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: 406-542-0359 ext. 203 E-mail: karen@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: Granite Creek Tributary AOP Project

River, stream, or lake: Granite Creek

Location: Township: 11N Range: 24W Section: 1

Latitude: 46.738209 Longitude: -114.566414 *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 Granite Cr. sub-watershed. Granite Cr. is an important tributary of Lolo Cr. which includes designated Bull Trout Critical Habitat. These streams support high densities of Westslope Cutthroat Trout and remnant Bull 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 in large tributary of Granite Cr. that is seasonally disconnected and reduce chronic stream sedimentation by upsizing from a 42in. x 24in. culvert to an 11ft. bottomless arch.

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

In 2009, the Lolo National Forest acquired more than 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 restoration and enhancement opportunities in the basin.

The proposed collaborative project would take place on Granite 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 these and other coldwater species.

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, and installing large wood jams on the Montana Legacy Project lands. Since 2006, road decommissioning and other road treatments have 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, ten culverts have been converted to bottomless arches or bridges for enhanced fish passage, and dozens of large wood jams have been installed.

Last year the Clark Fork Coalition and Forest Service upgraded an additional 8 fish-bearing stream crossings in Granite Creek. However, one tributary with a 24in. x 42in. squashed culvert was too large and contains too much fish habitat for a simple stream simulation culvert upgrade. It was determined that a designed AOP was needed for this stream crossing.

For this project, the engineering firm, D,J, and A Engineering was hired to design a aquatic organism passage (AOP) culvert for the 7ft. bankful stream crossing. They designed an 11ft. bottomless arch culvert that would allow for fish passage and withstand a 100-year flood event. The installation of this crossing will make the Granite Creek Road (FS 9942) completely passible to fish and other aquatic organisms year-round. Timberland Excavation was hired to implement this project and construction is slated for this summer.

At the completion of this project, the entire Granite Creek Road (FS 9942) 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.

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

The construction of Granite Creek Road (FS 9942) seasonally disconnects a large fish-bearing tributary of Granite Creek. Upsizing this culvert 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 Granite Cr. tributary

Length/size of impact, if larger than project extent (e.g., stream miles opened): 2 stream mi. opened

F. Project Budget Summary:

Grant Request (Dollars):	**$**	**63,170**
Matching Dollars:	**$**	**136,428**
Matching In-Kind Services:*	**$**	**0**

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

Other Contributions (not part of this app)	**$**	
Total Project Cost:	**$**	**199,598**

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, and A Engineering has surveyed the proposed stream crossing for fish passage. The proposed AOP upgrade was found to be a seasonal barrier 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 bottomless arch 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 this seasonal fish barrier. Additionally, sediment produced on Granite Creek Road is chronically delivering sediment at the stream crossing. The culvert will be upsized from a 24in x 42in. culvert to an 11 ft. bottomless arch. 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 Granite Creek watershed. Additionally, 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 Granite 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: 5/7/24

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 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* **								
Survey and permitting (Forest Service)	1	lump sum	$ 4,000.00	$ 4,000.00		$ 4,000.00		$ 4,000.00
Culvert design (DJ and A engineering)	1	lump sum	$ 26,634.00	$ 26,634.00		$ 26,634.00		$ 26,634.00
CFC Project Management (coordination, oversight, and outreach)	200	hours	$ 50.00	$ 10,000.00		$ 10,000.00		$ 10,000.00
				$ -		$ -		$ -
			Sub-Total	$ 40,634.00	$ -	$ 40,634.00	$ -	$ 40,634.00
Travel								
Mileage	2000	miles	$0.670	$ 1,340.00				$ -
Per diem				$ -				$ -
			Sub-Total	$ 1,340.00	$ -	$ 1,340.00	$ -	$ 1,340.00
Construction Materials** **								
Bottomless arch culvert	1	each	$ 28,145.00	$ 28,145.00		28,145.00		$ 28,145.00
Precast concrete member, culvert footing	114	linear foot	$ 478.00	$ 54,492.00		$ 54,492.00		$ 54,492.00
Native seed	1	each	$ 50.00	$ 50.00		$ 50.00		$ 50.00
				$ -				$ -
				$ -				$ -
			Sub-Total	$ 82,687.00	$ -	$ 82,687.00	$ -	$ 82,687.00
Equipment, Labor, and Mobilization								
Mobilization and Demobilization	1	lump sum	$ 11,660.00	$ 11,660.00	$ 11,660.00			$ 11,660.00
Construction survey and staking	1	lump sum	$ 6,592.00	$ 6,592.00	$ 6,592.00			$ 6,592.00
Soil erosion and pollution control	1	lump sum	$ 3,935.00	$ 3,935.00	$ 3,935.00			$ 3,935.00
Clearing and grubbing	1	lump sum	$ 700.00	$ 700.00	$ 700.00			$ 700.00
Removal of existing corregated steel pipe	1	each	$ 313.00	$ 313.00	$ 313.00			$ 313.00
Borrow excavation	180	cubic yards	$ 49.00	$ 8,820.00	$ 8,820.00			$ 8,820.00
Drainage excavation	2	each	$ 350.00	$ 700.00	$ 700.00			$ 700.00
Large Woody Debris Structure	150	cubic yards	$ 60.00	$ 9,000.00	$ 9,000.00			$ 9,000.00
Structure excavation	1	lump sum	$ 7,103.00	$ 7,103.00	$ 7,103.00			$ 7,103.00
Placed riprap, class 2	15	cubic yards	$ 179.00	$ 2,685.00	$ 2,685.00			$ 2,685.00
Geocell footing stabilization	66	square yard	$ 63.00	$ 4,158.00	$ 4,158.00			$ 4,158.00
Install corregated steel structural plate arch	56	linear foot	$ 134.00	$ 7,504.00	$ 7,504.00			$ 7,504.00
Remove and reset gate	1	each	$ 875.00	$ 875.00		$ 875.00		$ 875.00
Equipment rental, large dump truck	16	hours	$ 110.00	$ 1,760.00		$ 1,760.00		$ 1,760.00
Equipment rental, hydrologic excavator with thumb	16	hours	$ 175.00	$ 2,800.00		$ 2,800.00		$ 2,800.00
Streambed simulation material	45	cubic yards	$ 39.21	$ 1,764.45		$ 1,764.45		$ 1,764.45
Channel rock for culvert banks, engineerede banks , and riffles	20	cubic yards	$ 65.75	$ 1,315.00		$ 1,315.00		$ 1,315.00
Channel rock for rock weirs	10	cubic yards	$ 177.50	$ 1,775.00		$ 1,775.00		$ 1,775.00
slash filter windrow	307	linear foot	$ 4.00	$ 1,228.00		$ 1,228.00		$ 1,228.00
Weed treatment (2 applications)	1	lump sum	$ 250.00	$ 250.00		$ 250.00		$ 250.00
				$ -				
			Sub-Total	$ 74,937.45	$ 63,170.00	$ 11,767.45	$ -	$ 74,937.45
			TOTALS	$ 199,598.45	$ 63,170.00	$ 136,428.45	$ -	$ 199,598.45

OTHER REQUIREMENTS:

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)

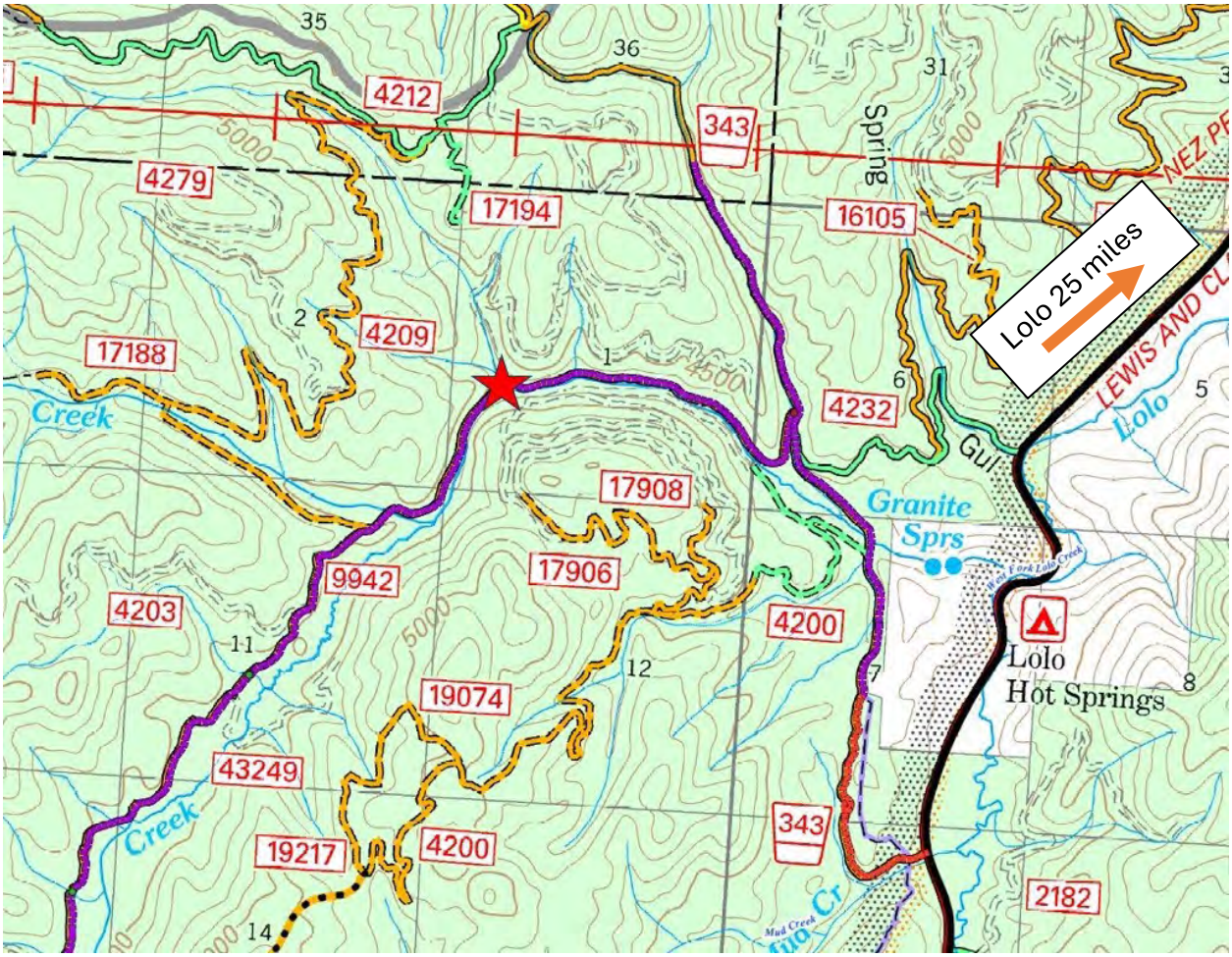
CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Forest Service	$ -	$ 91,428.00	$ 91,428.00	yes
MT DEQ	$ -	$ 45,000.00	$ 45,000.00	yes
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ 136,428.00	$ 136,428.00	

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ -	$ -	

Granite Creek Tributary AOP – Map



Granite Creek Tributary AOP – Photos

Figure 1: 42 inch x 24 inch culvert outlet.

Figure 2: Unnamed 7ft. bankful tributary of Granite Creek downstream of Granite Creek Road.

MONTANA FISH, WILDLIFE & PARKS

Future Fisheries Improvement Program

Appendix: FWP Statement

Project Title: Upper Granite Creek Culvert Replacement - 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 an existing, undersized culvert on US Forest Service ownership that complements a series of other projects in the upper Granite Creek watershed over the past several years (see application for description). The proposed project site lies near the mouth of a small, unnamed tributary in the lower portion of Granite Creek.

Granite Creek is a cold-water system in the upper portion of the Lolo Creek Basin that predominantly supports westslope cutthroat trout and brook trout. The drainage historically contained an abundant bull trout population, but the density and distribution of this species has declined over the past decade in Granite Creek. Granite Creek and greater Lolo Creek 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 were 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 William Ladd Knotek Date: 5-6-24

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

5/2/2024

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 Granite Creek Tributaries AOP Project. 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 Granite Creek, an important remnant bull trout and westslope cutthroat trout fishery. The Granite Creek road (FS 9942) disconnects this fish-bearing tributaries. Replacing this undersized 24in. x 42in. culvert with an 11ft. bottomless arch culvert 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 installing large wood jams, decommissioning 30 miles of roads and stream crossings in the upper Lolo Creek watershed, 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.

The Lolo National Forest continues to provide funding to these efforts, when possible, including a contribution of $93,733 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 the Granite Creek Tributaries AOP Project. Funds from the Future Fisheries Improvement Program are essential to completing on-the-ground reclamation 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

CLARK FORK COALITION

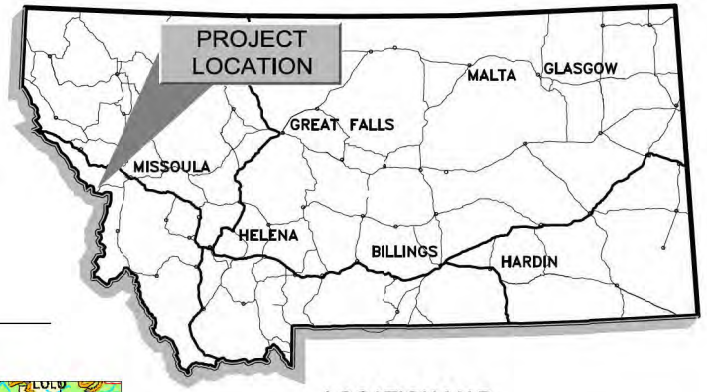
FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE, REGION 1

CONSTRUCTION PLANS FOR:

GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT

USFS RD 9422 MP 1.20
MISSOULA RANGER DISTRICT
LOLO NATIONAL FOREST
MISSOULA COUNTY, MONTANA

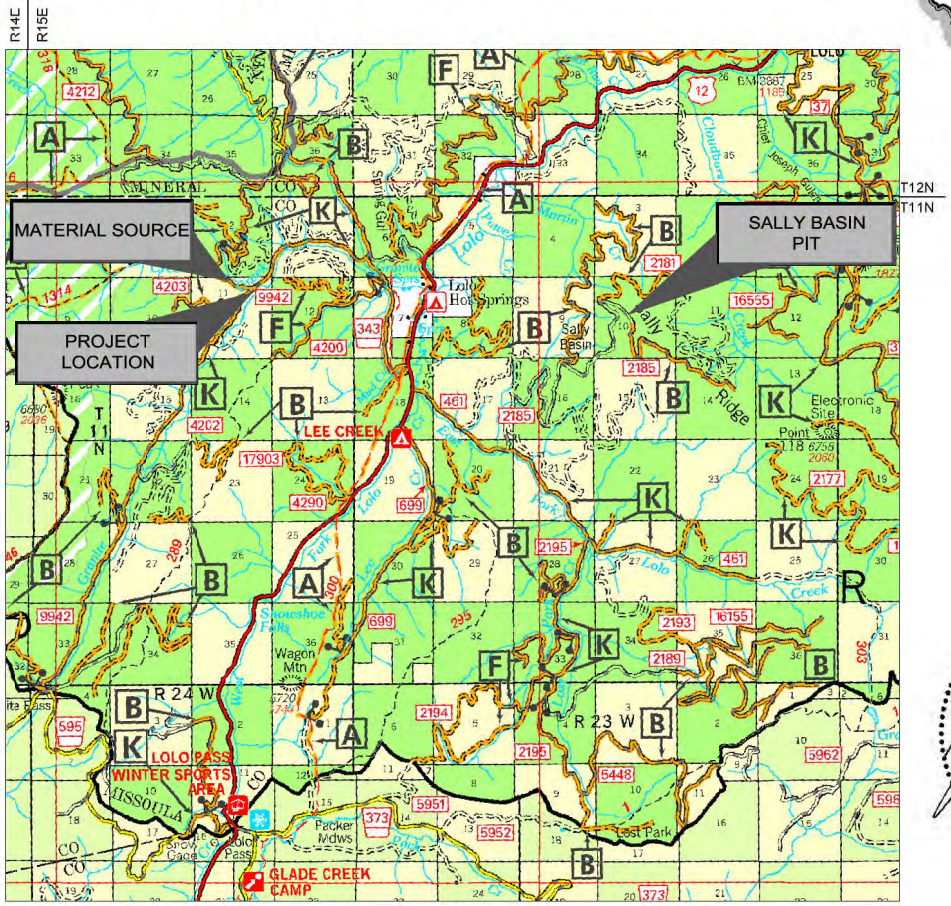


LOCATION MAP

INDEX TO SHEETS

MATERIAL SOURCES

GOVERNMENT SOURCE
UNCLASSIFIED BORROW
CULVERT BACKFILL
RIPRAP
GEOCELL GRANULAR BACKFILL
COMMERCIAL SOURCE - OPTIONAL GOVERNMENT SOURCE MAY BE USED WITH APPROVAL OF USFS REPRESENTATIVE
STREAMBED SIMULATION ROCK
CHANNEL ROCK



VICINITY MAP

APPROVED:

CAROLYN UPTON — Digitally signed by CAROLYN UPTON Date: 2024.03.29 15:20:33 -06'00'

FOREST SUPERVISOR
LOLO NATIONAL FOREST — DATE

PATRICK O CONNOR — Digitally signed by PATRICK O CONNOR Date: 2024.03.29 09:09:30 -06'00'

DISTRICT RANGER
MISSOULA RANGER DISTRICT — DATE

NATHAN KEGEL — Digitally signed by NATHAN KEGEL Date: 2024.03.12 08:37:46 -06'00'

FOREST ENGINEER
LOLO NATIONAL FOREST — DATE

ENGINEERS
PLANNERS
SURVEYORS

SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	ITEM DESCRIPTION	MEASUREMENT METHOD	MEASUREMENT UNIT	QTY	COMMENTS
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. STUMPS TO BE BURIED CR 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	180	GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM PIT ADJACENT TO SITE, 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	2	
20803	CULVERT BACKFILL	CQ	CUBIC YARD	150	GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM SALLY BASIN PIT OR PIT ADJACENT TO SITE, WITH APPROVAL FROM USFS REPRESENTATIVE. MATERIAL MEETING FP-14 SUBSECTION 703.06
20806	STRUCTURE EXCAVATION	LSQ	LUMP SUM	ALL	
25101	PLACED RIPRAP, CLASS 2	CQ	CUBIC YARD	15	GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM SALLY BASIN PIT AND PIT ADJACENT TO SITE, WITH APPROVAL FROM USFS REPRESENTATIVE. MATERIAL MEETING FP-14 SUBSECTION 705.02
27201	GEOCELL FOOTING STABILIZATION, 6" DEPTH	CQ	SQUARE YARD	66	INCLUDES PIT RUN AGGREGATE BACKFILL MATERIAL MEETING FP-14 SUBSECTION 703.06. GOVERNMENT FURNISHED. POTENTIAL MATERIAL FROM SALLY BASIN PIT AND PIT ADJACENT TO SITE, WITH APPROVAL FROM USFS REPRESENTATIVE.
55217	PRECAST CONCRETE MEMBER, CULVERT FOOTING	CQ	LINEAR FOOT	114	
60303	11'-0" SPAN X 3'-6" RISE CORRUGATED STEEL STRUCTURAL PLATE ARCH, 0.140" THICKNESS	CQ	LINEAR FOOT	56	PAY ITEM INCLUDES INSTALLATION OF STRUCTURE ONLY. STRUCTURE TO BE FURNISHED BY THE CLARK FORK COALITION.
61903	REMOVE AND RESET GATE	CQ	EACH	1	IF EXISTING GATE NEEDS TO BE REPLACED, NEW GATE TO BE GOVERNMENT FURNISHED.
62201A	EQUIPMENT RENTAL, LARGE DUMP TRUCK	CQ	HOUR	16	FOR WORK PERFORMED TO CONSTRUCT ENGINEERED BANKS OUTSIDE OF CULVERT. WORK TO EE DONE AT DIRECTION OF FOREST SERVICE REPRESENTATIVE. STREAMBED SIMULATION ROCK BED CLASS 2 AND CHANNEL ROCK CLASS CR-1 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 EE DONE AT DIRECTION OF FOREST SERVICE REPRESENTATIVE. STREAMBED SIMULATION ROCK BED CLASS 2 AND CHANNEL ROCK CLASS CR-1 QUANTITIES INCLUDED IN ITEMS 64801 AND 64803A.
64801	STREAMBED SIMULATION MATERIAL BED CLASS 2	CQ	CUBIC YARD	45	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 ADJACENT TO SITE, WITH APPROVAL OF USFS REPRESENTATIVE
64803A	CHANNEL ROCK FOR CULVERT BANKS, ENGINEERED BANKS & RIFFLES, CLASS CR-1	CQ	CUBIC YARD	20	COMMERCIAL SOURCE. MATERIAL FROM THE EXCAVATION MEETING THE GRADATION FOR CHANNEL ROCK, CLASS CR-1 MAY BE USED. POTENTIAL GOVERNMENT SOURCE MATERIAL FROM SALLY BASIN PIT OR PIT ADJACENT TO SITE, WITH APPROVAL OF USFS REPRESENTATIVE
64803B	CHANNEL ROCK FOR ROCK WEIRS, CLASS CR-2	CQ	CUBIC YARD	10	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 ADJACENT TO SITE, WITH APPROVAL OF USFS REPRESENTATIVE
67050	SLASH FILTER WINDROW	AQ	LINEAR FOOT	307	SEE SHEET 3. GOVERNMENT SOURCE WITHIN 5 MILES OF PROJECT SITE. MATERIAL CONSERVED FROM SITE CLEARING AND GRUBBING MAY BE USED.

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 53.4 CFS WITH A HEADWATER DEPTH TO CULVERT RISE RATIO LESS THAN 0.8. THE 2-YEAR RECURRENCE INTERVAL (Q2) FLOW IS 10.6 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.

CONCRETE: USE CLASS A(AE) CONCRETE FOR PRECAST MEMBERS. THE REQUIRED 28-DAY COMPRESSIVE STRENGTH (F'C) IS 4,500 PSI WITH AN ENTRAINED AIR CONTENT OF 5% ± 1%. FINISH ALL PRECAST ELEMENTS WITH AN ORDINARY SURFACE FINISH. MAKE ALL CONCRETE IN ACCORDANCE WITH AN APPROVED MIX DESIGN. CHAMFER ALL EXPOSED EDGES OF CONCRETE 3/4" AND FILLET ALL ACUTE ANGLES 3" UNLESS OTHERWISE NOTED.

REINFORCING STEEL: USE REINFORCING STEEL OF THE DEFORMED TYPE CONFORMING TO AASHTO M31 (ASTM A615) GRADE 60. CONCRETE COVER IS AS SHOWN; WHERE NOT SHOWN IT MUST CONFORM TO AASHTO. CUT AND BEND REINFORCING STEEL IN CONFORMANCE WITH ACI 315. LAP SPLICE BARS 2' MIN.

HARDWARE AND STRUCTURAL STEEL: USE SHAPES, PLATES AND BARS MEETING THE REQUIREMENTS OF ASTM A36, UNLESS OTHERWISE SPECIFIED IN THESE PLANS. USE HARDWARE MEETING THE REQUIREMENTS OF ASTM A325, EXCEPT AS NOTED IN THE DRAWINGS.

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.

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REGION 1
NORTHERN REGION

PROJECT NAME
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
SCHEDULE OF QUANTITIES AND GENERAL NOTES

DATE: FEB-24
ARCHIVE NO.
DESIGNER: T.GRIGSBY
DRAWN: T.GRIGSBY
CHECKED: B.KAMRUD
PROJECT NO.: 7444
DWG SHEET NO.: 2
SHEET 2 OF 17

2/28/24 11:45 TE82A.GRIGSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;

LEGEND

EXISTING FEATURES

- EXISTING EDGE OF ROAD
- EXISTING EDGE OF SHOULDER
- EXISTING CULVERT
- 1010 MAJOR CONTOUR (5')
- MINOR CONTOUR (1')
- CONTROL POINT
- EDGE OF WATER

CENTERLINE POINTS

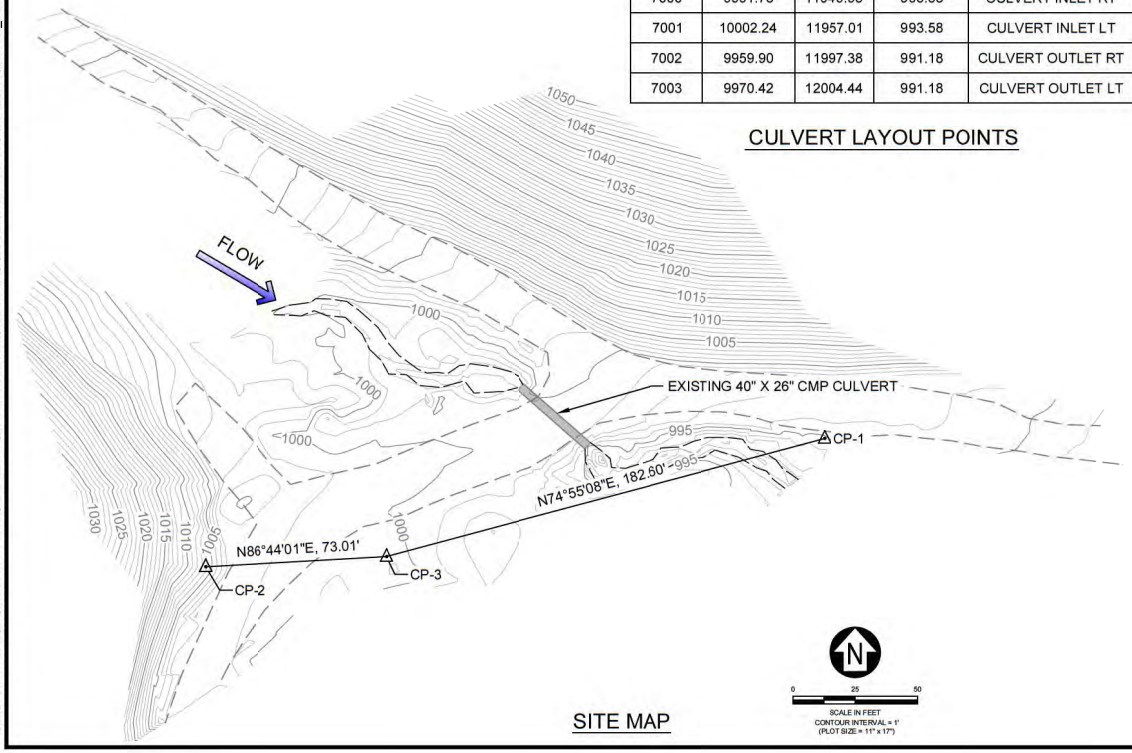
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
6000	10043.14	11944.61	1004.00	SPUR RD-CL BP STA 20+00
6001	10034.62	11961.27	1003.31	SPUR RD-CL PC STA 20+18.71
6002	10034.03	11962.42	1003.26	SPUR RD-CL STA 20+20
6003	10023.52	11979.41	1002.52	SPUR RD-CL STA 20+40
6004	10010.68	11994.72	1001.80	SPUR RD-CL STA 20+60
6005	10002.96	12002.10	1001.42	SPUR RD-CL PT STA 20+70.68
6006	9995.98	12008.28	1001.06	SPUR RD-CL STA 20+80
6007	9993.60	12010.38	1000.92	SPUR RD-CL EP STA 20+83.17

SPUR ROAD CENTERLINE LAYOUT POINTS

CULVERT LAYOUT POINT TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
7000	9991.73	11949.95	993.58	CULVERT INLET RT
7001	10002.24	11957.01	993.58	CULVERT INLET LT
7002	9959.90	11997.38	991.18	CULVERT OUTLET RT
7003	9970.42	12004.44	991.18	CULVERT OUTLET LT

CULVERT LAYOUT POINTS



SITE MAP

N

0 25 50

SCALE IN FEET
CONTOUR INTERVAL = 1'
(PLOT SIZE = 11" x 17")

CENTERLINE POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
5001	9898.74	11857.43	1001.15	RD-CL BP STA 10+20
5002	9899.88	11858.12	1001.14	RD-CL PC STA 10+21.34
5003	9915.17	11868.81	1000.96	RD-CL STA 10+40
5004	9917.29	11881.23	1000.56	RD-CL STA 10+50
5005	9929.81	11882.40	1001.10	RD-CL STA 10+60
5006	9942.37	11897.95	1001.27	RD-CL STA 10+80
5007	9950.17	11910.50	1001.50	RD-CL PT STA 10+94.78
5008	9952.68	11915.07	1001.60	RD-CL STA 11+00
5009	9962.32	11932.60	1002.03	RD-CL STA 11+20
5010	9971.95	11950.12	1002.30	RD-CL STA 11+40
5011	9972.17	11950.51	1002.30	RD-CL PC STA 11+40.44
5012	9980.74	11968.08	1002.24	RD-CL STA 11+60
5013	9983.19	11974.04	1002.15	RD-CL CULVERT-CL STA 11+66.45
5014	9987.70	11988.82	1001.84	RD-CL STA 11+80
5015	9992.77	12006.16	1001.13	RD-CL STA 12+00
5016	9995.89	12025.91	1000.12	RD-CL STA 12+20
5017	9997.03	12045.86	999.10	RD-CL STA 12+40
5018	9996.18	12065.84	998.21	RD-CL STA 12+60
5019	9994.09	12081.66	997.61	RD-CL PT STA 12+75.96
5020	9993.40	12085.64	997.47	RD-CL STA 12+80
5021	9989.98	12105.34	996.88	RD-CL STA 13+00
5022	9986.57	12125.05	996.41	RD-CL STA 13+20
5023	9983.16	12144.76	995.98	RD-CL EP STA 13+40

NEW ROAD CENTERLINE LAYOUT POINTS

CONTROL POINT TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1	9974.92	12095.00	998.09	NAIL
CP-2	9923.25	11845.80	1004.64	NAIL
CP-3	9927.41	11918.69	1002.27	REBAR

SURVEY CONTROL POINTS

CONTROL POINTS SET BY USFS

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REGION 1
NORTHERN REGION

PROJECT NAME

GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE

PROJECT CONTROL

DATE
FEB-24

ARCHIVE NO.

DESIGNER
T.GRIGSBY

DRAWN
T.GRIGSBY

CHECKED
B.KAMRUD

PROJECT NO.
7444

DWG SHEET NO.
3

SHEET 3 OF 17

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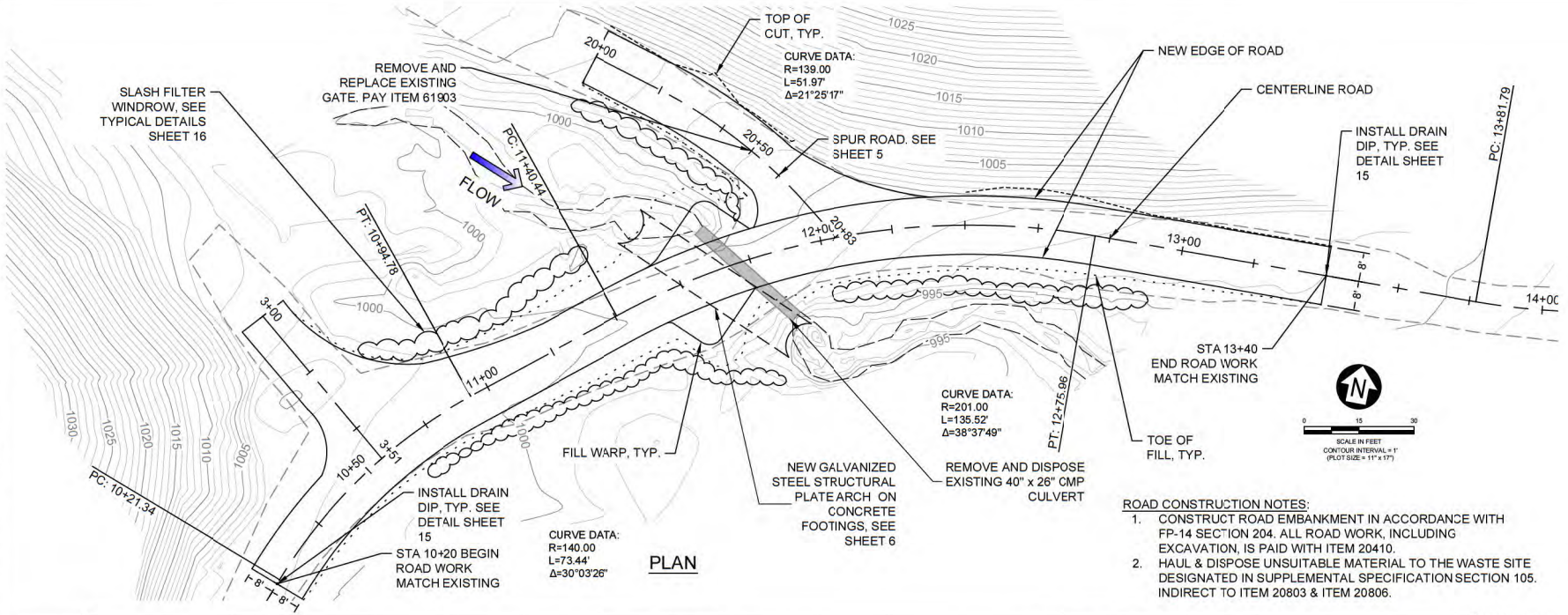
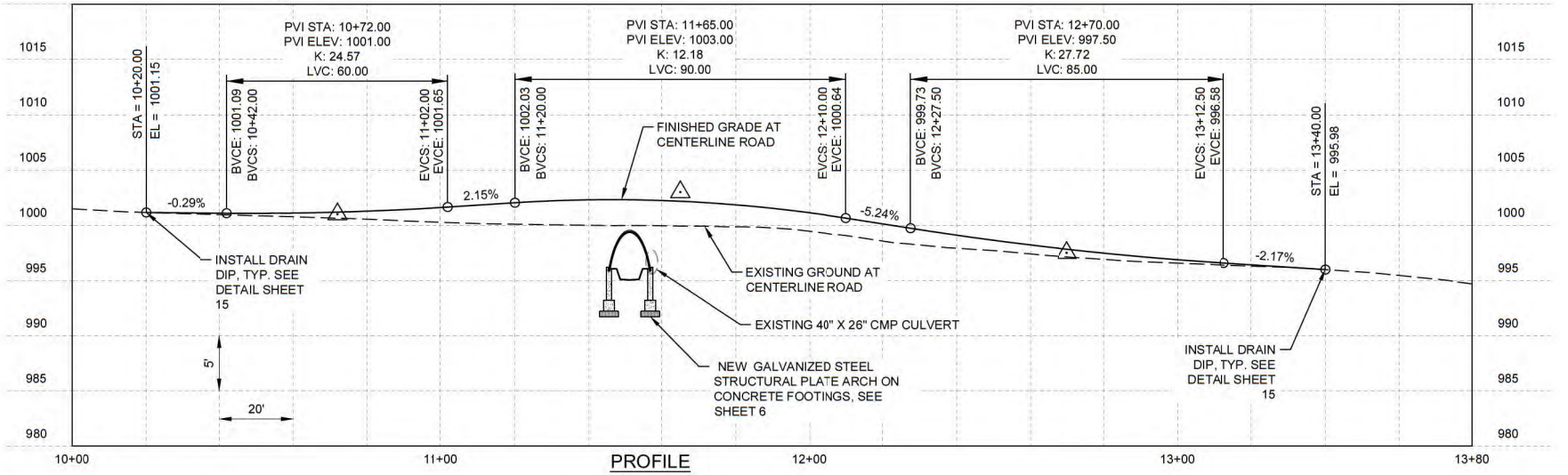


ROAD CONSTRUCTION NOTES:

1. CONSTRUCT ROAD EMBANKMENT IN ACCORDANCE WITH FP-14 SECTION 204. ALL ROAD WORK, INCLUDING EXCAVATION, IS PAID WITH ITEM 20410.
2. HAUL & DISPOSE UNSUITABLE MATERIAL TO THE WASTE SITE DESIGNATED IN SUPPLEMENTAL SPECIFICATION SECTION 105. INDIRECT TO ITEM 20803 & ITEM 20806.



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NORTHERN REGION

PROJECT NAME

GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

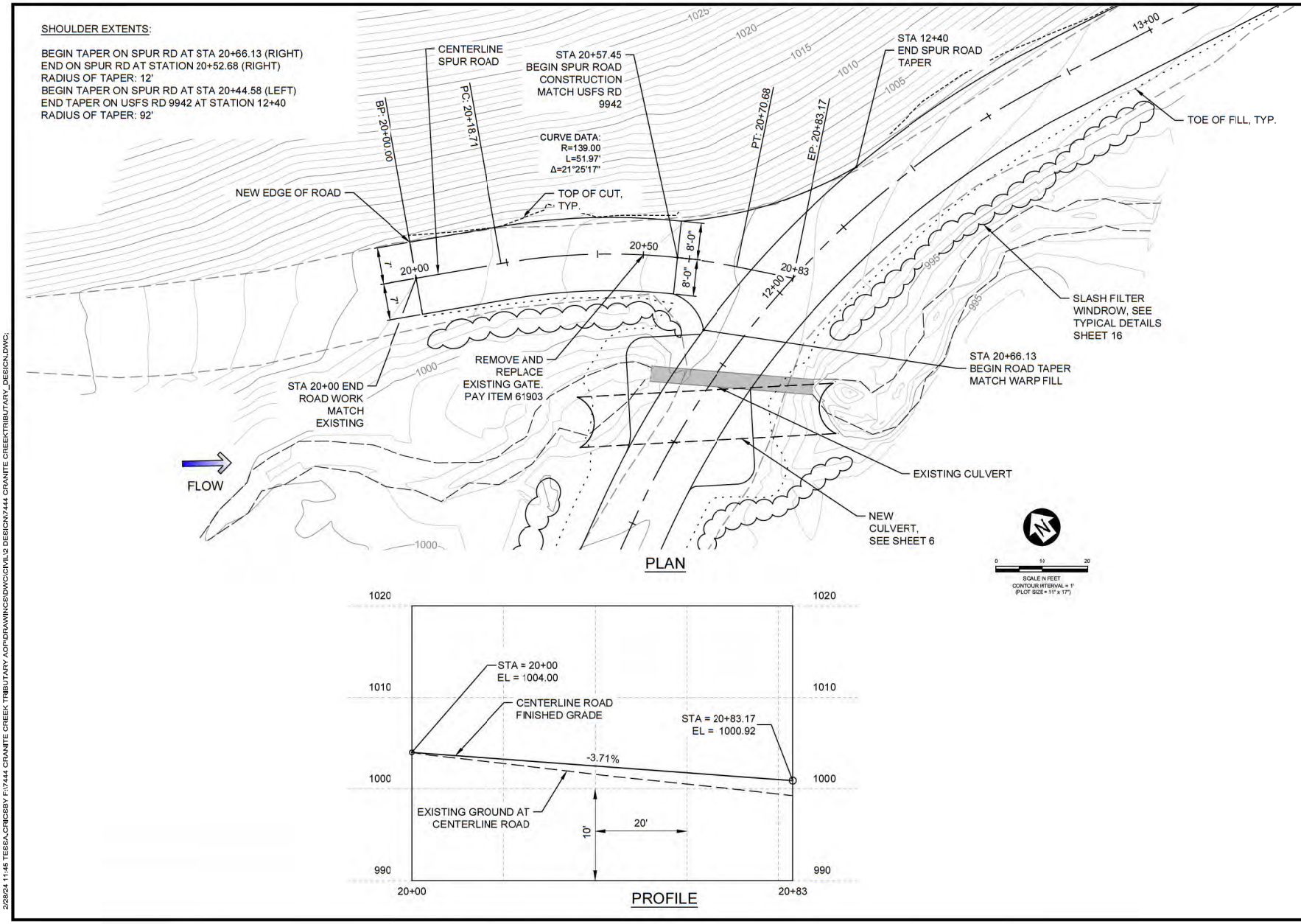
DRAWING TITLE

ROAD PLAN & PROFILE

DATE
FEB-24

ARCHIVE NO.

DESIGNER	DWG SHEET NO.
T.GRIGSBY	4
DRAWN: T.GRIGSBY	
CHECKED: B.KAMRUD	
PROJECT NO.: 7444	SHEET 4 OF 17



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NORTHERN REGION

PROJECT NAME

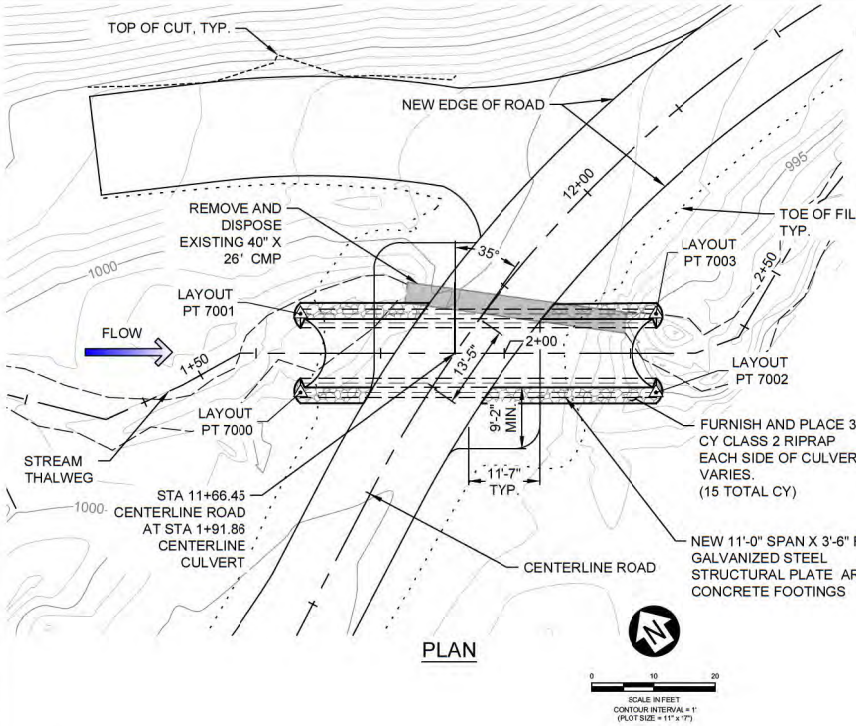
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE

SPUR ROAD PLAN & PROFILE

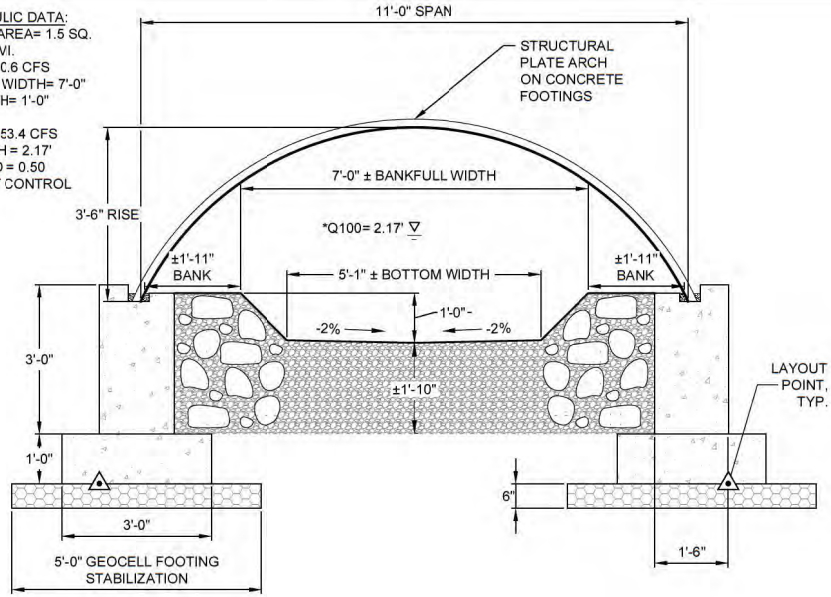
DATE	FEB-24
ARCHIVE NO.	
DESIGNER	T.GRIGSBY
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	5
	SHEET 5 OF 17



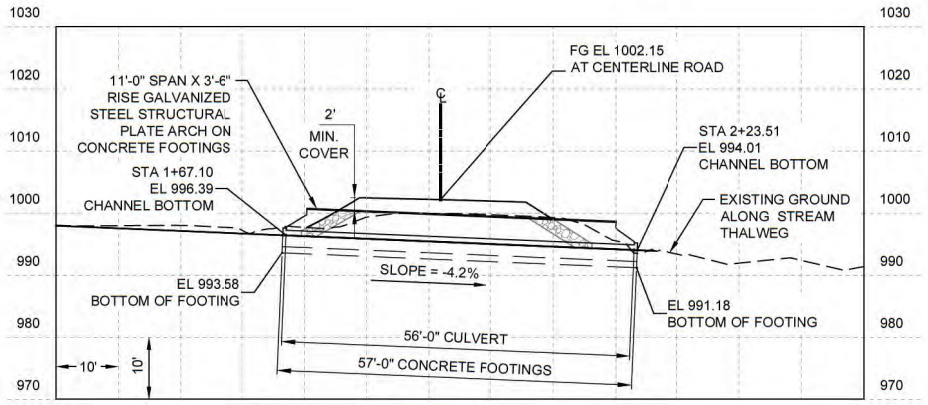
PLAN

HYDRAULIC DATA:
DRAINAGE AREA= 1.5 SQ. MI.
Q2= 10.6 CFS
BANKFULL WIDTH= 7'-0"
DEPTH= 1'-0"

Q100= 53.4 CFS
DEPTH = 2.17'
HW/D = 0.50
*OUTLET CONTROL

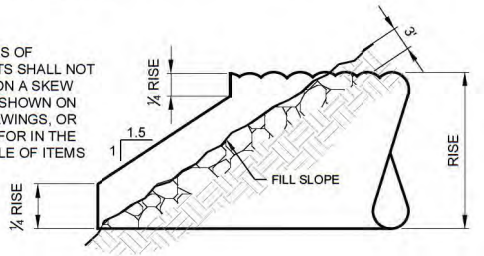


TYPICAL SECTION STRUCTURAL PLATE ARCH
NOT TO SCALE

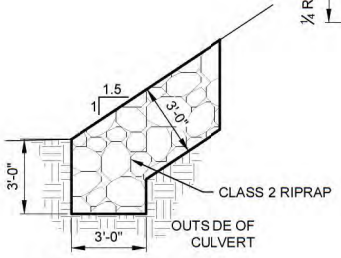


SECTION THRU CENTERLINE CULVERT
SCALE: 1" = 20'

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
NOT TO SCALE



RIPRAP DETAIL
NOT TO SCALE

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REGION 1
NORTHERN REGION

PROJECT NAME
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
CULVERT GENERAL LAYOUT

DATE
FEB-24

ARCHIVE NO.

DESIGNER
T.GRIGSBY

DRAWN
T.GRIGSBY

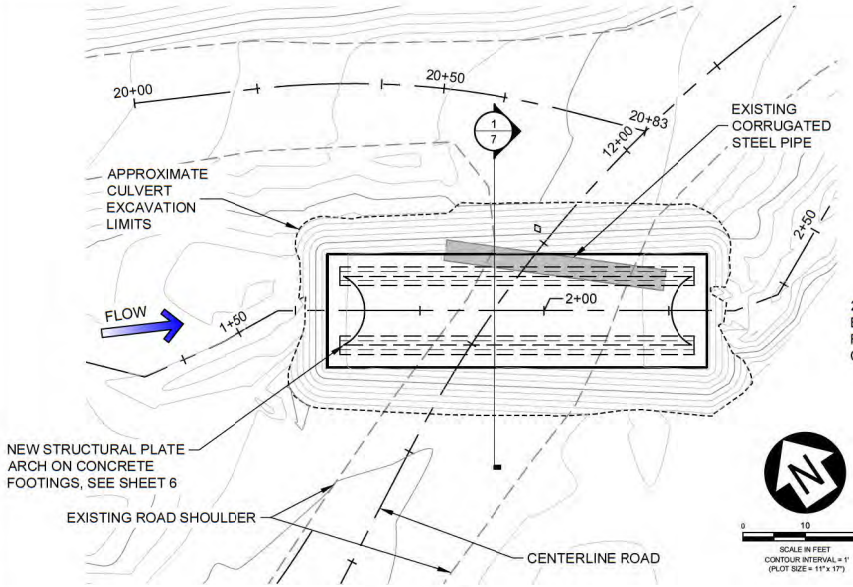
CHECKED
B.KAMRUD

PROJECT NO.
7444

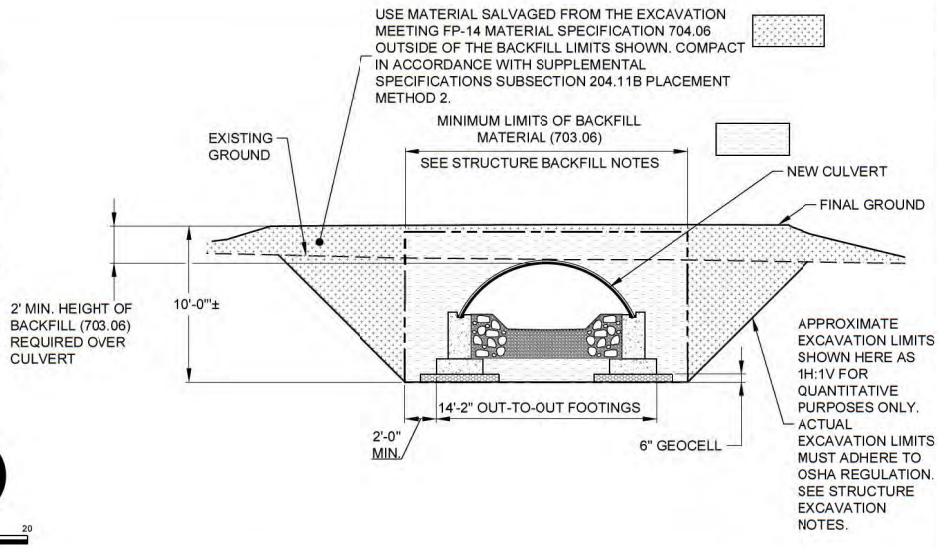
DWG SHEET NO.
6

SHEET 6 OF 17

2/28/24 11:45 TE82A.GRIGSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWING\SDW\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;



PLAN



1/7 STRUCTURAL EXCAVATION & BACKFILL SECTION
NOT TO SCALE

DEWATERING AND SOIL EROSION CONTROL NOTES:

1. PROTECT AGAINST SOIL ERCSION 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 14.
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 14 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.

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REGION 1
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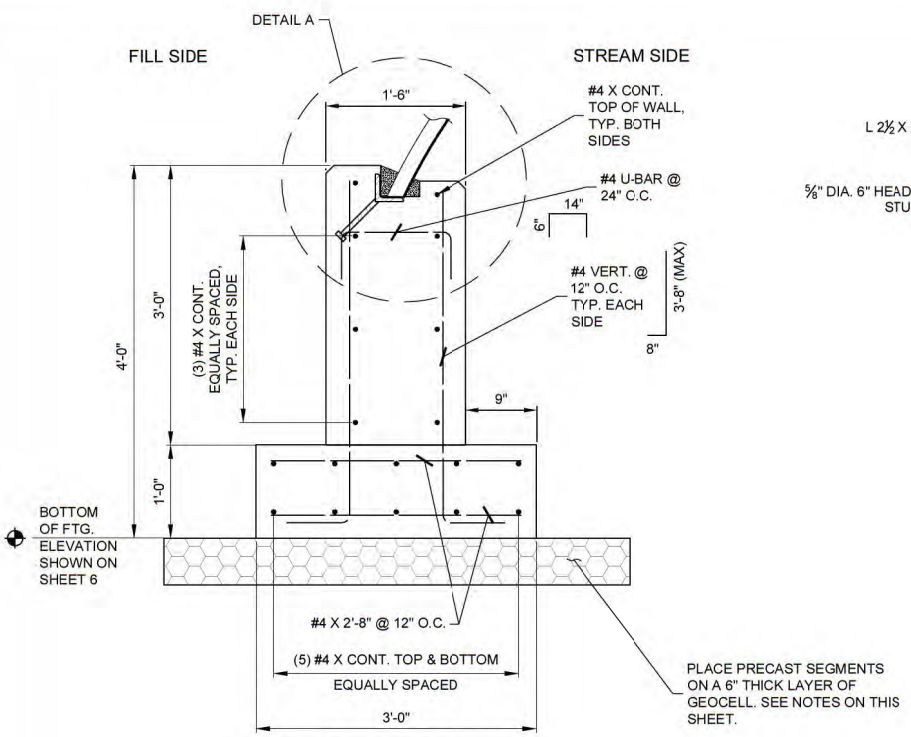
PROJECT NAME
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
STRUCTURE EXCAVATION & BACKFILL

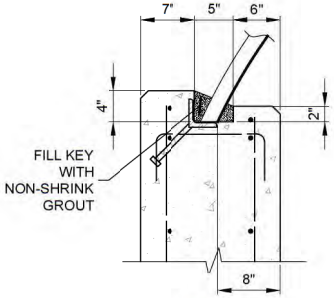
DATE	FEB-24
ARCHIVE NO.	
DESIGNER	T.GRIGSBY
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	7
SHEET	7 OF 17



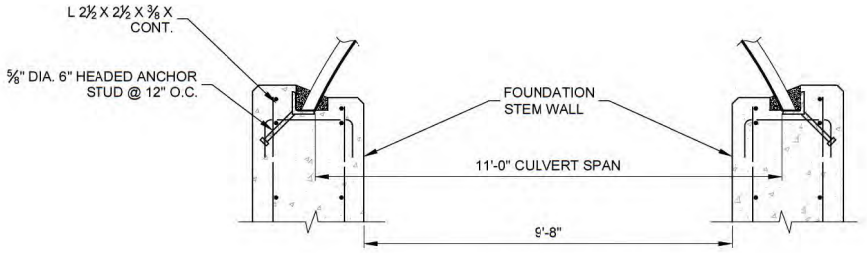
FOOTING DETAIL
SCALE: 3/4" = 1'

NOTES:

1. PROVIDE 2" CLEAR COVER FOR ALL REINFORCEMENT UNLESS OTHERWISE SHOWN.
2. O.C. = ON CENTER.
3. USE 24" MIN. LAP SPLICE FOR ALL REINF. BARS.



DETAIL A
NOT TO SCALE



INSTALLATION DETAIL
NOT TO SCALE

FOUNDATION NOTES

1. PREPARE FOUNDATION IN ACCORDANCE WITH SECTION 208 OF THE SPECIFICATIONS. FOUNDATION MUST BE APPROVED IN WRITING BY THE USFS REPRESENTATIVE PRIOR TO PLACING THE GEOCELL.
2. A FOUNDATION INVESTIGATION HAS NOT BEEN CONDUCTED AT THIS SITE. THE FOLLOWING DESIGN ASSUMPTIONS MUST BE VERIFIED BY THE CONTRACTOR:
   - 2.2. NOTIFY THE USFS REPRESENTATIVE IMMEDIATELY IF BEDROCK OR VERY SOFT CLAY SOILS ARE ENCOUNTERED WITHIN THE LIMITS OF THE FOUNDATIONS SHOWN IN THESE PLANS. IN NO CASE SHOULD THE FOOTING BE PLACED DIRECTLY ON LARGE BOULDERS, RANDOM OUTCROPPINGS OF BEDROCK, OR SOFT SOILS WITHOUT PRIOR APPROVAL.
   - 2.3. THE CULVERT FOOTING WAS DESIGNED FOR AN ASSUMED ALLOWABLE BEARING PRESSURE OF 2,000 PSF (SERVICE).

INFORMATIONAL QUANTITIES

ITEM DESCRIPTION	UNIT	QUANTITY
STRUCTURAL CONCRETE, CLASS A(AE)	CUBIC YARD	31

INFORMATIONAL QUANTITIES SHOWN ABOVE ARE FOR THE PRECAST CULVERT FOOTING AND CONSIDERED INCIDENTAL TO ITEM 55217.

GEOCELL NOTES:

1. PLACE GEOCELL ON UNDISTURBED SUBGRADE.
2. INSTALL GEOCELL IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATIONS 272.06, HOLDING LINES AND GRADES IN PLACE WITH SUITABLE SIDE FORMS (I.E. "STRETCHER FRAMES" OR STEEL STAKES) TO ENSURE CELLS ARE EXPANDED TO THE MINIMUM DIMENSION REQUIRED BY THE MANUFACTURER.
3. BACKFILL GEOCELL WITH PIT RUN MATERIAL MEETING FP-14 SUBSECTION 703.06.
4. PLACE CLASS 1, TYPE A SEPARATION GEOTEXTILE UNDER GEOCELL AND WRAP OVER TOP AFTER BACKFILLING (INCIDENTAL TO ITEM 27201).
5. EXTEND GEOCELL 1' MINIMUM BEYOND LIMITS OF FOOTING ON ALL SIDES.

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GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

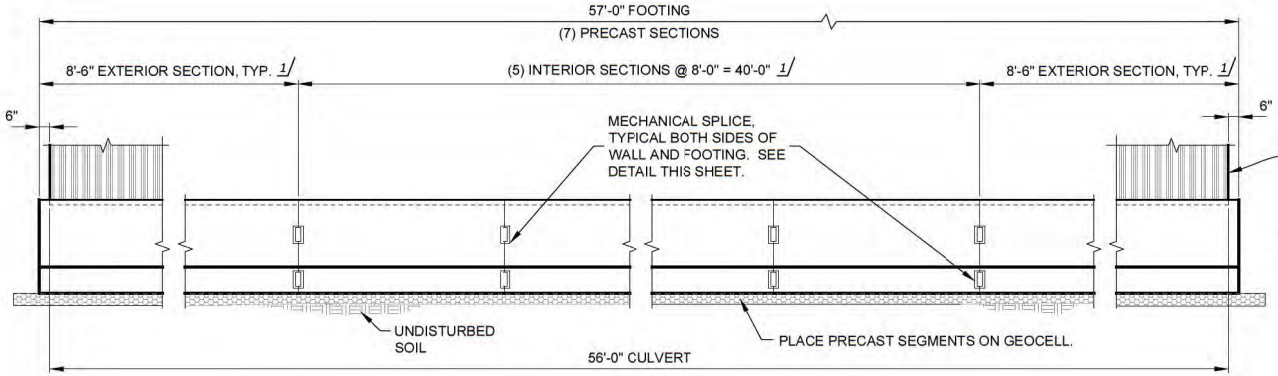
DRAWING TITLE
FOOTING DETAILS

DATE
FEB-24

ARCHIVE NO.

DESIGNER	DWG SHEET NO.
T.GRIGSBY	8
DRAWN: T.GRIGSBY	
CHECKED: B.KAMRUD	
PROJECT NO.: 7444	SHEET 8 OF 17

2/28/24 11:45 TESSA.GRIGSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;



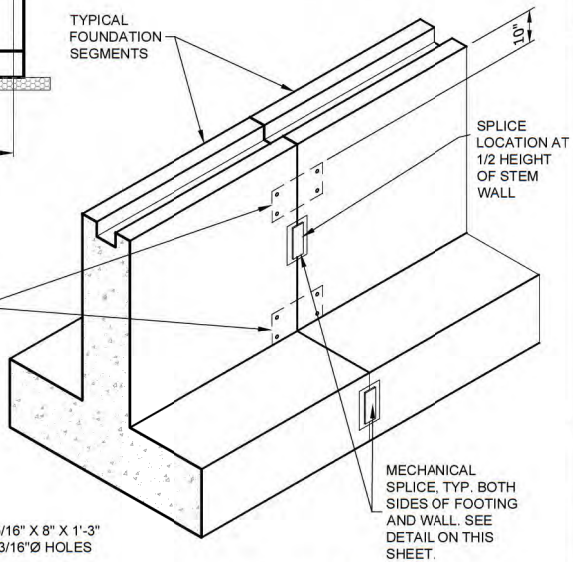
1/ CONTRACTOR MAY ADJUST PRECAST SEGMENT LENGTHS SHOWN DEPENDING UPON SETTING EQUIPMENTS CAPABILITIES. FOOTING WEIGHT IS APPROXIMATELY 1,125 LB/FT.

PRECAST FOUNDATION ELEVATION

Not to Scale

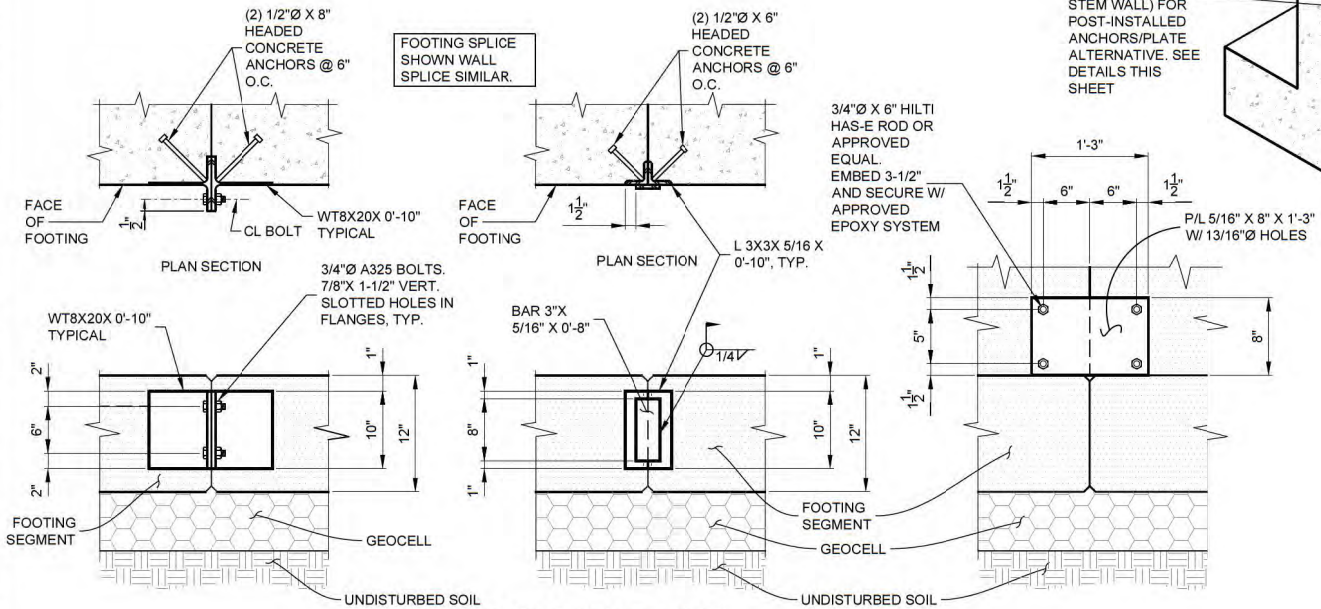
PRIOR TO FABRICATING PRECAST FOOTINGS SUBMIT FOR APPROVAL SHOP DRAWINGS DETAILING SEGMENT LENGTHS, SPLICE CONNECTIONS, PROPOSED CONCRETE MIX DESIGN, PICK LOCATIONS, AND SELECTED CONNECTION FOR CULVERT.

OTHER PRECAST/PREFABRICATED FOOTING OPTIONS THAT MEET SIZE, STRENGTH AND FUNCTIONALITY OF CONCRETE FOOTINGS SHOWN MAY BE SUBMITTED FOR REVIEW AND APPROVAL.



TYPICAL PRECAST SEGMENT

NOT TO SCALE



MECHANICAL SPLICE DETAIL

Not to Scale

USDA FOREST SERVICE
United States Department of Agriculture
Forest Service

REGION 1
NORTHERN REGION

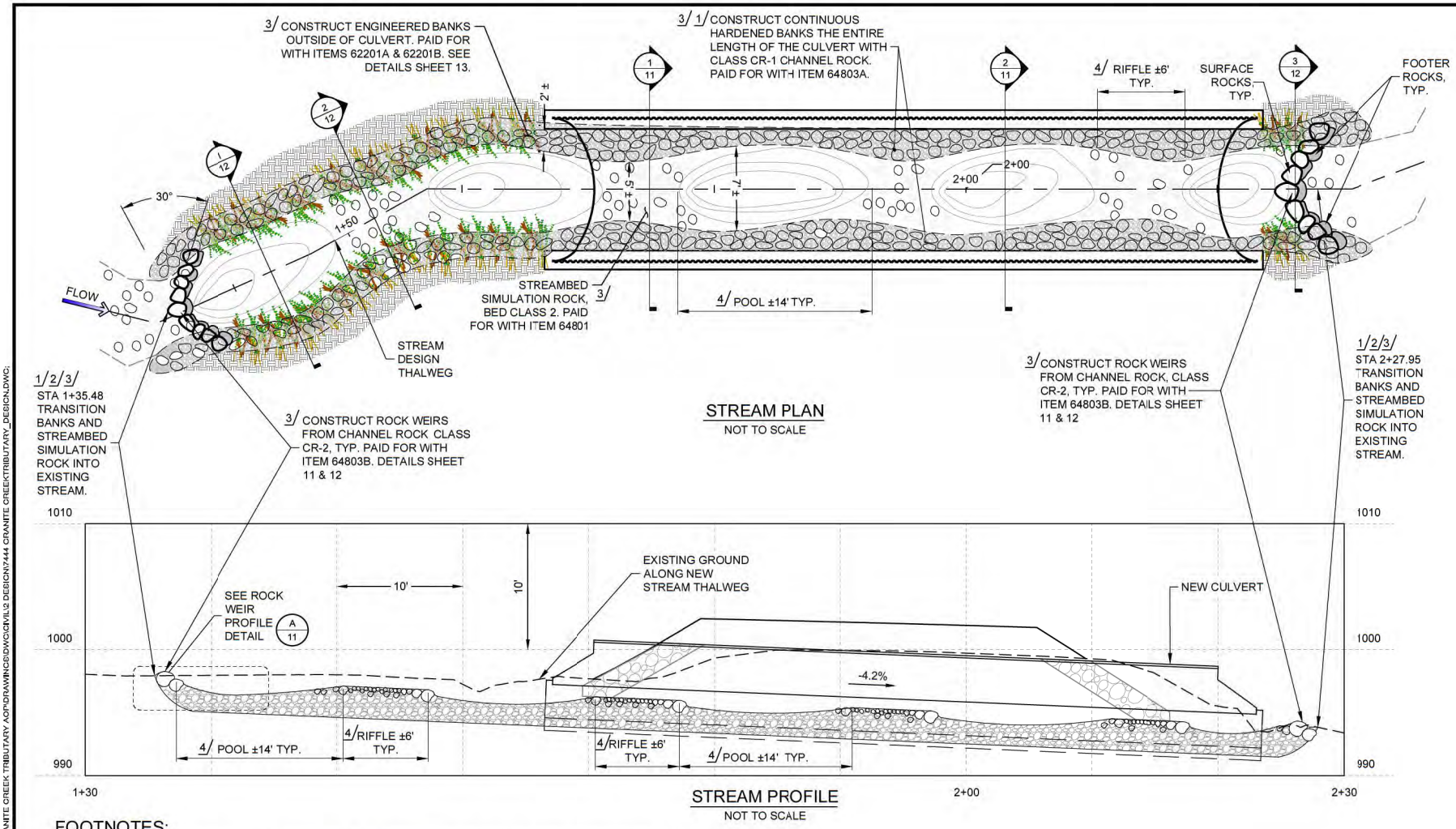
PROJECT NAME
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
PRECAST DETAILS

DATE	FEB-24
ARCHIVE NO.	
DESIGNER	T.GRIGSBY
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	9
SHEET	9 OF 17

2/28/24 11:45 TE82A.GRIGSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\3 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;



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.

4/ 1'-0" TOLERANCE FOR POOL AND RIFFLE LENGTHS AND 0'-6" TOLERANCE ON CHANNEL WIDTHS TO ACCOUNT FOR NATURAL VARIABILITY.

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DRAWING TITLE

STREAM SIMULATION DETAILS

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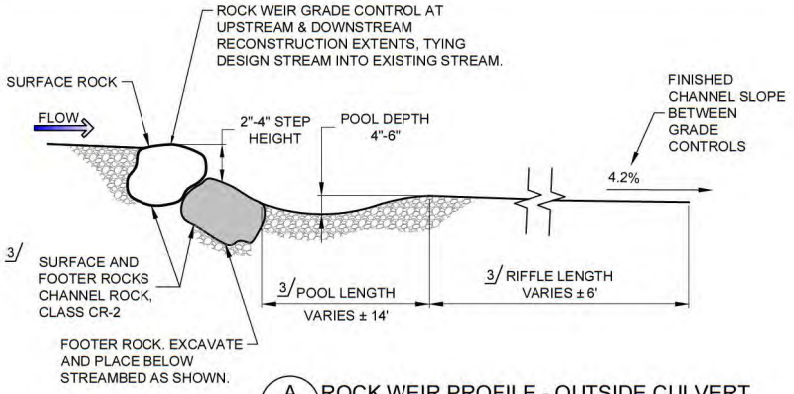
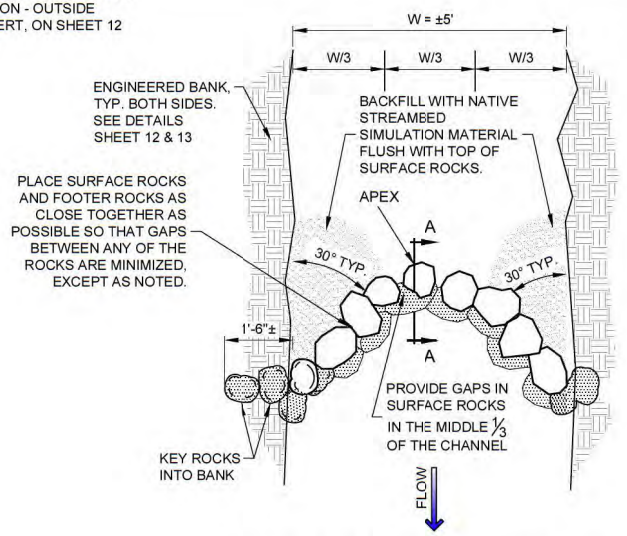
ARCHIVE NO.	
DESIGNER	T.GRIGSBY
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	10
SHEET	10 OF 17



A/11 ROCK WEIR PROFILE - OUTSIDE CULVERT
NOT TO SCALE

*TYP. ROCK WEIR CROSS SECTION - OUTSIDE CULVERT, ON SHEET 12



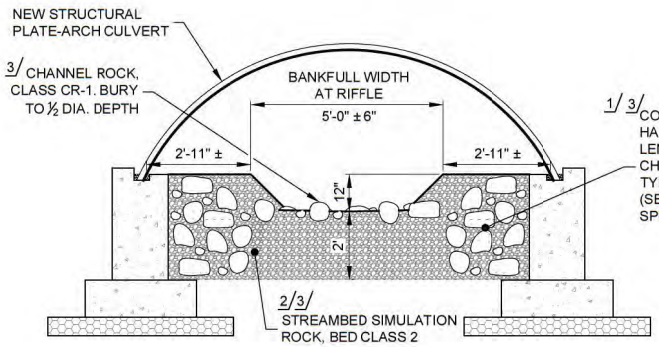
ROCK WEIR PLAN - OUTSIDE CULVERT
NOT TO SCALE

FOOTNOTES:

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

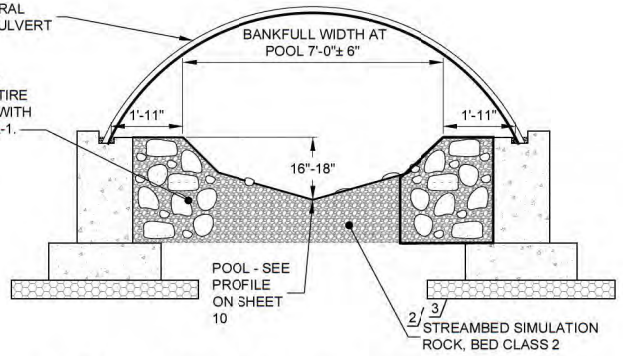
2/ THE FINAL CHANNEL BOTTOM SHOULD BE A DENSE, WELL INTERLOCKED STREAMBED WITH LOW PERMEABILITY. COMPACT EACH LAYER AND FILL SURFACE VOIDS BY WASHING IN FINE MATERIAL. USE WATER PRESSURE, TAMPING RODS, AND SIMILAR HAND OPERATED EQUIPMENT TO FORCE FINE MATERIAL INTO ALL SURFACE VOIDS.

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



1/3/ CONSTRUCT CONTINUOUS HARDENED BANKS THE ENTIRE LENGTH OF THE CULVERT WITH CHANNEL ROCK, CLASS CR-1. TYPICAL BOTH SIDES (SEE SUPPLEMENTAL SPECIFICATIONS 705.08)

1/11 TYPICAL RIFFLE SECTION - INSIDE CULVERT
NOT TO SCALE



2/11 TYPICAL POOL SECTION - INSIDE CULVERT
NOT TO SCALE

United States Department of Agriculture
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NORTHERN REGION

PROJECT NAME
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
STREAM SIMULATION DETAILS

DATE
FEB-24

ARCHIVE NO.

DESIGNER
T.GRIGSBY

DRAWN
T.GRIGSBY

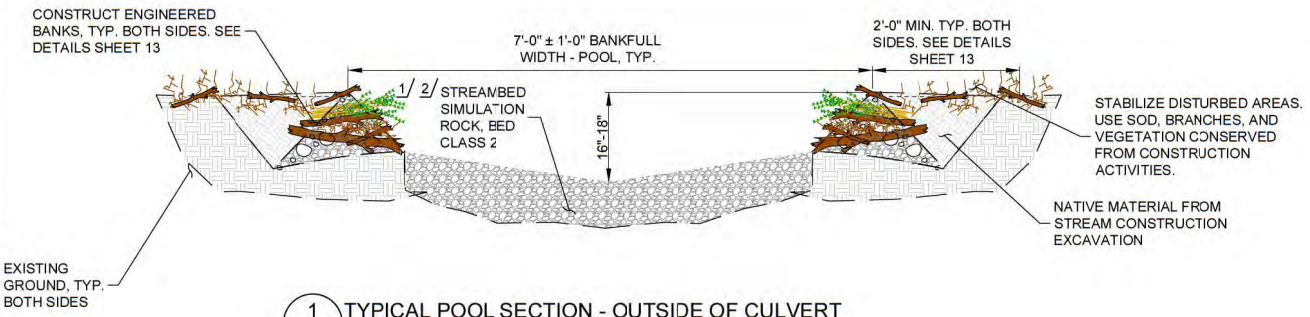
CHECKED
B.KAMRUD

PROJECT NO.
7444

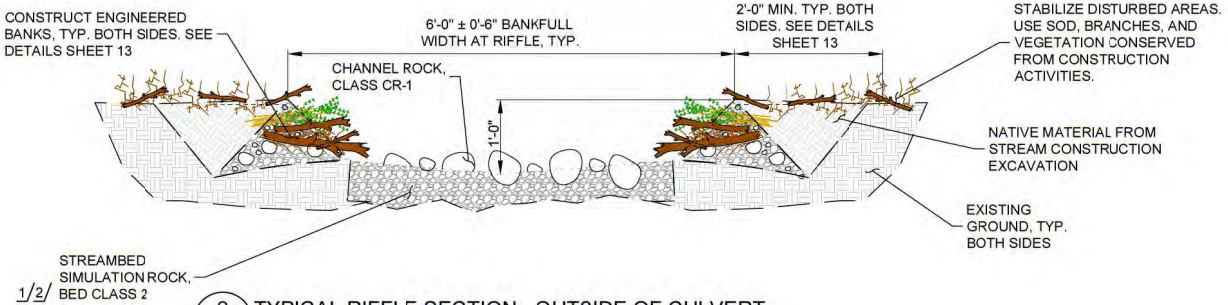
DWG SHEET NO.
11

SHEET 11 OF 17

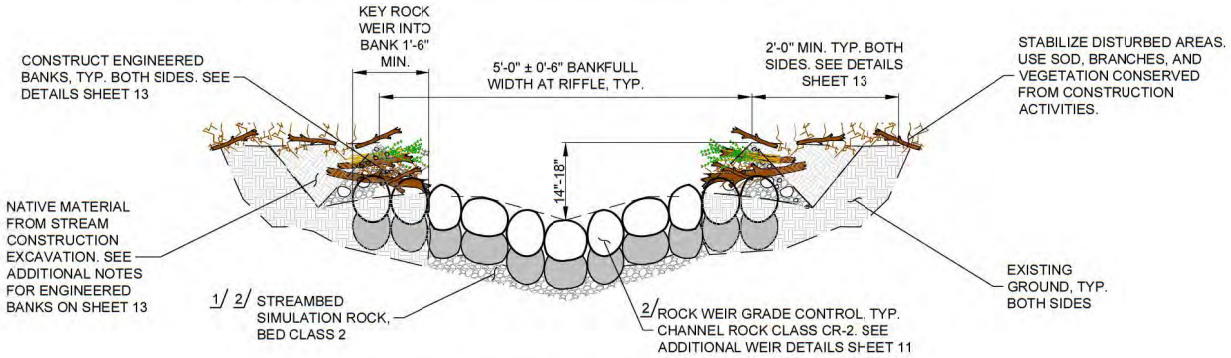
2/28/24 11:45 TE8SA.GRIGSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;



1/12 TYPICAL POOL SECTION - OUTSIDE OF CULVERT
NOT TO SCALE



2/12 TYPICAL RIFFLE SECTION - OUTSIDE OF CULVERT
NOT TO SCALE



3/12 TYPICAL ROCK WEIR SECTION - OUTSIDE OF CULVERT
NOT TO SCALE

FOOTNOTES:

1/ 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.

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

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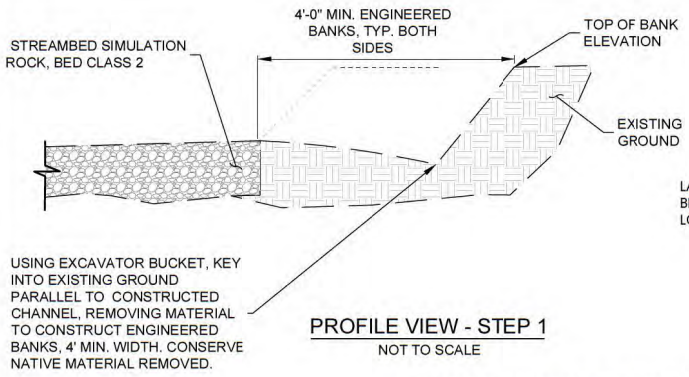
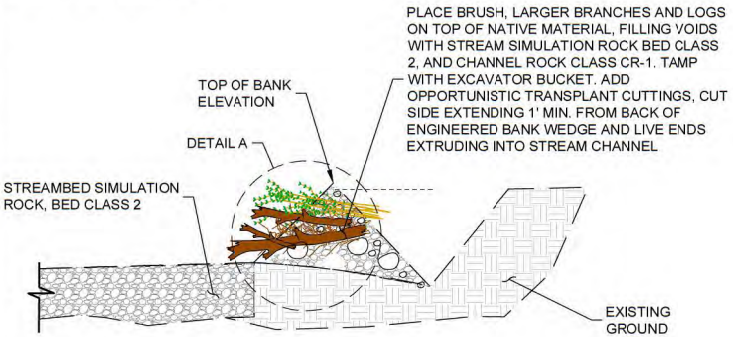
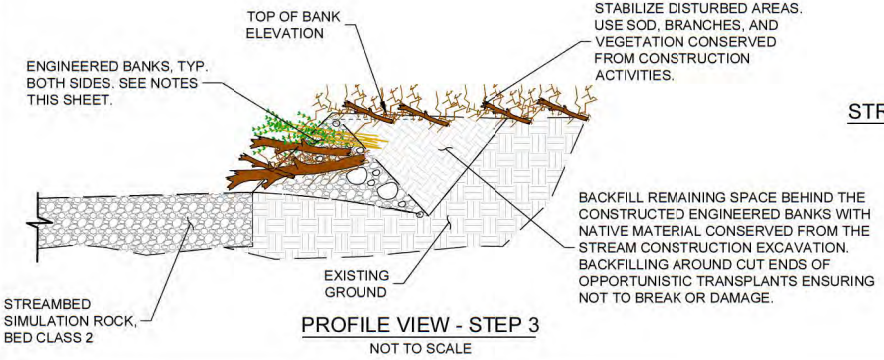
PROJECT NO.	7444
DWG SHEET NO.	12
SHEET	12 OF 17



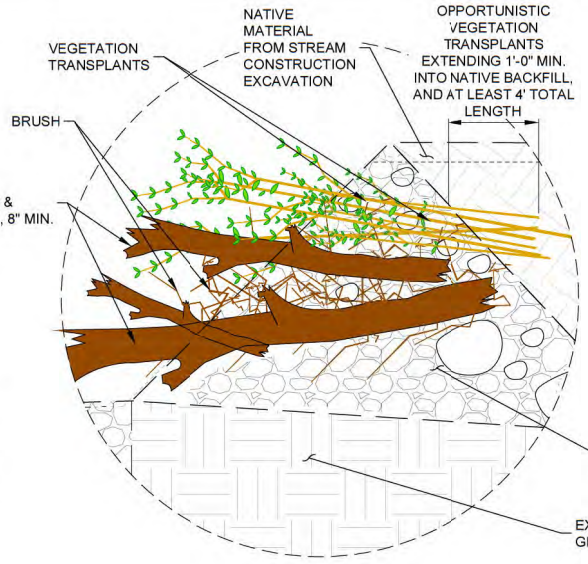
PROFILE VIEW - STEP 1
NOT TO SCALE



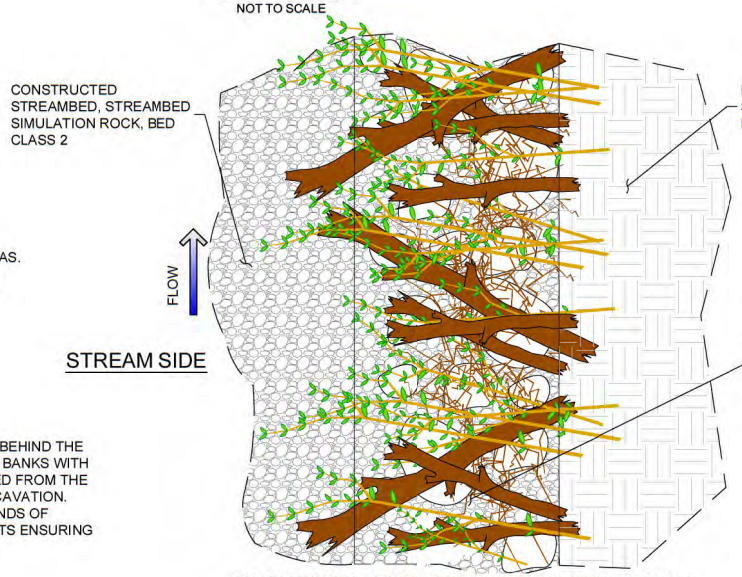
PROFILE VIEW - STEP 2
NOT TO SCALE



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-1 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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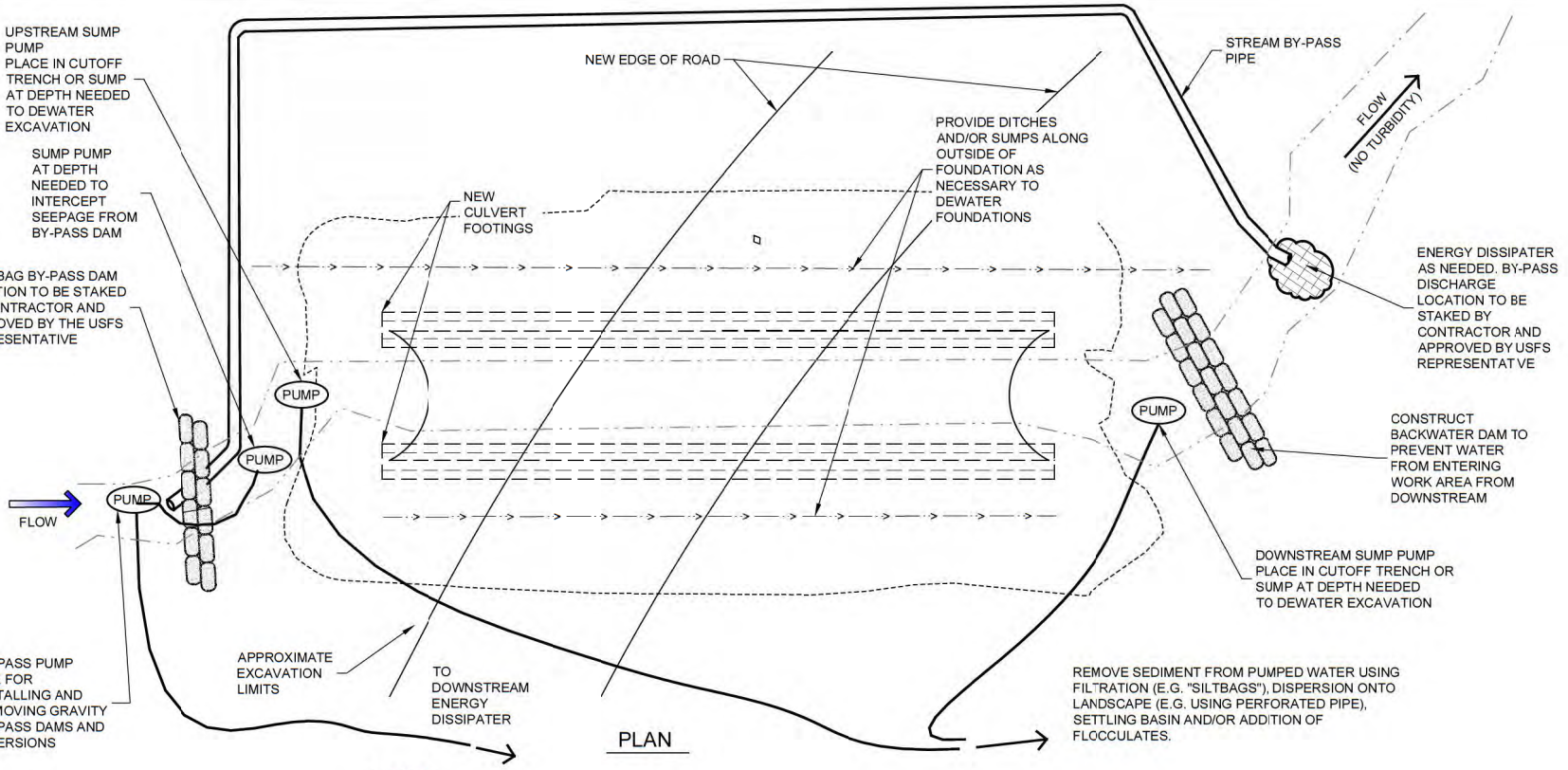
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	13
SHEET	13 OF 17

2/28/24 11:45 TE82A.GRIGSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_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 RELEVE 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.

NOT FOR CONSTRUCTION

CONTRACTOR SUBMITTAL & APPROVAL BY USFS REPRESENTATIVE REQUIRED ACCORDING TO SUPPLEMENTAL SPECIFICATIONS 157

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GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE
DEWATERING REQUIREMENTS

DATE	FEB-24
ARCHIVE NO.	
DESIGNER	T.GRIGSBY
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	14
SHEET	14 OF 17

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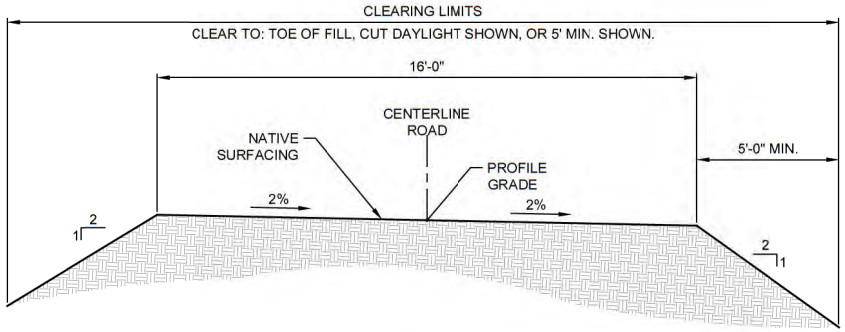
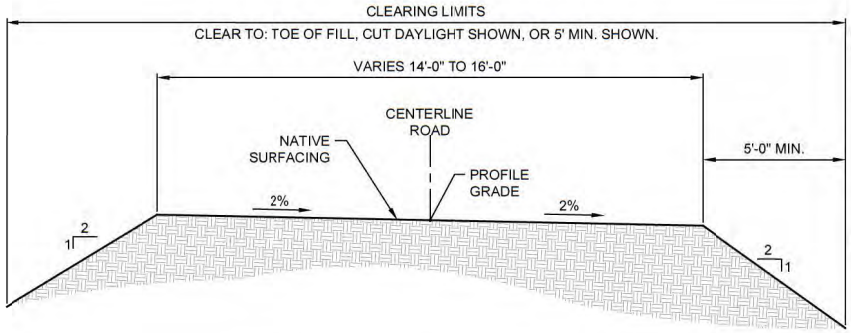


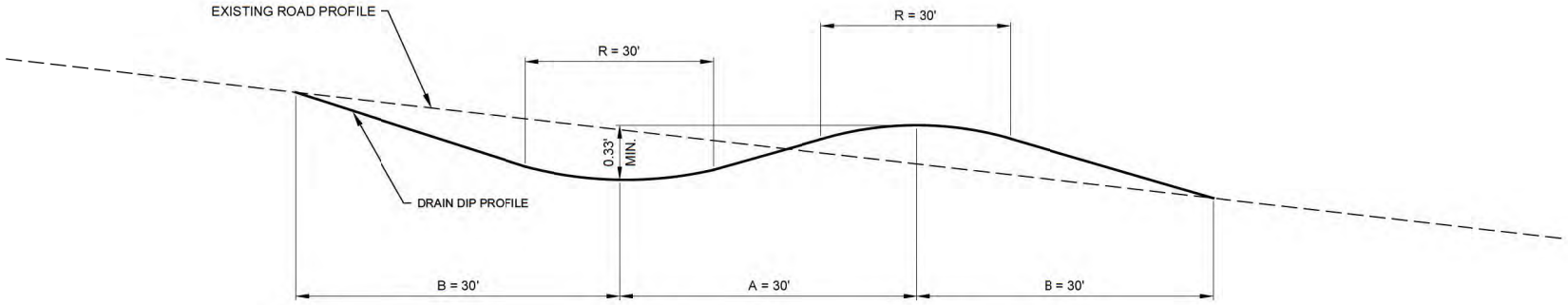
TYPICAL ROAD SECTION: USFS RD 9942

STA 10+20 TO 13+40



TYPICAL ROAD SECTION: SPUR ROAD

STA 20+00 TO 20+57.45



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

DRAIN DIP TYPICAL DETAIL

NOT TO SCALE

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.

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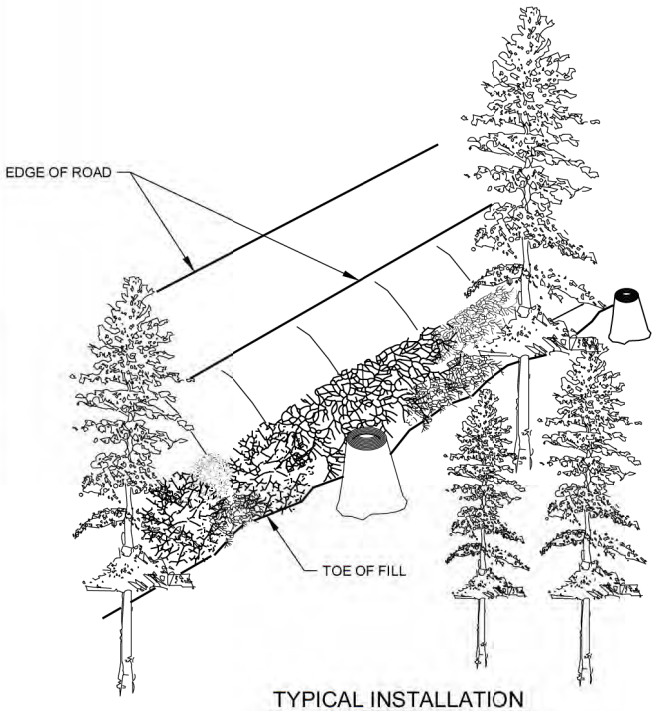
PROJECT NO.
7444

DWG SHEET NO.
15

SHEET 15 OF 17

2/28/24 11:46 TE82A.CRICSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;



TYPICAL INSTALLATION

SLASH FILTER WINDROW NOTES:

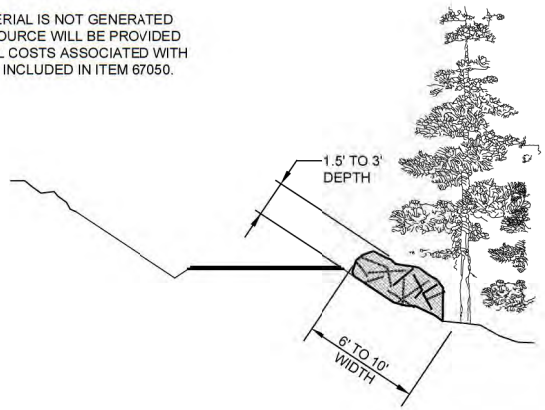
1.) USE SLASH MATERIAL GENERATED FROM CLEARING AND GRUBBING. STOCKPILE MATERIALS BEFORE CONSTRUCTING WINDROWS.

2.) SLASH, LIMBS AND TOPS MUST BE SMALLER THAN 12 FEET LONG AND 6 INCHES DIAMETER. DO NOT USE STUMPS AND ROOT WADS.

3.) PLACE SLASH AT THE TOE OF THE NEW FILL SLOPE WITH A BACKHOE AND TAMP INTO PLACE WITH THE BUCKET. SLASH SHOULD BE TAMPED SO IT IS EMBEDDED APPROXIMATELY 6 INCHES INTO THE SURFACE TO PREVENT WATER FROM RUNNING UNDER THE WINDROW.

4.) DO NOT INTERFERE WITH THE FUNCTIONING OF DRAINAGE STRUCTURES OR BLOCK STREAM CHANNELS WITH WINDROWS.

5.) IF SUFFICIENT QUANTITY OF SLASH MATERIAL IS NOT GENERATED ON-SITE FROM CLEARING OPERATIONS, A SOURCE WILL BE PROVIDED WITHIN 1/2 MILES OF THE PROJECT SITE. ALL COSTS ASSOCIATED WITH CUTTING, HAUL, AND PLACING SLASH TO BE INCLUDED IN ITEM 67050.



WINDROW DIMENSIONS

SLASH FILTER WINDROW
NOT TO SCALE

United States Department of Agriculture
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LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

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TYPICAL DETAILS

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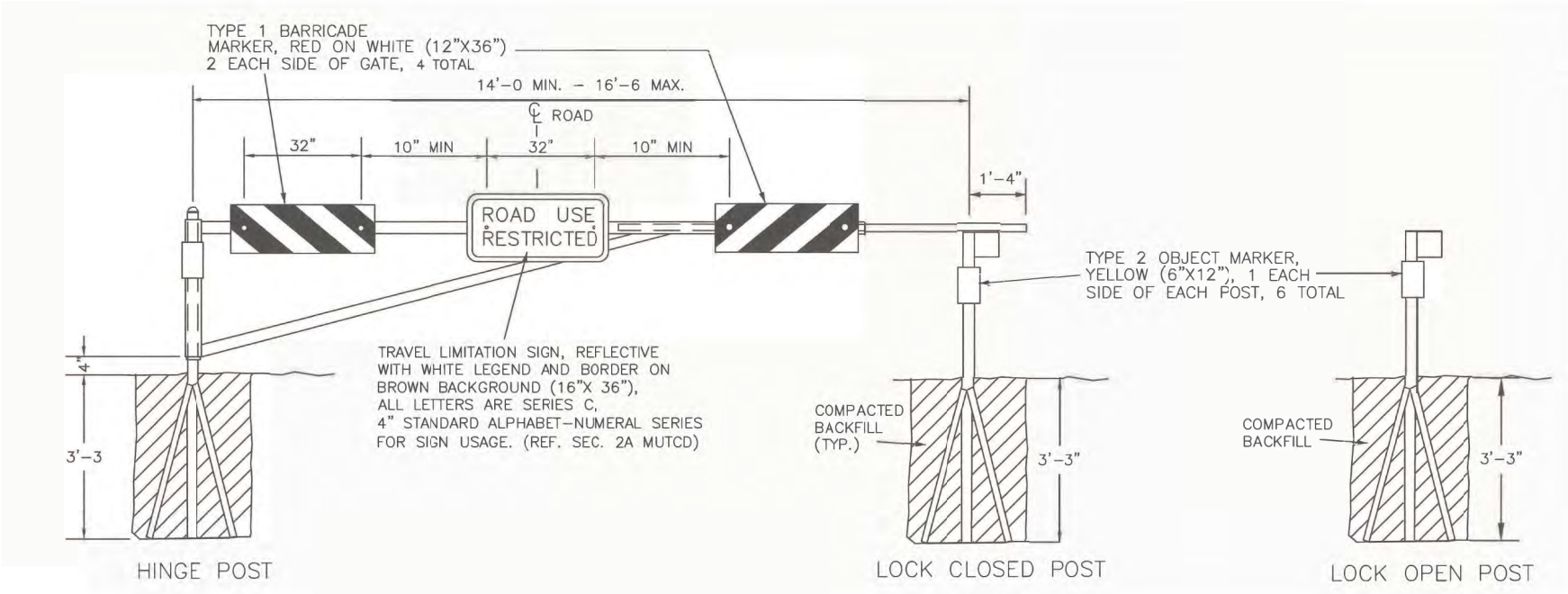
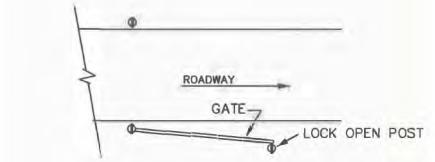
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	16
SHEET	16 OF 17

2/28/24 11:46 TE8SA.CRICSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;



GENERAL NOTES

1. REMOVE EXISTING GATE AND REINSTALL AT LOCATION APPROVED BY USFS REPRESENTATIVE. IF EXISTING GATE IS NOT SUITABLE FOR RE-USE, THE GOVERNMENT WILL SUPPLY A NEW GATE FOR INSTALLATION. IF A NEW GATE IS USED, THE REMOVED GATE BECOMES PROPERTY OF THE CONTRACTOR AND MUST BE REMOVED FROM FOREST LAND AND DISPOSED OF IN A LEGAL MANNER.
2. PIPE SIZES SHOWN ARE FOR STANDARD WEIGHT STEEL PIPE, CONFORMING TO ASTM A120.
3. WELDING SHALL BE DONE IN ACCORDANCE WITH THE BEST MODERN PRACTICE AND THEN APPLICABLE REQUIREMENTS OF AMERICAN WELDING SOCIETY D1 1
4. PAINTING OF THE GATE AND ALL APPURTENANCES SHALL CONFORM TO SECTION 563 - PAINTING, SYSTEM 2, 3, OR 5. FINAL COAT TINT SHALL BE NATIONAL PARK SERVICE GREEN (FEDERAL STANDARD 595A COLOR # 14062).
5. ALL BACKFILL MATERIAL SHALL BE COMPACTED IN 6" LIFTS UNTIL THERE IS NO DEFORMATION.
6. STRUCTURAL PIPE AND STEEL PLATE SHALL CONFORM TO ASTM A 36.
7. CONTRACTOR WILL SUPPLY AND INSTALL SIGNS. SIGNS WILL MEET THE REQUIREMENTS OF SECTION 633. ALL WORK AND MATERIALS PERTAINING TO SECTION 633 - SIGNS, SHALL BE SUBSIDIARY TO SECTION 650 - ROAD CLOSURE DEVICES. NO SEPARATE PAYMENT WILL BE MADE.
8. DRILL 3/8" Ø HOLES AND USE 5/16" BOLTS WITH ANTI-THEFT LOCKING NUTS FOR SIGN INSTALLATIONS.
9. ALL WORK ASSOCIATED WITH GATE CONSTRUCTION PAID INDIRECT TO ITEM 61903.



PLAN VIEW

United States Department of Agriculture
Forest Service

REGION 1
NORTHERN REGION

PROJECT NAME

GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT RD 9942 MP 1.20 LOLO NATIONAL FOREST

MISSOULA RANGER DISTRICT

DRAWING TITLE

GATE INSTALLATION DETAIL

DATE	FEB-24
ARCHIVE NO.	
DESIGNER	T.GRIGSBY
DRAWN	T.GRIGSBY
CHECKED	B.KAMRUD
PROJECT NO.	7444
DWG SHEET NO.	17
SHEET	17 OF 17

2/28/24 11:46 TEB2A.GRIGSBY F:\7444 GRANITE CREEK TRIBUTARY AOP\DRAWINGS\DWG\CIVIL\2 DESIGN\7444 GRANITE CREEKTRIBUTARY_DESIGN.DWG;

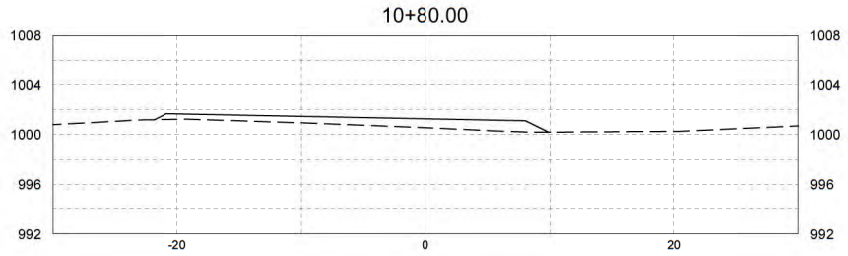
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT

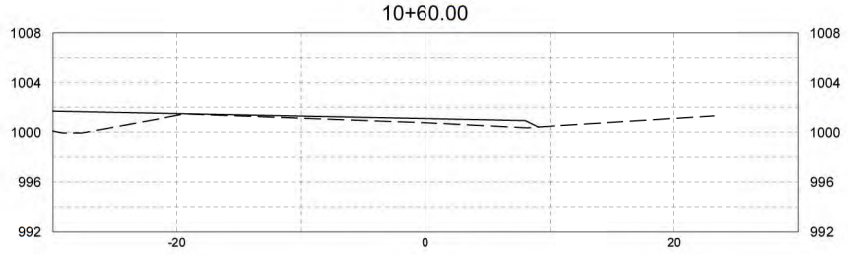
USFS RD 9422 MP 1.20

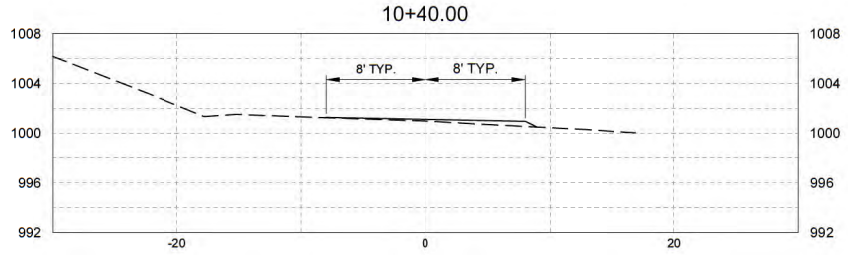
ROAD CROSS SECTIONS

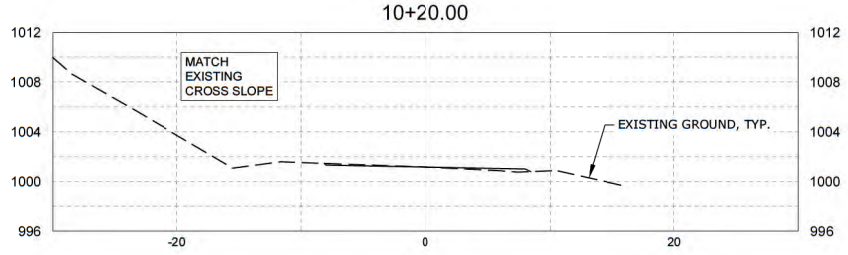
PREPARED BY: DJ&A ENGINEERS PLANNERS SURVEYORS

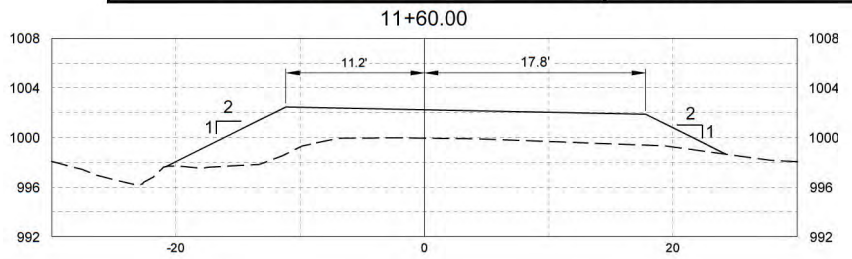
Sheet XS1 OF XS4

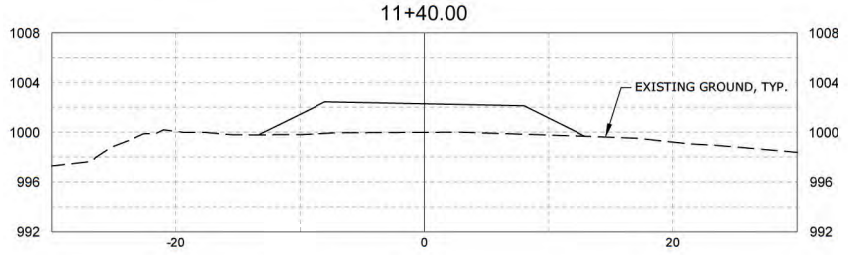


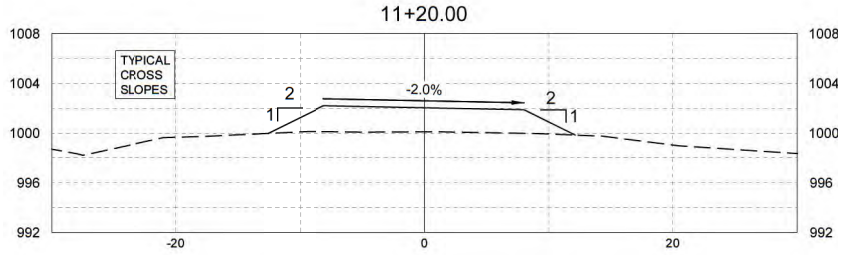


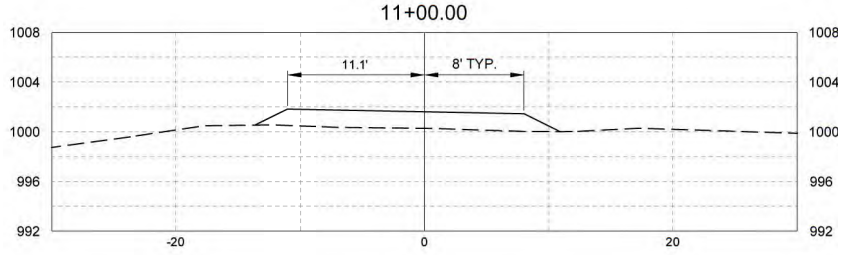












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GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT

USFS RD 9422 MP 1.20

ROAD CROSS SECTIONS

PREPARED BY: DJ&A ENGINEERS PLANNERS SURVEYORS

Sheet XS2 OF XS4

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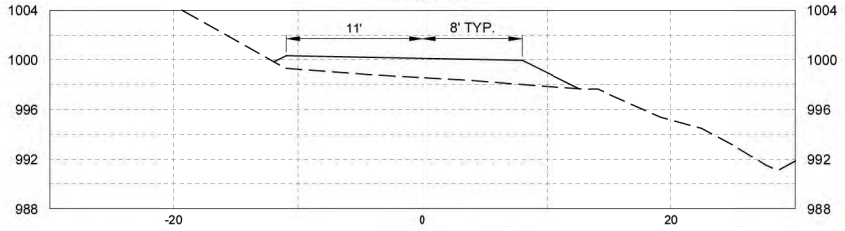

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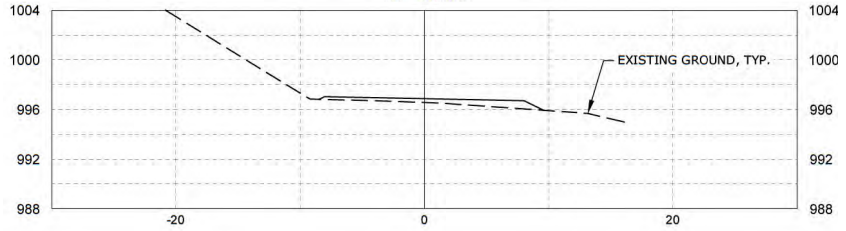

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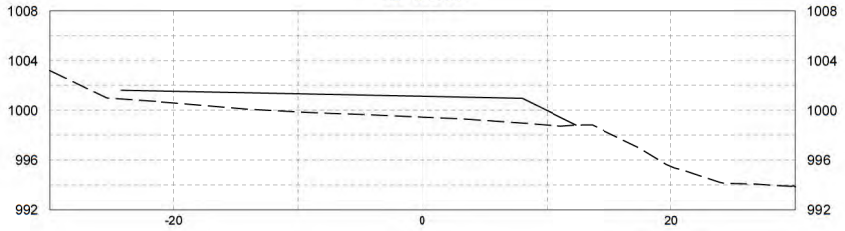

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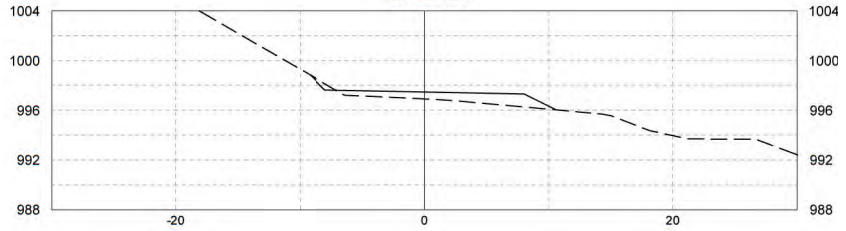

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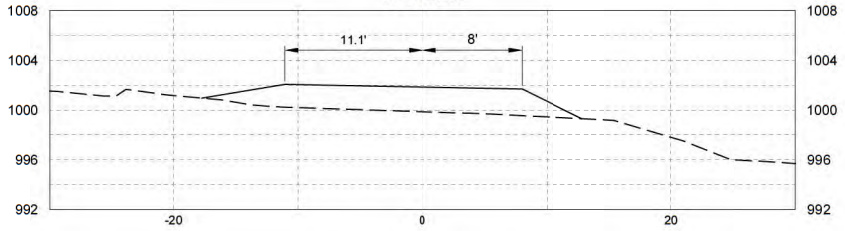

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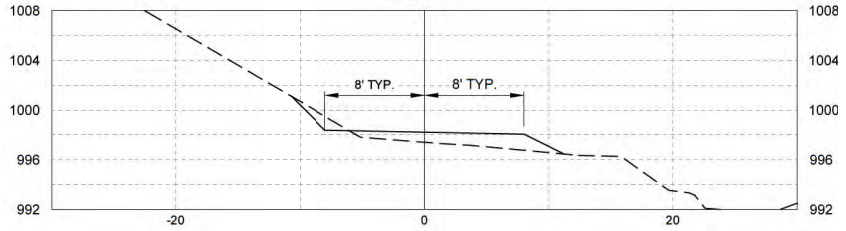

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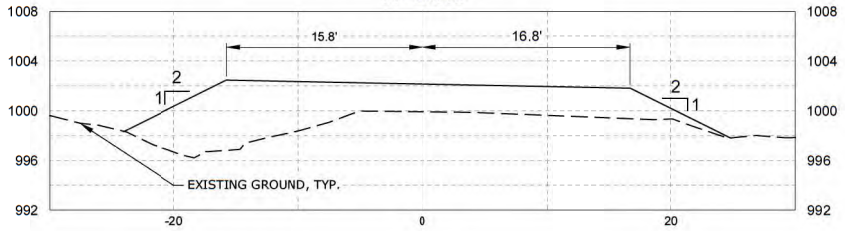

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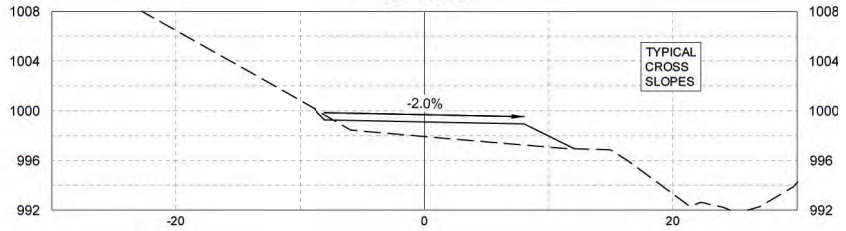

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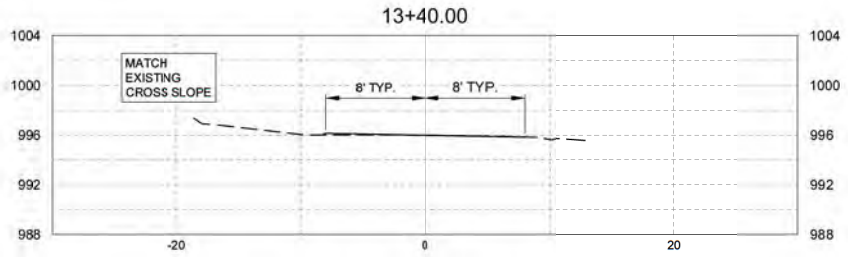
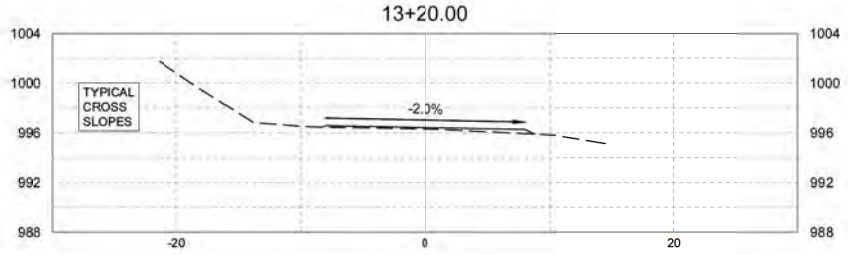
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT
USFS RD 9422 MP 1.20
ROAD CROSS SECTIONS

PREPARED BY: DJ&A ENGINEERS PLANNERS SURVEYORS

Sheet XS3 OF XS4

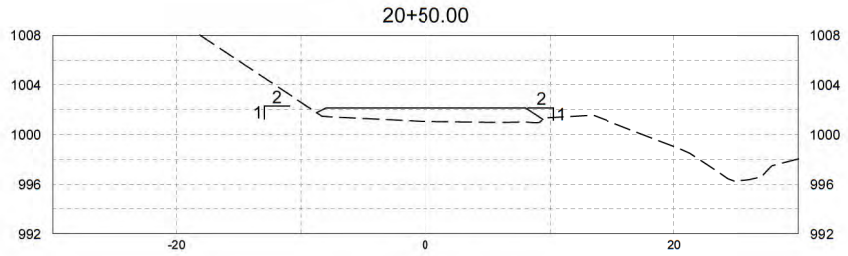


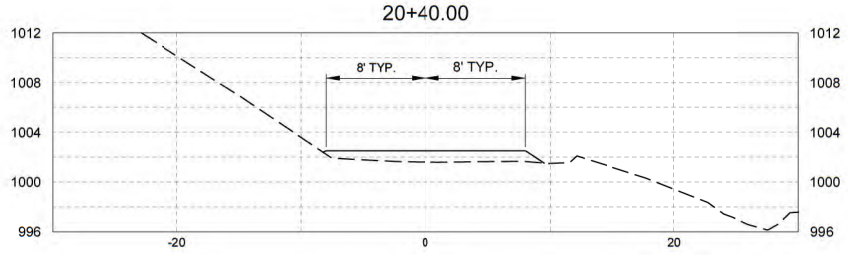


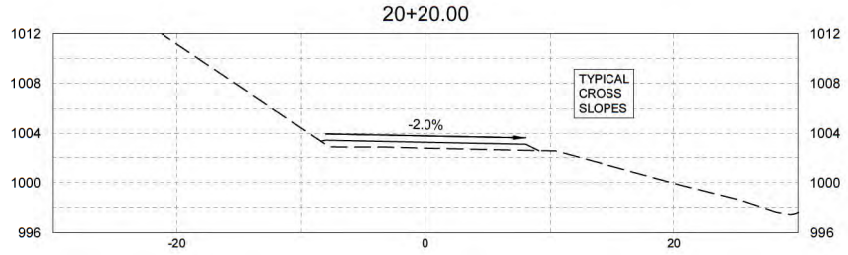
GRANITE CREEK TRIBUTARY AOP CULVERT REPLACEMENT
USFS RD 9422 MP 1.20
SPUR ROAD CROSS SECTIONS

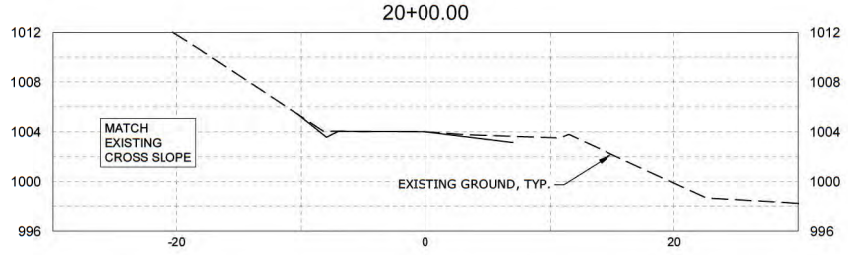
PREPARED BY: DJ&A ENGINEERS PLANNERS SURVEYORS

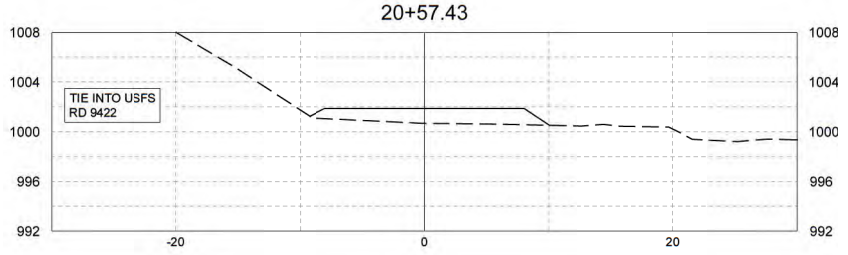
Sheet XS4 OF XS4











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