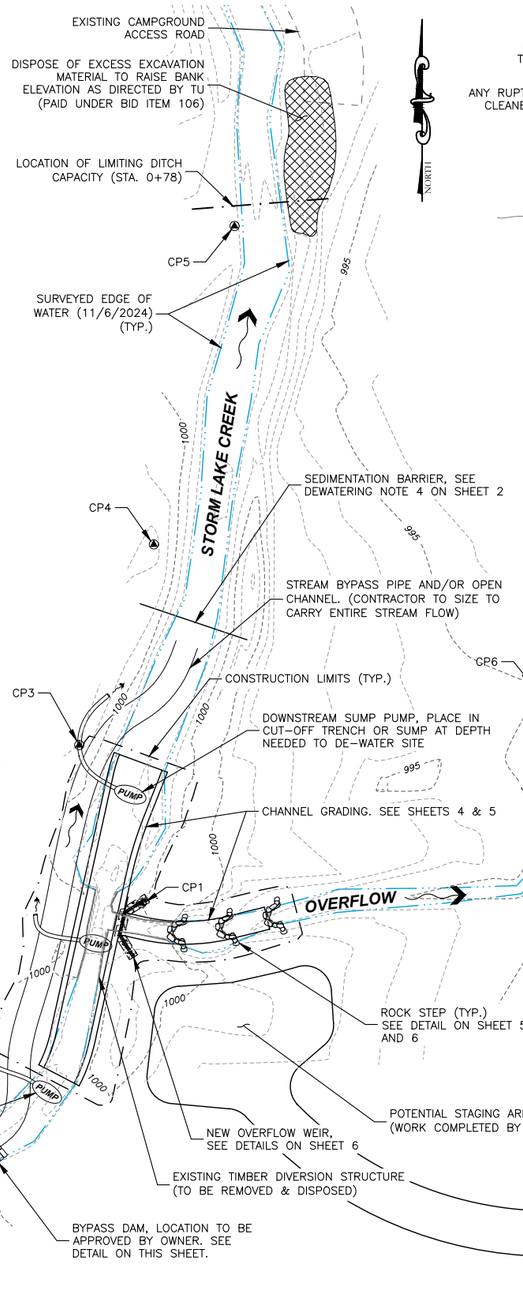
1. THIS SHEET ILLUSTRATES A GENERIC ACCESS PLAN WITH POSSIBLE METHODS OF ACCESS AND REQUIREMENTS AND IS NOT CONSIDERED ADEQUATE FOR THIS PROJECT. BSB AND TU SHALL DEVELOP AND CONSTRUCT THEIR OWN PROJECT SPECIFIC ACCESS PLAN PRIOR TO THE WORK. CONTRACTOR SHOULD RESTORE ACCESS ROAD UPON PROJECT COMPLETION.
2. ANY SLASH FROM CLEARING AND GRUBBING SHALL REMAIN ON-SITE, TEMPORARILY STOCKPILED AND PLACED ON OBLITERATED ROADWAY SURFACE AND SCATTERED ON DISTURBED AREAS. WORK RELATED TO PLACING AND SCATTERING STOCKPILED CLEARING AND GRUBBING MATERIAL IS PAID FOR UNDER BID ITEM 112.
3. CONSTRUCTION LIMITS ARE NOT INCLUSIVE OF TEMPORARY ACCESS ROAD. SEE OBLITERATION DETAIL ON THIS SHEET.
4. AFTER CONSTRUCTION, THE ACCESS ROAD AND STAGING AREAS LEADING TO THE PROJECT SITE SHALL BE RESTORED TO THE APPROXIMATE CONTOURS PRIOR TO CONSTRUCTION.
5. THE EXISTING TIMBER DIVERSION STRUCTURE SHALL BE REMOVED AND DISPOSED ACCORDING TO ALL STATE AND FEDERAL REGULATIONS.
6. THE WORK IS ANTICIPATED TO REQUIRE AN EXCAVATOR TO MOVE, SORT, PLACE, AND INSTALL MATERIAL ON SITE AND A DUMP TRUCK TO TRANSPORT MATERIAL TO AND FROM THE SITE.
7. THE ESTIMATED TIME TO COMPLETE THE WORK IS 2-3 WEEKS.

EARTHWORK NOTES:

1. ALL EXCAVATION, EMBANKMENT, TRENCHING, AND SHORING NECESSARY FOR ANY CONSTRUCTION ACTIVITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THESE DRAWINGS ARE NOT INTENDED TO PROVIDE MEANS OR METHODS OF CONSTRUCTION.
2. THE ESTIMATED QUANTITIES SHOWN ON THIS SHEET ARE FOR INFORMATIONAL PURPOSES ONLY.
3. PROPER DRAINAGE SHALL BE MAINTAINED DURING CONSTRUCTION TO KEEP SURFACE WATER RUNOFF (OR FROM SATURATED SOILS) FROM ENTERING THE EXCAVATIONS.
4. CONTRACTOR SHALL STOCKPILE AND USE SUITABLE ON-SITE MATERIAL FROM STRUCTURE EXCAVATION AND NEW CHANNEL GRADING AT THE EXISTING CROSSING FOR STREAMBED SIMULATION MATERIAL. SORTING SHOULD BE ANTICIPATED TO MEET THE GRADATION REQUIREMENTS OUTLINED IN THE TABLE ON THIS SHEET.

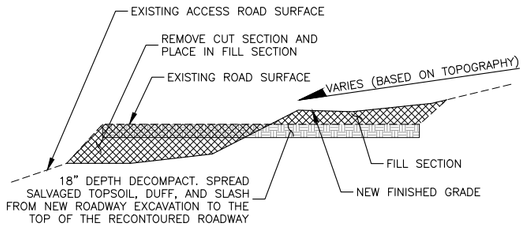
GRADATION REQUIREMENTS FOR STREAMBED SIMULATION ROCK (INCHES)

100% PASSING	84% PASSING	50% PASSING	16% PASSING	10% PASSING
10	4	1 3/4	1/2	NO. 10 SIEVE



PLAN VIEW OF UPPER STORM LAKE CREEK DIVERSION

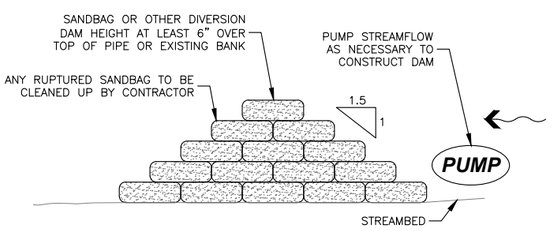
0 20 40
SCALE IN FEET



*ALL WORK FOR ROADWAY SHALL BE PAID FOR UNDER BID ITEM 112

OBLITERATION DETAIL

NOT TO SCALE



DIVERSION DAM DETAIL

NOT TO SCALE

ESTIMATED QUANTITIES

MAIN CHANNEL EXCAVATION	36 CY
MAIN CHANNEL STREAMBED MATERIAL	19 CY
OVERFLOW CHANNEL EXCAVATION	6 CY
OVERFLOW CHANNEL STREAMBED MATERIAL	12 CY
16" + SILL ROCKS	30 EA
22" + FOOTER ROCKS	21 EA
1"-MINUS BEDDING MATERIAL	2 CY
CAST IN PLACE CONCRETE	4 CY

CONTROL POINT COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP1	5,000.00	10,000.00	1,000.00	REBAR W/ RPC
CP2	4,928.66	9,940.14	1,000.97	REBAR W/ RPC
CP3	5,041.74	9,983.57	1,001.92	REBAR W/ RPC
CP4	5,094.71	10,003.26	1,002.29	REBAR W/ RPC
CP5	5,178.76	10,024.58	998.59	REBAR W/ RPC
CP6	5,056.96	10,103.65	995.04	REBAR W/ RPC

SURVEY NOTES:

1. LOCAL COORDINATE SYSTEM WAS UTILIZED. NO COMBINATION SCALE FACTOR (CSF) IS NEEDED.
2. RPC = RED PLASTIC CAP

VIEW LOOKING DOWNSTREAM AT EXISTING TIMBER DIVERSION STRUCTURE

VIEW OF EXISTING TIMBER DIVERSION STRUCTURE LOOKING UPSTREAM AT OVERFLOW CHANNEL CHUTE

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT: 1-23244
DESIGNED: BMW
DRAWN: BMW
CHECKED: JDE
APPROVED: JDE
DATE: MAY 9, 2025

MONTANA JUSTIN DAVID EVERSOLE 15030PE LICENSED PROFESSIONAL ENGINEER 6-2-25

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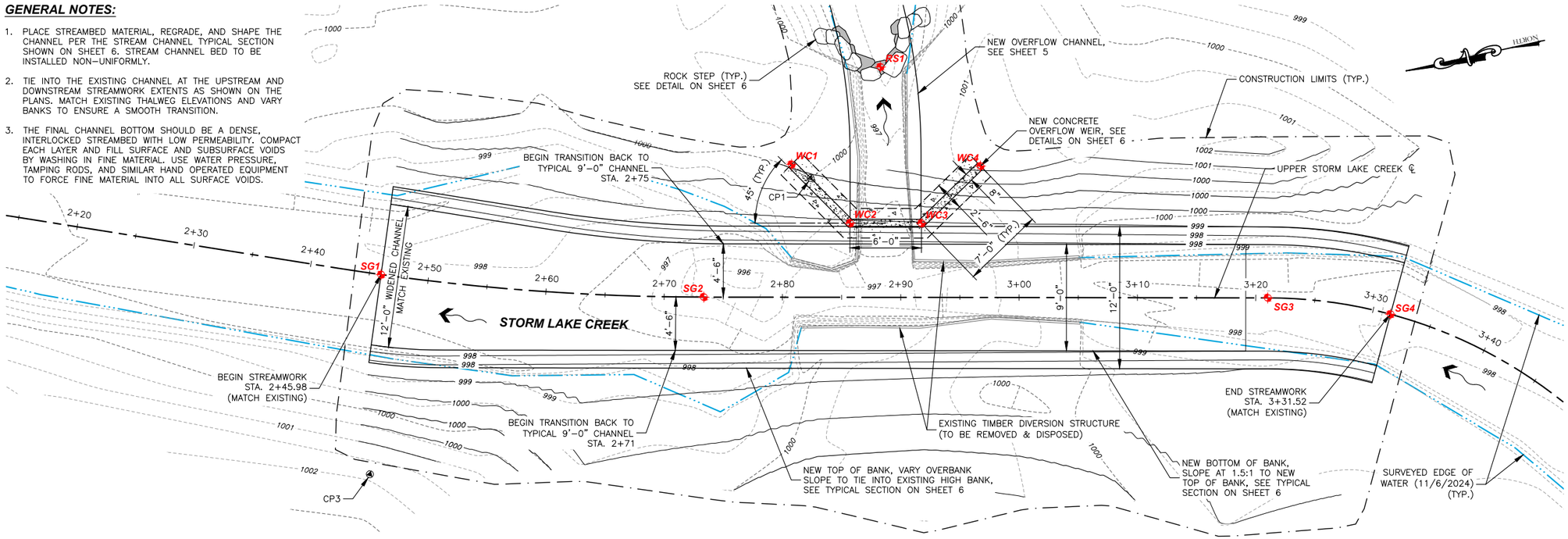
TROUT UNLIMITED
UPPER STORM LAKE CREEK DIVERSION
OVERALL SITE AND DEWATERING PLAN

SHEET NO.
3
OF 6

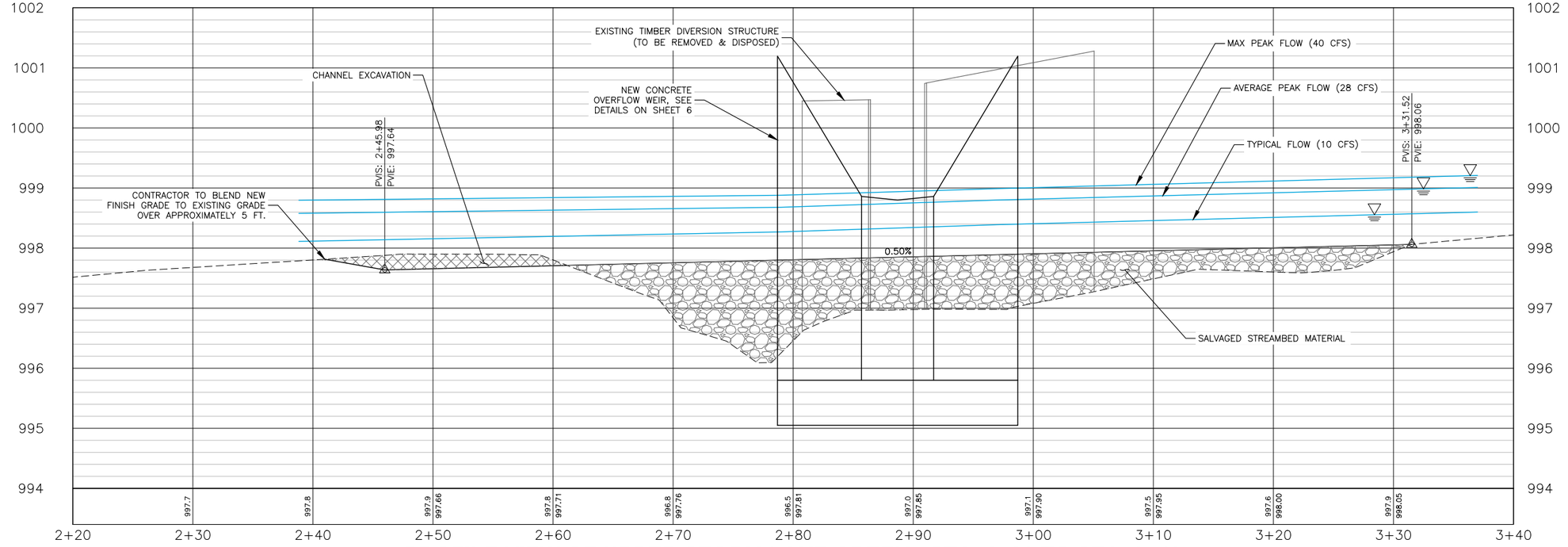
GENERAL NOTES:

1. PLACE STREAMBED MATERIAL, REGRADE, AND SHAPE THE CHANNEL PER THE STREAM CHANNEL TYPICAL SECTION SHOWN ON SHEET 6. STREAM CHANNEL BED TO BE INSTALLED NON-UNIFORMLY.
2. TIE INTO THE EXISTING CHANNEL AT THE UPSTREAM AND DOWNSTREAM STREAMWORK EXTENTS AS SHOWN ON THE PLANS. MATCH EXISTING THALWEG ELEVATIONS AND VARY BANKS TO ENSURE A SMOOTH TRANSITION.
3. THE FINAL CHANNEL BOTTOM SHOULD BE A DENSE, INTERLOCKED STREAMBED WITH LOW PERMEABILITY. COMPACT EACH LAYER AND FILL SURFACE AND SUBSURFACE VOIDS BY WASHING IN FINE MATERIAL. USE WATER PRESSURE, TAMPING RODS, AND SIMILAR HAND OPERATED EQUIPMENT TO FORCE FINE MATERIAL INTO ALL SURFACE VOIDS.



PLAN VIEW OF UPPER STORM LAKE CREEK - STA. 2+20 TO STA. 3+40

0 5 10
SCALE IN FEET



PROFILE VIEW OF UPPER STORM LAKE CREEK - STA. 2+20 TO STA. 3+40

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 2'

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT: 1-23244
DESIGNED: BMW
DRAWN: BMW
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APPROVED: JDE
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GreatWestern ENGINEERING
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HELENA, MT 59601
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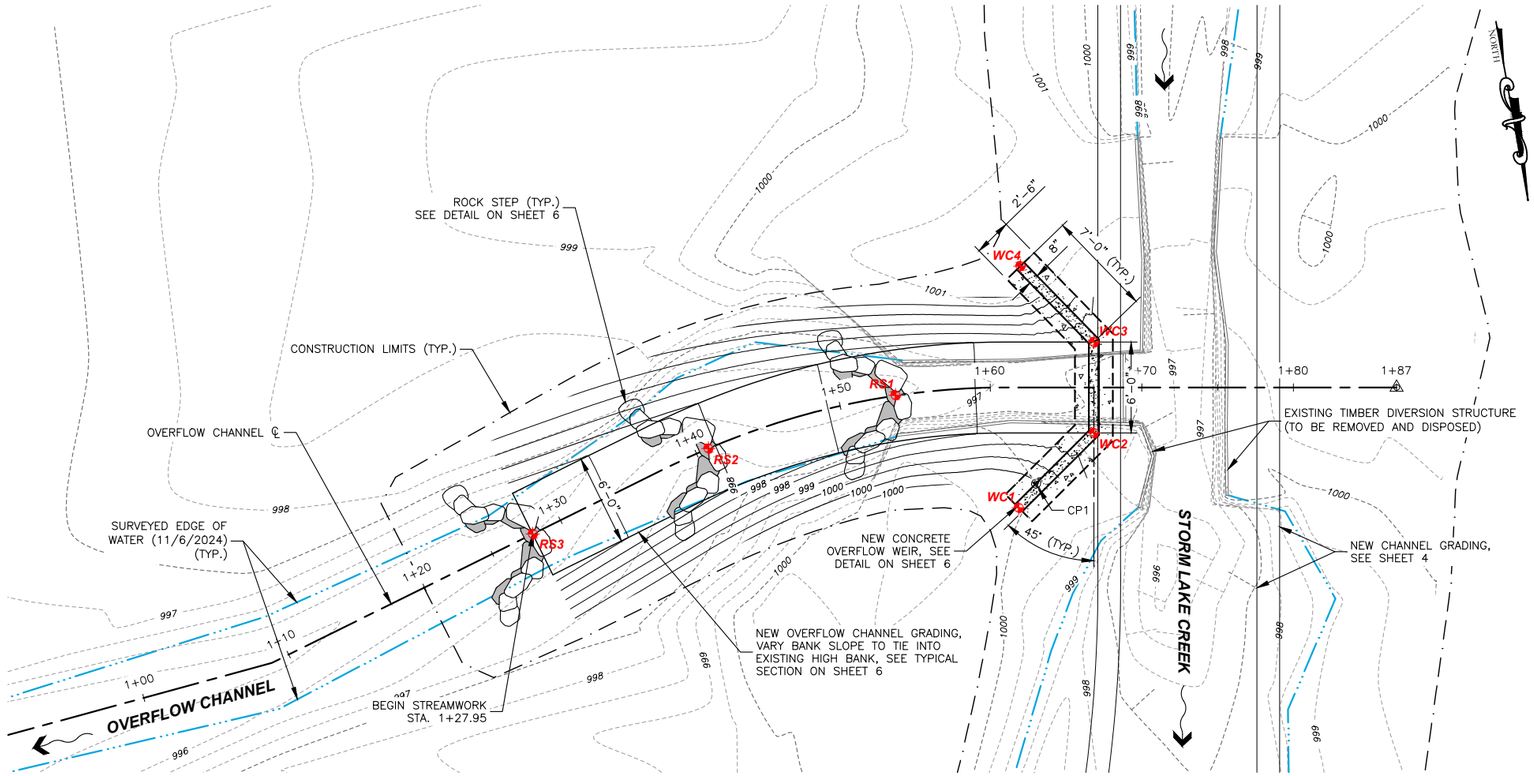
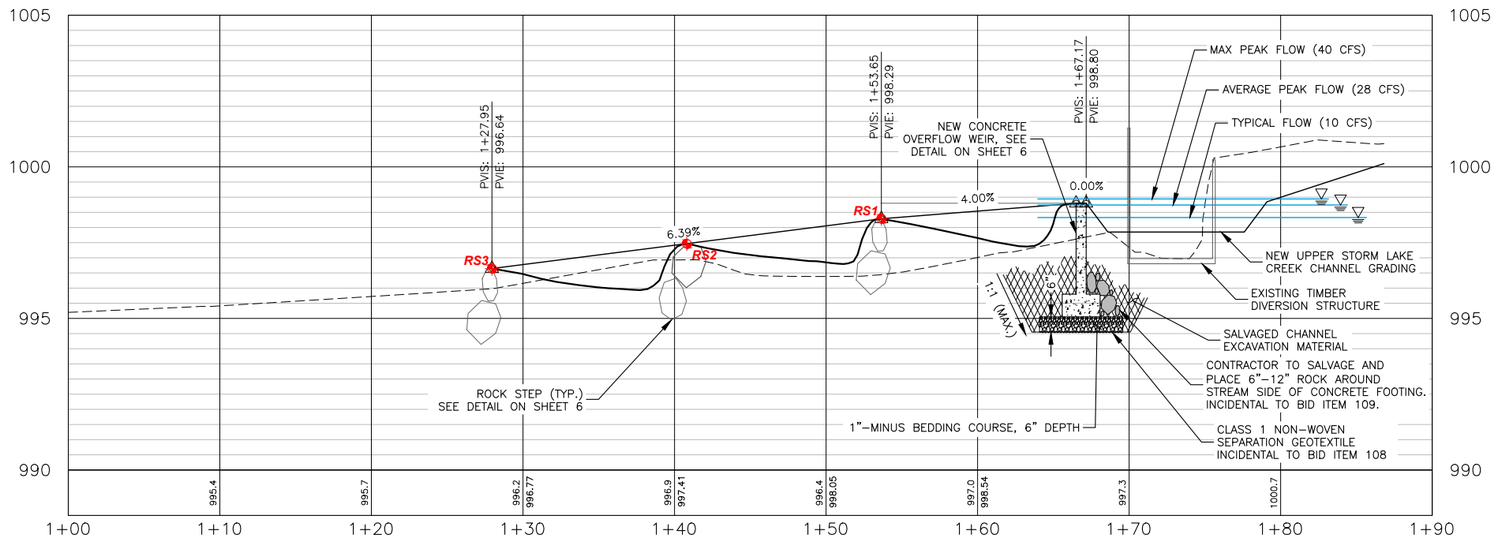
TROUT UNLIMITED
UPPER STORM LAKE CREEK DIVERSION
STREAM PLAN AND PROFILE

SHEET NO.
4
OF 6



PLAN VIEW OF OVERFLOW CHANNEL - STA. 1+00 TO STA. 1+90

0 5 10
SCALE IN FEET



PROFILE VIEW OF OVERFLOW CHANNEL - STA. 1+00 TO STA. 1+90

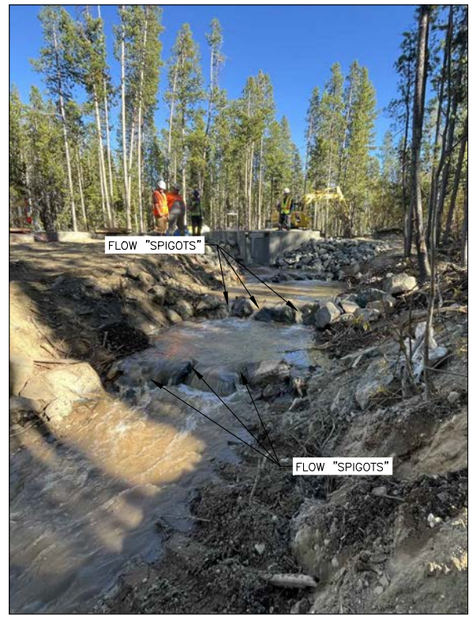
HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 5'

HYDRAULIC RESULTS

FLOW PROFILE	FLOW (CFS)	DEPTH OVER WEIR (FT)	OVERFLOW DISCHARGE (CFS)	FREEBOARD AT LIMITING DITCH SECTION (FT) (STA. 0+78)
MAX PEAK FLOW	40	0.13	0.62	0.17
AVERAGE PEAK FLOW	28	-0.07	0.00	0.37
TYPICAL FLOW	10	-0.48	0.00	0.79

NOTES:

1. DESIGN FLOWS WERE DETERMINED FROM FLOW MEASUREMENTS PROVIDED BY BSB AT THE STORM LAKE CREEK 9 FT. WEIR COLLECTED BETWEEN 2014 AND 2021.
2. A NEGATIVE "DEPTH OVER WEIR" VALUE INDICATES THE DISTANCE THE WATER SURFACE IS BELOW THE WEIR CREST.



REFERENCE PHOTO FOR NEW ROCK STEP STRUCTURES. NOTE FLOW "SPIGOTS".

PROJECT STAKING TABLE

POINT	NORTHING	EASTING	ELEVATION
SG1	5037.20	9999.83	997.64
SG2	5010.98	9992.11	997.77
SG3	4964.44	9981.81	998.01
SG4	4954.60	9978.23	998.06
WC1	5001.32	10001.46	1001.20
WC2	4997.56	9995.56	998.86
WC3	4991.70	9994.26	998.86
WC4	4985.76	9997.91	1001.20
RS1	4992.32	10007.87	998.29
RS2	4993.07	10020.67	997.46
RS3	4996.07	10033.16	996.64

NO.	REVISION DESCRIPTION	BY	DATE

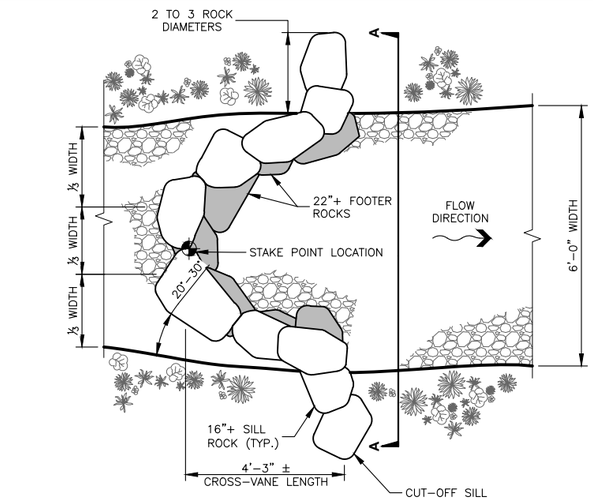
PROJECT: 1-23244
DESIGNED: BMW
DRAWN: BMW
CHECKED: JDE
APPROVED: JDE
DATE: MAY 9, 2025

MONTANA JUSTIN DAVID EVERSOLE 15012PE LICENSED PROFESSIONAL ENGINEER 6-3-2025

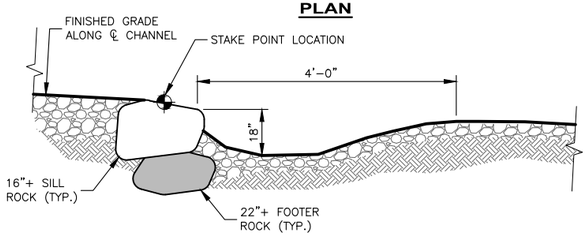
GreatWestEngineering
2501 BELT VIEW DRIVE
HELENA, MT 59601
(406)449-8627

TROUT UNLIMITED
UPPER STORM LAKE CREEK DIVERSION
OVERFLOW PLAN AND PROFILE

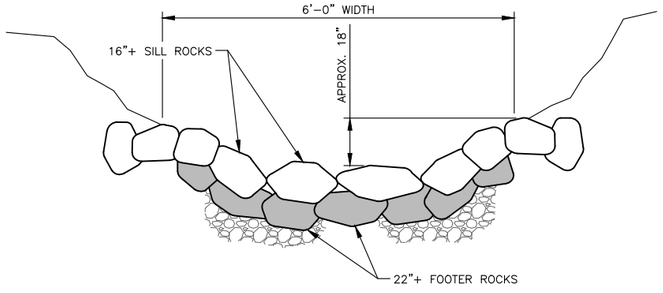
SHEET NO.
5
OF 6



PLAN



PROFILE



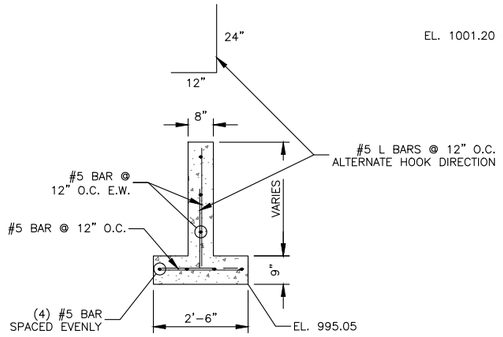
SECTION A-A

ROCK STEP STRUCTURE

NOT TO SCALE

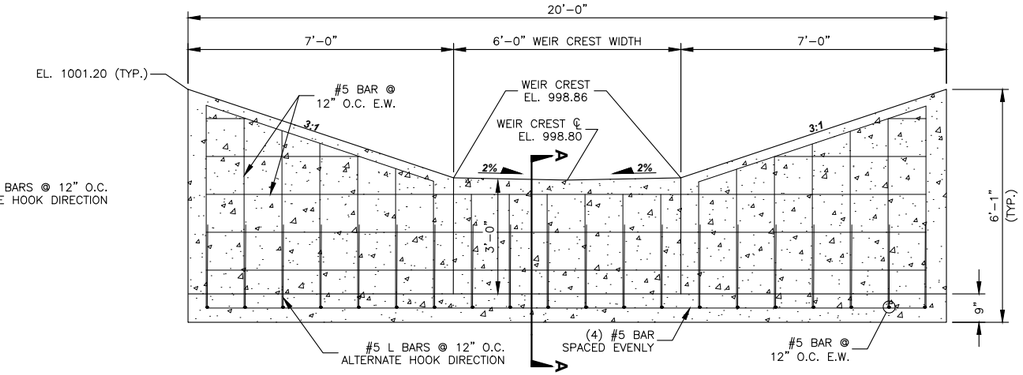
ROCK STEP STRUCTURE NOTES:

1. MINIMIZE GAPS BETWEEN FOOTER ROCKS. BACKFILL SIDES OF FOOTER ROCKS WITH NATIVE GRAVEL AND COBBLE.
2. PLACE SILL ROCKS SLIGHTLY UPSTREAM OF FOOTER ROCKS, MINIMIZE GAPS IN SILL ROCKS. CONTRACTOR TO COORDINATE WITH TU DURING PLACEMENT OF SILL AND FOOTER ROCKS.
3. FOOTER AND SILL ROCKS SHOULD BE PLACED SUCH THAT THEY SUPPORT EACH OTHER AND "LOCK" INTO PLACE. THE ROCKS SHOULD NOT MOVE OR BE PUSHED DOWNSTREAM BY FLOWING WATER.
4. PLACE SILL ROCKS SUCH THAT 2–3 CONCENTRATED "SPIGOTS" OF FLOW FORM BETWEEN ROCKS. PLACE SILL AND FOOTER ROCKS SUCH THAT THE CONCENTRATED "SPIGOTS" OF FLOW DO NOT LAND DIRECTLY ON FOOTER ROCKS, ACTING AS SPLASH PADS. SEE PHOTO ON SHEET 5.
5. THE SHAPE AND SPACING OF ROCK STEP STRUCTURES SHOWN IS CONCEPTUAL AND MAY BE MODIFIED IN THE FIELD AS DIRECTED BY TU TO BEST FIT THE CHANNEL AND OTHER SITE CONDITIONS.
6. CONTRACTOR SHOULD ANTICIPATE RUNNING CONTINUOUSLY FLOWING WATER IN THE OVERFLOW CHANNEL UPON COMPLETION OF THE ROCK STEPS TO VERIFY THEIR CONSTRUCTION AND FUNCTIONALITY. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE REWORK OF THE ROCK STEPS.
7. SEE PROJECT STAKING TABLE LOCATED ON SHEET 6 FOR ROCK STEP STAKING INFORMATION. THE LISTED ELEVATION SHOULD BE THE ELEVATION OF THE LOWEST "SPIGOT" ON THE ROCK STEP.
8. CONTRACTOR MAY USE SUITABLE ON–SITE MATERIAL FOR ROCK STEP STRUCTURES. THE MATERIAL SHALL BE APPROVED BY THE OWNER BEFORE PLACEMENT. ADDITIONAL ROCK FOR THE ROCK STEPS WILL BE SUPPLIED BY BSB IF REQUIRED.
9. CONSTRUCT POOLS DOWNSTREAM OF THE ROCK STEP STRUCTURES PER DETAILS ON THIS SHEET AND IN COORDINATION WITH TU.



SECTION A:A

1/4" = 1'–0"

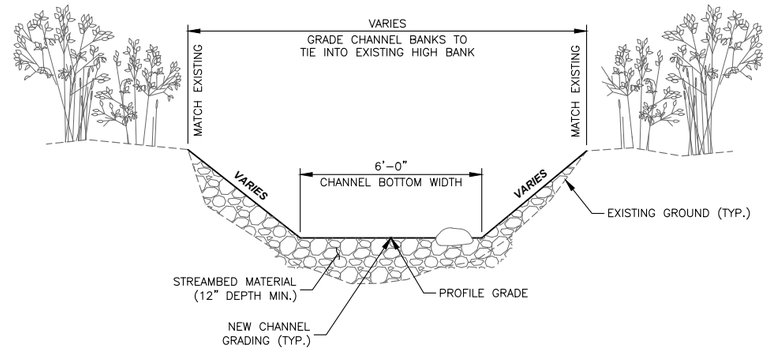


CONCRETE OVERFLOW WEIR STRUCTURE

1/4" = 1'–0"

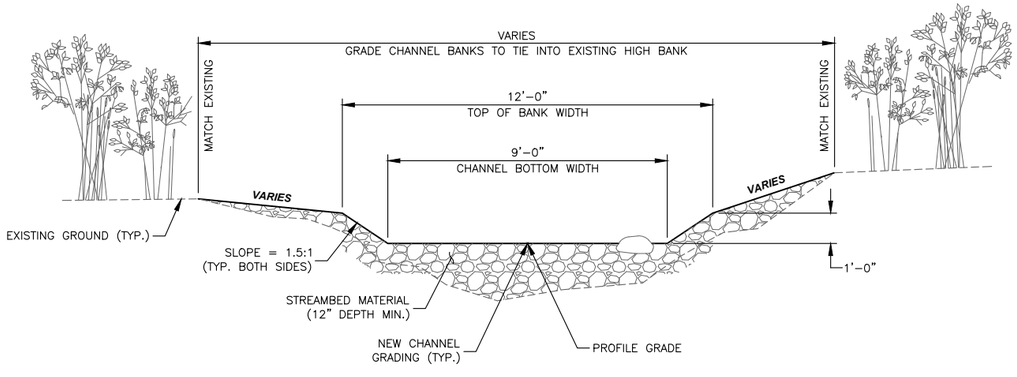
CONCRETE OVERFLOW WEIR STRUCTURE NOTES:

1. CONTRACTOR SHALL PLACE AND COMPACT 6 INCHES OF 1" MINUS BEDDING COURSE BENEATH THE CONCRETE FOOTING. THE BEDDING MATERIAL SHALL EXTEND 18 INCHES HORIZONTALLY BEYOND THE EDGE OF THE CONCRETE FOOTING AS SHOWN ON SHEET 5.
2. CONTRACTOR SHALL SALVAGE AND PLACE 6"–12" ROCK AROUND THE STREAM SIDE OF THE CONCRETE FOOTING AS SHOWN ON SHEET 5. THIS WORK IS INCIDENTAL TO BID ITEM 109.
3. SEE PROJECT STAKING TABLE LOCATED ON SHEET 5 FOR WEIR CREST STAKING INFORMATION.
4. ALL WORK RELATED TO SUBMITTALS, TESTING, SITE PREP, EXCAVATION, FORMING, REINFORCING, POURING, AND FINISHING IS PAID UNDER BID ITEM 109.



TYPICAL OVERFLOW CHANNEL SECTION

NOT TO SCALE



TYPICAL STORM LAKE CREEK SECTION

NOT TO SCALE

NO.	REVISION DESCRIPTION	BY	DATE

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DETAILS

SHEET NO.
6
OF 6