FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

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

I. APPLICANT INFORMATION

A. Applicant Name: Clark Fork Coalition

Mailing Address: 140 S. 4th St. W. #1

City: Missoula State: MT Zip: 59801

Telephone: 406-550-5503 E-mail: brian@clarkfork.org

B. Contact Person (if different than applicant): Adam Switalski – Clark Fork Coalition Project Mgr.

Address: 140 S. 4th St. W. #1

City: Missoula State: MT Zip: 59801

Telephone: 406-396-1941 (cell) E-mail: adam@clarkfork.org

C. Landowner and/or Lessee Name (if different than applicant): USDA Forest Service - Missoula Ranger District

Mailing Address: 24 Fort Missoula Road

City: Missoula State: MT Zip: 59804

Telephone: 406-329-3814 E-mail: dustin.walters@usda.gov

II. PROJECT INFORMATION

A. Project Name: Lee Creek Fish Passage Project

River, stream, or lake: Lee Creek

Location: Township: 11N Range: 23W Section: 19, 30

Latitude: 46.69506 Longitude: -114.52960 *Within project (decimal degrees)*

County: Missoula

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

The purpose of this project is to increase the native fish populations in the Upper Lolo watershed, specifically on the Lee Cr. sub-watershed. Lee Cr. is an important tributary of Lolo Cr. which includes designated Bull Trout Critical Habitat. These streams support high densities of westslope cutthroat trout populations, providing important spawning and rearing habitat for these and other salmonid species. We will work with the US Forest Service to improve fish passage and reduce chronic sedimentation in 2 tributaries of Lee Creek that are seasonally disconnected by the Lee Creek Road (FS699) and an upstream spur road (FS4304). We will upsize 3 undersized culverts to much larger, 84-in culverts with stream simulation bed material that will allow for year-round fish passage. An additional culvert will be upsized from 18-in to 36-in to allow for increased hydraulic capacity.

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

The proposed collaborative project would take place on Lee Creek – a tributary to main stem Lolo Creek. Lolo Creek and its tributaries historically supported a productive coldwater fishery consisting of native and introduced salmonids. Fisheries values are highlighted by high westslope cutthroat trout densities and Bull Trout Critical Habitat designation by the USFWS. Project reaches primarily represent spawning and rearing habitats for westslope cutthroat trout and other coldwater species.

In 2009, the Lolo National Forest acquired 32 square miles of corporate timber lands in Upper Lolo Creek watershed as part of the larger "Montana Legacy Project" in Western Montana. This land acquisition provides an opportunity for aquatic habitat restoration and enhancement opportunities in the basin. The proposed project builds upon long-term restoration efforts in the Lolo Creek watershed that have included removing undersized culverts (many fish passage barriers), reclaiming impactful forest roads, installing large wood jams, and applying gravel to erosive forest roads on the Montana Legacy Project lands.

Addressing the road system has been critical to restoring fish habitat in the upper Lolo. Road decommissioning and other road treatments have increased fish passage and reduced overall sediment inputs and hydrologic impacts at a large scale in the Lolo Creek headwaters. In total, more than 130 miles of forest roads have been treated (including 30 miles of high priority roads recontoured), dozens of stream crossings have been removed, 19 culverts have been converted to stream simulated culverts, bottomless arches, or bridges for enhanced fish passage. Dozens of large wood jams have also been installed.

For the 1st phase of this project, the engineering firm D,J,&A Engineering was hired to design an aquatic organism passage (AOP) culvert for one of the proposed culvert treatments (see included plan set), and the Forest Service is designing an additional 3 culvert upgrades. A total of four culverts will be upsized along the Lee Creek Road (FS 699) and an upstream spur road (FS 4304). This includes upsizing a 24-in culvert, and two 36-in culverts to 84-in culverts. The new culverts will be filled 1/3 full of stream simulation material. Rock bands will provide grade control and channel structure. Baffles welded in the pipe will maintain the rock bands and stream simulation material in place. An additional culvert will replace an 18-in culvert with a 36-in culvert. The culverts are all designed to allow for fish passage and withstand a 100-year flood event.

Phase two (not part of this project) will upsize additional culverts further upstream in Lee Creek. At the completion of the two phases of this project, the entire Lee Creek Road (FS 699) will have BMPs and gravel installed to further reduce sediment delivery to streams and complete our restoration efforts in the sub-watershed. The combination of culvert upgrades, road decommissioning, wood jam installations, and laying aggregate will increase the amount of available fish habitat and improve the quality of habitat leading to increased fish populations and improved angler opportunities.

Public outreach will be conducted by the Clark Fork Coalition, including social media posts, newsletter articles, and hosting field trips for local community members and government agencies to showcase the benefits of restoration work on aquatic habitat, water quality, and watershed health.

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

The construction of Lee Creek Road (FS 699) and an upstream spur (FS 4304) seasonally disconnects 2 fish-bearing tributaries of Lee Creek. Upsizing these culverts will provide year-round stream connectivity for fish and other aquatic organisms and increase hydrologic capacity to withstand a 100-year flood.

E. Length of stream or size of lake that will be treated (project extent): 3 miles of Lee Cr. tributaries

Length/size of impact, if larger than project extent (e.g., stream miles opened): 3 stream mi. opened

F. Project Budget Summary:

Grant Request (Dollars):	**$ 50,000**
Matching Dollars:	**$ 179,123**
Matching In-Kind Services:*	**$ 0**

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

Other Contributions (not part of this app)	**$ 6,000**
Total Project Cost:	**$ 235,123**

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:

This project is a collaborative project with the Clark Fork Coalition, the Lolo National Forest, Montana Department of Environmental Quality, and Montana Fish Wildlife and Parks.

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.*

The Clark Fork Coalition, public and private land managers, and project partners have been implementing and maintaining stream restoration projects since 2009. We are committed to our protection and restoration work and have staff dedicated to monitoring the effectiveness of these projects.

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 currently allowed or planned in this area.

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?

The Forest Service and D,J,&A Engineering has surveyed the proposed stream crossings for fish passage. The proposed AOP upgrades were found to be seasonal barriers to adult and juvenile passage. Several research studies have found that the removal or up-sizing of culverts has restored fish and other aquatic organism connectivity. While it is assumed that culvert upsizing to a stream simulation culvert will allow year-round fish passage, the Forest Service will install photo points before, as-built, and out-years to ensure that we are maintaining fish passage.

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

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

The project will benefit the coldwater fish community in upper Lolo Creek. Westslope cutthroat trout are the predominant fish species, but the project will also enhance habitat for Threatened bull trout, brook trout, brown trout and other coldwater species.

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

Currently, fish habitat in this tributary is limited due to seasonal fish barriers. Additionally, sediment produced on Lee Creek Road and an upstream spur road are chronically delivering sediment at stream crossings. Three culverts will be upsized (including a 24-in culvert and two 36-in culverts) to 84-in culverts with stream simulation material. This will allow for lower velocity, more roughness, and year-round fish and other aquatic organism passage. Ultimately, this will increase the amount of available spawning and rearing habitat in Lee Creek watershed. Additionally, an 18-in culvert will be upsized to a 36-in culvert. Up-sized culverts will reduce chronic sediment delivery associated with these road crossings and reduce the risk of catastrophic failure. Reducing stream sedimentation will improve the quality of spawning habitat.

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

By increasing the amount of spawning and rearing habitat in Lee Creek, it is expected to increase west-slope cutthroat and other trout species population densities. Additionally, it may help in the recovery of the relic Threatened bull trout population. With higher densities of fish, angler success is expected to increase. The entire project area is on public land and is open to angling. Wild fish populations downstream (i.e., Bitterroot River) are also expected to benefit through enhanced wild trout recruitment.

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.

The entire project area lies on accessible public land and is open to angling. Wild fish populations are expected to increase as a result of the project, leading to more opportunity for angling success. The proposed project, in combination with past restoration efforts (road decommissioning, stream crossing restoration, and large wood jam installation), will increase trout abundance, bull trout and westslope cutthroat trout conservation, and overall health, productivity and resiliency of upper Lolo Creek at a larger scale. These benefits will ultimately benefit public fishing opportunities in the lower Bitterroot River.

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

Overall public benefits from this project will include increased salmonid population resiliency and density and benefits to the Threatened bull trout. Most of these culverts are also at a risk of catastrophically failing and delivering large amounts of sediment into streams. Up-sizing them will minimize this risk, and maintain good water quality for downstream users.

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

The project will not interfere with the water or property rights of adjacent landowners. The entire project will take place on USFS property.

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

No, there is planned development of commercial recreational use at the site of the project.

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

No, the project is not associated with mine reclamation.

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: _____ Date: 11/14/2024

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables must be completed or the application will be returned

PROJECT COSTS					CONTRIBUTIONS			
WORK ITEMS (Itemize by Category)	NUMBER OF UNITS	UNIT DESCRIPTION *	COST/UNIT	TOTAL COST	FUTURE FISHERIES REQUEST	MATCH (Cash or Services)**	OTHER (Not part of this application)	TOTAL
Personnel* **								
Three culvert designs and permitting (Forest Service Engineer, Hydrologist, and Fish Bio)	1	lump sum	$ 6,000.00	$ 6,000.00			6,000.00	$ 6,000.00
Survey and one culvert design (DJ & A Engineering)	1	lump sum	$ 39,199.00	$ 39,199.00		$ 39,199.00		$ 39,199.00
CFC Project Management (coordination, oversight, and outreach)	200	hours	$ 50.00	$ 10,000.00		$ 10,000.00		$ 10,000.00
				$ -		$ -		$ -
			Sub-Total	$ 55,199.00	$ -	$ 49,199.00	$ 6,000.00	$ 55,199.00
Travel								
Mileage	2000	miles	$0.670	$ 1,340.00				$ -
Per diem				$ -				$ -
			Sub-Total	$ 1,340.00	$ -	$ 1,340.00	$ -	$ 1,340.00
Construction Materials** **								
84" Diameter Corrugated Steel Pipe, band, and 5 baffles (42 ft.)	1	each	$ 19,178.00	$ 19,178.00	19,178.00			$ 19,178.00
84" Diameter Corrugated Steel Pipe, band, and 5 baffles (44 ft.)	1	each	$ 20,091.00	$ 20,091.00	20,091.00			$ 20,091.00
84" Diameter Corrugated Steel Pipe, band, and 5 baffles (46 ft.)	1	each	$ 21,004.00	$ 21,004.00	10,731.00	10,273.00		$ 21,004.00
36" Diameter Corregated Steel Pipe (36 ft.)	1	each	$ 2,061.00	$ 2,061.00		$ 2,061.00		$ 2,061.00
Native seed	1	each	$ 50.00	$ 50.00		$ 50.00		$ 50.00
				$ -				$ -
			Sub-Total	$ 62,384.00	$ 50,000.00	$ 12,384.00	$ -	$ 62,384.00
Equipment, Labor, and Mobilization								
Mobilization	1	Lump Sum	$ 13,000.00	$ 13,000.00		$ 13,000.00		$ 13,000.00
Slash filter windrow	400	Foot	$ 12.50	$ 5,000.00		$ 5,000.00		$ 5,000.00
Clearing and grubbing, disposal method E	1	Lump Sum	$ 12,500.00	$ 12,500.00		$ 12,500.00		$ 12,500.00
Removal of existing corregated steel pipe	4	Each	$ 1,875.00	$ 7,500.00		$ 7,500.00		$ 7,500.00
Unclassified borrow excavation	100	Cubic Yard	$ 56.25	$ 5,625.00		$ 5,625.00		$ 5,625.00
Drainage excavation, type II drain dip	4	Each	$ 437.50	$ 1,750.00		$ 1,750.00		$ 1,750.00
Drainage excavation, type construct sediment basin	2	Each	$ 625.00	$ 1,250.00		$ 1,250.00		$ 1,250.00
Culvert backfill	200	Cubic Yard	$ 75.00	$ 15,000.00		15,000.00		$ 15,000.00
Structure excavation	1	Lump Sum	$ 12,500.00	$ 12,500.00		12,500.00		$ 12,500.00
Placed riprap, class III	12	Cubic Yard	$ 100.00	$ 1,200.00		1,200.00		$ 1,200.00
Streambed simulation material bedclass 2	50	Cubic Yard	$ 250.00	$ 12,500.00		$ 12,500.00		$ 12,500.00
Channel rock for culvert banks, class cr-2	50	Cubic Yard	$ 312.50	$ 15,625.00		$ 15,625.00		$ 15,625.00
Channel rock for rock weirs, class cr-2	40	Cubic Yard	$ 312.50	$ 12,500.00		$ 12,500.00		$ 12,500.00
Weed treatment (2 herbicide applications)	1	Lump Sum	$ 250.00	$ 250.00		$ 250.00		$ 250.00
				$ -				
			Sub-Total	$ 116,200.00	$ -	$ 116,200.00	$ -	$ 116,200.00
			TOTALS	$ 235,123.00	$ 50,000.00	$ 179,123.00	$ 6,000.00	$ 235,123.00

OTHER REQUIREMENTS:

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.
**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used). Do not use government salaries as match. Describe here or in text.

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications may require a justification or minimum of two competitive bids for the cost of undertaking the project. For projects that include a maintenance request, it must not exceed 10% of the total project cost.

****The Review Panel recommends a maximum fencing cost of $1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

Additional details:

APPLICATION MATCHING CONTRIBUTIONS

(do not include requested funds or contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Forest Service	$ -	$ 179,123.00	$ 179,123.00	Y
	$ -			
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ 179,123.00	$ 179,123.00	

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Forest Service staff time for design and permitting	$ 6,000.00	$ -	$ 6,000.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ 6,000.00	$ -	$ 6,000.00	

MONTANA FISH, WILDLIFE & PARKS

Future Fisheries Improvement Program

Appendix: FWP Statement

Project Title: Lee Creek Culvert Replacements - Clark Fork Coalition & U.S. Forest Service

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

Then proposed project involves replacement of a series of existing, undersized culvert on US Forest Service ownership that complement numerous other fish passage and watershed enhancement projects in the upper Lolo Creek watershed over the past decade (see application for description). Lee Creek is a tributary of the West Fork of Lolo Creek in the headwaters of the basin.

Lee Creek is a second order tributary that predominantly supports brook trout and westslope cutthroat trout (WCT). Cutthroat trout in this stream are hybridized (~90% WCT genetic contribution), but represent a conservation population as per the most recent FWP definition. The drainage may have historically supported bull trout, but none have been detected in recent decades as the density and distribution of this species has declined in Lolo Creek. Lee Creek and the West Fork, as part of the greater Lolo Creek watershed, are also important sources of recruitment for the lower Bitterroot River trout fishery near Missoula.

FWP supports the proposed project, as it addresses a known fish passage issue, complements adjacent enhancement projects, and represents a reasonable financial investment. The request for Future Fisheries Program funding is matched by significant contributions from other funding sources and project costs should be moderated through a competitive bidding process.

Please feel free to contact me for additional information.

William Ladd Knotek
Fisheries Management Biologist
FWP-Region 2

Name of FWP Biologist Wm Ladd Knotek Date: 10/31/24

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

November 12, 2024

Future Fisheries Improvement Program
C/O Michelle McGree
P.O Box 200701
1420 E. 6th Avenue
Helena, MT 59620

Dear Ms. McGree,

The Lolo National Forest supports the Clark Fork Coalition's grant application for the Lee Creek Fish Passage Project – Phase 1. The Clark Fork Coalition is applying for grant funds from the Future Fisheries Improvement Program to work with the US Forest Service to improve fish passage in Lee Creek, an important westslope cutthroat trout fishery. The Lee Creek Road (FS 699) disconnects several fish-bearing tributaries. Replacing four undersized, 2-foot culverts with 7-foot AOP culverts will provide year-round stream connectivity for fish and other aquatic organisms and would increase hydrologic capacity.

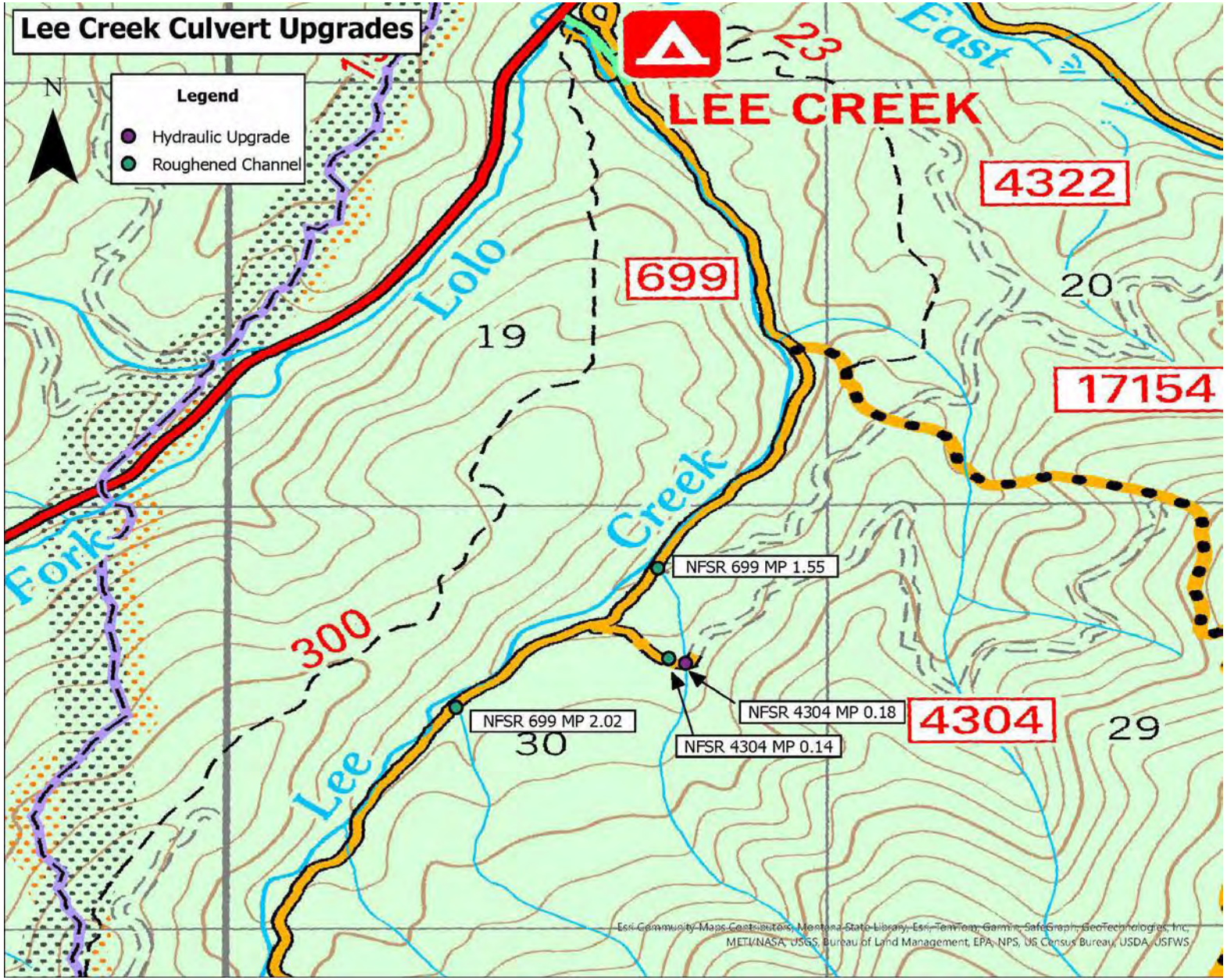
The Clark Fork Coalition and the Lolo National Forest have been working on cooperative projects for several years, including upsizing AOP culverts, installing large wood jams, and decommissioning 30 miles of roads and stream crossings in the upper Lolo Creek watershed. The CFC has also worked on establishing temperature monitoring stations, collecting stream discharge data for instream flow management, working to understand beaver habitat feasibility and reintroduction, and completing a climate change watershed vulnerability assessment on the Lolo National Forest.

The Lolo National Forest continues to provide funding to these efforts, including a contribution of Inflation Reduction Act (IRA) funds towards this fish passage project. The Clark Fork Coalition and the Lolo National Forest have a track record of proven success and are now continuing the partnership with Lee Creek Fish Passage Project – Phase 1. Funds from the Future Fisheries Improvement Program are essential to completing on-the-ground aquatic restoration projects.

Thank you for the funding opportunity and your continued work for conservation of natural resources. Please do not hesitate to contact me at crystal.s.stonesifer@usda.gov if you have any questions.

Sincerely,

Crystal Stonesifer
Missoula District Ranger


Lee Creek Culvert Upgrades
N
Legend
Hydraulic Upgrade
Roughened Channel
LEE CREEK
East
23
4322
699
20
19
Lolo
17154
Creek
Fork
300
NFSR 699 MP 1.55
NFSR 699 MP 2.02
NFSR 4304 MP 0.18
NFSR 4304 MP 0.14
4304
29
30
Lee
Esri Community Maps Contributors, Montana State Library, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS

Lee Creek Fish Passage Project – Photos

Figure 1: FSR 699 MP 0.9 inlet

Figure 2: FSR 699 MP 0.9 outlet

Figure 3: FSR 699 MP 1.55 inlet

Figure 4: FSR 699 MP 1.55 outlet

Figure 5: FSR 4304 MP 0.14 inlet

Figure 6: FSR 4304 MP 0.14 outlet

Figure 7: FSR 4304 MP 0.18 inlet

Figure 8: FSR 4304 MP 0.18 outlet

CLARK FORK COALITION

CLARK FORK COALITION &
UNITED STATES FOREST SERVICE

CONSTRUCTION PLANS FOR:

LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT

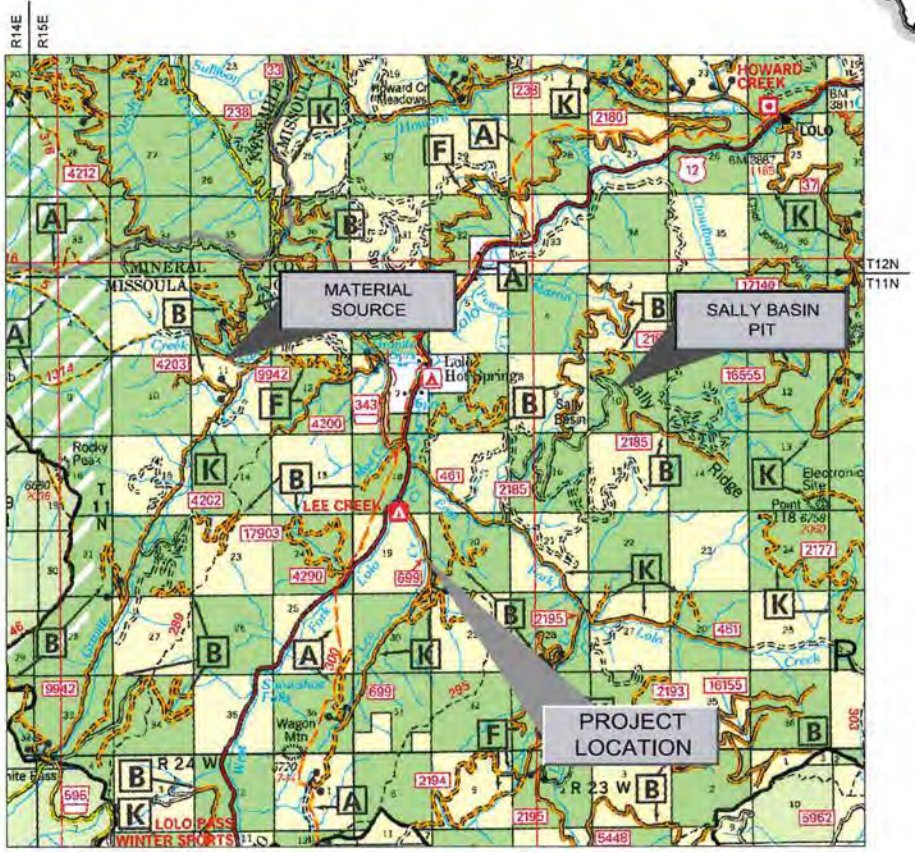
USFS RD 699 MP 0.8
MISSOULA RANGER DISTRICT
LOLO NATIONAL FOREST
MISSOULA COUNTY, MONTANA

LOCATION MAP

INDEX TO SHEETS

MATERIAL SOURCES

GOVERNMENT/CLIENT FURNISHED
UNCLASSIFIED BORROW
CULVERT BACKFILL
RIPRAP
CRUSHED AGGREGATE SURFACING
COMMERCIAL SOURCE - OPTIONAL GOVERNMENT SOURCE MAY BE USED WITH APPROVAL OF USFS REPRESENTATIVE
STREAMBED SIMULATION ROCK
CHANNEL ROCK



VICINITY MAP

APPROVED:

FOREST SUPERVISOR — DATE
LOLO NATIONAL FOREST

RECOMMENDED:

DISTRICT RANGER — DATE
MISSOULA RANGER DISTRICT

FOREST ENGINEER — DATE
LOLO NATIONAL FOREST

MONTANA
JACOB W. ROSKE
No. 22241 PE
LICENSED PROFESSIONAL ENGINEER

11/1/24

DJ&A
ENGINEERS
PLANNERS
SURVEYORS

SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	ITEM DESCRIPTION	MEASUREMENT		QTY	COMMENTS
		METHOD	UNIT		
15101	MOBILIZATION	LSQ	LUMP SUM	ALL	INCLUDES TEMPORARY TRAFFIC CONTROL.
15201	CONSTRUCTION SURVEY AND STAKING	LSQ	LUMP SUM	ALL	LICENSED SURVEYOR REQUIRED.
15730	SOIL EROSION & POLLUTION CONTROL	LSQ	LUMP SUM	ALL	SEE GENERAL NOTES.
20101	CLEARING AND GRUBBING, DISPOSAL METHOD E	LSQ	LUMP SUM	ALL	SALVAGE TOPSOIL, SOD, LARGE WOOD, BRANCHES, ETC. FOR ENGINEERED STREAM BANK CONSTRUCTION AND FOR SLASH TO BE PLACED ON DISTURBED AREAS. STUMPS TO BE BURIED OR INCORPORATED INTO THE ENGINEERED STREAM BANK CONSTRUCTION.
20302	REMOVAL OF EXISTING CORRUGATED STEEL PIPE, DISPOSAL METHOD A	AQ	EACH	1	
20410	UNCLASSIFIED BORROW EXCAVATION	CQ	CUBIC YARD	90	GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM PIT ON USFS RD 9422 MP 1.20, WITH APPROVAL FROM USFS REPRESENTATIVE. EXCESS MATERIAL FROM EXCAVATION MEETING FP-14 704.06 MAY ALSO BE USED. IN-PLACE QUANTITY NOT ADJUSTED FOR SHRINK/SWELL.
20425	DRAINAGE EXCAVATION, TYPE DRAIN DIP	AQ	EACH	1	
20803	CULVERT BACKFILL	CQ	CUBIC YARD	100	GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM SALLY BASIN PIT OR PIT ON USFS RD 9422 MP 1.20, WITH APPROVAL FROM USFS REPRESENTATIVE. MATERIAL MEETING FP-14 SUBSECTION 703.06.
20806	STRUCTURE EXCAVATION	LSQ	LUMP SUM	ALL	CONTRACTOR RESPONSIBLE FOR VERIFYING UTILITIES.
25101	PLACED RIPRAP, CLASS 2	CQ	CUBIC YARD	20	GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM SALLY BASIN PIT AND PIT ON USFS RD 9422 MP 1.20, WITH APPROVAL FROM USFS REPRESENTATIVE. MATERIAL MEETING FP-14 SUBSECTION 705.02.
30207	CRUSHED AGGREGATE SURFACING, COMPACTION METHOD 1	CQ	CUBIC YARD	70	GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM SALLY BASIN PIT AND PIT ON USFS RD 9422 MP 1.20, WITH APPROVAL FROM USFS REPRESENTATIVE. MATERIAL MEETING FP-14 SUBSECTION 703.06.
60203	84" DIAMETER ROUND CORRUGATED STEEL PIPE, 0.105" THICKNESS	CQ	LINEAR FOOT	42	PAY ITEM INCLUDES INSTALLATION OF STRUCTURE ONLY. STRUCTURE AND BAFFLES TO BE FURNISHED BY THE CLARK FORK COALITION. CONTRACTOR TO INSTALL BAFFLES. PAY ITEM INCLUDES BEDDING MATERIAL.
62201A	EQUIPMENT RENTAL, LARGE DUMP TRUCK	CQ	HOUR	16	FOR WORK PERFORMED TO CONSTRUCT ENGINEERED BANKS OUTSIDE OF CULVERT. WORK TO BE DONE AT DIRECTION OF FOREST SERVICE REPRESENTATIVE. STREAMBED SIMULATION ROCK BED CLASS 2 AND CHANNEL ROCK CLASS CR-2 QUANTITIES INCLUDED IN ITEMS 64801 AND 64803A.
62201B	EQUIPMENT RENTAL, HYDRAULIC EXCAVATOR WITH THUMB	CQ	HOUR	16	FOR WORK PERFORMED TO CONSTRUCT ENGINEERED BANKS OUTSIDE OF CULVERT. WORK TO BE DONE AT DIRECTION OF FOREST SERVICE REPRESENTATIVE. STREAMBED SIMULATION ROCK BED CLASS 2 AND CHANNEL ROCK CLASS CR-2 QUANTITIES INCLUDED IN ITEMS 64801 AND 64803A.
64801	STREAMBED SIMULATION MATERIAL BED CLASS 2	CQ	CUBIC YARD	20	COMMERCIAL SOURCE. MATERIAL FROM THE EXCAVATION MEETING THE GRADATION FOR BED CLASS 2 MAY BE SALVAGED AND USED. POTENTIAL GOVERNMENT SOURCE MATERIAL FROM SALLY BASIN PIT OR PIT ON USFS RD 9422 MP 1.20, WITH APPROVAL OF USFS REPRESENTATIVE.
64803A	CHANNEL ROCK FOR BANKS, CLASS CR-2	CQ	CUBIC YARD	20	COMMERCIAL SOURCE. MATERIAL FROM THE EXCAVATION MEETING THE GRADATION FOR CHANNEL ROCK, CLASS CR-2 MAY BE USED. POTENTIAL GOVERNMENT SOURCE MATERIAL FROM SALLY BASIN PIT OR PIT ON USFS RD 9422 MP 1.20, WITH APPROVAL OF USFS REPRESENTATIVE.
64803B	CHANNEL ROCK FOR ROCK WEIRS, CLASS CR-2	CQ	CUBIC YARD	15	COMMERCIAL SOURCE. MATERIAL FROM THE EXCAVATION MEETING THE GRADATION FOR CHANNEL ROCK, CLASS CR-2 MAY BE USED. POTENTIAL GOVERNMENT SOURCE MATERIAL FROM SALLY BASIN PIT OR PIT ON USFS RD 9422 MP 1.20, WITH APPROVAL OF USFS REPRESENTATIVE.
67050	SLASH	LSQ	LUMP SUM	ALL	PLACE SLASH CONSERVED FROM CLEARING AND GRUBBING ON DISTURBED AREAS AND ON RIPRAP AT CULVERT INLET AND OUTLET AS DIRECTED BY USFS REPRESENTATIVE.

CQ=CONTRACT QUANTITY; AQ=ACTUAL QUANTITY; LSQ=LUMP SUM QUANTITY (SEE FP-14 SECTION 109)

GENERAL NOTES

DESIGN: THIS STRUCTURE IS DESIGNED FOR HL-93 LIVE LOADING IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION.

HYDROLOGY AND HYDRAULICS: THIS STRUCTURE HAS BEEN DESIGNED TO PASS THE ANNUAL PEAK FLOW HAVING A 100-YEAR RECURRENCE INTERVAL (Q100) OF 49.6 CFS WITH A HEADWATER DEPTH TO CULVERT RISE RATIO LESS THAN 0.8. THE 2-YEAR RECURRENCE INTERVAL (Q2) FLOW IS 12.2 CFS.

SPECIFICATIONS: CONSTRUCT THE PROJECT IN COMPLIANCE WITH FEDERAL HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROAD AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-14) AND APPLICABLE SUPPLEMENTAL SPECIFICATIONS.

DEWATERING & EROSION CONTROL PLAN: SUBMIT A SOIL EROSION AND SEDIMENT CONTROL PLAN ALONG WITH A DEWATERING PLAN TO THE USFS REPRESENTATIVE FOR APPROVAL AT LEAST THIRTY (30) DAYS PRIOR TO BEGINNING WORK. SEE SECTION 157 OF THE SUPPLEMENTAL SPECIFICATIONS FOR DETAILS. CONSTRUCT TEMPORARY MEANS TO DIVERT THE FLOW OF THE LIVE STREAM AS NECESSARY TO PERFORM WORK. DO NOT PUMP WATER FROM EXCAVATIONS DIRECTLY INTO THE LIVE STREAM. IMPLEMENT RUNOFF AND SEDIMENT CONTROL BMPS (I.E. SILT FENCES OR BIODEGRADABLE STRAW WADDLES) AT DIRECTION OF USFS REPRESENTATIVE.

DISPOSAL: ALL MATERIALS DESIGNATED FOR REMOVAL BECOME THE PROPERTY OF THE CONTRACTOR AND ARE TO BE DISPOSED OF BY REMOVING FROM THE FOREST IN AN ENVIRONMENTALLY SAFE MANNER IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS. DISPOSAL METHOD A PER FP-14 SECTION 203.05

TEMPORARY TRAFFIC CONTROL: SUBMIT A TEMPORARY TRAFFIC CONTROL PLAN TO THE USFS REPRESENTATIVE FOR APPROVAL AT LEAST 30 DAYS PRIOR TO INTENDED USE.

WELDING: WELD IN ACCORDANCE WITH THE STRUCTURAL WELDING CODE, AWS D1.1. A CERTIFIED WELDER IS REQUIRED.

IN-STREAM WORK: ALL IN-STREAM WORK WILL BE DONE BETWEEN JULY 15TH AND SEPTEMBER 1ST, OR AS DESCRIBED IN PERMIT. ALLOWANCE SHALL BE GIVEN TO THE OWNER TO CAPTURE AND REMOVE FISH AND OTHER AQUATIC ORGANISMS FROM WITHIN THE CONSTRUCTION WORK AREA PRIOR TO AND DURING WORK ACTIVITIES.

UNDERGROUND UTILITIES: UNDERGROUND UTILITIES ARE PRESENT AND ARE THE CONTRACTORS RESPONSIBILITY. CONTRACTOR IS REQUIRED TO COORDINATE WITH BLACKFOOT COMMUNICATIONS AND ANY OTHER UTILITY COMPANY PRESENT IN THE AREA.

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REGION 1
NORTHERN REGION

PROJECT NAME:
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

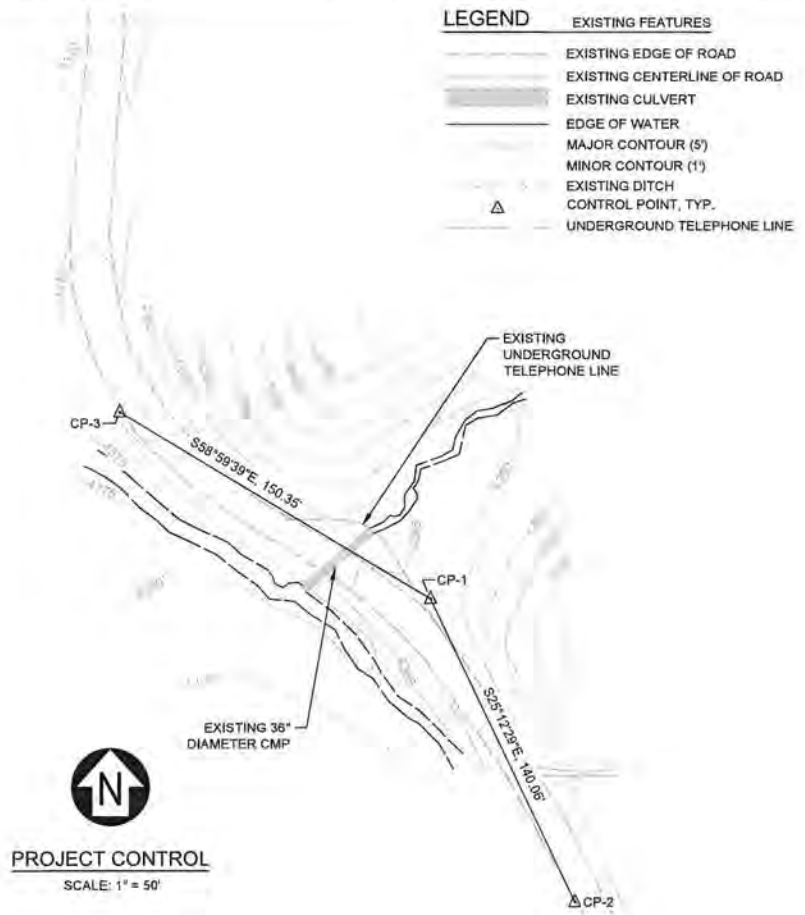
DRAWING TITLE:
SCHEDULE OF QUANTITIES & GENERAL NOTES

DATE: NOV-24

ARCHIVE NO:

DESIGNER	DWG SHEET NO.
T.GRIGSBY	2
DRAWN: T.GRIGSBY	
CHECKED: B.KAMRUD	SHEET 2 OF 12
PROJECT NO.: 7489	

11/04 11:37 TESSA.GRIGSBY C:\DJA\PWWORK\DJA_PROD\DM5928287489 LEE CREEK TRIBUTARY AOP_DESIGN.DWG



CENTERLINE POINTS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
6000	932063.88	707804.32	4374.54	RD CL - STA 11+26.06 - PC
6001	932011.11	707813.27	4377.34	RD CL - STA 11+80 - BEGIN CONSTRUCTION
6002	931993.24	707822.21	4378.28	RD CL - STA 12+00
6003	931977.03	707833.88	4379.50	RD CL - STA 12+20
6004	931962.88	707847.99	4381.10	RD CL - STA 12+40
6005	931947.73	707870.17	4383.85	RD CL - STA 12+66.91 - PT
6006	931941.55	707881.71	4385.38	RD CL - STA 12+80
6007	931932.11	707899.34	4387.47	RD CL - STA 13+00
6008	931925.23	707912.19	4388.54	RD CL - CL CULVERT - STA 13+14.57
6009	931922.96	707916.43	4388.81	RD CL - STA 13+19.38 - PC
6010	931910.53	707932.77	4389.50	RD CL - STA 13+40
6011	931899.00	707941.54	4389.65	RD CL - STA 13+54.52 - PT
6012	931877.13	707954.61	4390.00	RD CL - STA 13+80
6013	931859.96	707964.87	4390.48	RD CL - STA 14+00
6014	931842.79	707975.13	4391.16	RD CL - STA 14+20
6015	931825.63	707985.39	4391.93	RD CL - STA 14+40 - END OF CONSTRUCTION

ROAD CENTERLINE POINTS

POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
7000	931939.87	707926.23	4379.74	CULVERT INVERT - IN
7001	931909.66	707897.25	4376.39	CULVERT INVERT - OUT

CULVERT LAYOUT POINTS

SEE SHEET 6 FOR LOCATION OF CULVERT LAYOUT POINTS

CONTROL POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1	931909.99	707943.35	4385.97	SET RPC
CP-2	931783.27	708003.00	4393.70	SET RPC
CP-3	931987.44	707814.48	4378.83	SET RPC

SURVEY CONTROL POINTS

SET RPC = REBAR WITH RED PLASTIC CAP SET BY DJ&A

COORDINATE SYSTEM: NAD83 MONTANA STATE PLANES, INTERNATIONAL FOOT

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NORTHERN REGION

PROJECT NAME

LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE

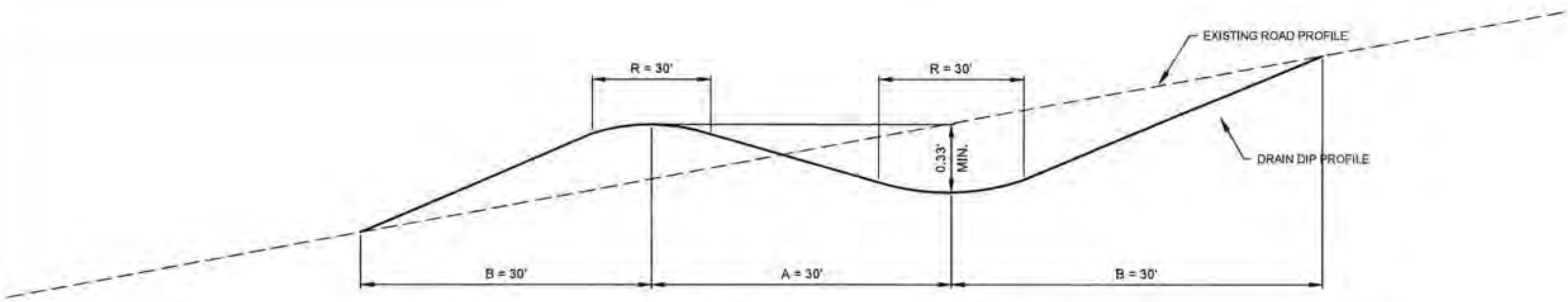
PROJECT CONTROL

DATE
NOV-24

ARCHIVE NO.

DESIGNER	DWG SHEET NO.
T.GRIGSBY	3
DRAWN: T.GRIGSBY	
CHECKED: B.KAMRUD	SHEET 3 OF 12
PROJECT NO.: 7489	

11/7/24 11:37 TESSA.GRIGSBY C:\DJA-PW\WORK\DJA-PRODOMS\25286\7489\LEE CREEK TRIBUTARY AOP_DESIGN.DWG;



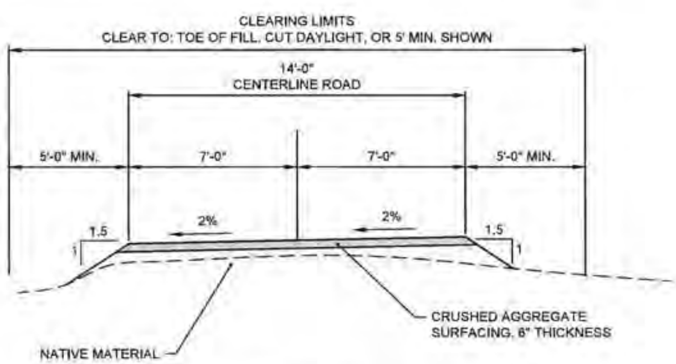
GRADE (%)	LOWBOY				GRADE (%)	LOG TRUCK				GRADE (%)	4X4 (FIRE ENGINE)			
	LENGTH	TAPER	ROUNDING			LENGTH	TAPER	ROUNDING			LENGTH	TAPER	ROUNDING	
	A(ft)	B(ft)	%	R(ft)		A(ft)	B(ft)	%	R(ft)		A(ft)	B(ft)	%	R(ft)
0-5	30	30	7	30	0-5	20	25	10	20	0-5	10	15	19	10
6-9	30	50	7	30	6-9	20	40	10	20	6-9	10	20	19	10
10-12	30	60	7	30	10-12	20	50	10	20	10-30	10	10	19	10
				15					15					5

CHORD LENGTH FOR ROUNDING, TYPICAL

NOTES:
1. MINIMUM CROSS SLOPE OF DRAINLINE: 2% MIN AND 4% MAX.
2. SKEW OF DRAINLINE SHALL BE 0-25 DEGREES.
3. WHEN RIPRAP IS SPECIFIED AT OUTLET, IT SHALL BE SHAPED TO ASSURE WATER GOES ONTO RIPRAP, NOT AROUND. INSTRUMENT SHALL BE USED TO DETERMINE LOW POINT.
4. RIPRAP TOP ELEVATION SHALL BE AT TOP OF FINISHED OUTLET GRADE, NOT SUBGRADE.
5. TAPER LENGTHS SHALL BE WITHIN 10% OF LISTED LENGTHS.
6. DRAIN DIP LOCATIONS WILL BE FINALIZED BY THE USFS REPRESENTATIVE.

DRAIN DIP TYPICAL DETAIL

NOT TO SCALE



TYPICAL ROAD SECTION

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LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

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DRAWING TITLE
TYPICAL SECTION & DETAILS

DATE
NOV-24

ARCHIVE NO.

DESIGNER
T.GRIGSBY

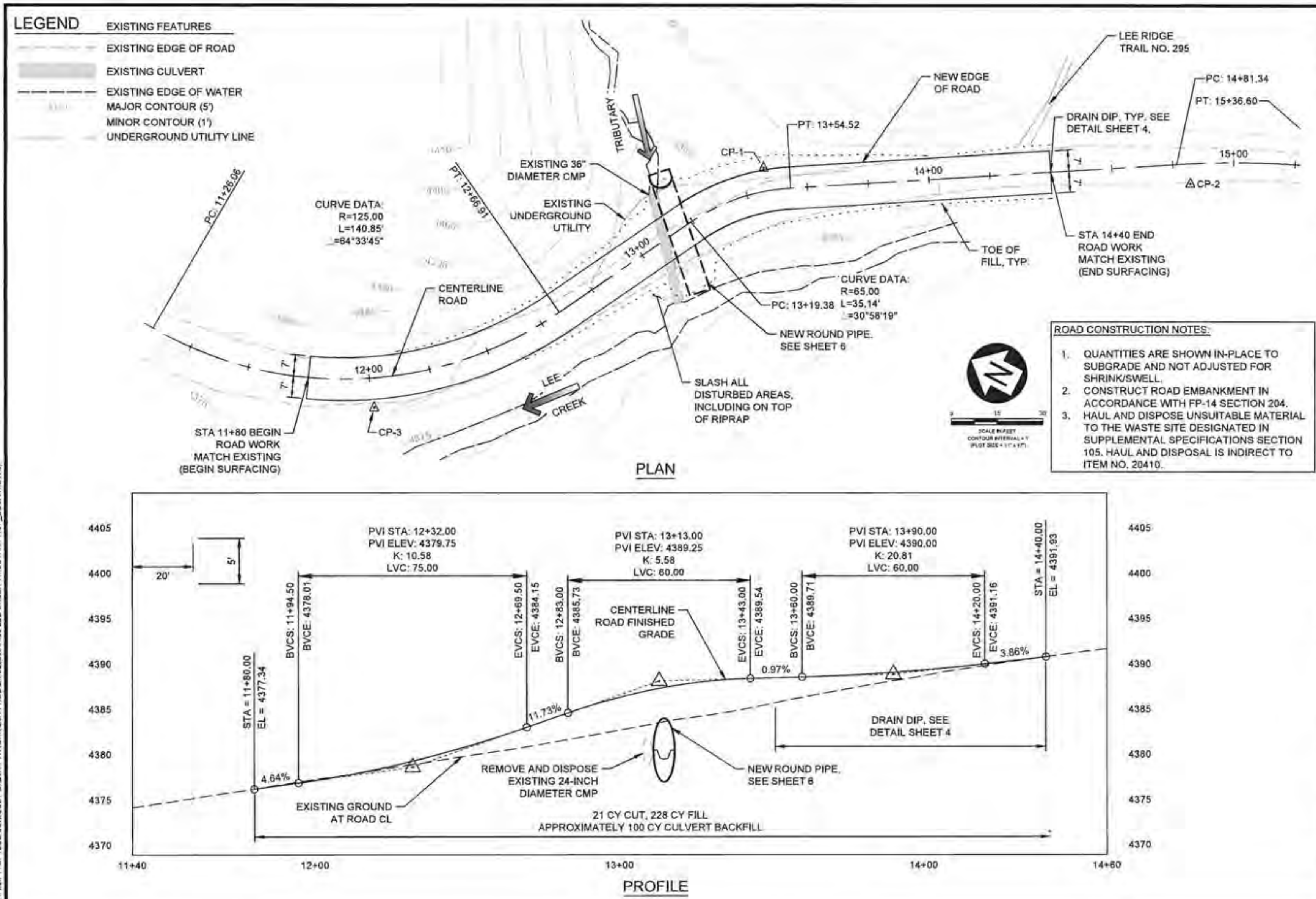
DWG SHEET NO.
4

DRAWN
T.GRIGSBY

CHECKED
B.KAMRUD

PROJECT NO.
7489

SHEET 4 OF 12



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NORTHERN REGION

PROJECT NAME

LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE

ROAD PLAN & PROFILE

DATE NOV-24	
ARCHIVE NO.	
DESIGNER T.GRIGSBY	DWG SHEET NO. 5
DRAWN T.GRIGSBY	
CHECKED B.KAMRUD	
PROJECT NO. 7489	SHEET 5 OF 12

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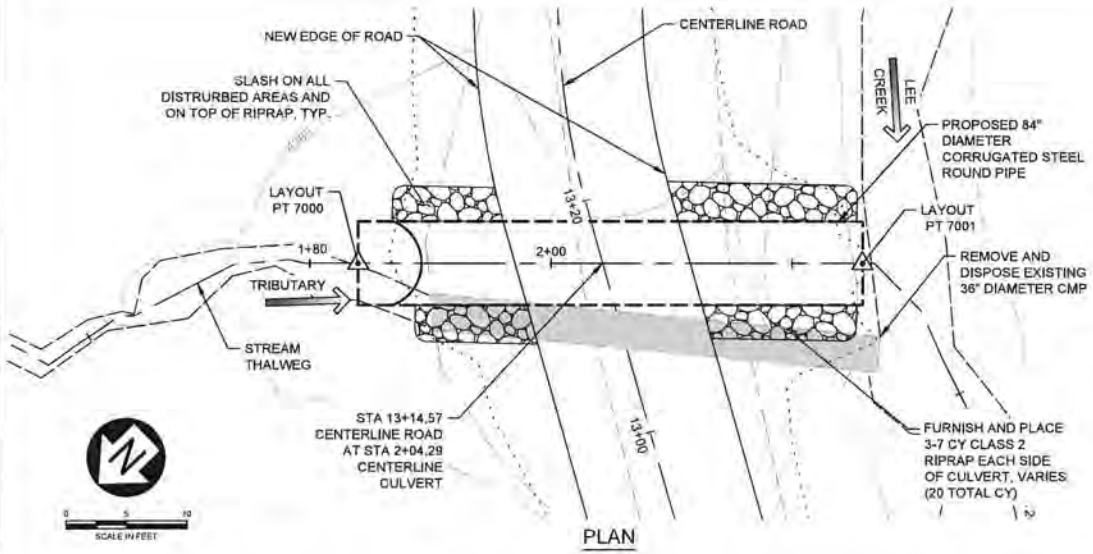
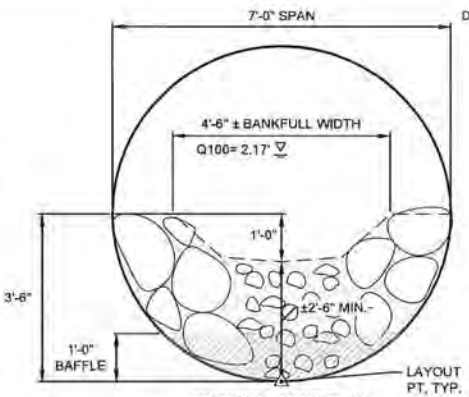


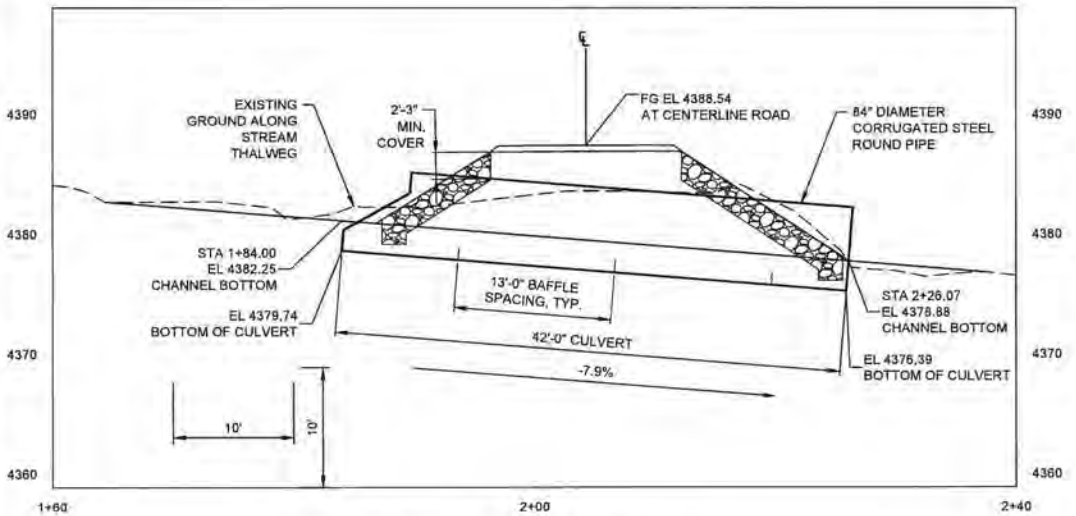
PLAN



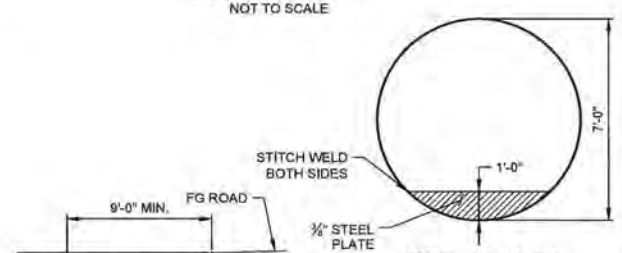
TYPICAL SECTION
NOT TO SCALE

HYDRAULIC DATA:
DRAINAGE AREA= 1.0 SQ. MI.
Q2= 12.2 CFS
BANKFULL WIDTH= 4'-6"
DEPTH= 1'-0"

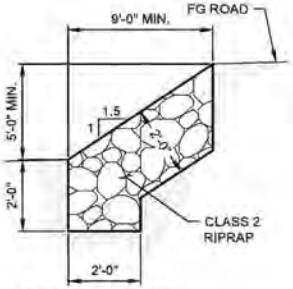
Q100= 49.6 CFS
DEPTH = 2.17'
HW/D = 0.48
*OUTLET CONTROL



SECTION THRU CENTERLINE CULVERT



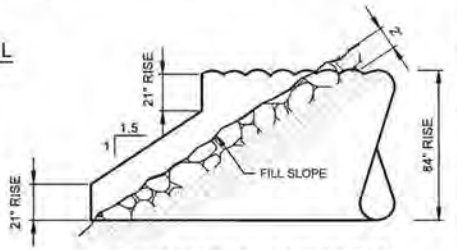
STEEL BAFFLES
NOT TO SCALE



RIPRAP DETAIL
NOT TO SCALE

BAFFLE NOTES:
1. SPRAY-GALVANIZE BAFFLE PLATES AFTER WELDING
2. LOCATE CULVERT JOINTS HALFWAY BETWEEN BAFFLES.

1. THE ENDS OF CULVERTS SHALL NOT BE CUT ON A SKEW UNLESS SHOWN ON THE DRAWINGS, OR CALLED FOR IN THE SCHEDULE OF ITEMS



STEP BEVELED END DETAIL
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PROJECT NAME
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
CULVERT GENERAL LAYOUT

DATE: NOV-24
ARCHIVE NO.

DESIGNER	DWG SHEET NO.
T.GRIGSBY	6
DRAWN: T.GRIGSBY	
CHECKED: B.KAMRUD	
PROJECT NO.: 7489	SHEET 6 OF 12

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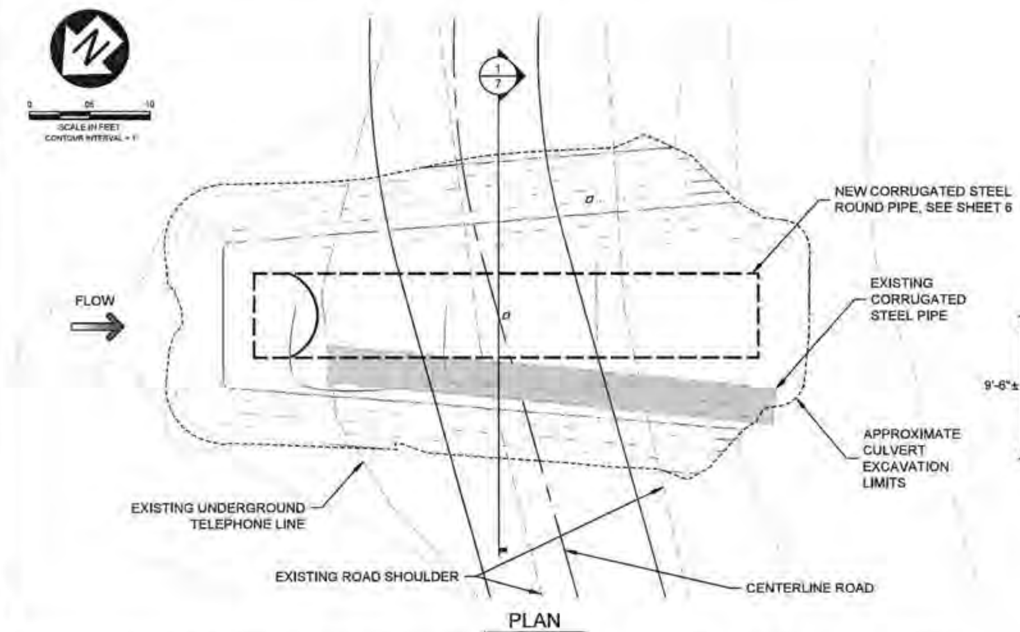

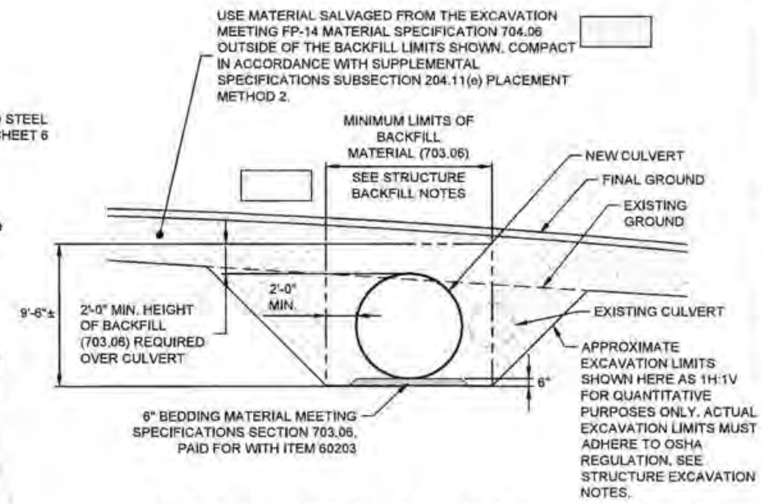

1/7 STRUCTURAL EXCAVATION & BACKFILL SECTION
NOT TO SCALE

DEWATERING AND SOIL EROSION CONTROL NOTES:

1. PROTECT AGAINST SOIL EROSION AND SEDIMENTATION DURING CONSTRUCTION IN ACCORDANCE WITH FP-14 SECTION 157 AND THE PROJECT PERMITS. PREPARE AND SUBMIT A SOIL EROSION AND SEDIMENT CONTROL PLAN TO THE USFS REPRESENTATIVE FOR APPROVAL.
2. DEWATER THE EXCAVATION IN ACCORDANCE WITH FP-14 SECTIONS 208 AND 157 AND THE REQUIREMENTS ON SHEET 12.
3. CONTRACTOR SHOULD ANTICIPATE WATER INFILTRATING THE EXCAVATIONS.
4. CULVERT EXCAVATION, CULVERT EXCAVATION, RIPRAP AND ROCK WEIR PLACEMENT, AND BACKFILL ARE TO BE COMPLETED IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. STANDING OR RUNNING WATER IN THE WORK AREA DOES NOT RELIEVE THE CONTRACTOR FROM MEETING THE SPECIFICATIONS.
5. DEWATERING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. DEVELOP AND SUBMIT TO THE USFS REPRESENTATIVE A PROJECT-SPECIFIC DEWATERING AND SEDIMENT CONTROL PLAN WITH THE EXCAVATION PLAN FOR APPROVAL. SHEET 12 ILLUSTRATES THE GENERAL DEWATERING REQUIREMENTS AND POSSIBLE METHODS AND EQUIPMENT AND IS NOT CONSIDERED ADEQUATE OR COMPLETE FOR THIS PROJECT. DEVELOP AND SUBMIT A PROJECT-SPECIFIC DEWATERING PLAN INCLUDING DRAWINGS AND A WRITTEN OUTLINE ILLUSTRATING AND DESCRIBING PROPOSED LAYOUT, METHODS, AND EQUIPMENT. APPROVAL OF THE CONTRACTOR'S DEWATERING PLAN DOES NOT RELIEVE THE CONTRACTOR FROM COMPLETING THE WORK AS REQUIRED. IF THE CONTRACTOR'S METHODS ARE NOT PRODUCING ADEQUATE RESULTS, THE CONTRACTOR MUST RE-EVALUATE AND SUBMIT ANOTHER DEWATERING PLAN. RE-SUBMITTAL OF THE DEWATERING PLAN, IF REQUIRED, IS INCIDENTAL TO THE WORK.

STRUCTURE EXCAVATION NOTES:

1. COMPLETE STRUCTURE EXCAVATION IN ACCORDANCE WITH FP-14 SECTION 208 & 209.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR EXCAVATION SUPPORT AND COMPLIANCE WITH ALL APPLICABLE OSHA REGULATIONS.
3. LIMITS OF STRUCTURE EXCAVATION ARE SHOWN FOR INFORMATION ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXCAVATION LIMITS AND QUANTITIES BASED ON THE APPROVED EXCAVATION PLAN.
4. PROTECT STOCKPILED MATERIAL FROM CONTAMINATION AND WEATHER DAMAGE WITH PLASTIC SHEETING, OR BY SOME OTHER METHOD. IF STOCKPILED MATERIAL FROM THE EXCAVATION BECOMES TOO WET OR CONTAMINATED IN THE STOCKPILE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO DISPOSE OF THE UNSUITABLE MATERIAL AND REPLACE IT WITH AN EQUAL AMOUNT OF SUITABLE MATERIAL. ALL COSTS FOR STORING, PROTECTING, REHANDLING, AND PLACING STOCKPILED MATERIAL IS INDIRECT TO ITEM 20806 STRUCTURE EXCAVATION.
5. NOTIFY THE USFS REPRESENTATIVE IMMEDIATELY IF BEDROCK OR SOFT, UNSUITABLE SOILS ARE ENCOUNTERED.
6. WORK CLOSELY WITH USFS REPRESENTATIVE TO DISCUSS EXCAVATION PLAN PRIOR TO EXCAVATING. DISCUSS EXCAVATION LIMITS, METHODS, EQUIPMENT TO BE USED, LOCATION OF STOCKPILES, AND ESTIMATED QUANTITIES. EXCAVATION MUST COMPLY WITH ALL APPLICABLE OSHA REQUIREMENTS.

STRUCTURE BACKFILL NOTES:

1. BACKFILL LIMITS SHOWN HERE ARE THE MINIMUM REQUIREMENTS. PLACE BACKFILL IN ACCORDANCE WITH FP-14 SECTION 209, AND AS SHOWN ON THESE PLANS, WITH MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 703.06. COMPACT BACKFILL MATERIAL IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATIONS SUBSECTION 209.10B COMPACTION METHOD 2. ANY MATERIAL OUTSIDE THE BACKFILL LIMITS SHOWN IS CONSIDERED ROAD EMBANKMENT AND THE MATERIAL MUST MEET THE REQUIREMENTS OF FP-14 SUBSECTION 704.06.
2. IT IS ASSUMED THAT MATERIAL CONSERVED FROM THE STRUCTURE EXCAVATION AT THIS SITE WILL MEET THE REQUIREMENT FOR ROAD EMBANKMENT (704.06). SOME MIXING AND SORTING MAY BE REQUIRED TO MEET THE MATERIAL SPECIFICATION. HAUL AND DISPOSE UNSUITABLE AND EXCESS MATERIAL TO THE DESIGNATED WASTE SITE. HAUL AND DISPOSAL OF UNSUITABLE OR EXCESS MATERIAL IS INDIRECT TO ITEM 20806.
3. BEDDING MATERIAL CONSISTS OF LOOSELY PLACED CRUSHED AGGREGATE MEETING SPECIFICATIONS SECTION 703.06. BEDDING MATERIAL IS INCLUDED IN BID ITEM 60203.

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REGION 1
NORTHERN REGION

PROJECT NAME
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
STRUCTURAL EXCAVATION & BACKFILL

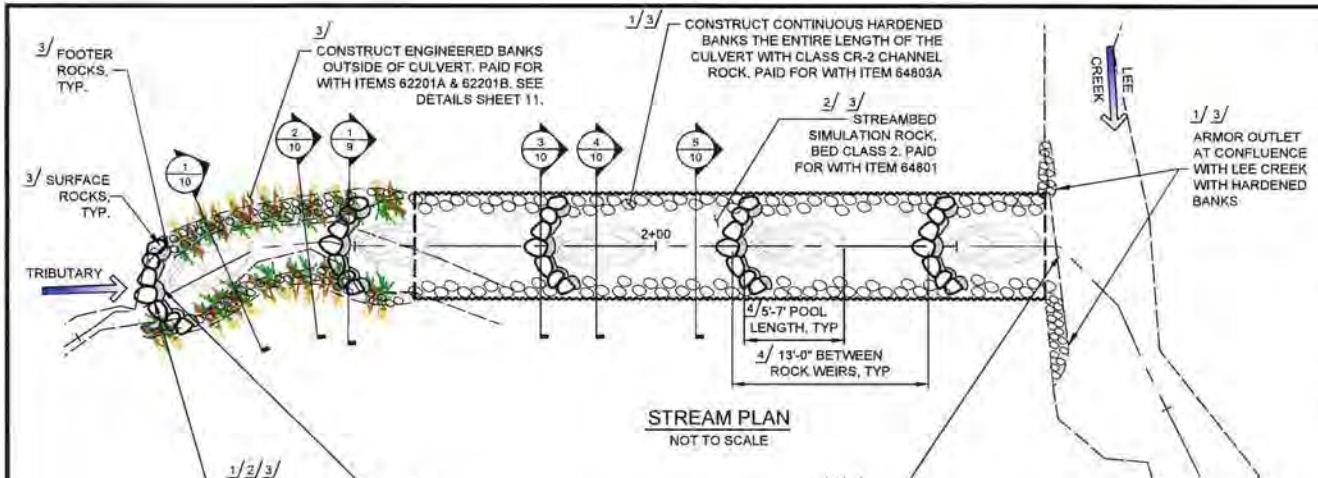
DATE NOV-24

ARCHIVE NO.

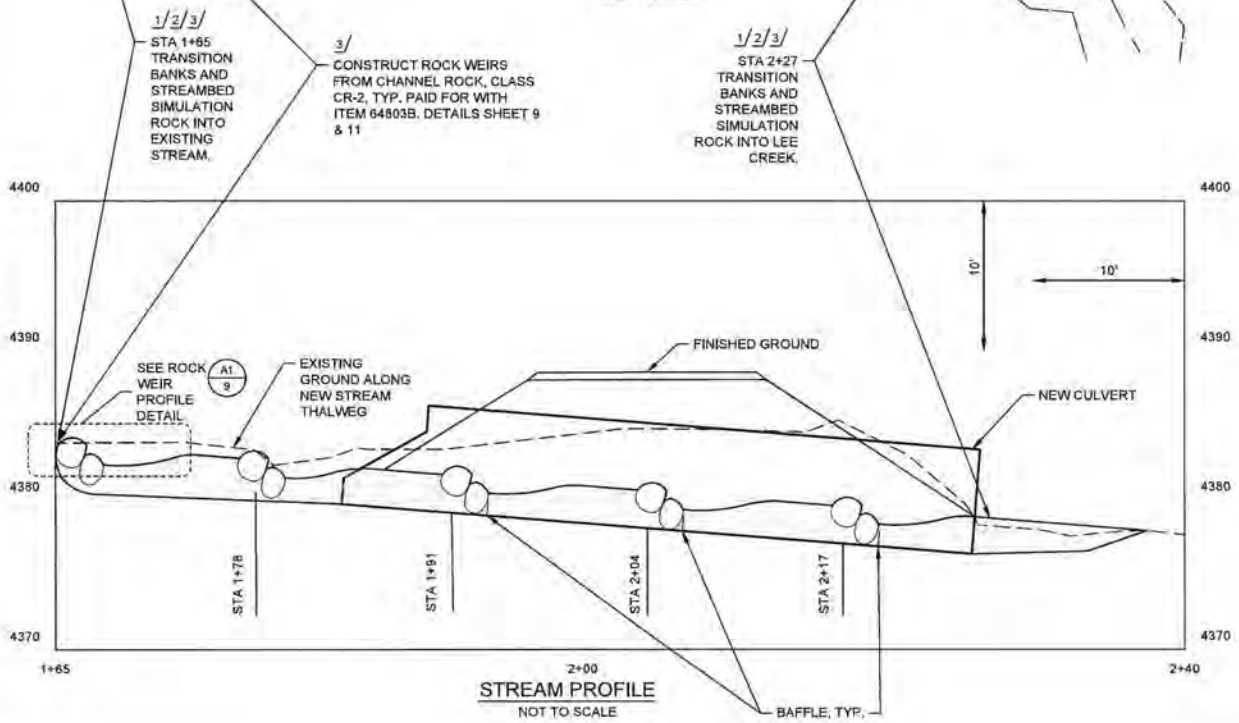
DESIGNER T.GRIGSBY
DRAWN T.GRIGSBY
CHECKED B.KAMRUD
PROJECT NO. 7489

DWG SHEET NO. 7

SHEET 7 OF 12



STREAM PLAN
NOT TO SCALE



STREAM PROFILE
NOT TO SCALE

FOOTNOTES:

1/ INTER-MIX STREAMBED MATERIAL AS DIRECTED BY USFS REPRESENTATIVE DURING PLACEMENT OF CHANNEL ROCK BANK INSIDE THE CULVERT TO SEAL VOIDS THROUGHOUT THE SECTION.

2/ THE FINAL CHANNEL BOTTOM SHOULD BE A DENSE, WELL INTERLOCKED STREAMBED WITH LOW PERMEABILITY. COMPACT EACH LAYER AND FILL SURFACE VOIDS BY WASHING IN FINE MATERIAL. USE WATER PRESSURE, TAMPING RODS, AND SIMILAR HAND OPERATED EQUIPMENT TO FORCE FINE MATERIAL INTO ALL SURFACE VOIDS.

3/ NATIVE MATERIAL MEETING GRADATION FOR THE SPECIFIED BED CLASS, AND CHANNEL ROCK MAY BE SALVAGED AND INCORPORATED IN TO THE SIMULATED STREAMBED, BANKS, AND ROCK WEIRS.

4/ 1' TOLERANCE FOR POOL LENGTHS TO ACCOUNT FOR NATURAL VARIABILITY.

5/ INTER-MIX STREAMBED MATERIAL AS DIRECTED BY USFS REPRESENTATIVE DURING PLACEMENT OF ENGINEERED BANKS TO SEAL VOIDS THROUGHOUT THE SECTION.

ROCK WEIR LAYOUT POINTS		
WEIR#	STATION	ELEVATION
1	1+65	4383.7
2	1+78	4382.7
3	1+91	4381.6
4	2+04	4380.6
5	2+17	4379.5

GRADE CONTROL LAYOUT TABLE

USDA United States Department of Agriculture Forest Service

REGION 1
NORTHERN REGION

PROJECT NAME
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
STREAM SIMULATION DETAILS

DATE NOV-24

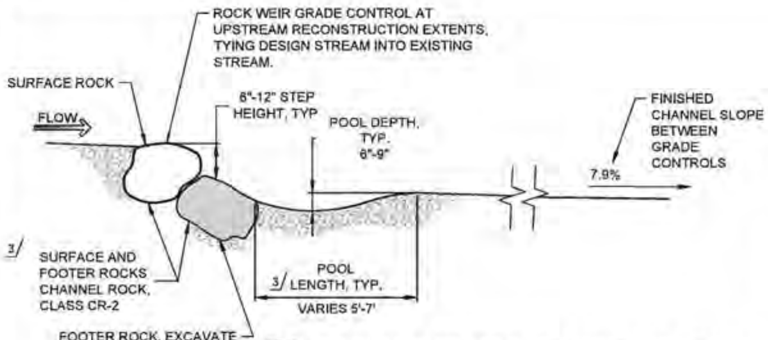
ARCHIVE NO.

DESIGNER T.GRIGSBY
DRAWN T.GRIGSBY
CHECKED B.KAMRUD
PROJECT NO. 7489

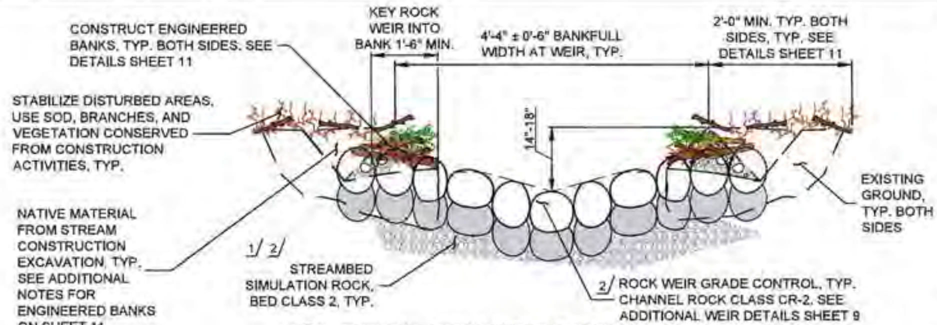
DWG SHEET NO. 8

SHEET 8 OF 12

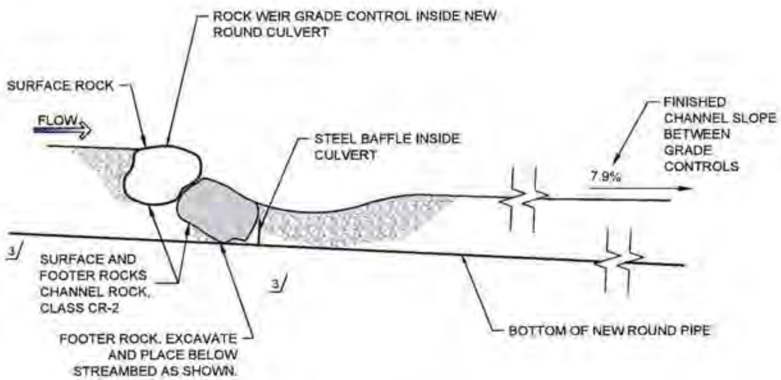
11/1/24 11:37 TESSA.GRIGSBY C:\DJA-PW\WORKDJA-PROD\DMS25269784\B LEE CREEK TRIBUTARY AOP_DESIGN (DWG)



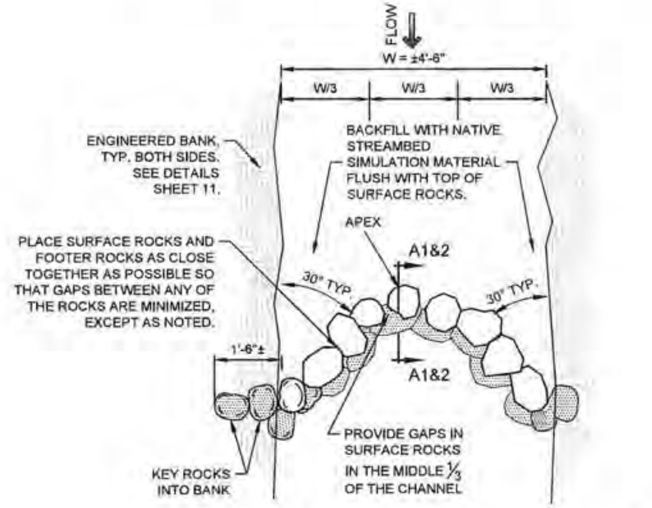
A1 / 9 ROCK WEIR PROFILE - OUTSIDE CULVERT
NOT TO SCALE



1 / 9 TYPICAL ROCK WEIR SECTION - OUTSIDE CULVERT
NOT TO SCALE



A2 / 9 ROCK WEIR PROFILE - INSIDE CULVERT
NOT TO SCALE



ROCK WEIR PLAN - INSIDE & OUTSIDE CULVERT
NOT TO SCALE

FOOTNOTES:

1/ INTER-MIX STREAMBED MATERIAL AS DIRECTED BY USFS REPRESENTATIVE DURING PLACEMENT OF CHANNEL ROCK INSIDE THE CULVERT TO SEAL VOIDS THROUGHOUT THE SECTION.

2/ THE FINAL CHANNEL BOTTOM SHOULD BE A DENSE, WELL INTERLOCKED STREAMBED WITH LOW PERMEABILITY. COMPACT EACH LAYER AND FILL SURFACE VOIDS BY WASHING IN FINE MATERIAL. USE WATER PRESSURE TAMPING RODS, AND SIMILAR HAND OPERATED EQUIPMENT TO FORCE FINE MATERIAL INTO ALL SURFACE VOIDS.

3/ NATIVE MATERIAL MEETING GRADATION FOR THE SPECIFIED BED CLASS, AND CHANNEL ROCK MAY BE SALVAGED AND INCORPORATED INTO THE SIMULATED STREAMBED.

USDA
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REGION 1
NORTHERN REGION

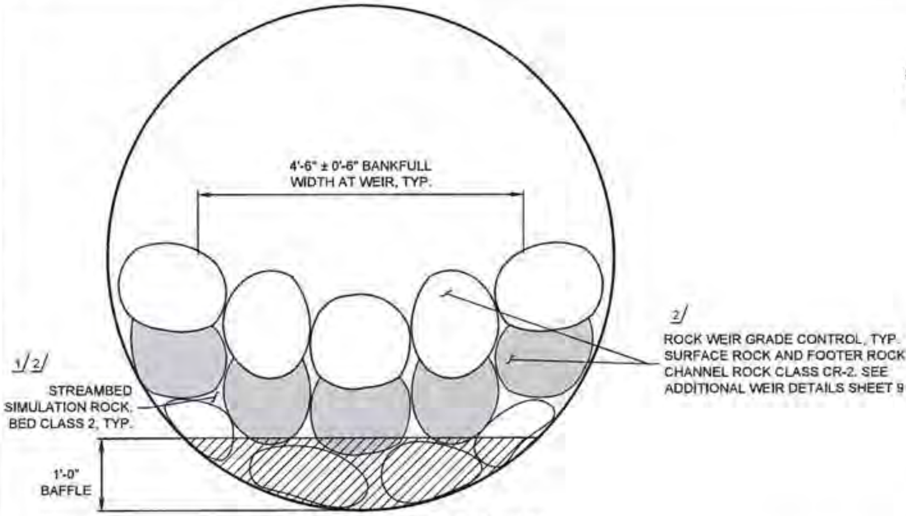
PROJECT NAME
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

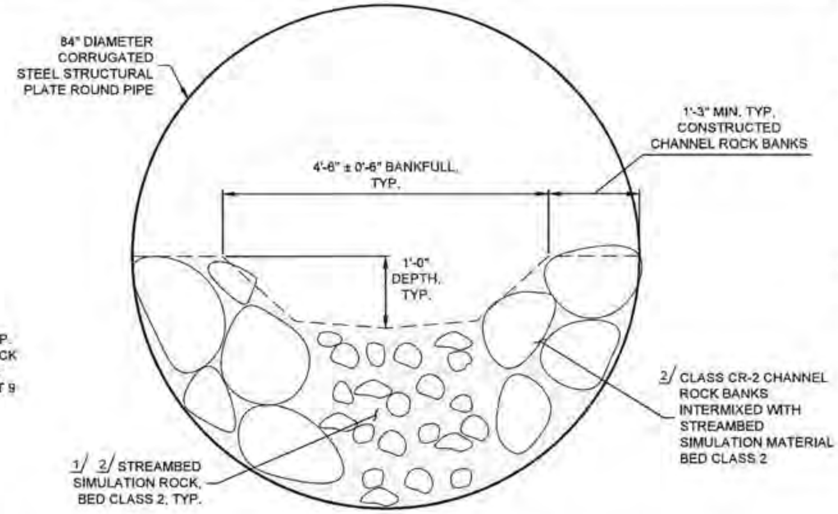
DRAWING TITLE
STREAM SIMULATION DETAILS

DATE NOV-24
ARCHIVE NO.
DESIGNER T.GRIGSBY
DRAWN T.GRIGSBY
CHECKED B.KAMRUD
PROJECT NO. 7489
DWG SHEET NO. 9
SHEET 9 OF 12

11/1/24 11:37 TESSA.GRIGSBY



3/10 TYPICAL ROCK WEIR SECTION
NOT TO SCALE



5/10 TYPICAL SECTION - INSIDE CULVERT
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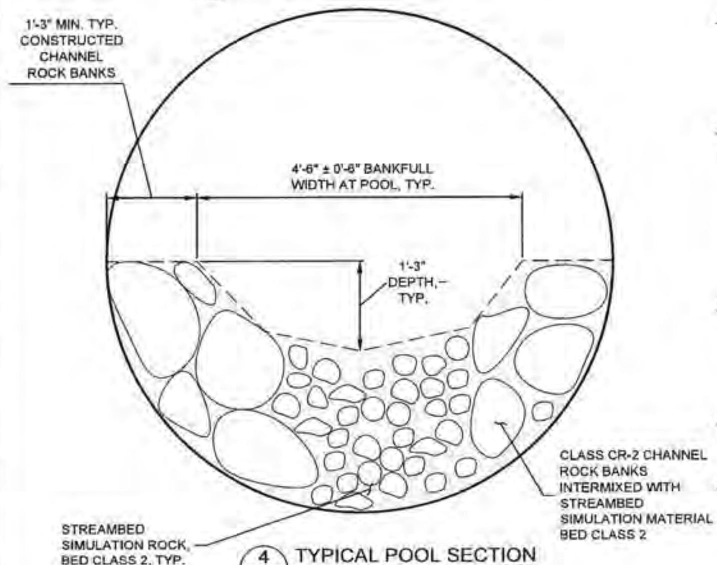


4/10 TYPICAL POOL SECTION
NOT TO SCALE

FOOTNOTES:

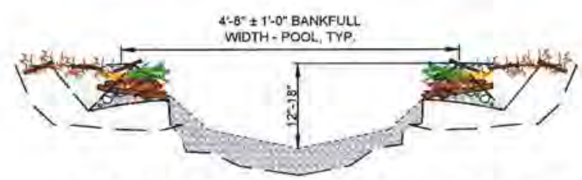
1/ INTER-MIX STREAMBED MATERIAL AS DIRECTED BY USFS REPRESENTATIVE DURING PLACEMENT OF CHANNEL ROCK BANK INSIDE THE CULVERT TO SEAL VOIDS THROUGHOUT THE SECTION.

2/ THE FINAL CHANNEL BOTTOM SHOULD BE A DENSE, WELL INTERLOCKED STREAMBED WITH LOW PERMEABILITY. COMPACT EACH LAYER AND FILL SURFACE VOIDS BY WASHING IN FINE MATERIAL. USE WATER PRESSURE, TAMPING RODS, AND SIMILAR HAND OPERATED EQUIPMENT TO FORCE FINE MATERIAL INTO ALL SURFACE VOIDS.

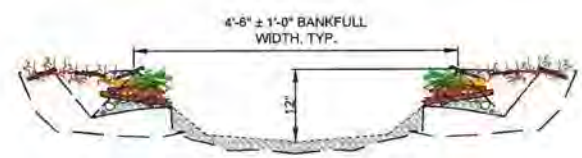
3/ NATIVE MATERIAL MEETING GRADATION FOR THE SPECIFIED BED CLASS, AND CHANNEL ROCK MAY BE SALVAGED AND INCORPORATED IN TO THE SIMULATED STREAMBED, BANKS, AND ROCK WEIRS.

4/ 1' TOLERANCE FOR POOL LENGTHS TO ACCOUNT FOR NATURAL VARIABILITY.

5/ INTER-MIX STREAMBED MATERIAL AS DIRECTED BY USFS REPRESENTATIVE DURING PLACEMENT OF ENGINEERED BANKS TO SEAL VOIDS THROUGHOUT THE SECTION.



1/10 TYPICAL POOL SECTION - OUTSIDE CULVERT
NOT TO SCALE



2/10 TYPICAL LOW FLOW CHANNEL SECTION - OUTSIDE CULVERT
NOT TO SCALE

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NORTHERN REGION

PROJECT NAME
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

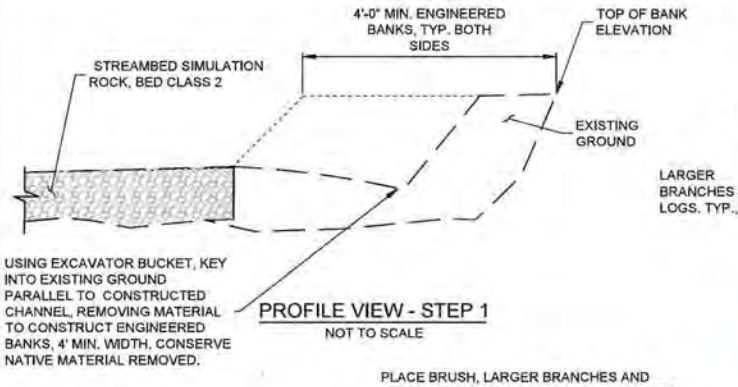
DRAWING TITLE
STREAM SIMULATION DETAILS

DATE
NOV-24

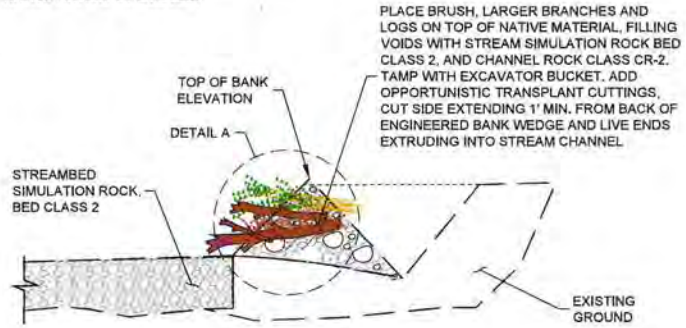
ARCHIVE NO.

DESIGNER T.GRIGSBY	DWG SHEET NO. 10
DRAWN T.GRIGSBY	
CHECKED B.KAMRUD	SHEET 10 OF 12
PROJECT NO. 7489	

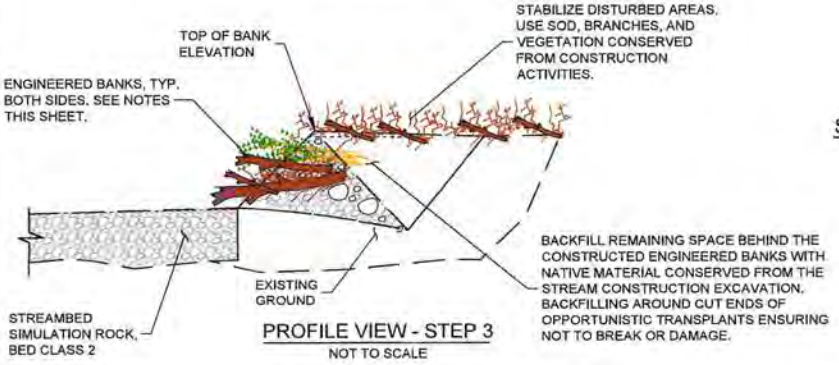
11/1/24 11:37 TESSA.GRIGSBY C:\DJA-PWWORK\DJA-PROD\DMS29\28617489 LEE CREEK TRIBUTARY AOP_DESIGN.DWG



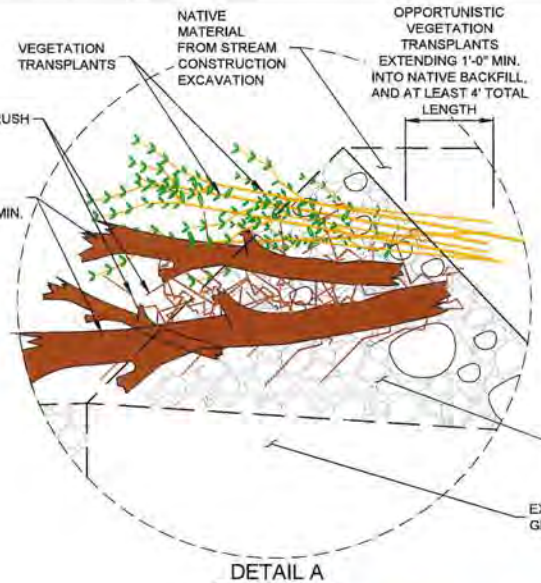
PROFILE VIEW - STEP 1
NOT TO SCALE



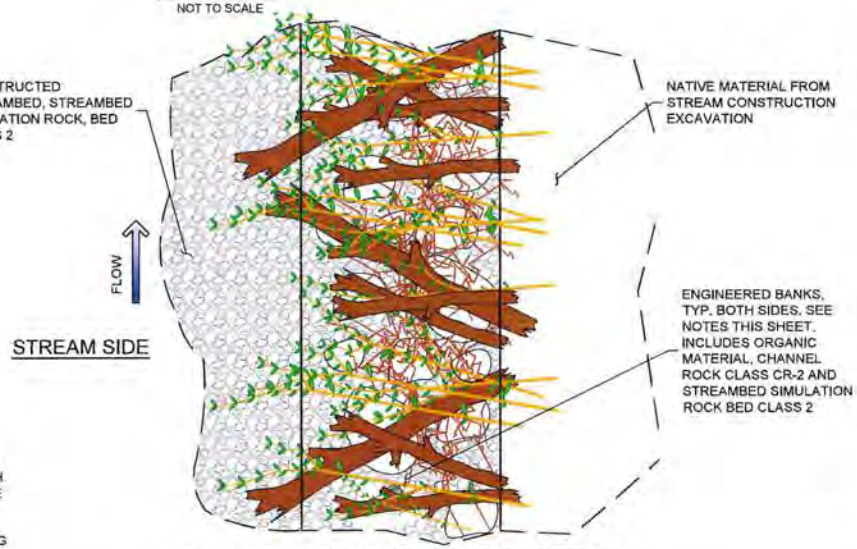
PROFILE VIEW - STEP 2
NOT TO SCALE



PROFILE VIEW - STEP 3
NOT TO SCALE



DETAIL A
NOT TO SCALE



PLAN VIEW - TYP. BOTH SIDES OF STREAM
NOT TO SCALE

ENGINEERED BANKS:

1. CONSTRUCT CHANNEL BED WITH STREAMBED SIMULATION ROCK BED CLASS 2.
2. PLACE LARGER BRANCHES AND LOGS, BRUSH, AND OPPORTUNISTIC TRANSPLANT CUTTINGS ON TOP OF BANK, LIVE LEAFY EDGES FACING IN TOWARDS THE CONSTRUCTED CHANNEL, CUT END OF OPPORTUNISTIC TRANSPLANT CUTTINGS EXTENDING OUTSIDE OF THE ENGINEERED BANK. USE MIX OF STREAMBED SIMULATION ROCK BED CLASS 2 AND CHANNEL ROCK CLASS CR-2 FOR ENGINEERED BANK CONSTRUCTION. SEE DETAIL A.
3. FILL IN REMAINING EXCAVATION BETWEEN ENGINEERED BANK AND EXISTING GROUND (WHERE CUT ENDS OF OPPORTUNISTIC TRANSPLANT CUTTINGS EXTEND) WITH NATIVE MATERIAL FROM THE STREAM CONSTRUCTION EXCAVATION.

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REGION 1
NORTHERN REGION

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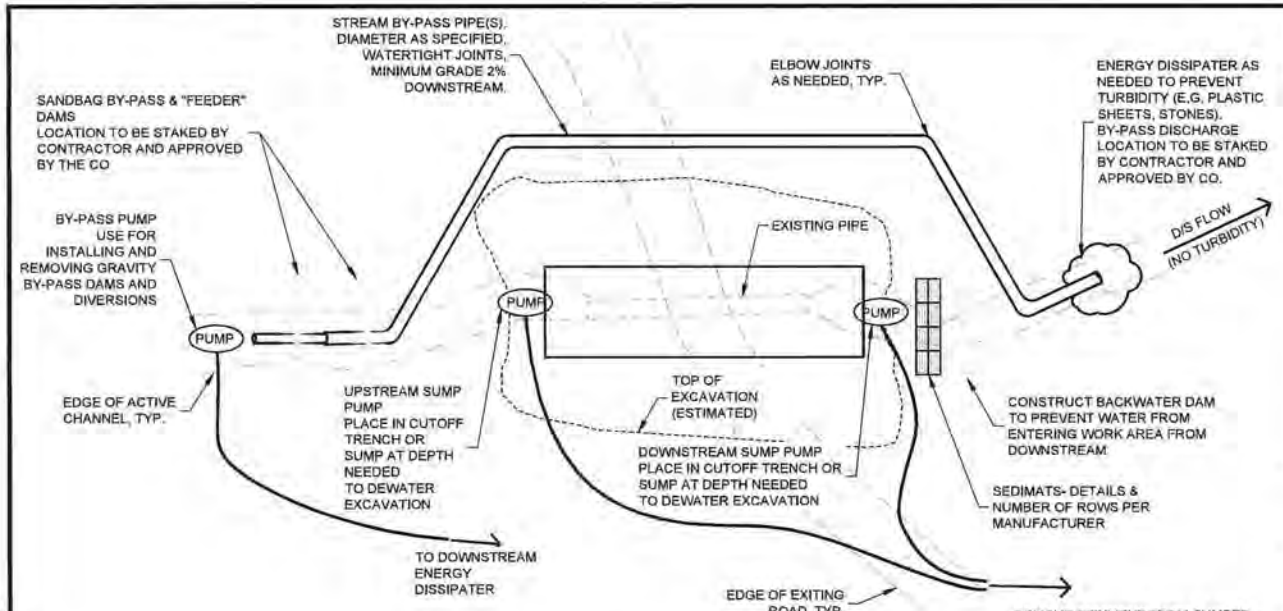
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
STREAM SIMULATION DETAILS

DATE	NOV-24
ARCHIVE NO.	
DESIGNER	T.GRIGSBY
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7489
DWG SHEET NO.	11
SHEET	11 OF 12

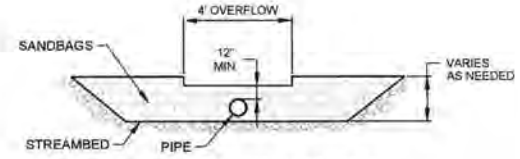
11/1/24 11:37 TESSA.GRIGSBY C:\DJA-PW\WORK\DJA-PROD\0035258\7489 LEE CREEK TRIBUTARY AOP_DESIGN.DWG



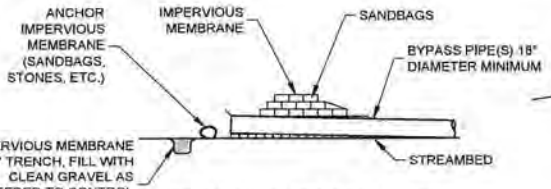
PLAN

NOTES:

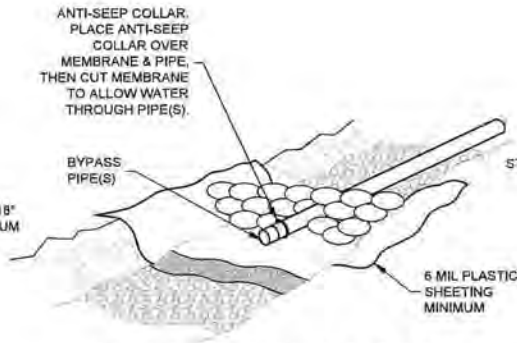
1. DEWATER EXCAVATIONS IN ACCORDANCE WITH FP-14 SECTIONS 208, 209 AND 157, AS APPLICABLE, AND THE REQUIREMENTS SHOWN. PROTECT AGAINST SOIL EROSION AND SEDIMENTATION DURING CONSTRUCTION IN ACCORDANCE WITH FP-14 SECTION 157 AND THE PROJECT PERMITS.
2. DEWATERING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. DEVELOP AND SUBMIT TO THE USFS REPRESENTATIVE A PROJECT-SPECIFIC DEWATERING PLAN FOR APPROVAL. AT A MINIMUM, THE DEWATERING PLAN MUST INCLUDE DRAWINGS AND A WRITTEN OUTLINE ILLUSTRATING AND DESCRIBING PROPOSED LAYOUT, METHODS, EQUIPMENT AND ANTICIPATED STREAM FLOW VOLUME. APPROVAL OF THE CONTRACTOR'S DEWATERING PLAN DOES NOT RELIEVE THE CONTRACTOR FROM COMPLETING THE WORK AS REQUIRED. IF THE CONTRACTOR'S METHODS ARE NOT PRODUCING ADEQUATE RESULTS, THE CONTRACTOR MUST STOP WORK IMMEDIATELY, RE-EVALUATE, AND SUBMIT A REVISED DEWATERING PLAN. DO NOT PROCEED WITH WORK UNTIL THE REVISED DEWATERING PLAN IS APPROVED BY THE USFS REPRESENTATIVE. RE-SUBMITTAL OF THE DEWATERING PLAN, IF REQUIRED, IS INCIDENTAL TO THE WORK.
3. THIS SHEET ILLUSTRATES THE GENERAL DEWATERING REQUIREMENTS AND POSSIBLE METHODS AND EQUIPMENT AND IS NOT CONSIDERED ADEQUATE OR COMPLETE FOR THIS PROJECT.
4. CONTRACTOR IS RESPONSIBLE FOR SIZING ALL PUMPS, DAMS, BYPASS PIPE, OPEN CHANNELS, AND ANY OTHER MEANS PROPOSED TO DIVERT THE STREAM FLOW.
5. ALL WORK IN THE VICINITY OF THE STREAM IS TO BE COMPLETED IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. STANDING OR RUNNING WATER IN THE WORK AREA DOES NOT RELIEVE THE CONTRACTOR FROM MEETING THE SPECIFICATIONS.
6. ALL OPEN CHANNEL DIVERSIONS MUST BE LINED WITH IMPERMEABLE MATERIAL.
7. WASH THE NEWLY CONSTRUCTION CHANNEL PRIOR TO RE-WATERING. THIS INCLUDES HOSING THE NEW CHANNEL AND PUMPING THE TURBID WASH WATER ONTO EITHER VEGETATED GROUND OR A SETTLING BASIN IN ACCORDANCE WITH THE APPROVED DEWATERING PLAN. RETURN THE STREAM FLOW TO THE NEWLY CONSTRUCTED CHANNEL SLOWLY AND IN A MANNER TO MINIMIZE SEDIMENTATION.



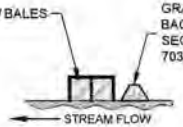
BYPASS DAM ELEVATION VIEW



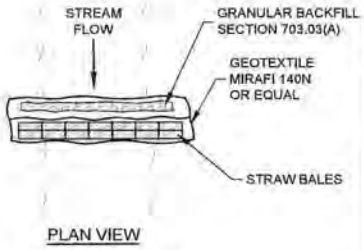
BYPASS DAM PROFILE VIEW



SANDBAG BYPASS DAM DETAILS



SECTION VIEW



PLAN VIEW

GEOTEXTILE-WRAPPED STRAW BALE SEDIMENT CONTROL WEIR

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REGION 1
NORTHERN REGION

PROJECT NAME
LEE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 699 MP 0.8 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
DEWATERING REQUIREMENTS

DATE: NOV-24
ARCHIVE NO.
DESIGNER: T.GRIGSBY
DRAWN: T.GRIGSBY
CHECKED: B.KAMRUD
PROJECT NO.: 7489
DWG SHEET NO.: 12
SHEET 12OF 12

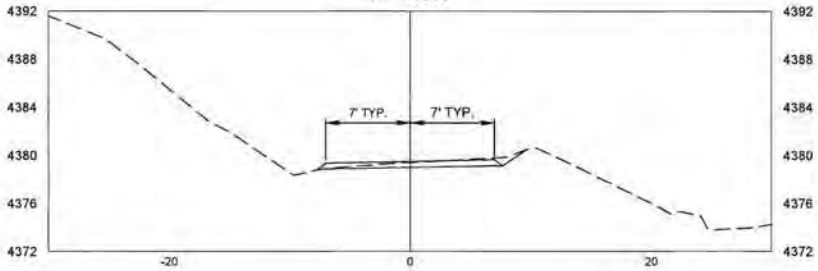
11/1/24 11:37 TESSA.GRIGSBY C:\DJA-PW\WORK\DJA-PROD\DN3252887\4B LEE CREEK TRIBUTARY AOP_DESIGN.DWG

LEE CREEK TRIBUTARY AOP CULVERT
RD 699 MP 0.8
ROAD CROSS SECTIONS

PREPARED BY DJ&A ENGINEERS PLANNERS SURVEYORS

Sheet XS01 OF XS03

12+20.00



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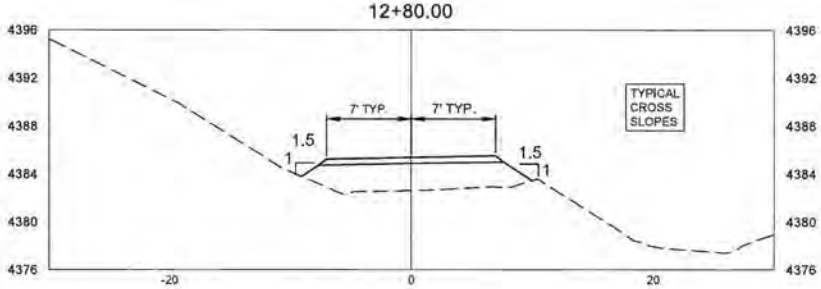

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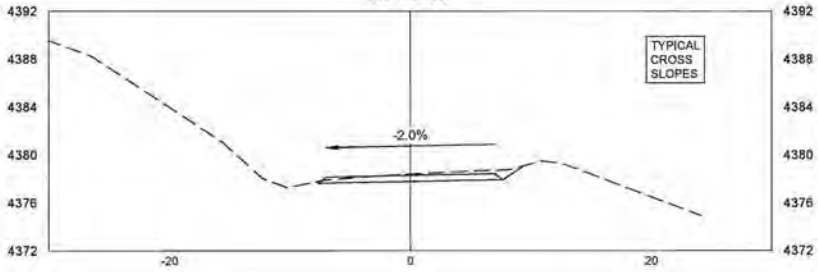

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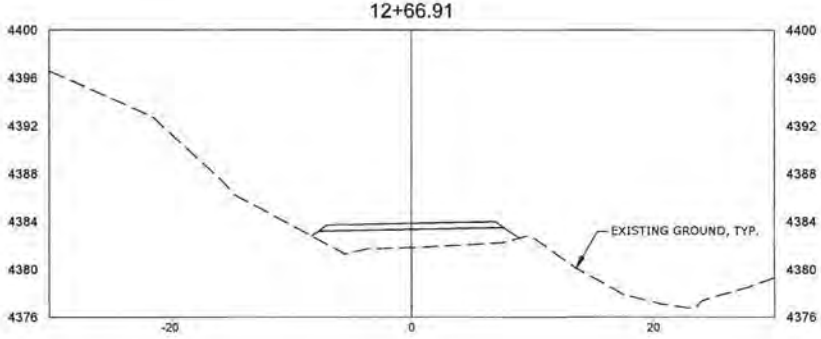

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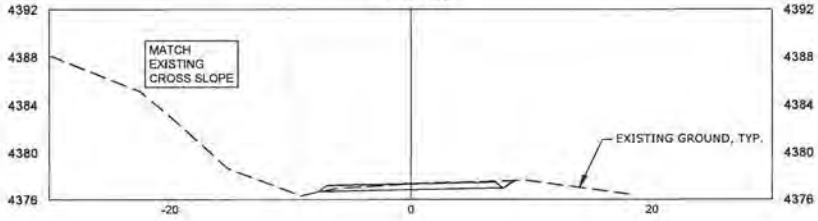

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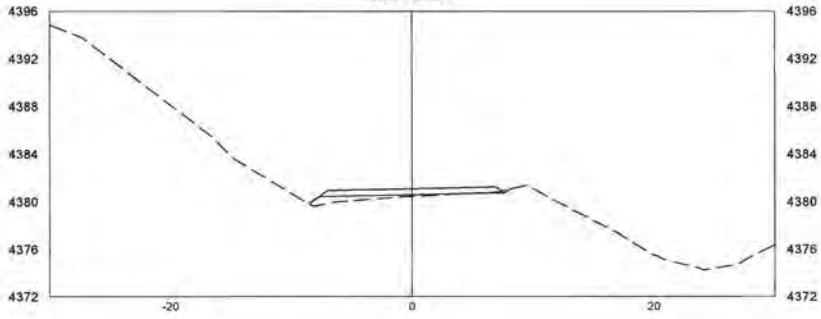


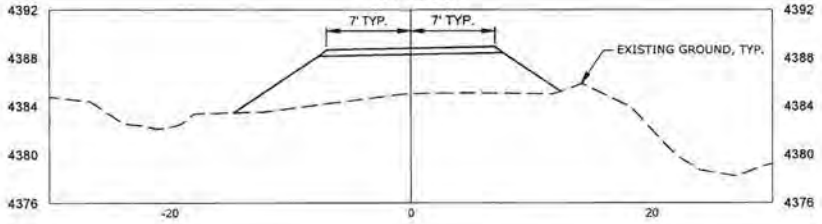
11/1/24 11:37 TESSA.GRIGSBY C:\DJA-PW\WORK\DJA-PROD\DMS25286-7469 LEE CREEK TRIBUTARY AOP_DESIGN.DWG

LEE CREEK TRIBUTARY AOP CULVERT
RD 699 MP 0.8
ROAD CROSS SECTIONS

PREPARED BY DJ&A ENGINEERS PLANNERS SURVEYORS

Sheet XS02 OF XS03

13+19.38



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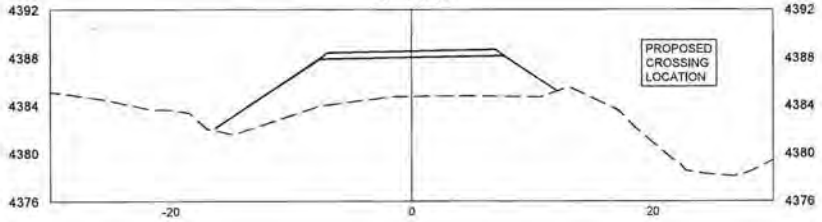

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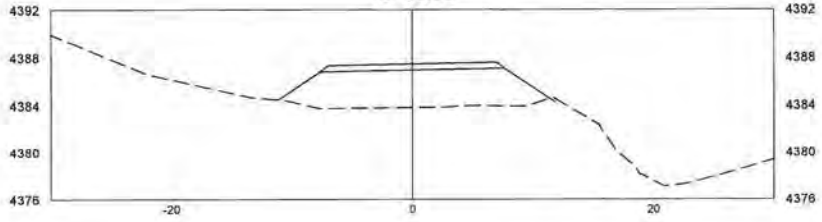

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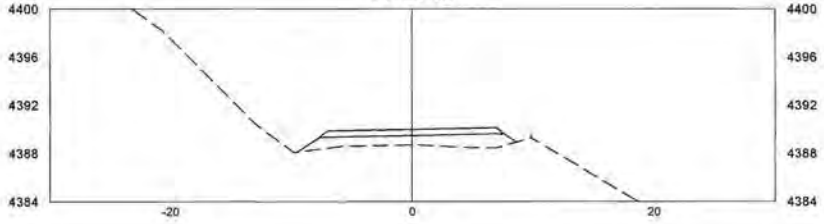

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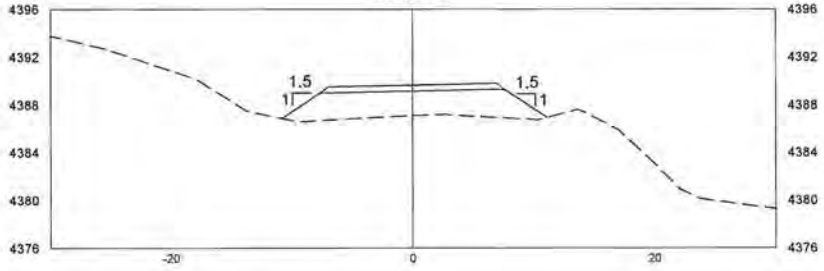

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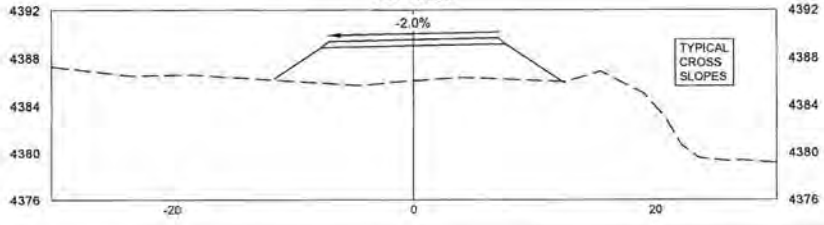
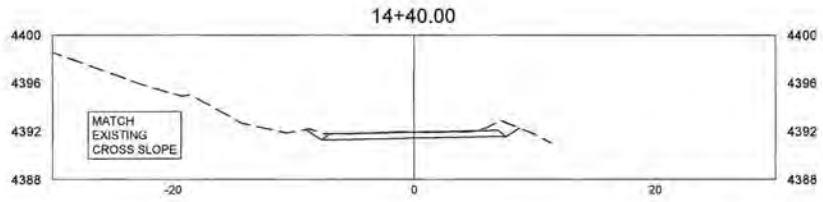


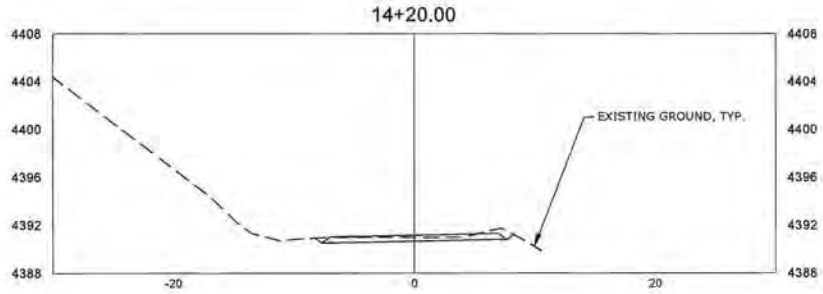
11/1/24 11:37 TESSA.GRIGSBY C:\DJA-PW\WORK\DJA-PROD\DM8252\8872489 LEE CREEK TRIBUTARY AOP_DESIGN.DWG

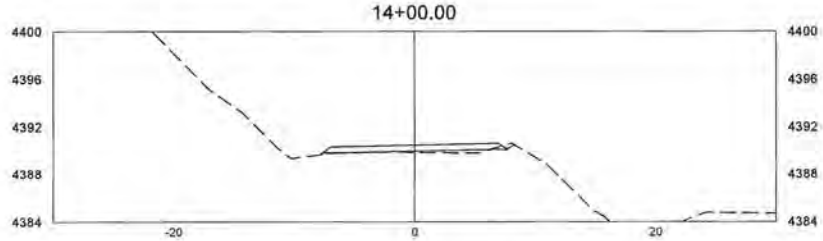
LEE CREEK TRIBUTARY AOP CULVERT
RD 699 MP 0.8
ROAD CROSS SECTIONS

PREPARED BY: DJ&A ENGINEERS PLANNERS SURVEYORS

Sheet XS03 OF XS03







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