

Request for Proposals

Crag Crest National Recreation Trail Reconstruction

Grand Mesa, Uncompahgre and Gunnison National Forests

Background and Statement of Work: The U.S. Forest Service and National Forest Foundation (NFF) are working together to implement projects associated with the Great American Outdoors Act (GAOA). The Crag Crest National Recreation Trail Reconstruction Project has been prioritized by the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests through the U.S. Department of Agriculture's list of deferred maintenance projects for GAOA funding.

Crag Crest National Recreation Trail is located on the Grand Mesa and winds through a variety of scenery from craggy lake views to deep forested sections and wildflower meadows. This project is located on the 6.5-mile crest portion of the trail which is open to foot traffic only. The Crag Crest Trail Reconstruction Project prioritizes the protection of natural resources, mitigation of safety hazards, and keeping trail users on the trail. It focuses on constructing new and improving existing retaining walls and drainage structures such as water bars and turnpikes.

Information Requested

If interested in submitting a bid for this project, please provide a proposal for the above statement of work by providing:

- technical approach
- work experience
- cost
- capacity for this project
- experience in similar projects

Specific requirements are detailed below.

I. PROJECT OVERVIEW AND REQUIREMENTS

General Specifications

(a) Description of Work – This Request for Proposals is for restoration services related to Crag Crest National Recreation Trail Reconstruction:

1. Trail layout and planning, including flagging and/or creation of GPS layer of work items to be completed.
2. Up to 34,987 linear feet of trail restoration, including but limited to tread improvement, brushing, clearing, and de-berming.
3. Obliteration of approximately 30 linear feet of social trail and/or abandoned trail.
4. Hazard tree removal for approximately 1 tree.
5. Maintaining up to 2,814 linear feet of talus section.

6. Installation of approximately 1 shallow stream crossing with rock retainer.
7. Installation of up to 104 rock waterbars.
8. Maintenance of approximately 100 existing waterbars.
9. Maintenance of approximately 120 linear feet of existing ditch.
10. Maintenance of approximately 12 existing drain dips.
11. Maintenance of approximately 9 existing switchbacks.
12. Maintenance of approximately 413 linear feet of turnpike, including re-crowning.
13. Installation of up to 125 linear feet of stacked rock side barrier.
14. Installation of up to 850 square feet of Mechanically Stabilized Earth (MSE) retaining wall, rock or treated timber.
15. Installation and/or replacement of up to 14 trail signs.

The Contractor shall identify what they can supply in terms of materials, labor, equipment, supplies, supervision, quality control, and incidentals required to complete the work described. The Contractor shall perform all work in a safe and conscientious manner.

- (a) Project Location – The project is located on the Grand Valley Ranger District, Uncompahgre National Forest, approximately 17 miles north of Cedaredge, Colorado, Mesa County, or approximately 38 miles from Grand Junction, Colorado. It is accessed from two trailheads: one on the west end across from Island Lake (N39.04257, W-107.99777) and one on the east adjacent to Eggleston Lake (N39.04882, W-107.93668).
- (b) Work Schedule – Crag Crest Trail is typically accessible between July and October. Work completed in 2025 is preferable, but extended proposals through 2026 will be considered.

Other Project Requirements and Specifications

- (a) Utilities – There will be no sanitation, water, electrical or housing services available. The Contractor shall make its own arrangements for temporary facilities if needed. Backcountry spike camping is possible. The Contractor must practice Leave No Trace principles. All camps are subject to inspection.
- (b) Access – The trailhead is easily accessed by most vehicle types. High clearance and 4x4 is not required.
- (c) Safety - The Contractor shall perform all work in a safe and conscientious manner. It is the responsibility of the Contractor to implement adequate safety measures and follow all Occupational Safety and Health Administration (OSHA) requirements.
- (d) Requirements –
 - a. The Contractor shall coordinate with the NFF representative and the Forest Service representative to schedule a pre-work site walkthrough and inspections for work acceptance throughout the project as required.
 - b. The Contractor shall submit a Plan of Operations to the NFF representative prior to commencing work and keep the NFF representative informed of any schedule changes throughout the duration of the project.
 - c. The Contractor shall inform the NFF representative 60 days in advance of mobilization if a trail closure will be required.
- (e) Specifications – Project work shall be accomplished in accordance with the following:
 - Appendix A. Schedule of Items

- Appendix B. Plans and Drawings
- Appendix C. Standard Specifications for Construction of Trails on Forest Service Projects
- Appendix D. Federal Flowdown Provisions

Insurance Requirements

Upon selection of the winning bid, the Contractor agrees that it has and shall maintain the following insurance coverage indicated below. The effective date of all coverage shall precede the start of any work.

- a. State minimum workers' compensation insurance coverage for its employees, if any.
- b. Broad form general liability, property damage, and automotive liability insurance in the minimum amount of \$1,000,000 for bodily injury, death, or damage to property of any person and \$2,000,000 for bodily injury, death, or damage to property of more than one person. The Contractor shall name NFF an Additional Named Insured and provide NFF with a certificate of insurance evidencing such coverages, prior to the initiation of the Scope of Services.
- c. If the Scope of Services includes professional services as identified herein, Contractor shall also provide professional errors and omissions liability insurance. Professional services for purposes of this section include, but are not limited to performing architecture, engineering, landscape architecture, land surveying or planning, preparation and signing or stamping of drawings, maps, surveys or construction specifications, or design and development of computer software, programs or websites by the Contractor or by subcontractors on behalf of the Contractor, for which professional liability insurance would typically be required. The minimum coverage limits required are \$1,000,000 for each claim and \$1,000,000 annual aggregate.

Prohibited Telecommunications Services and Equipment

If required, the Contractor is responsible for compliance with the prohibition on certain telecommunications and video surveillance services or equipment identified in 2 CFR 200.216.

Payment/Performance Security

Contractor shall post cash, a letter of credit, bond, or other financial security that is easily convertible into cash in a form acceptable to the NFF, in its sole determination, to assure completion of the work required under any subsequent agreement and payment of all amounts lawfully due to all persons supplying or furnishing to the Contractor or Contractor's subcontractors with labor, laborers, materials, rental machinery, tools or equipment used or to perform the work. Contractor may incorporate required associated costs into mobilization costs or other approved expenses.

- a. Work that is classified as construction in accordance with the Miller Act or Little Miller Act or if required per conditions of the funding source, payment and performance bonding will be required in the full amount of any Agreement. For the purposes of this Request for Proposal, construction is defined as "any contract greater than \$100,000 for the construction, alteration, or repair of any public building or public work where the federal government is the owner", or
- b. If Contractor is not self-performing at least 85% of the total contract value or if the cost of materials is in excess of the larger of \$100,000 or 50% of the contract total, payment and performance bonding will be required in the full amount of the agreement, or

- c. If the value of the agreement is in excess of \$250,000, Contractor will be required to post financial security in a form acceptable to the NFF in the amount of 5% of the total agreement value up to \$250,000 in total financial security.

Federal Exclusion Verification

The selected Contractor will be required to affirm that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

Federal Flowdown Provisions

Flowdown Requirements: Any Agreement associated with this RFP may be subject to flowdown requirements under associated federal or state funding agreements, which are included and attached as Appendix D.

II. REQUIRED COMPONENTS

Technical Proposal

Please provide a detailed technical approach to the work.

Contractor Qualifications

- (a) Past Experience – Please provide a brief explanation of previous work experience with land management agencies.
- (b) References – Please provide three professional references that can speak to past performance.

Pricing Schedule

Contractor shall price work according to the schedule below. Prevailing wages are required per conditions of funding sources.

	Task/Item*	Unit of Measure	Units**	Unit Cost	Extended Cost
(a)	Mobilization	Lump Sum	1		
(b)	Trail Layout and Planning (including flagging and/or creation of GPS layer of work items to be completed)	Lump Sum	1		
(c)	Existing Trail Restoration	Linear Ft	34,987		
(d)	Borrow	Cubic Yds	225		
(e)	Abandoned Trail Obliteration	Linear Ft	30		
(f)	Hazard Tree Removal	Each	1		

(g)	Talus Section Maintenance	Linear Ft	2,814		
(h)	Shallow Stream Ford with rock retainer	Each	1		
(i)	Installation of Check Step	Each	10		
(j)	Rock Waterbar Installation	Each	104		
(k)	Waterbar Maintenance	Each	100		
(l)	Ditch Maintenance	Linear Ft	120		
(m)	Drain Dip Maintenance	Each	17		
(n)	Switchback Maintenance	Each	9		
(o)	Turnpike Maintenance	Linear Ft	413		
(p)	Side Barrier Installation, Type Stacked Rock	Linear Ft	125		
(q)	Retaining Wall Installation, Type MSE with Treated Timber or Rock Facing	Linear Ft	850		
(r)	Sign Installation and/or Replacement	Each	14		
				Total Bid	

*NFF reserves the right to award or not award items in the pricing schedule as funding availability allows. Multiple contract awards are possible.

**Units in the pricing schedule are approximate quantities. Contractor will be compensated for actual quantities completed in compliance with the project plans and specifications.

III. SUBMISSION, EVALUATION, AND CONTACTS

Contractor Selection Process

This is a request for proposals only and bids furnished are not offers from the National Forest Foundation. This request does not commit the National Forest Foundation to pay any costs incurred in the preparation or submission of the proposal or to contract for supplies or services.

The NFF will use the Evaluation Factors below to review each submitted bid. Based on the outcomes of that selection process, the NFF will notify successful and unsuccessful bidders by December 20, 2024 and will prepare a separate contract document.

Evaluation Factors and Relative Importance

The following criteria will be used in the evaluation of submitted proposals, ordered from highest weighting (level 3) to lowest weighting (level 1).

Level 3 Criteria

- Price / cost
- Equipment and contractor capability

- Timing of when contractor can begin and/or finish the project
- Past performance,

references, and USFS feedback

Level 2 Criteria

- Technical proposal / proposed approach to project
- Overall strategic benefits to meeting NFF goals and grant needs, requirements, and timelines

Level 1 Criteria

- Benefits to the local community
- Relationship to local community

Point of Contact

Please submit any questions about the project in writing to the Point of Contact.

Kaily Raley
National Forest Foundation, GMUG Recreation Coordinator
kralley@nationalforests.org

Responses will be shared with known interested parties by email or otherwise posted at <https://www.nationalforests.org/rfp>.

Bid Submission

Submit bids via email to kralley@nationalforests.org by end of day **December 8, 2024**.

Equal Opportunity Provider

In accordance with Federal law and U.S. Department of Agriculture policy, the National Forest Foundation is prohibited from discriminating on the basis of race, color, national origin, sex, age, religion, political beliefs, or disability.

Appendix A

Crag Crest NRT Rehab Restoration Schedule of Items

Pay Item Number	Description	Quantity	Unit of Measure	Method of Measure	Cost	Total Unit Cost
90701	Mobilization	1	L.S.Q.	L.S.Q.		
91103	Existing Trail Restoration	34987	L.F.	A.Q.		
91104	Borrow	225	C.Y.	C.Q.		
91115	Abandoned Trail Obliteration	30	L.F.	A.Q.		
91217	Hazard Tree Removal	1	Each	A.Q.		
91502	Talus Section Maintenance	2814	L.F.	A.Q.		
91701	Ford, Type Rock Retainer	1	Each	A.Q.		
92201	Rock Waterbar	104	Each	A.Q.		
92203	Waterbar Maintenance	100	Each	A.Q.		
92504	Ditch Maintenance	120	L.F.	A.Q.		
92706	Drain Dip Maintenance	17	Each	A.Q.		
93102	Switchback Maintenance	9	Each	A.Q.		
93203	Turnpike Maintenance	413	L.F.	A.Q.		
93301	Side Barrier, Type Stacked Rock	125	L.F.	A.Q.		
93501	Retaining Wall, Type MSE with Treated Timber or Rock Facing	850	S.F.	A.Q.		
95110	Sign Relacement	14	Each	A.Q.		
					Total	

Appendix B

UNITED STATES DEPARTMENT OF AGRICULTURE



FOREST SERVICE



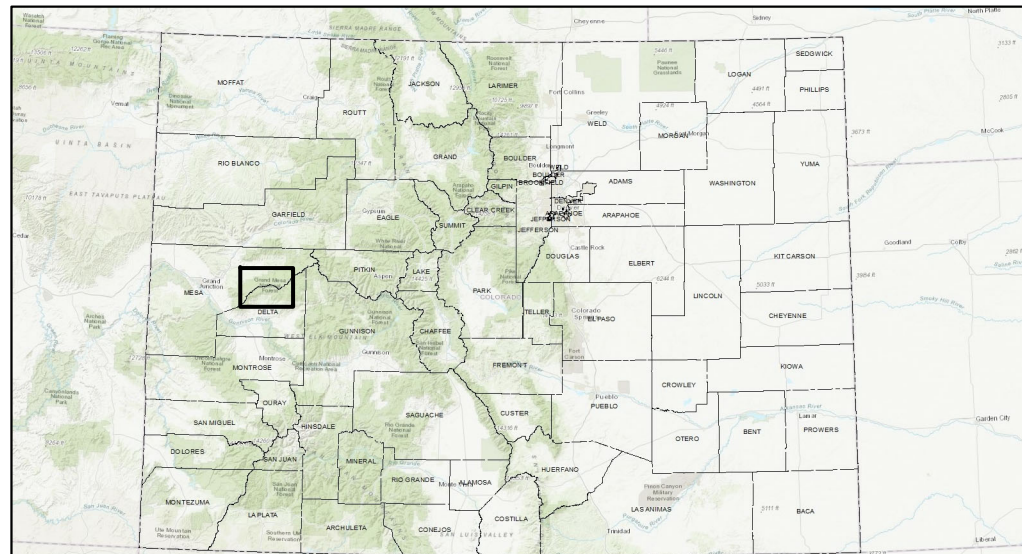
ROCKY MOUNTAIN REGION

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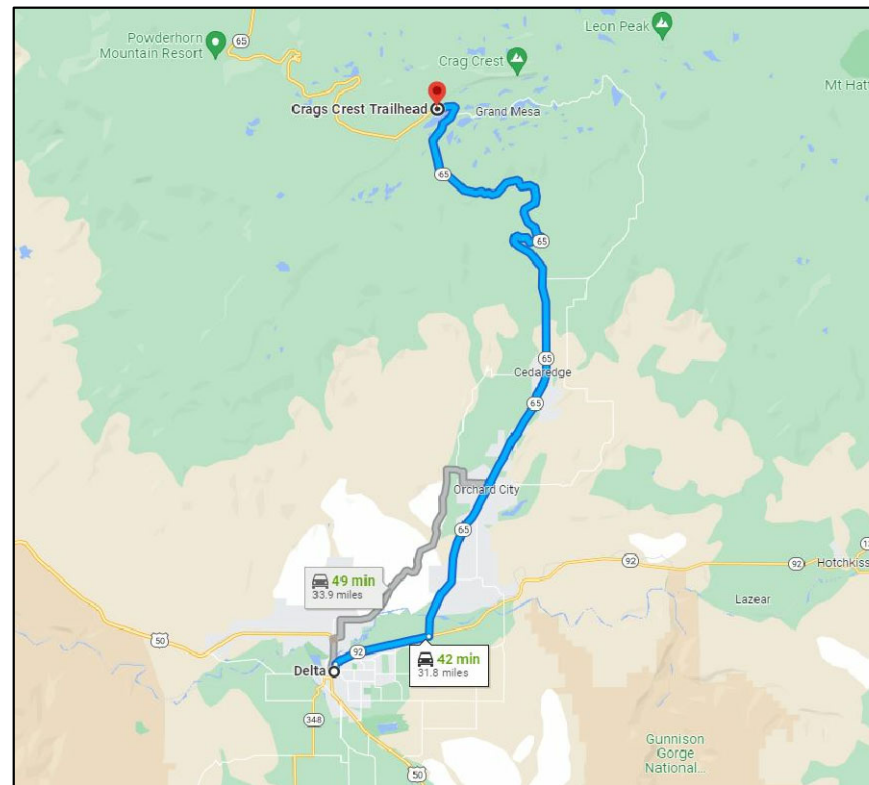
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GMUG NATIONAL FORESTS GRAND VALLEY RANGER DISTRICT

TRAIL CONSTRUCTION PLANS FOR

CRAG_CREST_NRT_RECONSTRUCTION



PROJECT SITE

PREPARED BY:

CIVIL ENGINEER _____ DATE _____

TRANSPORTATION ENGINEER _____ DATE _____

RECOMMENDED BY:

FOREST RECREATION STAFF OFFICER _____ DATE _____

DISTRICT RANGER _____ DATE _____

FOREST ENGINEER _____ DATE _____

APPROVED BY:

FOREST SUPERVISOR _____ DATE _____

REVISIONS:

No.	_____	DATE _____	INITIALS _____
No.	_____	DATE _____	INITIALS _____
No.	_____	DATE _____	INITIALS _____

DESIGN: DOUG MARAH _____ DATE _____

DRAWN: SETH EHRET _____ DATE _____

CHECKED: DARIS MATOS _____ DATE _____

PROJECT NAME
CRAG CREST NRT RECONSTRUCTION

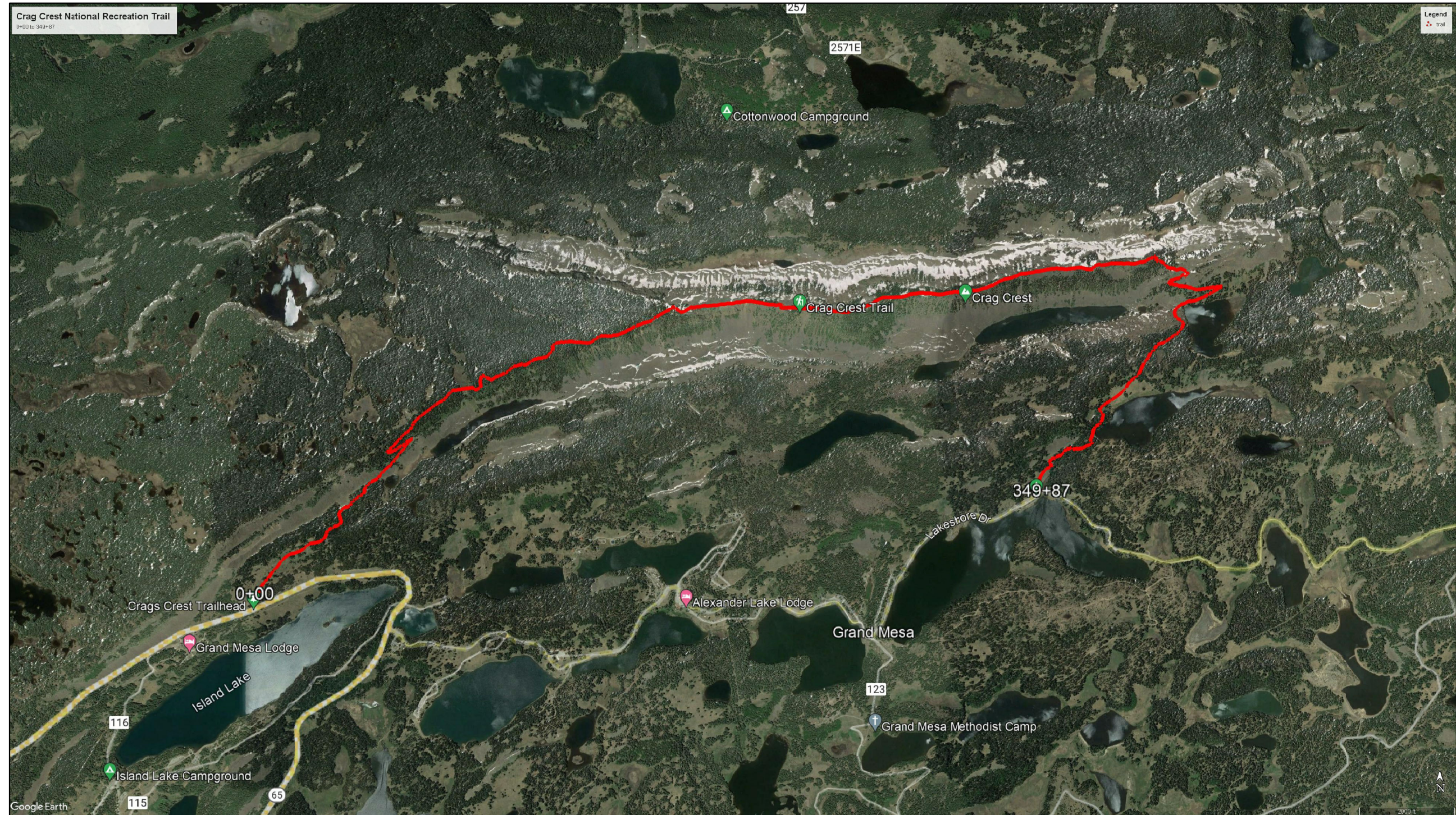
SECTION **900-GENERAL** TYPICAL ID **TTL**

REVISION DATE
NO SCALE

DRAWING NO.
STD_900-01

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CRAG CREST NATIONAL RECREATION TRAIL



FROM CEDAREDGE, COLORADO: TAKE HIGHWAY 65 NORTH FOR 11 MILES TO THE CRAG CREST TRAIL HEAD PARKING LOT.
 FROM GRAND JUNCTION, COLORADO: THE CRAG CREST TRAIL HEAD PARKING LOT IS APPROXIMATELY 38 MILES FROM GRAND JUNCTION. TAKE
 HIGHWAY 70 EAST, TO HIGHWAY 65 SOUTH.
 PROJECT ENDS AT THE CRAG CREST CAMPGROUND PARKING LOT ON NFSR 121 TRICKLE PARK ROAD.

U.S. DEPARTMENT OF AGRICULTURE
 FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION
CRAG CREST NRT RECONSTRUCTION
GMUG NATIONAL FORESTS
GRAND VALLEY RANGER DISTRICT

DRAWING NAME
VICINITY MAP

SECTION
900 - GENERAL

TYPICAL ID
VCM

REVISION DATE
NO SCALE

DRAWING NO.
STD_900-02

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TYPICAL ID DEFINITIONS

GENERAL NOTES

DRAWING NUMBER	TYP ID	DRAWING NAME
STD_900-01	TTL	TITLE_SHEET
STD_900-02	VCM	VICINITY_MAP
STD_900-03	GNT	GENERAL_NOTES
STD_900-04	WKL	WORK_LIST
STD_906-01	SOQ	SUMMARY_OF_QUANTITIES
STD_910-01	STT	STANDARD_TRAIL_TERMS
STD_911-01	TSF/TCS	TYPICAL_CROSS_SECTION_SLOPE_FINISH
STD_911-30-01	ETR	EXISTING_TRAIL_RESTORATION
STD_912-01	CLT	CLEARING_LIMITS_TREES_LOGS
STD_912-02	CLB	CLEARING_LIMITS_BRUSHING
STD_915-01	TAS	TALUS_SECTION
STD_917-20-01	RF1	CONSTRUCTED_ROCK_FORD
STD_917-20-02	RF2	CONSTRUCTED_ROCK_FORD
STD_922-10-01	RWB	ROCK_WATERBAR
STD_927-10-01	DD1	DRAIN_DIP
STD_927-10-02	DD2	DRAIN_DIP_DETAILS
STD_931-10-01	SW1	SWITCHBACK_TYPE_1
STD_932-10-01	TPK	TURNPIKE
STD_933-10-01	SRB	STACKED_ROCK_BARRIER
STD_935-20-01	RRW	STACKED_ROCK_RETAINING_WALL
STD_935-20-02		RETAINING_WALL_RECONSTRUCTION
STD_935-20-03		GEOGRID_LENGTHS_&_ANCHORING_DETAILS
STD_951-01	LIN	LOCATION_&_INFORMATION
STD_951-02	SPI	SIGN_&_POST_INSTALLATION

SECTION 909 – MAINTENANCE FOR TRAFFIC

909.10.01 – CONTRACTOR SHALL PROVIDE A DETAILED TRAFFIC CONTROL PLAN FOR MANAGING PUBLIC ACCESS THROUGH THE WORK AREAS. THE TRAFFIC CONTROL PLAN SHALL COMPLY WITH THE REQUIREMENTS OF THE MANUAL FOR TRAFFIC CONTROL DEVICES (MUTCD) PEDESTRIAN ACCESS AND THE FOREST SERVICE ENGINEERING MANUAL (EM) 7100.

SECTION 911.2 – BORROW

911.20.02 REQUIREMENTS. BORROW SITES SHALL BE WITHIN 1000 FEET OF THE SITE OF THE WORK. ALL BORROW SITES SHALL BE APPROVED BY THE CONTRACTING OFFICER BEFORE USE. AFTER USE, BORROW SITES WILL BE SLOPED TO DRAIN AND SLASHED IN WITH ANY AVAILABLE DUFF OR OTHER ORGANIC MATERIAL USED TO COVER THE DISTURBED GROUND. CONSTRUCTION AREA.

SECTION 912.10 – CLEARING AND GRUBBING

912.10.03 MATERIALS TO BE CLEARED. ALL LIVE ENGLEMANN SPRUCE OR COLORADO BLUE SPRUCE SHALL BE BUCKED INTO 4' LENGTHS OR SKINNED ON ONE SIDE TO THE CAMBIUM LAYER DOWN TO A 4" TOP. ALL SLASH SHALL BE SPREAD TO A MAXIMUM DEPTH OF 24" AND SHALL NOT BE PLACED IN LIVE DRAINAGES OR TO OBSTRUCT OVERLAND FLOW OF WATER.

Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	0+00	349+87	Existing Trail Restoration	STD 911-30-10		911		91103	L.F.	34987	Intersect Concrete Walkway
	0+10		Replace Existing Sign and Post	STD 951-01,02		951		95110	Each	2	
	0+90		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	1+56		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	2+00		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	2+73		Intersect Crag to Cobbett Trail								No Work
	3+11		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	3+41		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	4+13		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	4+67		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	5+28		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	6+21		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	6+89		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	7+32		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	8+05		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	8+90		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	9+71		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	10+54		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	11+68		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	12+78		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	13+11		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	14+25		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	14+86		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	16+20		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	17+21		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	17+81		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	18+32		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	20+43		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	20+63		Replace Existing Sign and Post	STD 951-01,02		951		95110	Each	1	
	21+00		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	21+02		Intersect Crag Crest Lower Loop								No Work
	21+90		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION
**CRAG CREST NRT RECONSTRUCTION
GMUG NATIONAL FORESTS
GRAND VALLEY RANGER DISTRICT**

DRAWING NAME
WORK LIST

SECTION
900 - GENERAL

TYPICAL ID
WKL

REVISION DATE
NO SCALE

DRAWING NO.
STD_900-04

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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	23+19		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	26+02		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	26+50		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	27+02		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	30+98		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	32+22		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	33+02		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	33+77		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	35+37	36+19	Turnpike Maintenance	STD 932-10-01		932		93203	L.F.	82	Add 4" Fill
	36+19		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	37+25		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	39+47		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	40+75	42+99	Talus Section Maintenance	STD 915-01		915		91502	L.F.	224	
	43+27		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	44+13		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	44+75		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	45+41		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	45+96		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	46+70		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	47+40		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	48+22		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	48+25	49+86	Talus Section Maintenance	STD 915-01		915		91502	L.F.	161	
	48+85		Rock Waterbar	STD 922-10-01		922		92203	Each	1	
	49+40	49+86	Talus Section Maintenance	STD 915-01		915		91502	L.F.	46	
	50+05		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	50+81		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	51+42		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	51+92		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	52+00	54+55	Talus Section Maintenance	STD 915-01		915		91502	L.F.	255	
	52+62		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	53+00		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	Add 4" Fill to Tread
	53+95		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION
**CRAG CREST NRT RECONSTRUCTION
GMUG NATIONAL FORESTS
GRAND VALLEY RANGER DISTRICT**

DRAWING NAME
WORK LIST

SECTION
900 - GENERAL

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STD_900-04

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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	54+55		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	56+10		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	56+85		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	58+41		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	59+20		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	59+28		Ditch Maintenance			925		92504	L.F.	100	
	59+58		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	Add 4" Fill to Tread
	59+98		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	60+36		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	60+83		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	61+31		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	61+78		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	62+88		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	64+57		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	65+90		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	66+16	66+78	Turnpike Maintenance	STD 932-10-01		932		93203	L.F.	62	Add 4" Fill
	68+32		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	69+10		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	74+24	75+47	Turnpike Maintenance	STD 932-10-01		932		93203	L.F.	123	Add 4" Fill
	75+54		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	76+10		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	77+24	77+92	Turnpike Maintenance	STD 932-10-01		932		93203	L.F.	68	Add 4" Fill
	78+56	79+34	Turnpike Maintenance	STD 932-10-01		932		93203	L.F.	78	Add 4" Fill
	79+42		Intersect NFST 712, Cotton Wood Trail								
	79+57		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	79+72		Sign Replacement	STD 951-01,02		951		95110	Each	4	
	80+27		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	82+06		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	84+91		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	86+77		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	88+17		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	88+58		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	

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GMUG NATIONAL FORESTS
GRAND VALLEY RANGER DISTRICT**

DRAWING NAME
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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	89+32		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	89+66		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	90+32		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	91+68		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	92+68		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	93+56		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	94+26		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	94+86		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	95+84		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	97+05		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	97+79		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	98+73		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	99+56		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	100+26		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	101+12		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	101+83		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	102+66		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	103+24		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	103+90		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	104+87		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	105+76		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	106+42		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	106+88		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	107+73		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	108+12		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	108+57		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	109+16		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	109+53		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	110+10		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	111+18		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	112+65		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	114+21		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	

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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	115+77		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	116+88		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	117+44		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	118+79		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	120+83		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	125+40		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	127+81		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	131+06		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	132+56		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	135+39		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	136+78		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	137+27		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	139+56		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	140+34		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	141+13		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	144+65	148+23	Talus Section Maintenance	STD 951-01,02		951		95102	Each	358	
	154+06	154+56	Talus Section Maintenance	STD 951-01,02		951		95102	Each	50	
	157+23		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	158+82	159+57	Talus Section Maintenance	STD 951-01,02		951		95102	Each	75	
	160+23	160+98	Talus Section Maintenance	STD 951-01,02		951		95102	Each	75	
	161+36		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	
	162+10		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	
	163+75		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	164+56		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	165+61		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	168+57		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	169+56		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	170+06		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	173+92		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	174+87		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	176+36		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	178+12		Rock Waterbar	STD 922-10-01		922		92201	Each	1	

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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	180+05		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	188+08		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	189+59		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	190+40		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	193+98		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	194+83		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	195+56		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	196+64		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	10	
	197+11		Hazard Tree Removal	STD 912-01		912		91217	Each	1	
	200+58		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	30	
	202+92		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	20	
	204+71		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	30	
	205+78		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	90	
	207+83		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	209+25		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	209+95		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	210+75		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	211+28		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	211+92		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	212+32		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	215+12		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	20	
	215+13		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	20	
	216+72		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	30	
	218+12		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	280	
	227+77		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	80	

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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	228+11	229+11	Talus Section Maintenance	STD 951-01,02		951		95102	Each	100	
	233+55		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	234+53		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	236+15		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	236+95		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	237+67		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	238+82		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	239+66		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	242+82		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	243+61		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	248+23		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	248+73		Abandoned Trail Obliteration	STD 911-01		911		91115	L.F.	30	
	248+95		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	249+44		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	249+87		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	4' Radius
	249+87		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	100	80 S.F. Left, 20 S.F. Right
	249+87		Ditch Maintenance			925		92504	L.F.	20	
	250+48		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	251+03		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	251+82		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	253+27	254+27	Talus Section Maintenance	STD 951-01,02		951		95102	L.F.	100	
	259+94		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	260+63		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	261+21		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	261+68		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	262+43		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	263+09		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	263+40		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	4' Radius
	263+40		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	100	80 S.F. Left, 20 S.F. Right
	263+79		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	264+16		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	4' Radius

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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	264+16		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	100	80 S.F. Left, 20 S.F. Right
	264+49		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	265+02		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	6' Radius
	265+02		Retaining Wall, Type MSE with Treated Timber or Rock Facing	STD 935-20-01,02,03		935		93501	S.F.	100	80 S.F. Left, 20 S.F. Right
	265+49		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	266+56		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	267+11	268+11	Talus Section Maintenance	STD 951-01,02		951		95102	L.F.	100	
	269+55		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	270+35		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	271+07		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	272+78		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	273+46		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	274+06	274+56	Talus Section Maintenance	STD 951-01,02		951		95102	L.F.	50	
	275+12		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	276+59		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	277+24	277+99	Side Barrier, Type Stacked Rock	STD 933-10-01		933		93301	L.F.	75	
	277+91	278+41	Side Barrier, Type Stacked Rock	STD 933-10-01		933		93301	L.F.	50	
	278+34		Switchback Maintenance	STD 931-10-01		931		93102	Each	1	4' Radius
	278+95		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	279+71		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	280+86		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	282+77		Drain Dip Maintenance	STD 927-01,02		927		92706	Each	1	
	284+08		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	285+25		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	286+00		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	287+56		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	290+18		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	291+36		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	293+66		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	294+38		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	294+77		Replace Existing Sign and Post	STD 951-01,02		951		95110	Each	1	Bullfinch Reservoir Access
	305+25		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	

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Trail Number	Begin Station	End Station	Task	Drawing Number	Typical ID	Specification Number	Supplemental Specification	Pay Item	Unit of Measure	Quantity	Note
711	307+82		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	308+76		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	309+28		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	310+30		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	310+90		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	311+49		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	312+84		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	313+60		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	313+71		Intersection with temporary logging road foot print								No Work
	331+81		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	333+70		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	337+14		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	337+88		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	338+53		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	339+08		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	339+53		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	340+52		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	340+82		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	341+22		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	341+95		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	342+87		Replace Existing Sign and Post	STD 951-01,02		951		95110	Each	5	Intersect Crag Crest Lower Loop
	343+35		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	343+54		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	344+09		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	344+67		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	345+43		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	345+95		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	347+12		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	347+85		Rock Waterbar	STD 922-10-01		922		92201	Each	1	
	348+44		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	349+82		Waterbar Maintenance	STD 922-10-01		922		92203	Each	1	
	349+82		Replace Existing Sign and Post	STD 951-01,02		951		95110	Each	1	
	349+87		Intersect Crag Crest Camp Ground Road, End of Project								



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION
**CRAG CREST NRT RECONSTRUCTION
GMUG NATIONAL FORESTS
GRAND VALLEY RANGER DISTRICT**

DRAWING NAME
WORK LIST

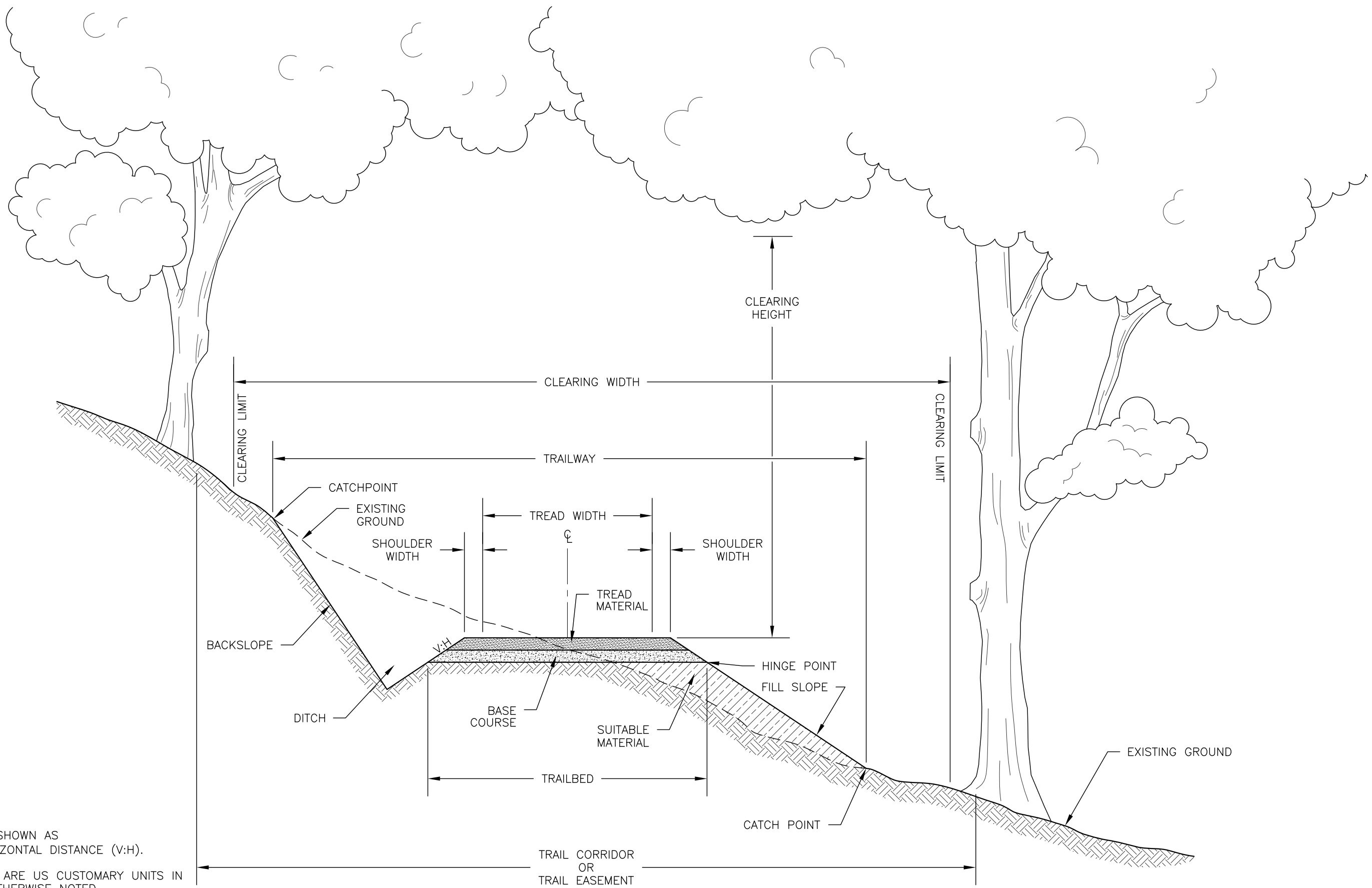
SECTION
900 - GENERAL

TYPICAL ID
WKL

REVISION DATE
NO SCALE

DRAWING NO.
STD_900-04

SHEET
12 OF 32



NOTES:
 ALL SLOPES ARE SHOWN AS VERTICAL-TO-HORIZONTAL DISTANCE (V:H).
 ALL UNITS SHOWN ARE US CUSTOMARY UNITS IN INCHES UNLESS OTHERWISE NOTED.

U.S. DEPARTMENT OF AGRICULTURE
 FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION
CRAG CREST NRT RECONSTRUCTION
GMUG NATIONAL FORESTS
GRAND VALLEY RANGER DISTRICT

DRAWING NAME
STANDARD TRAIL TERMS

SECTION: **910 - TRAILWAY**

TYPICAL ID: **STT**

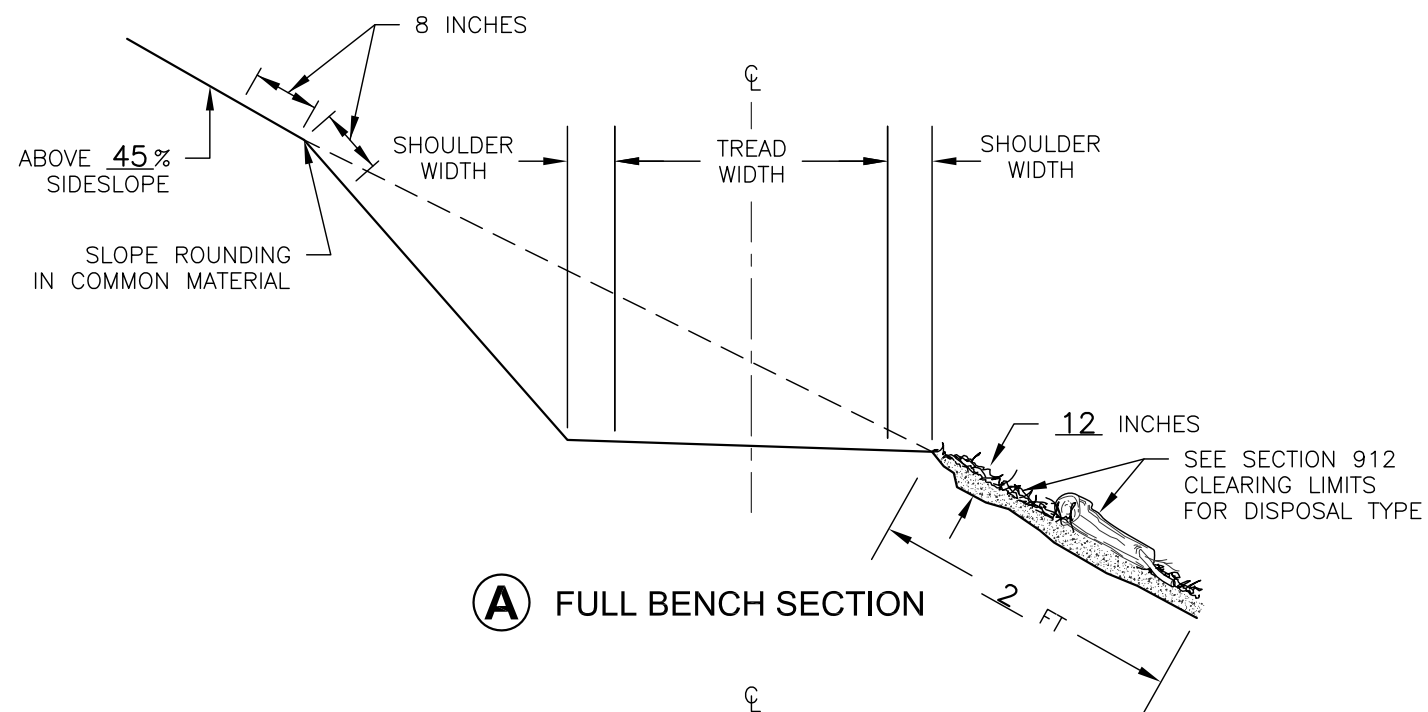
REVISION DATE

NOT TO SCALE

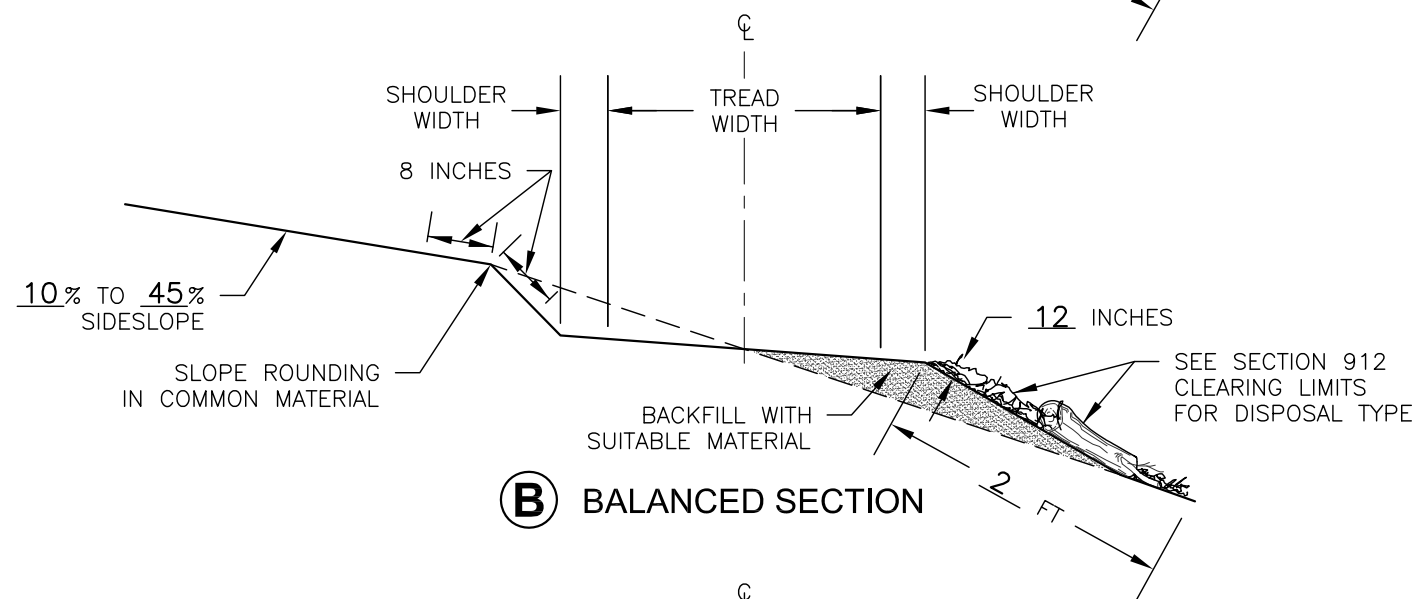
DRAWING NO.
STD_910-01

SHEET
14 OF **32**

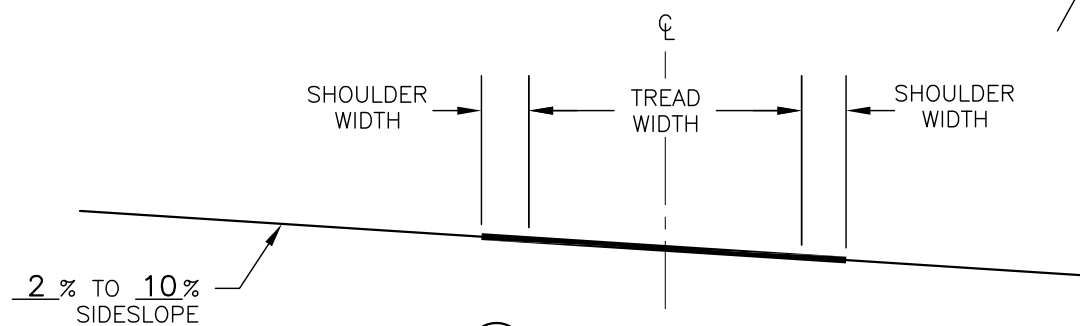
TYPICAL TRAIL CROSS SECTIONS



(A) FULL BENCH SECTION



(B) BALANCED SECTION



(C) FLAT SECTION

TYPICAL TRAIL TREAD AND SHOULDER WIDTH

TYPICAL ID	SECTION TYPE	TREAD FINISH	TREAD WIDTH	SHOULDER WIDTH		COMMENTS
				UPHILL	DOWNHILL	
TSF-1	ALL	T1	24"			TREAD WIDTH SHALL BE 24" MINIMUM

TREAD CROSS SLOPE

TYPICAL ID	OUTSLOPE	INSLOPE	CROWNED SECTION	COMMENTS
TCS-1	8%	X%	X%	OUTSLOPE SHALL BE 8% MINIMUM

SLOPE AND TRAILBED FINISH

TREAD FINISH	ROOTS	LOOSE ROCK	EMBEDDED ROCK	COMMENTS
T1	2"	3"	3"	
T2				
T3				
T4				
T5				
T6				

TRAILBED AND SLOPE FINISH

SLOPE FINISH

REMOVE ROOTS THAT PROTRUDE FROM THE BACKSLOPE WITH DIAMETERS GREATER THAN SHOWN IN THE SLOPE AND TRAILBED FINISH TABLE.

TRAILBED FINISH

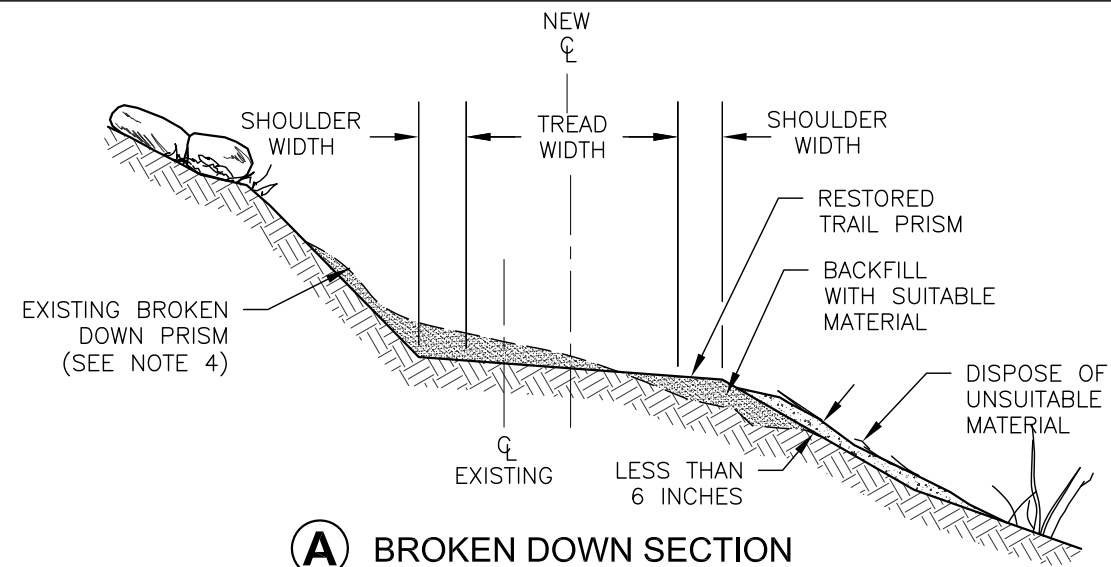
REMOVE LOOSE ROCK ON THE TRAILBED WITH A DIMENSION GREATER THAN SHOWN IN THE SLOPE AND TRAILBED FINISH TABLE.

REMOVE OR REDUCE EMBEDDED ROCK THAT PROTRUDES MORE THAN THE DIMENSIONS SHOWN IN THE SLOPE AND TRAILBED FINISH TABLE.

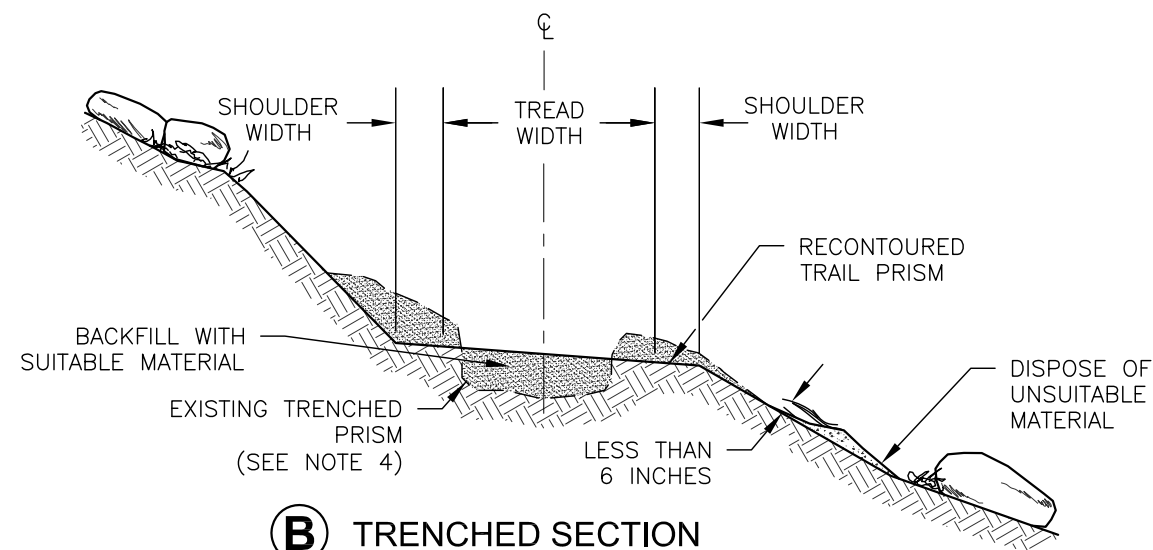
NOTES:

- SLASH CONSISTS OF LOGS, LIMBS, BRUSH, AND ROCKS PLACED RANDOMLY IN A WAY TO CATCH SEDIMENT MOVEMENT.
- LIMB ALL TREES AND SHRUBS AND TAMP SLASH INTO GROUND SO THAT 80% OF SLASH IS IN CONTACT WITH THE GROUND.

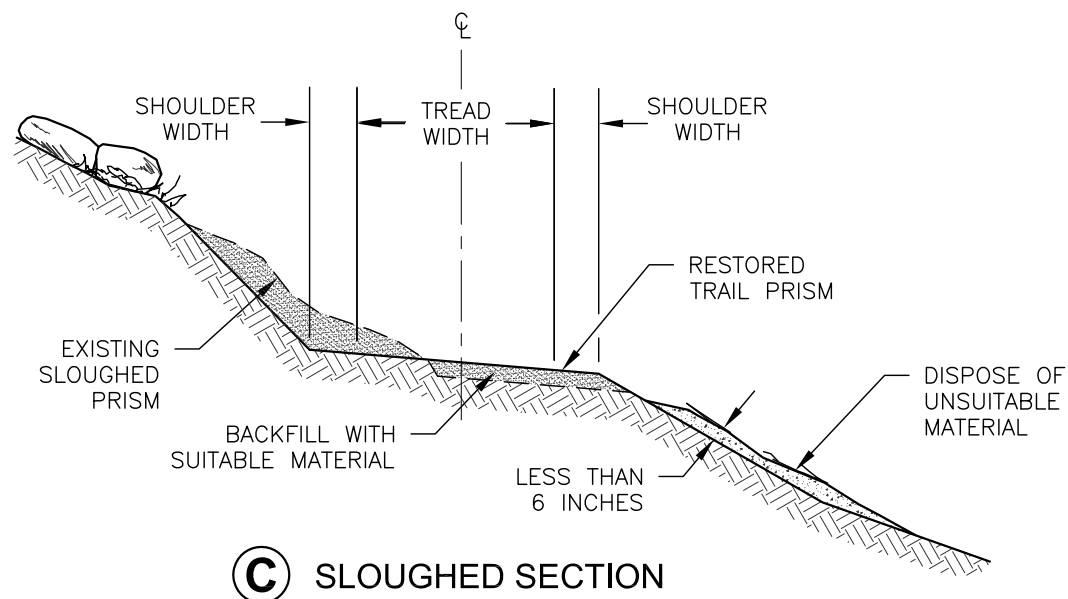
EXISTING TRAIL RESTORATION



(A) BROKEN DOWN SECTION



(B) TRENCHED SECTION

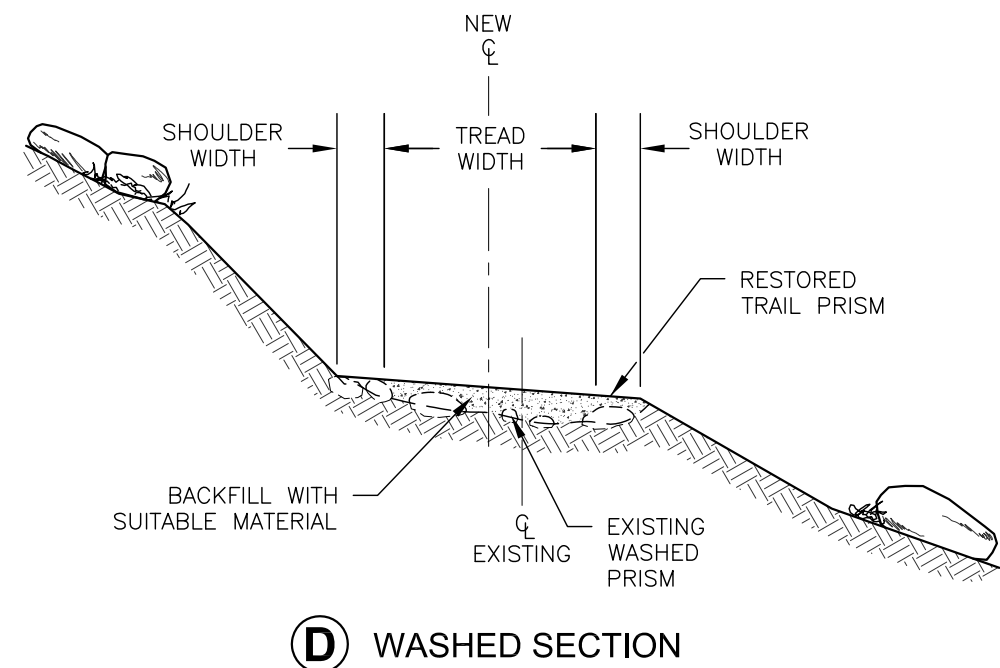


(C) SLOUGHED SECTION

TYPICAL ID	SECTION TYPE	TREAD WIDTH	SHOULDER WIDTH		COMMENTS
			UPHILL	DOWNHILL	
ETR-1	ALL	24"			

NOTES:

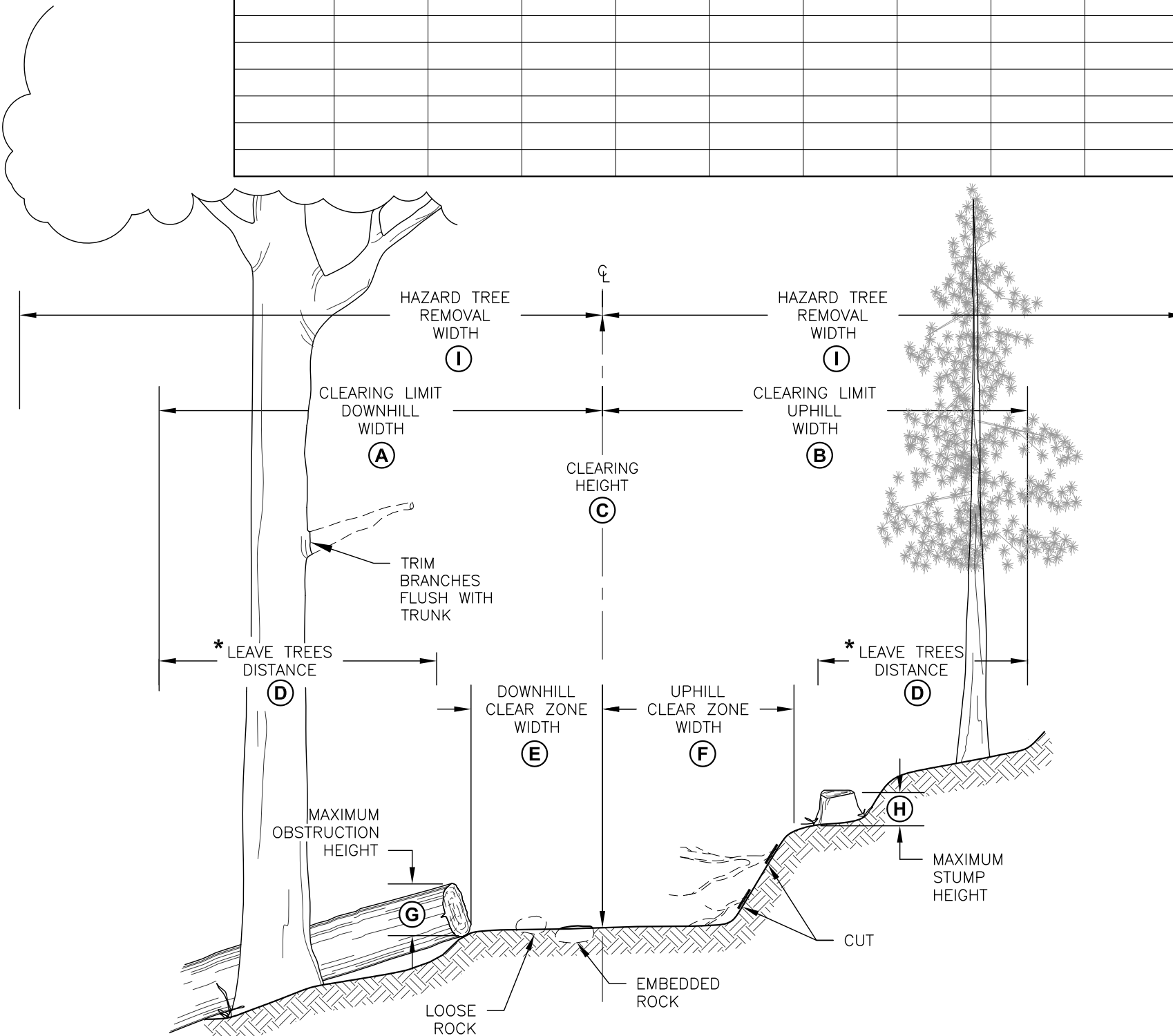
1. RE-ESTABLISH ORIGINAL DRAINAGE STRUCTURES TO MATCH NEW TREAD SURFACE.
2. INSTALL CHECK DAMS, DRAINAGE DIPS OR OTHER DRAINAGE STRUCTURES WHEN SPECIFIED.
3. DRAINAGE DIPS WILL BE STAKED IN THE FIELD WHEN REQUIRED AND WILL BE PAID SEPARATELY UNDER SECTION 927.
4. USE ONLY SUITABLE MATERIAL TO CONSTRUCT RESTORED TRAIL PRISMS. DISPOSE OF UNSUITABLE MATERIAL AS SHOWN ON PLANS.
5. SEEDING, FERTILIZING & MULCHING WHEN REQUIRED WILL BE PAID UNDER SECTION 981.



(D) WASHED SECTION

CLEARING LIMITS - TREES AND LOGS

TYPICAL ID	CLEARING METHOD	CLEARING LIMITS			* LEAVE TREES		CLEAR ZONE			STUMPS	HAZARD TREE	DISPOSAL METHOD	COMMENTS
		DOWNHILL WIDTH (A)	UPHILL WIDTH (B)	CLEARING HEIGHT (C)	DISTANCE (FEET) (D)	DIAMETER (INCHES)	DOWNHILL WIDTH (E)	UPHILL WIDTH (F)	MAXIMUM OBSTRUCTION HEIGHT (G)	MAXIMUM HEIGHT (H)	REMOVAL WIDTH (I)		
CLT-1	C 2	3'	5'	10'	4	12	3'	3'	8"	12"	75'	D 2	



CLEARING METHOD

CLEARING TYPE	CLEARING METHOD	COMMENTS
C1	NEW CONSTRUCTION	TREES, PRUNING, & BRUSH
C2	CLEARING LIMIT RESTORATION	TREES, PRUNING, LOGS, BRUSH & MAINTENANCE
C3	TRAIL OPENING	LOGGING OUT, LOOSE ROCK & DRAINAGE CLEARING
C4	HAZARD TREE REMOVAL	ALONG TRAIL CORRIDOR
C5	HAZARD TREE REMOVAL	INDIVIDUAL (AS MARKED)
C6	LOOSE ROCK & ROOT REMOVAL	

LEAVE TREES: LEAVE TREES SHOULD BE LIVE, SOUND & UNDAMAGED WITH UNCOMPROMISED ROOT SYSTEMS.

HAZARD TREES: HAZARD TREES ARE TREES THAT ARE STANDING OR LEANING DEAD TREES LARGER THAN 8 INCHES IN DIAMETER AND GREATER THAN 90 FEET IN HEIGHT.

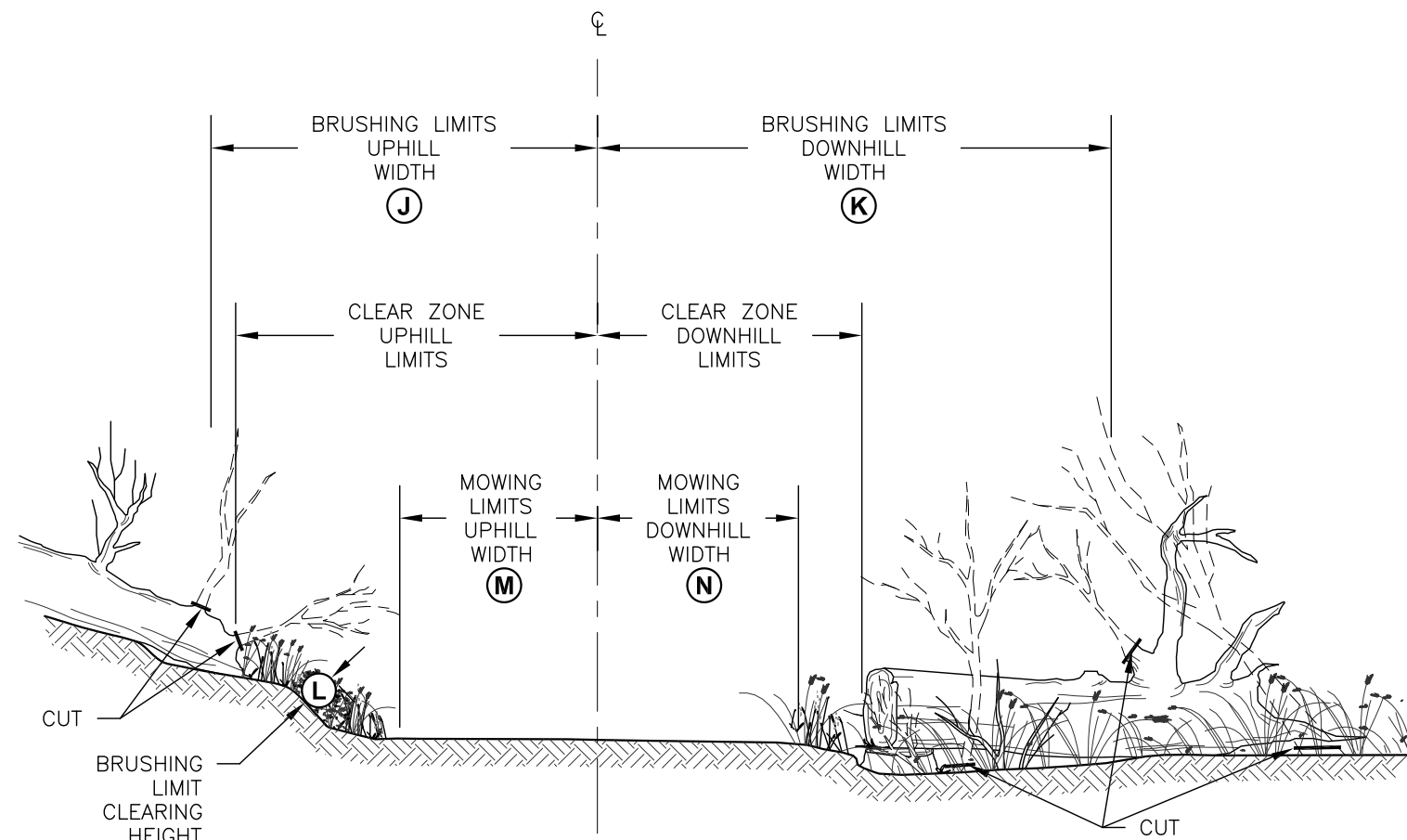
SLASH: SLASH SHALL NOT EXCEED 2' IN DEPTH. SLASH SHALL NOT BE CONCENTRATED IN PILES. SLASH SHALL NOT OBSTRUCT DRAINAGE STRUCTURES

DISPOSAL METHOD

DISPOSAL TYPE	DISPOSAL METHOD	COMMENTS
D1	LOP AND SCATTER OUTSIDE TRAILWAY	
D2	LOP AND SCATTER ON FILL SLOPE	
D3	PILE AND BURN	
D4	CHIP	
D5	HAUL TO DISPOSAL SITE	

CLEARING LIMITS - BRUSHING

TYPICAL ID	CLEARING METHOD	BRUSHING LIMITS			MOWING LIMITS		DISPOSAL METHOD	COMMENTS
		UPHILL WIDTH (J)	DOWNHILL WIDTH (K)	CLEARING HEIGHT (L)	UPHILL WIDTH (M)	DOWNHILL WIDTH (N)		
CLB-1	C 9	4'	4'	10'			D 1	



NOTE:
SEE SHEET STD_912-01 FOR
CLEAR ZONE LIMITS

SLASH: SLASH SHALL NOT EXCEED 2' IN DEPTH. SLASH SHALL NOT BE CONCENTRATED IN PILES. SLASH SHALL NOT OBSTRUCT DRAINAGE STRUCTURES

CLEARING METHOD

CLEARING TYPE	CLEARING METHOD	COMMENTS
C9	BRUSHING	
C10	MOWING	

DISPOSAL METHOD

DISPOSAL TYPE	DISPOSAL METHOD	COMMENTS
D1	LOP AND SCATTER OUTSIDE TRAILWAY	
D2	LOP AND SCATTER ON FILL SLOPE	
D3	PILE AND BURN	
D4	CHIP	
D5	HAUL TO DISPOSAL SITE	

TALUS OR ROCK SECTION

TYPICAL ID	TREAD WIDTH	SHOULDER WIDTH		GEOTEXTILE TYPE	BASE COURSE		SURFACE COURSE		COMMENTS
		UPHILL	DOWNHILL		TYPE	DEPTH*	TYPE	DEPTH	
TAS-1	24"			G 1	B 1	ASTERISK	N/A	N/A	TREAD WIDTH SHALL BE 24" MINIMUM OUTSLOPE SHALL BE 8% MINIMUM

*BASE COURSE DEPTH - AS NEEDED TO PROVIDE A USABLE SOUND TREAD
N/A WHEN NOT APPLICABLE

GEOTEXTILE TYPE

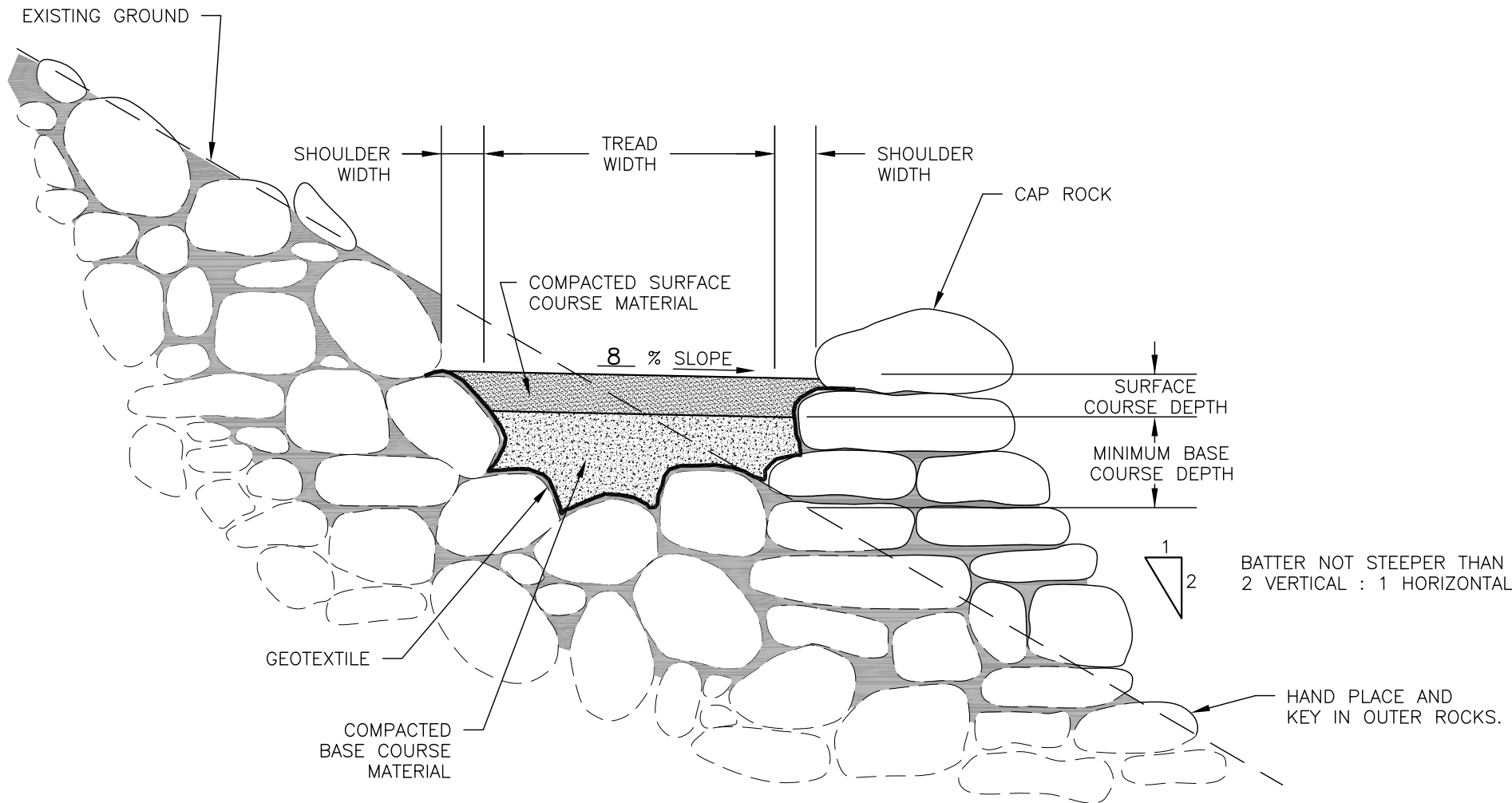
TYPE	MATERIAL	COMMENTS
G1	NON-WOVEN	
G2	WOVEN	

BASE COURSE MATERIAL TYPE

TYPE	MATERIAL	GRADATION	COMMENTS
B1	PITRUN		MAXIMUM SIZE 4" IN ITS LARGEST DIMENSION
B2	AGGREGATE		

SURFACE COURSE MATERIAL TYPE

TYPE	MATERIAL	GRADATION	COMMENTS
S1	PITRUN		
S2	AGGREGATE		



TYPICAL CROSS SECTION

NOTE:

1. REMOVE AND DISPOSE OF DUFF AND TOP ORGANIC LAYERS DOWN TO MINERAL SOIL.
2. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.

CONSTRUCTED FORD - ROCK STRUCTURE

TYPICAL ID	FORD LENGTH	APPROACHES		RETAINERS*		FOUNDATION**				SURFACE COURSE			ROCK DAM*		STEPPING ROCK MINIMUM SIZE (LBS)	COMMENTS	
		NEAR	FAR	TYPE	LENGTH	TYPE	DEPTH	LENGTH	GEOTEXTILE TYPE	TYPE	DEPTH	LENGTH	MINIMUM LENGTH	MINIMUM FACE ROCK SIZE (LBS)			
RF1-1	20'	10%	10%	R 1	10"	F 1	6"	10'	G 1	S 2	3"	15'	15'	150			

N/A WHEN NOT REQUIRED
 *MINIMUM DAM ROCK SIZE SHALL BE 150 LBS OR 2 CUBIC FEET *FOR TYPICAL RETAINERS SEE SHEET STD_911-03
 **FOR FOUNDATIONS SEE SECTION STD_918

GEOTEXTILE TYPE

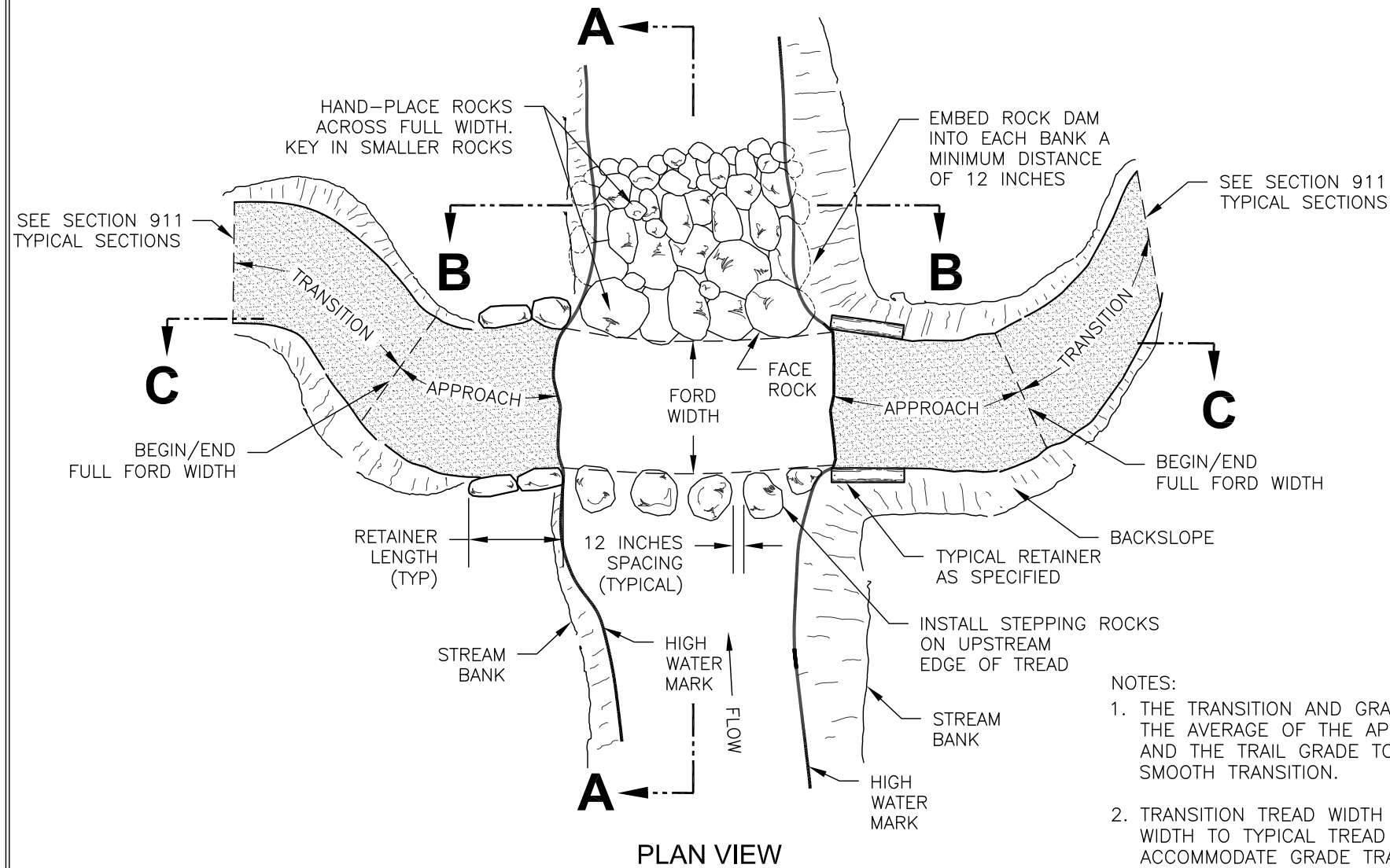
TYPE	MATERIAL	COMMENTS
G1	NON-WOVEN	
G2	WOVEN	
G3	GEOGRID	

FOUNDATION MATERIAL TYPE

TYPE	MATERIAL	COMMENTS
F1	GRAVEL	SMALL ROCKS LESS THAN 3 INCHES
F2	PAVING BLOCK	
F3	GEOCELL	

SURFACE COURSE MATERIAL TYPE

TYPE	MATERIAL	GRADATION	COMMENTS
S1	PITRUN		
S2	AGGREGATE	3" MINUS	
S3	CLAY		
S4	WOODCHIPS		



- NOTES:
1. THE TRANSITION AND GRADE SHALL BE THE AVERAGE OF THE APPROACH GRADE AND THE TRAIL GRADE TO CREATE A SMOOTH TRANSITION.
 2. TRANSITION TREAD WIDTH FROM FORD WIDTH TO TYPICAL TREAD WIDTH TO ACCOMMODATE GRADE TRANSITION.

STD_917-20 SHEET 1 OF 2

U.S. DEPARTMENT OF AGRICULTURE
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 GMUG NATIONAL FORESTS
 GRAND VALLEY RANGER DISTRICT**

DRAWING NAME
**CONSTRUCTED FORD
 ROCK STRUCTURE**

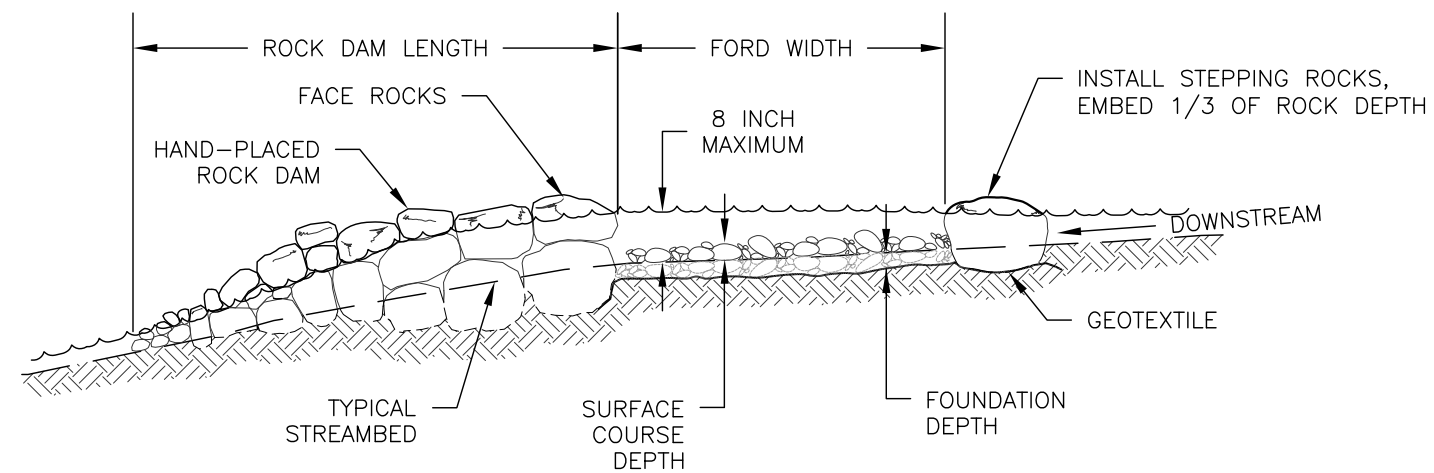
SECTION
917 - FORDS

TYPICAL ID
RF1

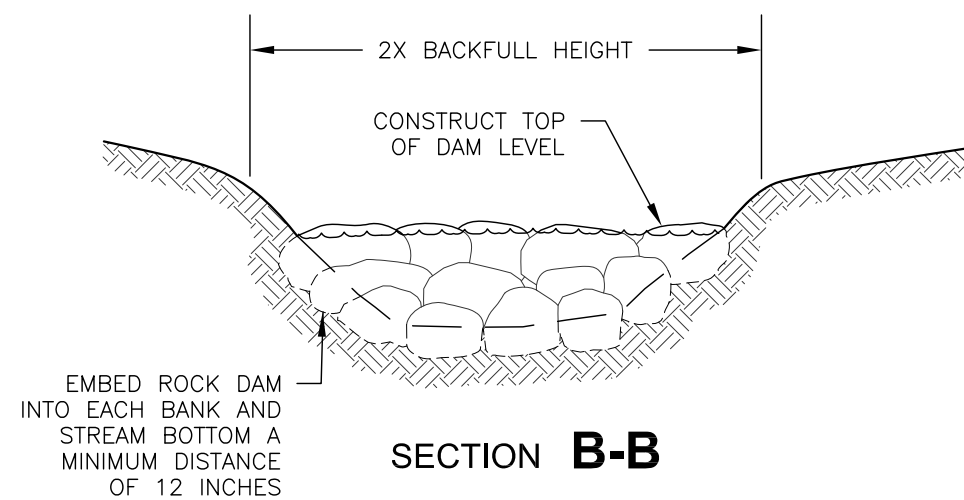
REVISION DATE
NO SCALE

DRAWING NO.
STD_917-20-01

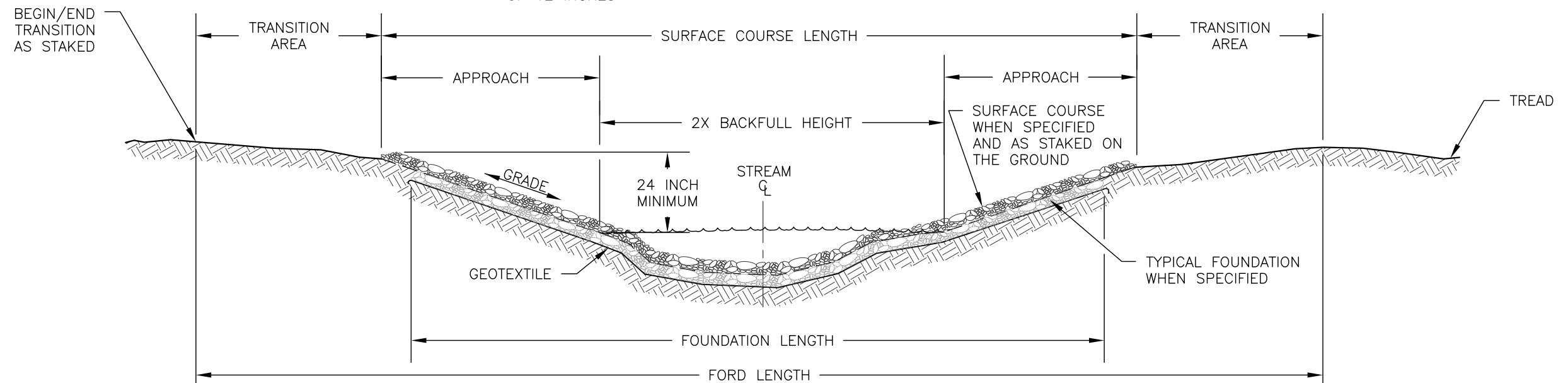
SHEET
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SECTION **A-A**



SECTION **B-B**



SECTION **C-C**

STD_917-20 SHEET 2 OF 2

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION
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GRAND VALLEY RANGER DISTRICT**

DRAWING NAME
**CONSTRUCTED FORD
ROCK STRUCTURE**

SECTION
917 - FORDS

TYPICAL ID
RF2

REVISION DATE
NO SCALE

DRAWING NO.
STD_917-20-02

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ROCK WATERBAR

SKEW

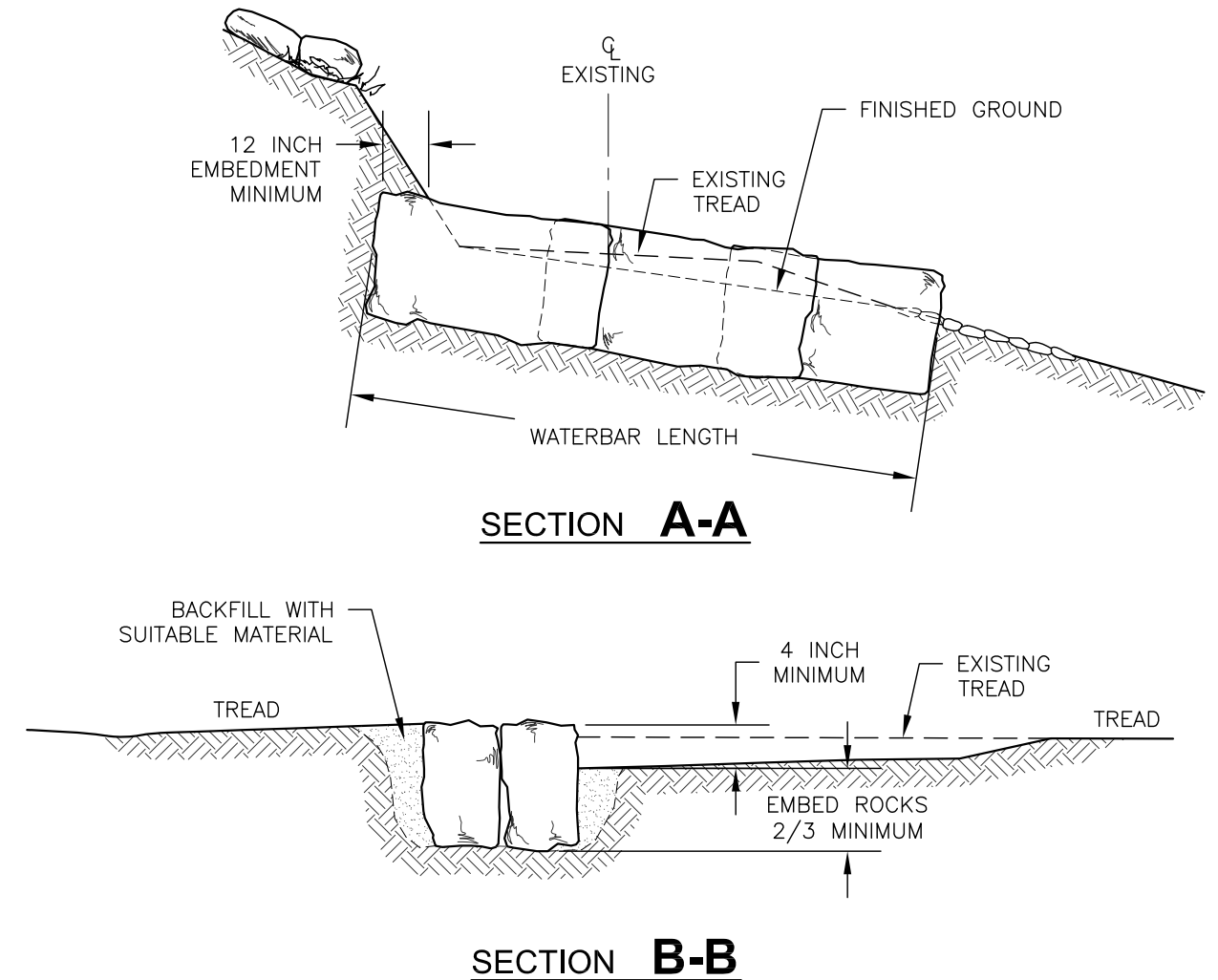
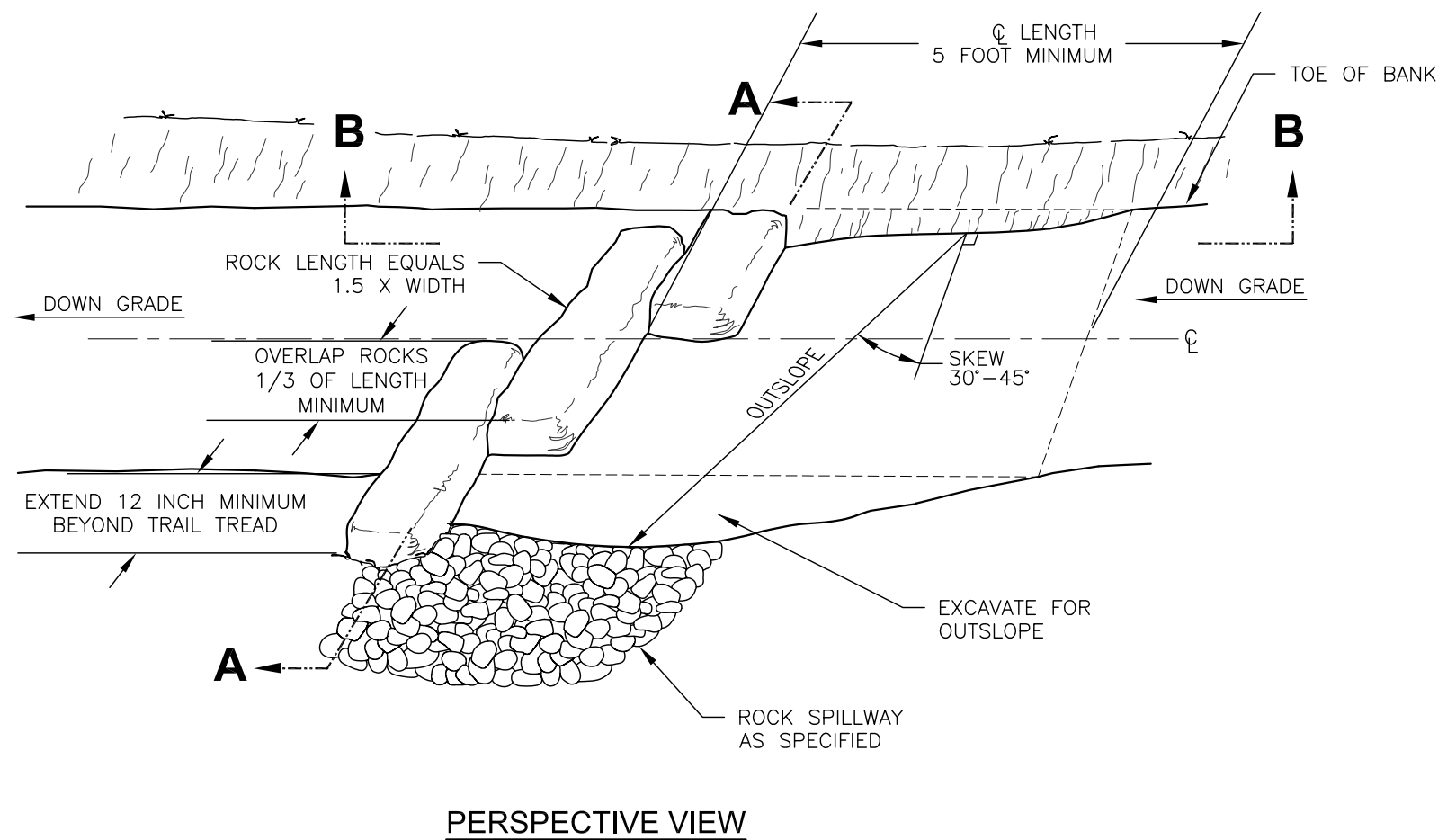
TRAIL GRADE	SKEW ANGLE
<5%	45° MAX
>5%	30° MIN

TYPICAL ID	MINIMUM ROCK SIZE (LBS)*	OUTSLOPE	℄ LENGTH**	SPILLWAY	COMMENTS
RWB-1	250	8% MIN	5' MIN	N/A	

N/A WHEN NOT APPLICABLE
 *MINIMUM ROCK SIZE SHALL BE 250 LBS OR 2 CUBIC FEET.
 **TRANSITION LENGTH MINIMUM 5', OR TRAIL GRADIENT PLUS 2', WHICH EVER IS GREATER.

NOTES:

1. INCREASE OUTSLOPE FROM THE BEGINNING OF THE TRANSITION TO MAXIMUM OUTSLOPE AT LEAST TRAIL GRADIENT PLUS 2%.
2. ALL MINERAL SOIL SHALL BE PLACED AND COMPACTED ON THE DOWN SLOPE SIDE OF BARRIER ROCKS.
3. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
4. ALL EXCAVATED SECTIONS FOR WATERBARS SHALL BE OUTSLOPED TO DAYLIGHT.



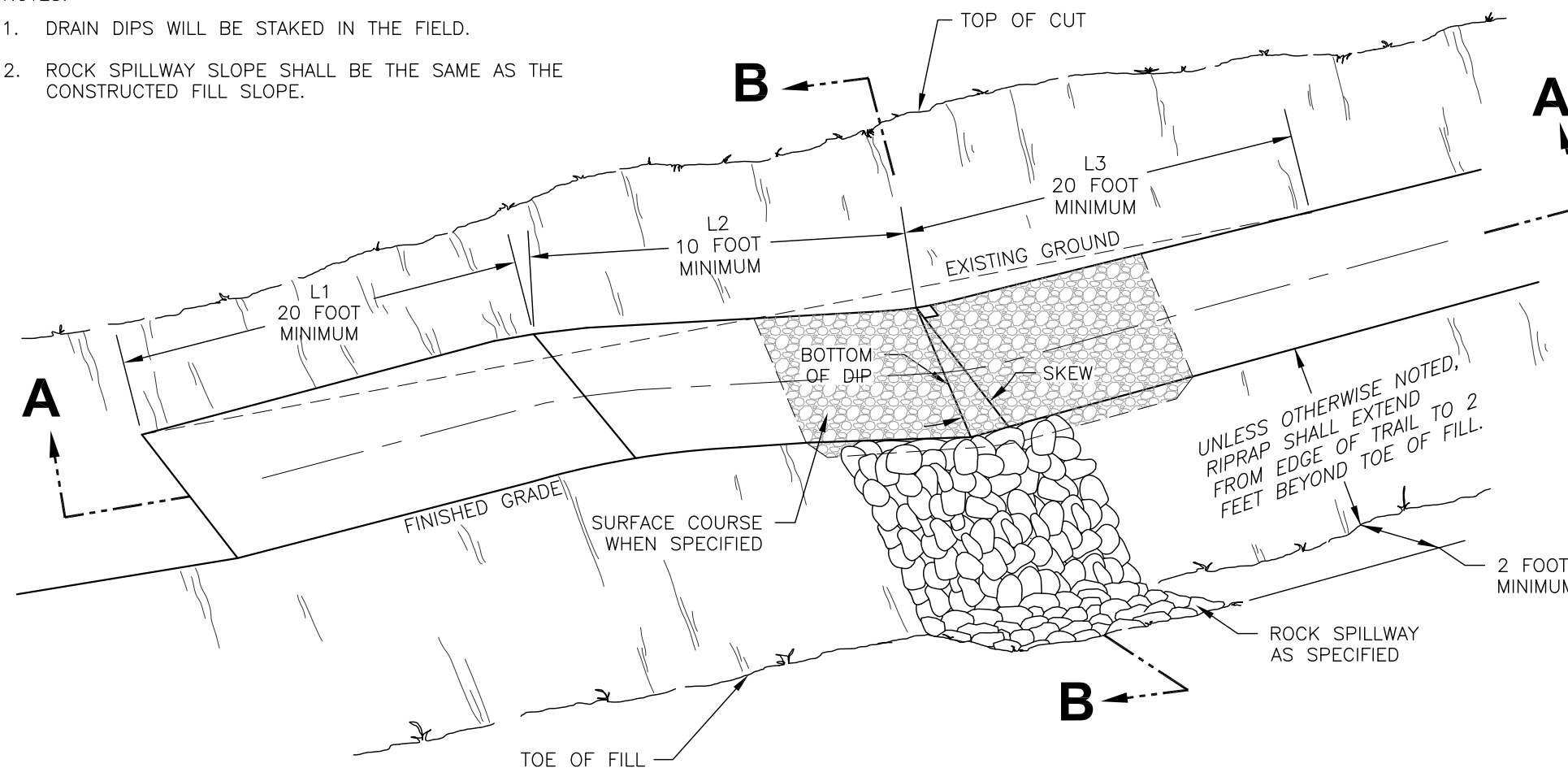
DRAIN DIP SECTION

TYPICAL ID	DRAIN DIP TYPE*	GEOTEXTILE TYPE	SKEW (DEGREES)	SURFACE COURSE		ROCK SPILLWAY***	COMMENTS
				TYPE	DEPTH		
DD1-1	DDX	N/A	30 MIN.	N/A	N/A	N/A	SKEW SHALL BE 30 DEGREES MINIMUM.

N/A WHEN NOT APPLICABLE
 *DRAIN DIP TYPE WILL BE BASED ON % PROFILE GRADE

NOTES:

1. DRAIN DIPS WILL BE STAKED IN THE FIELD.
2. ROCK SPILLWAY SLOPE SHALL BE THE SAME AS THE CONSTRUCTED FILL SLOPE.



GEOTEXTILE TYPE

TYPE	MATERIAL	COMMENTS
G1	NON-WOVEN	
G2	WOVEN	

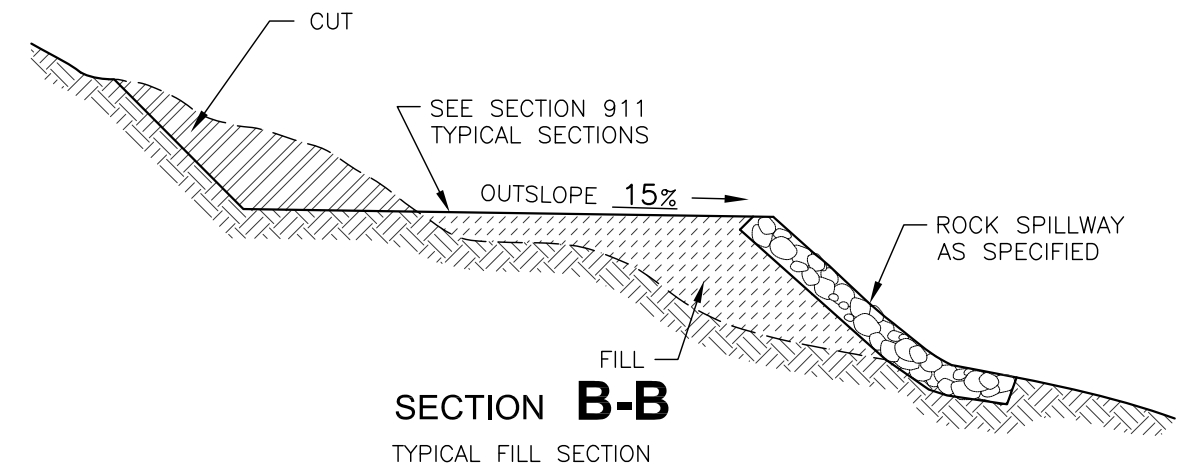
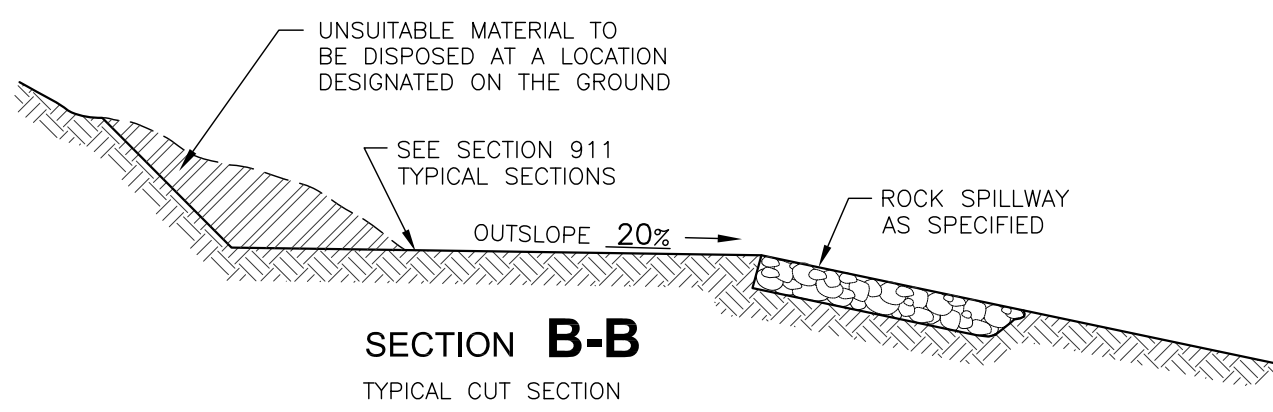
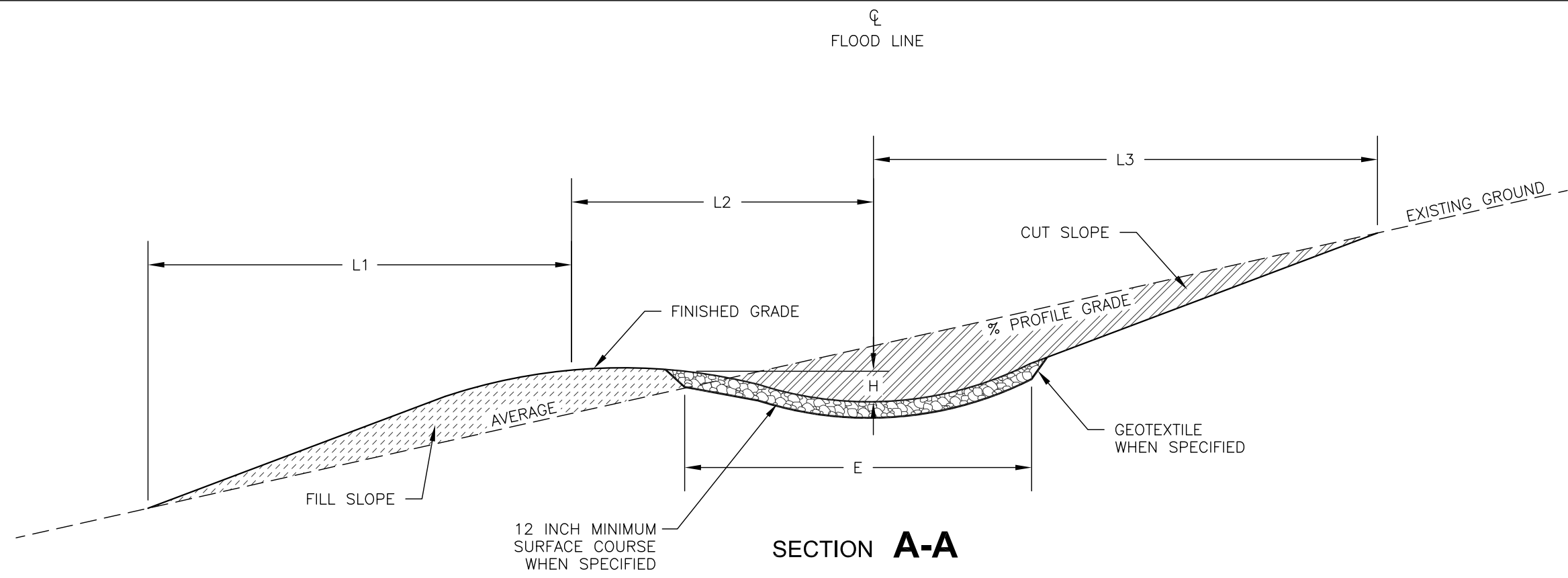
SURFACE COURSE MATERIAL TYPE

TYPE	MATERIAL	GRADATION	COMMENTS
S1	PITRUN		
S2	AGGREGATE		

DRAIN DIP CONSTRUCTION DIMENSIONS

DRAIN DIP TYPE	% PROFILE GRADE	L1	L2	L3	(H)	(E)
DD1	0 TO 4	20'	10'	20'	8"	10'
DD2	5 TO 6	20'	10'	20'	12"	10'
DD3	7 TO 8	20'	10'	20'	16"	12'
DD4	9 TO 10	20'	15'	30'	24"	15'
DD5						

OVER 10% NOT RECOMMENDED
 H = $\frac{1}{4}$ OF TREAD



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DRAWING NAME
DRAIN DIP DETAILS

SECTION: 927 - DRAIN DIPS TYPICAL ID: DD2

REVISION DATE
NO SCALE

DRAWING NO.
STD_927-10-02

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24 OF 32

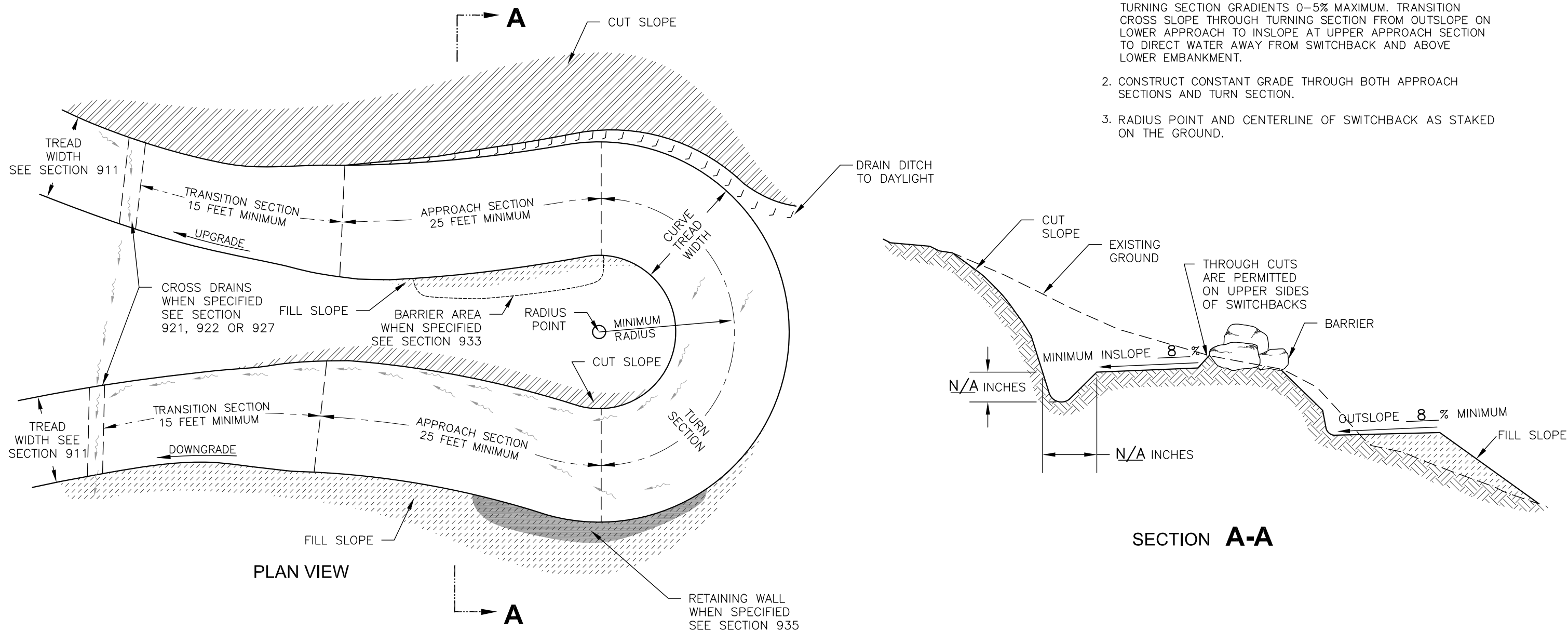
TYPE 1 RADIUS SWITCHBACK SECTIONS

TYPICAL ID	MINIMUM RADIUS	CURVE TREAD WIDTH	BARRIER TYPE	RETAINING WALL TYPE	CROSS DRAINS	COMMENTS
SW1-1	4'	24" MIN.	*	*	*	*SEE DESCRIPTION OF WORK FOR DETAILS

N/A WHEN NOT APPLICABLE

NOTES:

1. APPROACH GRADIENTS 15-25% FOR 25 FEET MINIMUM. TURNING SECTION GRADIENTS 0-5% MAXIMUM. TRANSITION CROSS SLOPE THROUGH TURNING SECTION FROM OUTSLOPE ON LOWER APPROACH TO INSLOPE AT UPPER APPROACH SECTION TO DIRECT WATER AWAY FROM SWITCHBACK AND ABOVE LOWER EMBANKMENT.
2. CONSTRUCT CONSTANT GRADE THROUGH BOTH APPROACH SECTIONS AND TURN SECTION.
3. RADIUS POINT AND CENTERLINE OF SWITCHBACK AS STAKED ON THE GROUND.



TYPE 1 - STANDARD TURNPIKE

TYPICAL ID	GEOTEXTILE TYPE	RETAINER*		DITCH						COMMENTS
		TYPE	TYPE	LOCATION		DIMENSIONS (INCHES)				
				LT	RT	D	E	F	G	
TPK-1	G 1	ROCK	N/A	N/A	N/A	N/A	N/A	N/A	N/A	AS EXISTING

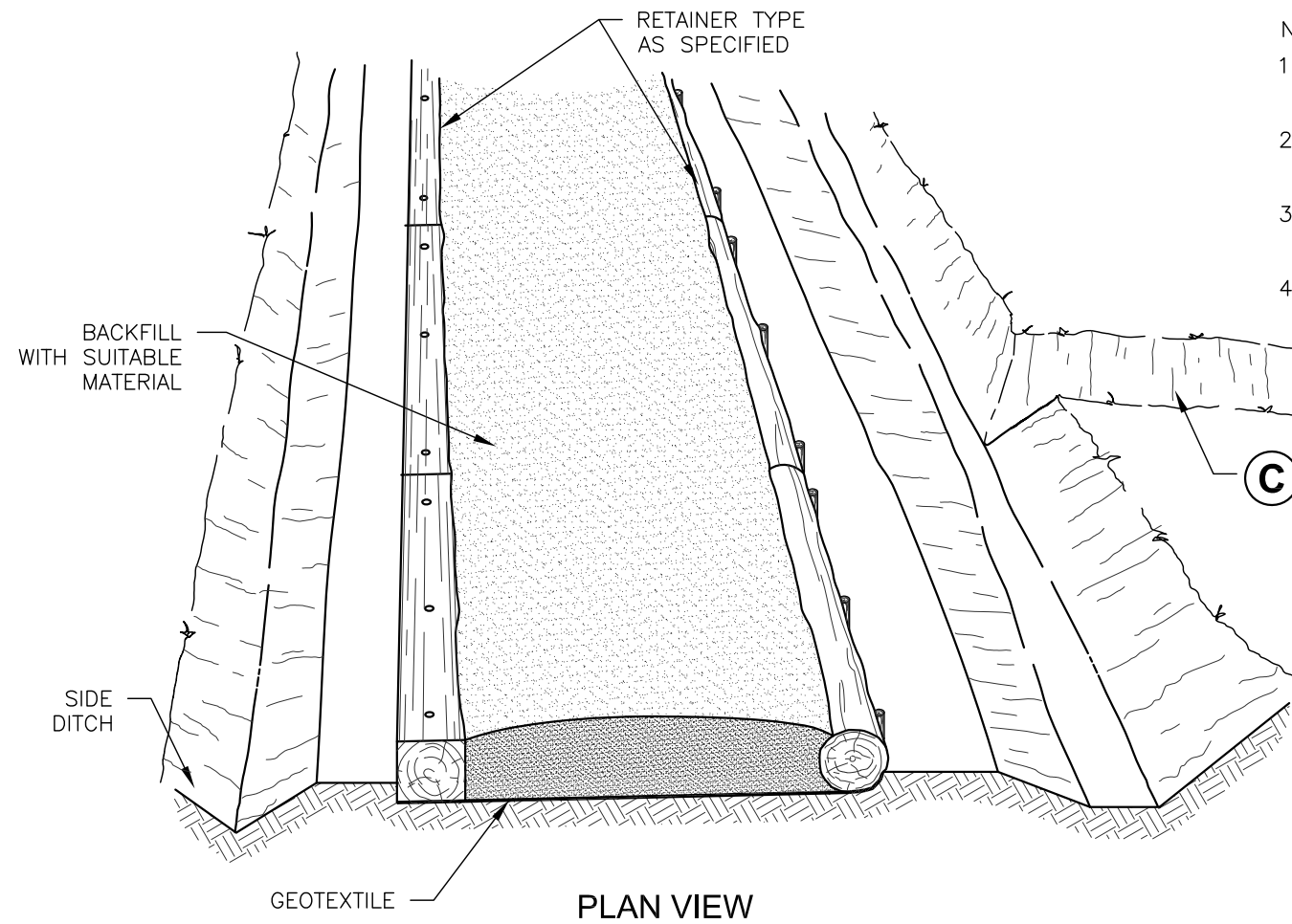
N/A WHEN NOT APPLICABLE
 *FOR TYPICAL RETAINERS SEE SHEET STD_911-03

GEOTEXTILE TYPE

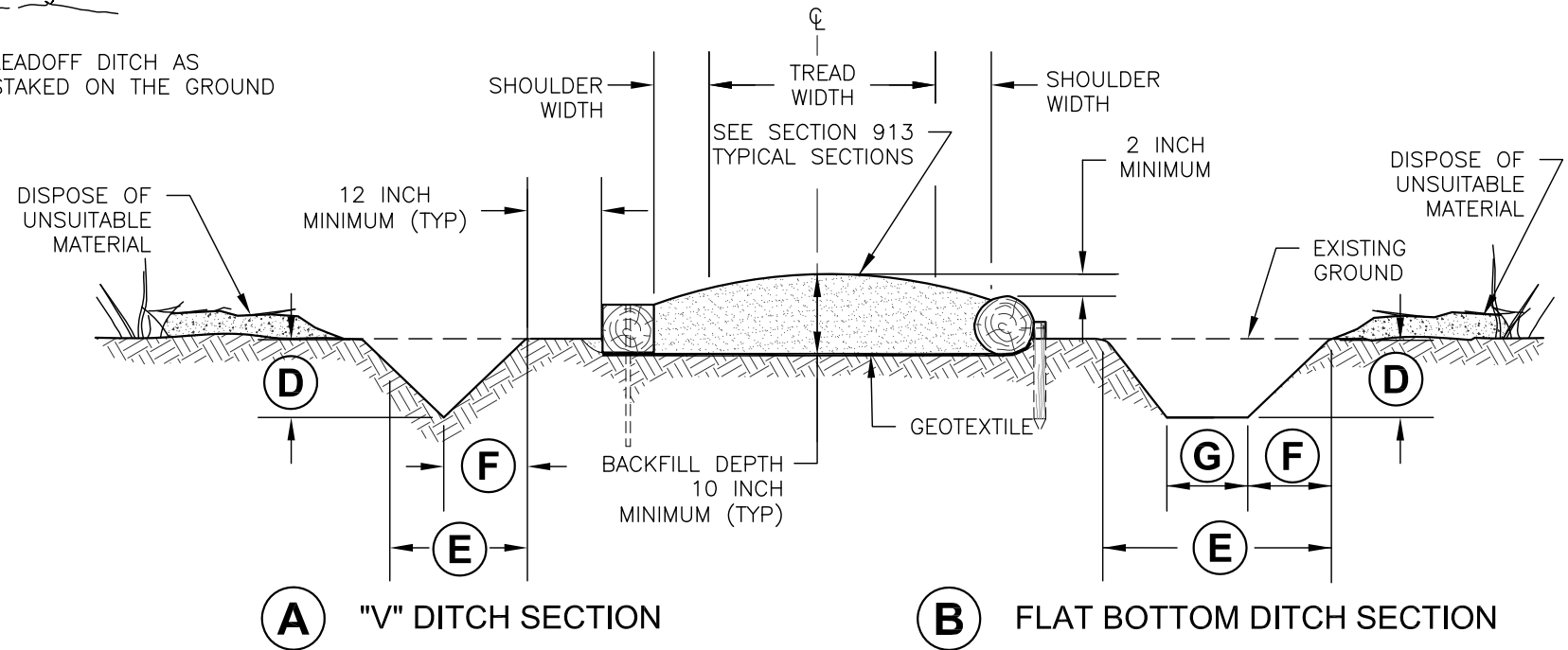
TYPE	MATERIAL	COMMENTS
G1	NON-WOVEN	
G2	WOVEN	

NOTES:

1. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
2. REMOVE AND DISPOSE OF DUFF AND TOP ORGANIC LAYERS DOWN TO MINERAL SOIL.
3. LEADOFF DITCH TO BE CONSTRUCTED THE SAME AS SIDE DITCHES.
4. LEAD-OFF DITCH TO DRAIN TO DAYLIGHT.



(C) LEADOFF DITCH AS STAKED ON THE GROUND

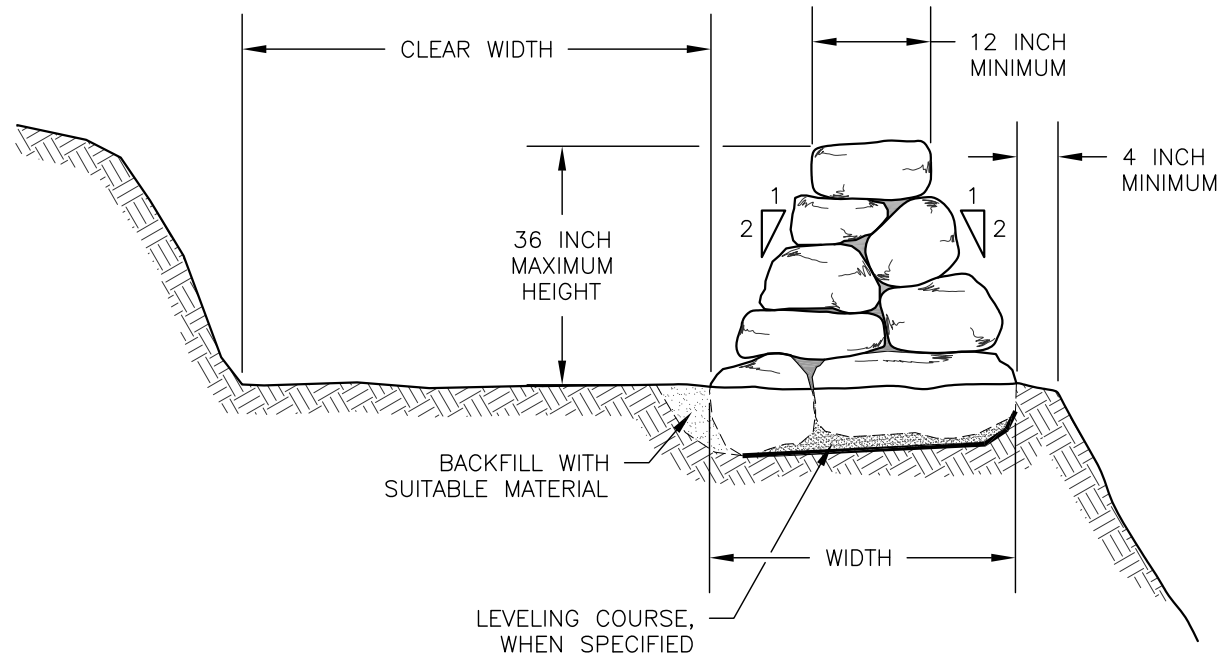


TYPICAL CROSS SECTION

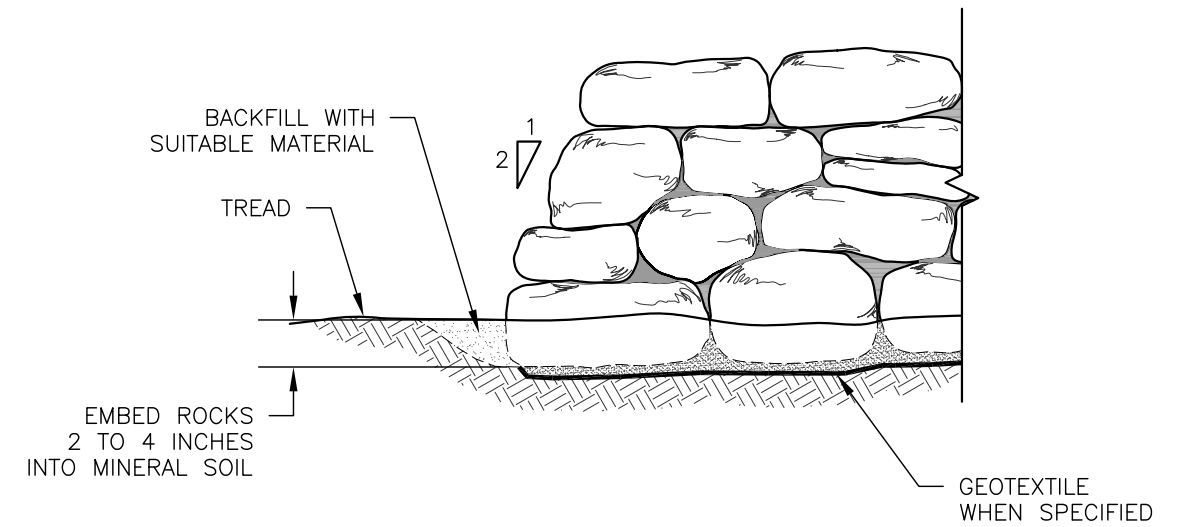
STACKED ROCK BARRIER

TYPICAL ID	CLEAR WIDTH	GEOTEXTILE TYPE	LEVELING COURSE TYPE	HEIGHT	WIDTH	COMMENTS
SRB-1	24" MIN.	N/A	L1	2'	3'	ALIGNMENT PARALLEL TO TRAIL ALIGNMENT

N/A WHEN NOT APPLICABLE



END VIEW



ELEVATION VIEW

NOTES:

1. USE ROCKS OF GENERAL RECTANGULAR SHAPE BETWEEN 45 AND 120 LBS. PLACE LARGER ROCKS ON BOTTOM.
2. USE ROCK CHIPS TO WEDGE LARGER ROCKS IN PLACE TO FORM A STABLE WALL.
3. LEAVE A 4 INCH GAP EVERY 8 TO 10 FEET OR USE FLEXIBLE PIPE ON BOTTOM COURSE FOR DRAINAGE.
4. PROVIDE ORGANIC-FREE BACKFILL MATERIAL WHERE SHOWN ON DRAWINGS FOR LEVELING AND SUPPORT OF BASE ROCK.
5. REMOVE AND DISPOSE OF DUFF AND TOP ORGANIC LAYERS DOWN TO MINERAL SOIL.
6. CLEAR WIDTH IS GREATER OR EQUAL TO THE TREAD AND SHOULDER WIDTHS DEFINED IN SECTION 911.

LEVELING COURSE MATERIAL

TYPE	MATERIAL	GRADATION	COMMENTS
L1	PITRUN	NATIVE	TIE INTO EXISTING SUBSTRATE
L2	AGGREGATE		

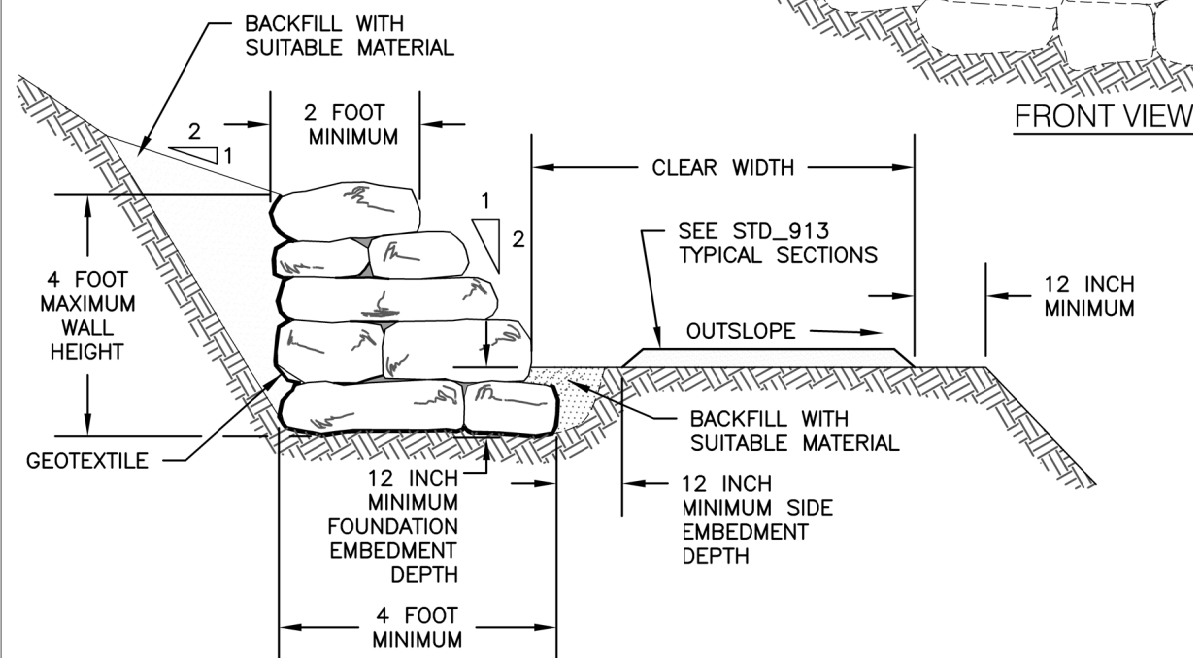
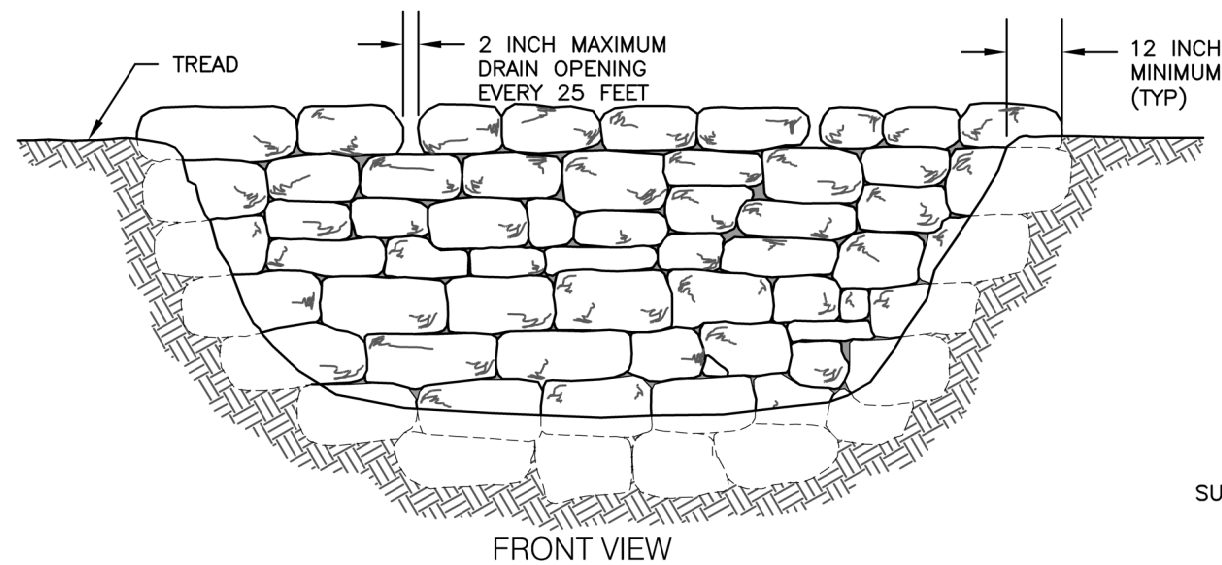
NOTES:

1. REMOVE AND DISPOSE OF DUFF AND TOP ORGANIC LAYERS DOWN TO MINERAL SOIL.
2. COMPACT BACKFILL AND FOUNDATION IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
3. CLEAR WIDTH IS GREATER OR EQUAL TO THE TREAD AND SHOULDER WIDTHS DEFINED IN SECTION 911.
4. MINIMUM ROCK DIMENSIONS 4" VERTICAL, 12" PERPENDICULAR TO TREAD AND 18" PARALLEL TO TREAD LINE.

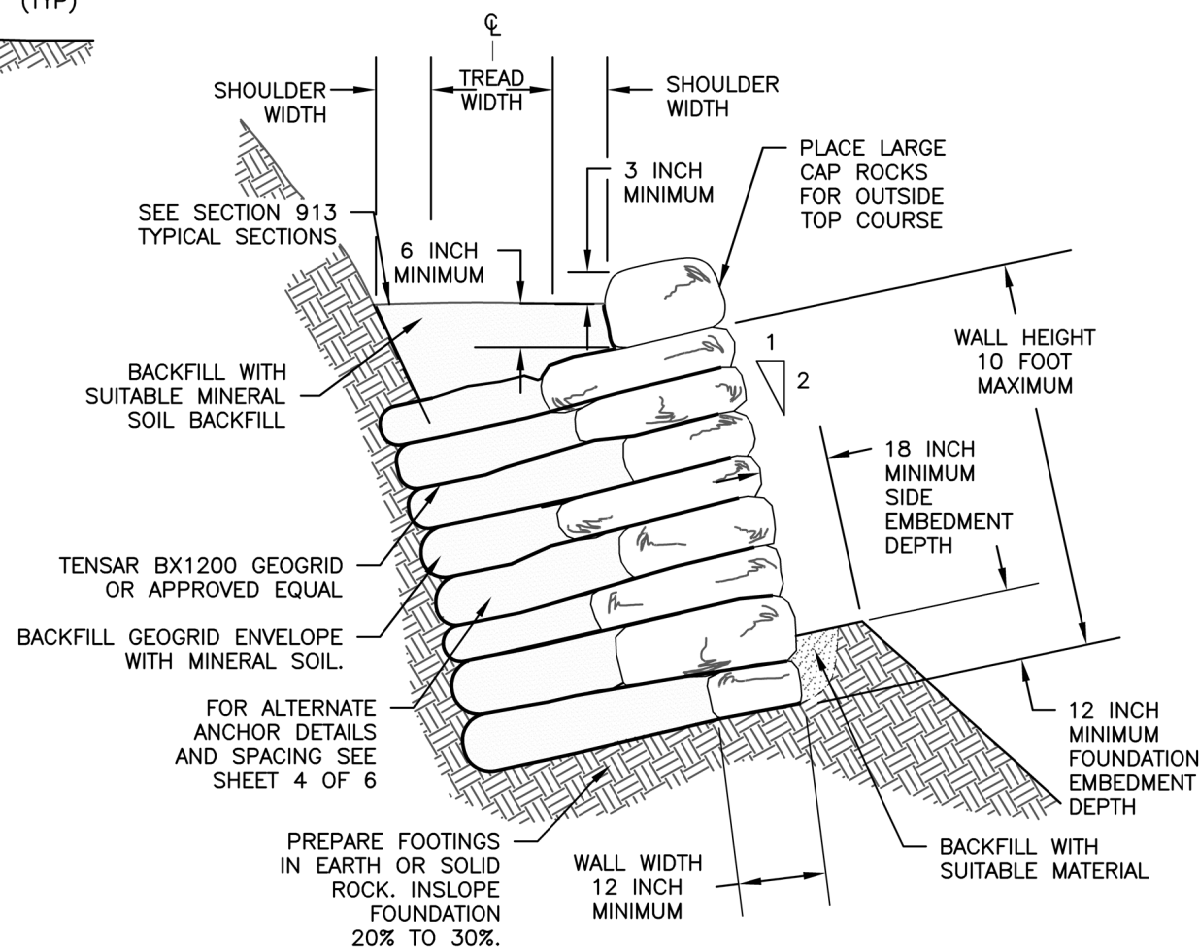
STACKED ROCK FACED RETAINING WALL

TYPICAL ID	GEOTEXTILE TYPE	EMBEDMENT DEPTH		HEIGHT	COMMENTS
		FOUNDATION	SIDE		
	BX 1200	12 MIN.	6" MIN.	VARIES	SEE TRAIL LOG

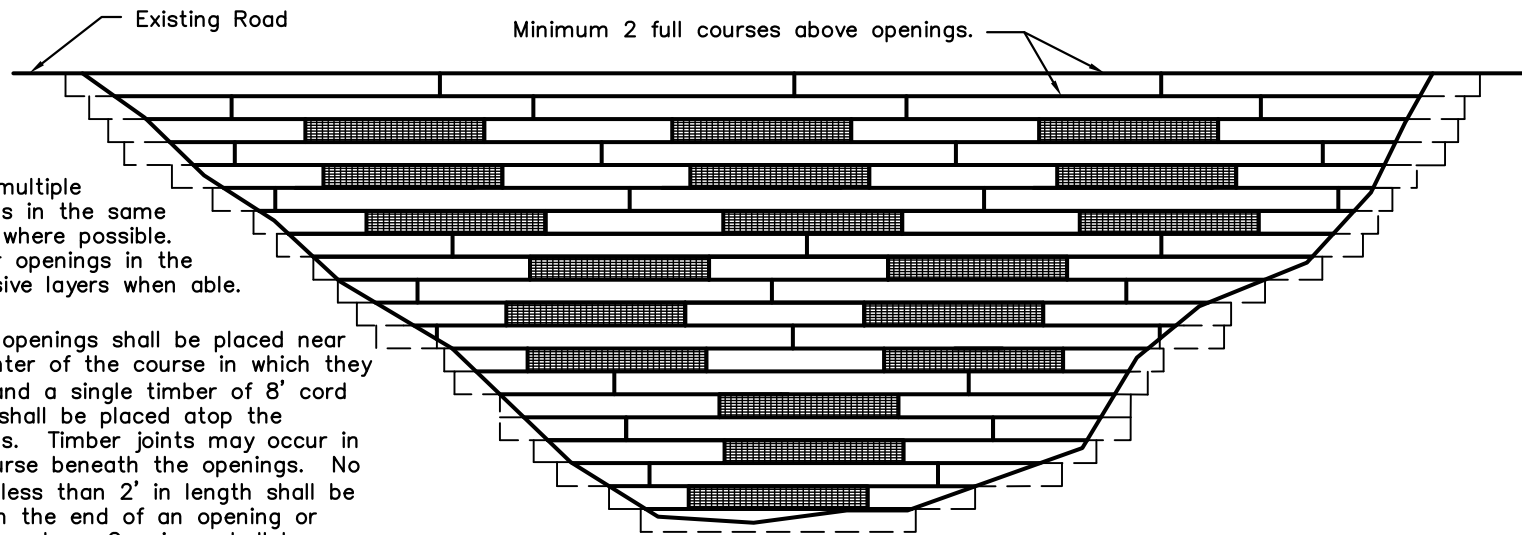
N/A WHEN NOT APPLICABLE



A UPHILL RETAINING WALL SECTION
SLOPE JOINTS INTO HILL.



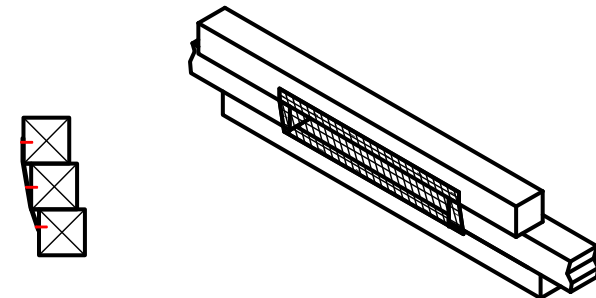
B UNDERTREAD RETAINING WALL SECTION
WALL FACING WIDTH SHALL BE 1 FOOT WIDE OR 1/4 THE WALL HEIGHT, WHICHEVER IS GREATER.



Install multiple openings in the same course where possible. Stagger openings in the successive layers when able.

The 4' openings shall be placed near the center of the course in which they occur and a single timber of 8' cord length shall be placed atop the openings. Timber joints may occur in the course beneath the openings. No timber less than 2' in length shall be used on the end of an opening or anywhere else. Openings shall be on alternating courses and shall have a 4' timber between them.

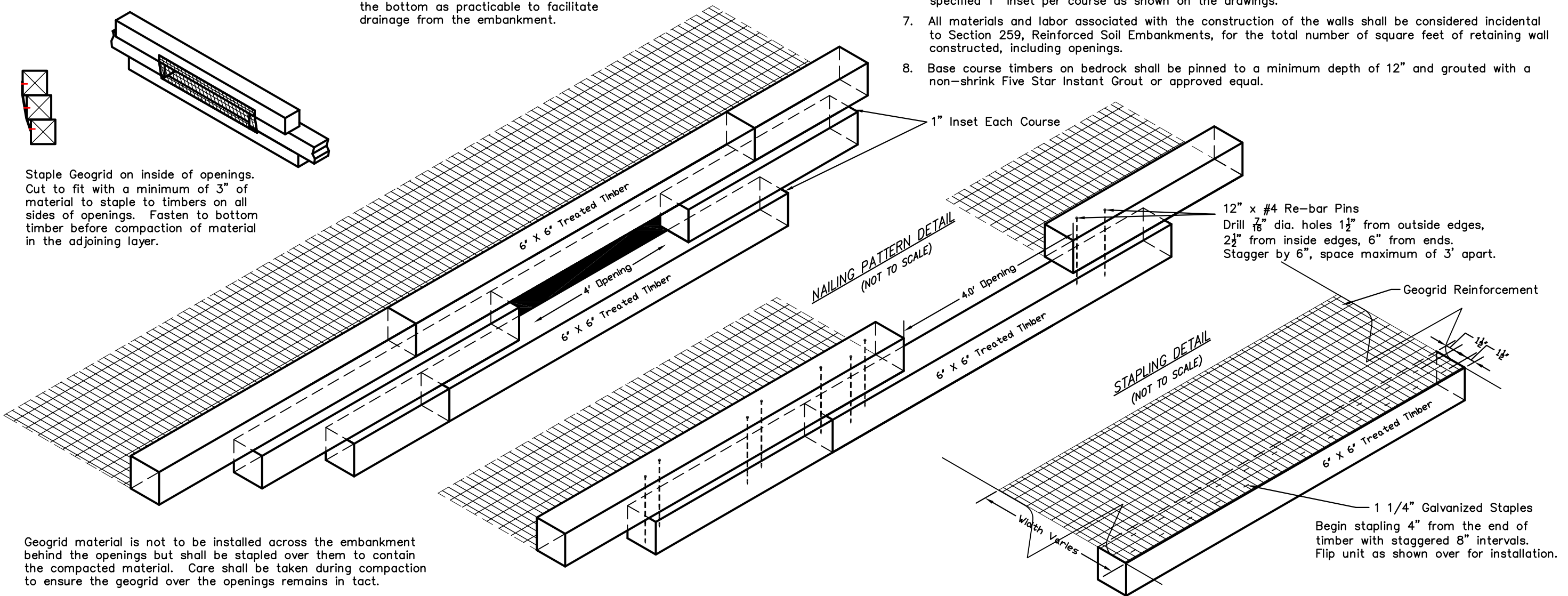
A 4' opening with minimum 2' timbers on the ends shall be installed as near the bottom as practicable to facilitate drainage from the embankment.



Staple Geogrid on inside of openings. Cut to fit with a minimum of 3" of material to staple to timbers on all sides of openings. Fasten to bottom timber before compaction of material in the adjoining layer.

NOTES

1. The 6" x 6" timbers shall be uniform in size (tolerance on all dimensions $\pm 1/8"$) with ends trimmed square. Timber shall be #2 grade or better Ponderosa Pine & treated to meet the penetration and retention requirements of AWPA C2 for continuous soil contact applications. Treatment type shall be approved in advance by the Engineer. Manufacturer's certificate of compliance shall be required.
2. Biaxial Geogrid shall meet the requirements of Section 714.03, Category 1. Geogrid Materials shall be Tensor BX1200 available from CONTECH Construction Products Inc., Denver, CO., 303-431-8999, or an approved equal. Geogrid for the base and alternating layers (full width layers) shall be installed with the machine direction parallel to the wall face (when deployed, the roll shall be perpendicular to the wall face). Geogrid in the intermediate layers can be installed with the machine direction either parallel or perpendicular to the wall face.
3. Wall details show construction of a wall on tangent for clarification. The actual walls shall be built along the alignment staked on the ground. Regardless of prevailing existing grade, each course shall be placed horizontally. Geogrid mats shall be cut on the down grade end to provide 6" minimum cover over the bottom mat and wrapped end.
5. Timbers shall be installed in 8' cord lengths where possible but may be cut in the field to fit. No length less than 2' shall be used. Cut ends shall be trimmed square and treated by an approved method.
6. Where a retaining wall is to be built along a radius, it is not required to cut timber ends to butt tight to the adjoining timbers. Timbers shall be adjusted in the field to obtain the specified 1" inset per course as shown on the drawings.
7. All materials and labor associated with the construction of the walls shall be considered incidental to Section 259, Reinforced Soil Embankments, for the total number of square feet of retaining wall constructed, including openings.
8. Base course timbers on bedrock shall be pinned to a minimum depth of 12" and grouted with a non-shrink Five Star Instant Grout or approved equal.



Geogrid material is not to be installed across the embankment behind the openings but shall be stapled over them to contain the compacted material. Care shall be taken during compaction to ensure the geogrid over the openings remains in tact.

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

R-2
 ROCKY MOUNTAIN REGION

Drawn SE
 Design PM
 Checked DM
 Reviewed _____

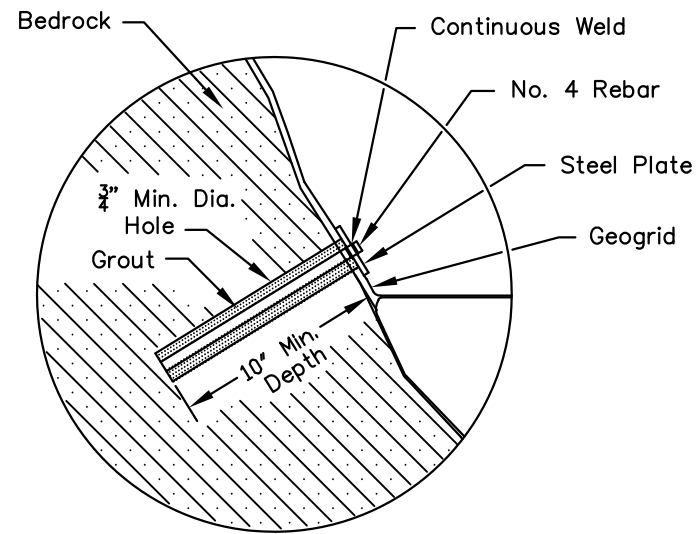
Forest
**Grand Mesa, Uncompahgre &
 Gunnison National Forests**

Project Name & Drawing No.
Crag Crest NRT Reconstruction
 STD_935-20-02

Sheet Title
Retaining Wall Reconstruction
 Scale Not to Scale Sheet 29
 of 32

REQUIRED GEOGRID LENGTHS

WALL HEIGHT (Ft.)	REQUIRED GEOGRID LENGTH, "L" Req'd (Ft.)
10	7.25
9	6.50
8	5.75
7	5.25
6	4.50
5	4.00
4	3.50
3	3.00



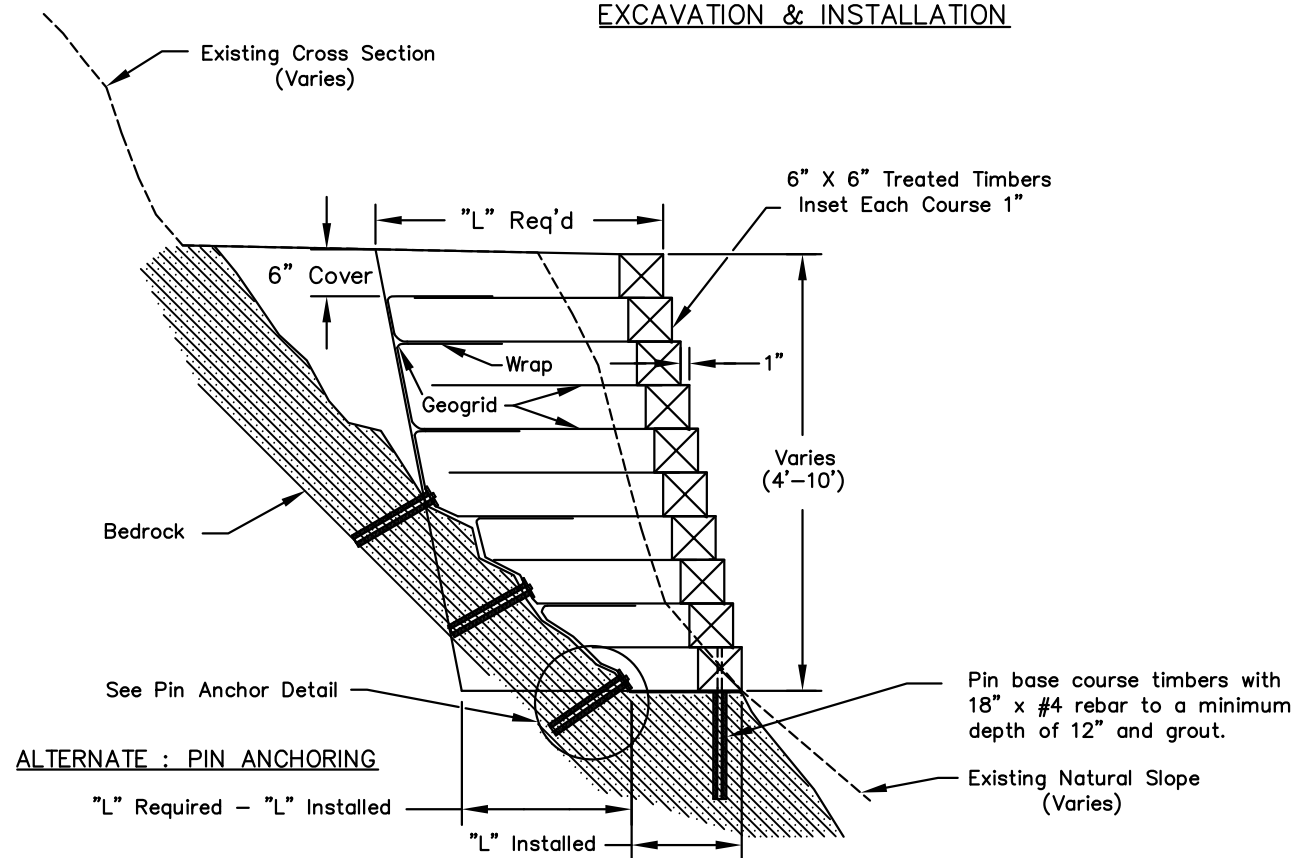
PIN ANCHOR DETAIL

Install Anchors with an Inclination of 15 to 30 degrees from Horizontal

NOTES:

1. Anchors shall be installed in areas where bedrock is encountered in a location such that the design geogrid length ("L" Req'd) cannot be installed.
2. Anchors shall be grouted using a non-shrink Five Star Instant Grout or approved equal.
3. Steel plate shall have the following minimum dimensions: Length = 12", Width = 2", and Thickness = 1/4". Plate shall be placed with the length horizontal across the slope.
4. Rebar pin shall be attached to the plate using a continuous weld, top surface only.

ALTERNATE METHOD OF EXCAVATION & INSTALLATION



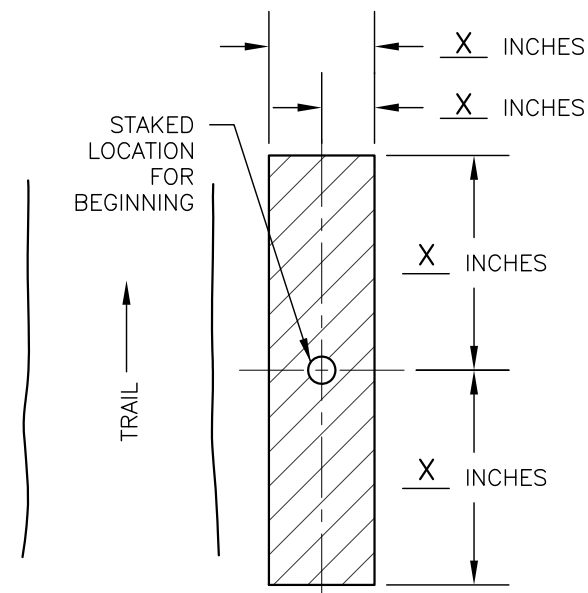
Anchor Spacing for Geogrid Layers, 0, 1, 2, 3, and 4 Ft. Above Base of Wall	
"L" Req'd—"L" Inst (Ft.)	Maximum Anchor Spacing (Ft.)
1	10.0
2	6.7
3	4.4
4	3.3
5	2.7
6	2.2

Anchor Spacing for Geogrid Layers, 5, 6, 7, 8, and 9 Ft. Above Base of Wall	
"L" Req'd—"L" Inst (Ft.)	Maximum Anchor Spacing (Ft.)
1	10.0
2	10.0
3	7.0
4	5.2
5	4.2

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SIGN DETAILS

TRAIL NO.	BEGINNING STATION	ENDING STATION	SIGN					SUPPORT			SIGN POST DETAILS
			TYPE	PANEL MATERIAL	SIZE (IN)	QUANTITY	INTERVALS	TYPE	SIZE (IN)	QUANTITY	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	WP	X x X	X	POSTS SHALL BE MINIMUM 6" DIAMETER X 8' TREATED, OR 6" X 6" X 8" TREATED. ALL POSTS SHALL BE RATED FOR DIRECT GROUND CONTACT.
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	
X	X+XX	X+XX	X	X	XX x XX	X	X FT	XX	X x X	X	



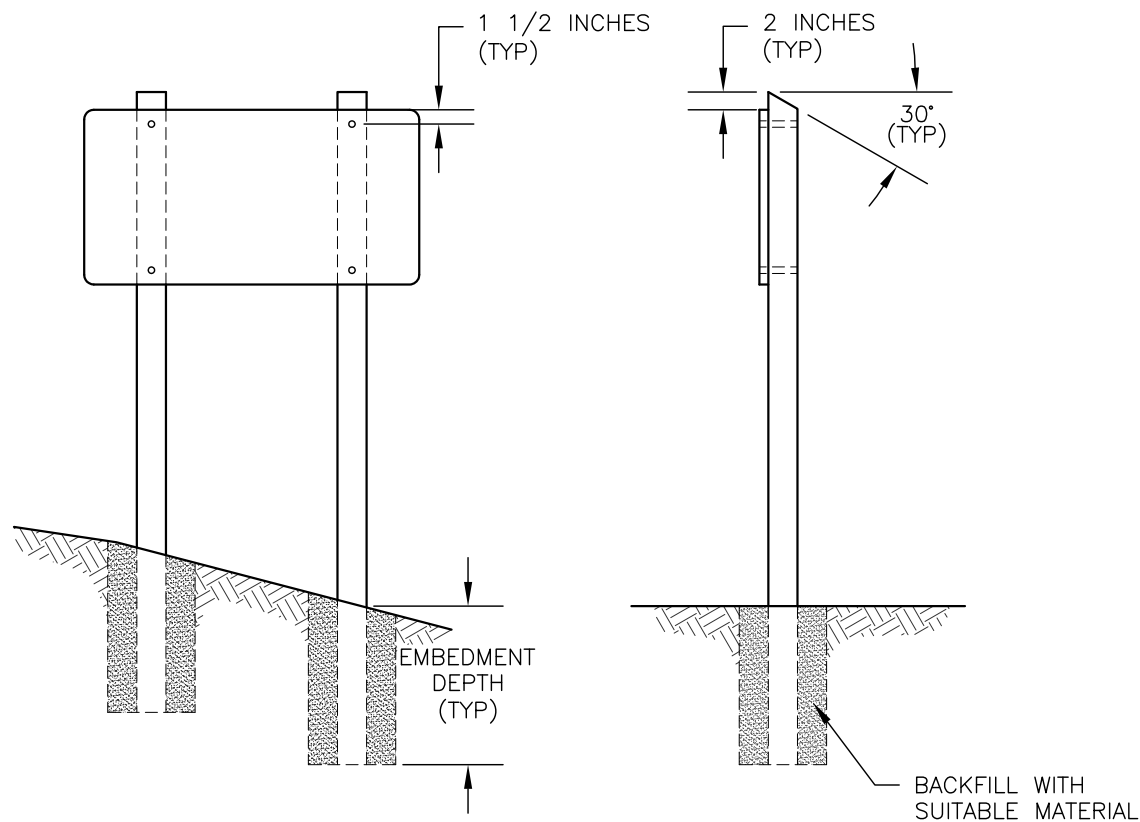
POST INSTALLATION TOLERANCE

POST PLACEMENT TOLERANCE IS WITHIN SHADED AREA FOR AVOIDING OBSTACLES EFFECTING POST HOLE INSTALLATION

SUPPORT TYPE

TR	TREE
WP	WOOD POST
SP	STEEL POST
FP	FLEXIBLE POST

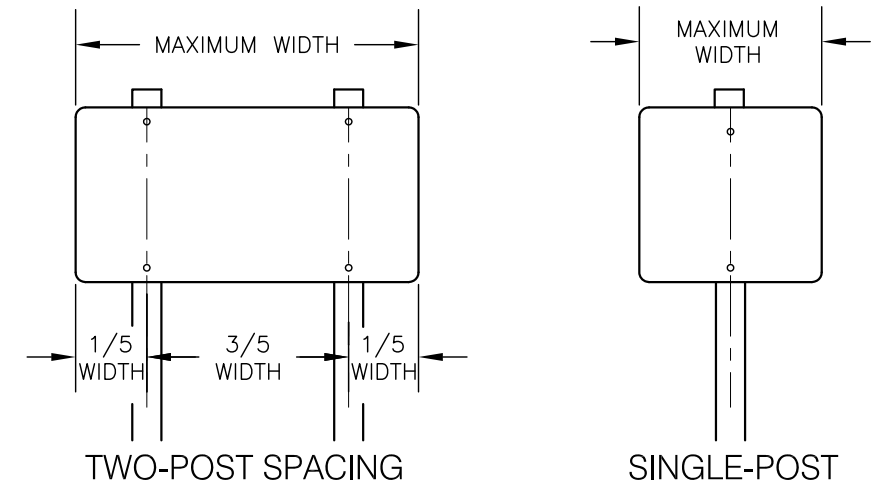
- NOTE:
- SIGN POSTS SHALL BE CONTRACTOR FURNISHED.
 - SIGNS SHALL BE GOVERNMENT FURNISHED.
 - REFER TO "EM-7100-15, SIGN AND POSTER GUIDELINES", FOR THE FS FOR SIGN SPECIFICATIONS, MATERIALS, AND PLACEMENT.



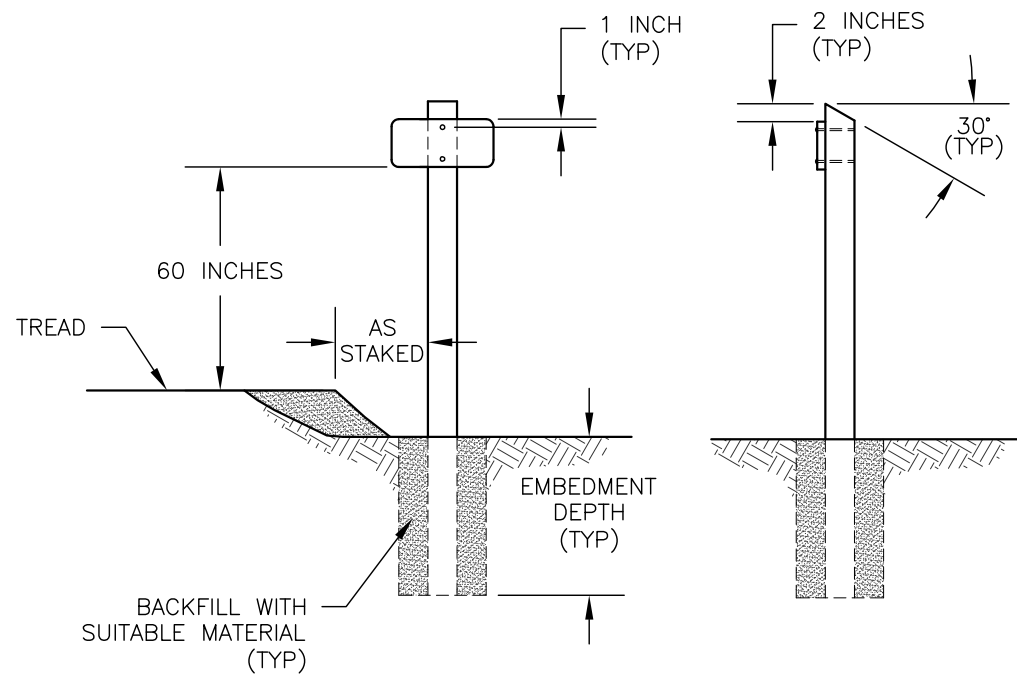
WOOD SIGN POST SPACING AND SIZE REQUIREMENTS

POST SIZE (IN)	SINGLE POST		TWO-POST		MINIMUM EMBEDMENT DEPTH (FT)
	MAX SIGN WIDTH (IN)	MAX SIGN AREA (SQ.FT)	MAX SIGN WIDTH (IN)	MAX SIGN AREA (SQ.FT)	
4 X 4	*48	10	72	20	3
4 X 6	48	20	72	50	4
6 X 6	48	20	96	95	4

*THE MAXIMUM WIDTH IS 36 INCHES FOR DIAMOND-SHAPED SIGNS.



GUIDLINES FOR WOOD SIGN POSTS



SIGN AND POST INSTALLATION

NOTES:

- REFER TO "EM-7100-15 SIGN AND POSTER GUIDELINES FOR THE FS" FOR SIGN SPECIFICATIONS, MATERIALS, AND PLACEMENT.
- POST SPACING APPLIES TO BOTH WOOD AND STEEL POSTS.
- FOR SIZES OF STEEL POSTS, REFER TO EM 7100-15.
- ALL HARDWARE SHALL BE ALUMINUM OR GALVANIZED.
- LAG SCREW FASTENERS REQUIRE LEAD HOLES IN POSTS AND SHALL BE DRILLED PRIOR TO INSTALLATION.
- BOLT HOLES IN POSTS TO BE 1/16 INCH LARGER (MAXIMUM) LARGER THAN THE BOLT HOLE REQUIREMENT.
- SIGN AND MARKER POSTS ONLY SHALL BE TREATED WITH CCA (CHROMATED COPPER ARSENATE) FOR UC4A GROUND CONTACT FOR GENERAL USE.
- COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.

Appendix C

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FOREST SERVICE PROJECTS

U.S. Customary Units

National Technology and Development Program

10/30/2014

Supersedes the 1996 Standard Specification for Construction and Maintenance of Trails

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Section 900

General Specifications

Section 901—Terms, Format, Abbreviations and Definitions

901.01 Meaning of Terms. These specifications are generally written in the imperative mood. In sentences using the imperative mood, the subject “the Contractor,” is implied. Also implied in this language is “shall,” “shall be,” or similar words or phrases. In material specifications, the subject may also be the supplier, fabricator, or manufacturer supplying material, products, or equipment for use on the project.

Wherever “*directed*,” “*required*,” “*prescribed*,” or similar words are used, the “*direction*,” “*requirement*,” or “*order*” of the Contracting Officer is intended. Similarly, wherever “*approved*,” “*acceptable*,” “*suitable*,” “*satisfactory*,” or similar words are used, they mean “*approved by*,” “*acceptable to*,” or “*satisfactory to*” the Contracting Officer.

The word “*will*” generally pertains to decisions or actions of the Contracting Officer.

Whenever in these specifications, or in other contract documents, the following terms (or pronouns in place of them) are used, the intent and meaning shall be interpreted as follows: reference to a specific standard, test, testing method, or specification shall mean the latest published edition or amendment that is in effect at the solicitation issue date for the public works contracts.

901.02 Specification Format These specifications are divided into Sections.

Sections 900 through 906, 908 and 909 consist of general contract requirements for which no direct payment is made. The requirements contained in Sections 900 through 906 are applicable to all contracts.

Sections 907, 908, 909 and 910 through 989 consist of construction contract requirements for specific items of work. Work under these Sections is paid for directly or indirectly according to Subsection 906.04 and the Section ordering the work. When there is no pay item in the bid schedule, no direct payment is made.

Sections 990 through 999 contain the material requirements for Sections 910 through 989. No direct payment is made in Sections 990 through 999. Payment for material is included as part of the work required in Sections 910 through 989.

The first three digits of the pay item number identify the Section under which the work is performed.

901.03 Abbreviations. Whenever these abbreviations are used in the specifications, they represent the following:

(a) Acronyms

AASHTO	American Association Of State Highway And Transportation Officials
ABS	Acrylonitrile-Butadiene-Styrene

AITC	American Institute of Timber Construction
ANSI	American National Standards Institute
AQ	Actual Quantities
APA	American Plywood Association
ASTM	American Society For Testing And Material
AWPA	American Wood Protection Association
CO	Contracting Officer
C.F.	Cubic Feet
C.Y.	Cubic Yard
DQ	Design Quantities
EA	Each
FAR	Federal Acquisition Regulation
g	Grams
HDPE	High-Density Polyethylene
hr	Hour
kg	Kilogram
kN	Kilonewtons
lb	Pound
L.F.	Linear Feet
LS	Lump Sum
LSQ	Lump Sum Quantities
m	Meter
m ²	Square Meter
m ³	Cubic Meter
mi	Mile
mm	Millimeter
MPa	Megapascals
MSE	Mechanically Stabilized Earth
N	Newton
NBS	National Bureau Of Standards
NCMA	National Concrete Masonry Association
OSHA	Occupational Safety & Health Administration
Pa	Pascal
PE	Polyethylene
PS	Product Standard Issued By The U.S. Department Of Commerce
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
S.F.	Square Feet
SQ	Staked Quantities
S.Y.	Square Yard
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association
WWPI	Western Wood Preservers Institute

Additional abbreviations may be found in Section 101.03 of the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03).

(b) Slope notation (vertical: horizontal). For slopes flatter than 1:1, express the slope as the ratio of one unit vertical to a number of units horizontal. For slopes steeper than 1:1, express the slope as the ratio of a number of units vertical to one unit horizontal.

901.04 Definitions The following terms, or pronouns in place of them, are used in these specifications or in other contract documents, the intent and meaning are as follows:

Barriers. A fence or other obstacle that prevents movement or access.

Base Course. The layer or layers of specified material of designed thickness placed on a trailbed to support surfacing.

Batter. A backward and upward slope of the face of a wall.

Berm. The ridge of material formed on the outer edge of the trail that projects higher than the tread.

Borrow. Suitable materials taken from approved sources designated on the plans or on the ground, to be used for embankments and backfilling.

Bridge. A trail structure, including supports, erected over a depression or obstruction such as a body of water, a road, a trail, or a railroad that provides a continuous pathway and that has a deck for carrying traffic or other loads.

Cap Rock. Rock placed in the top or uppermost layer in a constructed rock structure, such as a talus or rubble rock section or rock retaining wall.

Catch Point. The outer limits of a trailway where the excavation and/or embankment intersect with the ground line.

Clearing Limit. The area over and beside the trail that is cleared of trees, limbs, and other obstructions.

Climbing Turn. A reverse in direction of trail grade without a level landing used to change elevation on a steep slope.

Compacted. Consolidation that is obtained by tamping or rolling suitable material until no noticeable displacement of material is observed.

Contracting Officer (CO). An official of the Government with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the CO acting within the limits of their authority as delegated by the CO.

Culvert. Any structure with a bottom, regardless of the fill depth, the depth of invert, or the presence of a horizontal driving surface, or any bottomless (natural

channel) structure with footings that does not have wheel loads in direct contact with the top of the structure.

Curb. A border defining the edge of the trail or trail bridge.

Cushion Material. Native or imported material generally placed over rocky section of unsurfaced trail to provide a usable and maintained traveled way.

Designated on the Ground. The location of materials, work areas, and construction items, including lines and grades, marked on the ground with stakes, flagging, tags, or paint.

Drawings. Design sheets or fabrication, erection, or construction details submitted to the Government by the Contractor according to FAR Clause 52.236-21 Specifications and Drawings for Construction. Also refers to submissions and submittals.

Duff. Organic material overlying rock or mineral soil.

Embankment. A structure of suitable material placed on the prepared ground surface and constructed to the trailbed elevation.

Excess Excavation. Material in the trailway in excess of that needed for construction of designed trailways.

Falsework. Temporary construction work on which a main work is wholly or partly built and supported until the main work is strong enough to support itself.

Ford. A water-level stream crossing constructed to provide a level surface for safe traffic passage.

Full Bench. Trailbed constructed entirely on undisturbed material.

Gabion Basket. Rectangular wire baskets filled with rock used as pervious, semiflexible building blocks for slope and foundation stabilization.

Grade. The vertical distance of ascent or descent of the trail expressed as a percentage of the horizontal distance.

Hazard Tree. An unstable tree that is likely to fall across the trail.

Header Rock. Rock laid with the narrow end towards the face of the wall.

Inslope. Where the trails tread is sloped downward toward the backslope.

Leave Tree. Trees designated to be left or to remain undisturbed after trail construction.

Mineral Soil. Soil or aggregate that is free from organic substances and contains no particles larger than 2 inches at their greatest dimension.

Outslope. Where the trail tread is sloped downward toward the embankment or daylight side of the trailway.

Plans. The contract plans furnished by the Government showing the location, type, dimensions, and details of work.

Retainers. Embedded border of wood or rock used to retain fill and/or surface material.

Sideslope. The natural slope of the ground, usually expressed as a percentage.

Slough. That material from the backslope or the area of the backslope that has raveled onto the trailbed.

Slump. Where the trailbed material has moved downward, causing a dip in the trail grade.

Special Contract Requirements. Specifications that detail the conditions and requirements peculiar to an individual project, including additions and revisions to the standard specifications.

Standard Plans. Detailed plans approved for repetitive use and included as part of the plans.

Standard Specifications. The Standard Specifications for Construction of Trails on Federal Projects approved for general application and repetitive use.

Surfacing. Material placed on top of the trailbed or base course that provides the desired tread.

Suitable Material. Rock that can be accommodated in the trail structure, and soil free of duff with a recognizable granular texture.

Switchback. A reverse in direction of trail grade with a level landing used to change elevation on a steep slope, usually involving special treatment of the approaches, barriers, and drainages.

Trailbed. The finished surface on which base course or surfacing may be constructed. For trails without surfacing the trailbed is the tread.

Trailway. The portion of the trail within the limits of the excavation and embankment.

Tread. The surface portion of the trail upon which traffic moves.

Turnout. A short section of extra trail width to provide for passage of trail users.

Waterbar. A structure used for turning water off the trail, usually made of logs or stones.

Water Courses. Any natural or constructed channel where water naturally flows or will collect and flow during spring runoff, rainstorms, etc.

Additional definitions may be found in Section 101.03 of the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03).

Section 902—Intent of Contract

902.01 Intent of Contract. The intent of the contract is to provide for the construction and completion of the work described. The precise details of performing the work are not stipulated except as considered essential for the successful completion of the work. Furnish all labor, material, equipment, tools, transportation, and supplies necessary to complete the work according to the contract.

Section 903—Control of Work

903.01 Specifications and Drawings. Follow the requirements of FAR Clause 52.236-21 Specifications and Drawings for Construction.

(a) General. Prepare drawings as necessary to construct the work. Drawings include, but are not limited to, layouts that show the relative position (vertical and horizontal as appropriate) of work to be performed, fabrication details for manufactured items and assemblies, installation and erection procedures, details of post-tensioning and other systems, detailed trench and excavation procedures that conform to OSHA requirements, traffic control implementation drawings, and methods for performing work near existing structures or other areas to be protected. Show all the drawing dimensions in United States customary units.

Drawings shall be a minimum size of 11 by 17 inches and a maximum size of 24 by 36 inches. All text should have a minimum height of 1/8 inch for 24 by 36 inch drawings (D size sheets). Include on each drawing and calculation sheet, the project number, name, and other identification as shown in the contract.

Furnish 5 sets of drawings and supporting calculations for acceptance before performing work covered by the drawings. If drawings are returned for revision, correct and resubmit for acceptance. Allow 40 days per submission for railroad structures and 30 days per submission for all other structures. The review time as specified is applied separately to each drawing submitted. The CO may request additional specific drawings for unique situations in order to clarify layout, construction details, or methodology. If drawings must be resubmitted, the time for acceptance starts over. Obtain written approval before changing or deviating from the accepted drawings.

(b) Specific requirements for concrete and miscellaneous structures.

(1) Furnish drawings for the following:

- (a) Site-specific layouts for all wall types and gabion installations;
- (b) Gabion and revet mattress details and installation procedures;
- (c) Forms and falsework for reinforced concrete box culverts less than or equal to 6 feet in height;

- (d) Fabrication drawings for bridge railings and parapets;
 - (e) Fabrication drawings for prestressed members;
 - (f) Fabrication and installation drawings for expansion joint assemblies;
 - (g) Fabrication drawings for bearing assemblies;
 - (h) Construction joint location and concrete deck placement sequences not shown on the plans;
 - (i) Erection diagrams for Soil-Corrugated Metal Structure interaction systems (multi-plate structures);
 - (j) Structural steel fabrication drawings;
 - (k) Utility hangar details; and
 - (l) Fabrication and installation drawings for precast items.
- (2) Furnish drawings that bear the seal and signature of a professional engineer proficient in the pertinent design field for the following:
- (a) Erection plans;
 - (b) Reinforced soil slopes details;
 - (c) MSE wall and crib wall details;
 - (d) Details and installation procedures for proprietary wall systems;
 - (e) Temporary bridge structures for public use;
 - (f) All bridge forms except for railings, parapets, and components less than 6 feet in height;
 - (g) Shoring systems and cofferdams greater than 6 feet in height;
 - (h) All shoring systems that support traffic loadings;
 - (i) Forms and falsework for all structures greater than 6 feet in height;
 - (j) Post-tensioning systems;
 - (k) Ground anchors, soil nail, and rock bolt assembly details, layout, and installation and testing procedures;
 - (l) Tie back wall details; and
 - (m) Alternate retaining wall details.
- (3) Furnish drawings that bear the seal and signature of a professional engineer who is proficient in forms and falsework

design and licensed in the state where the project will be constructed for the following:

- (a) Falsework for any structure with a span exceeding 16 feet;
- (b) Falsework for any structure with a height exceeding 14 feet; and
- (c) Falsework for structures where traffic, other than workers involved in constructing the structure, will travel under the structure.

Section 904—Control of Materials

904.01 Handling Materials. Transport and handle all materials to preserve their quality and fitness for the work. Stockpile, load, and transport aggregates in a manner that will preserve specified gradation and avoid contamination.

Store materials to assure the preservation of their quality and fitness for the work. Locate stored materials to facilitate their prompt inspection. Sites on Government-administered land that are not already designated may be used for storage purposes and for placing of equipment only when approved in advance by the CO. Restore all storage sites in accordance with requirements SHOWN ON THE PLANS or as otherwise specified. Arrangements for storage on other than designated sites are the responsibility of the contractor.

904.02 Material Sources

(a) Designated Sources. Sources for materials such as, but not limited to, soil, rock, or logs that are not available from trailway excavation or clearing operations will be designated. Sources of local materials designated in the SPECIAL CONTRACT REQUIREMENTS or SHOWN ON THE PLANS are guaranteed by the Government for the quality and quantity of material in the source.

Use all needed suitable material from the source. The designation of a source includes the right to use areas SHOWN ON THE PLANS for the purposes designated (such as plant sites, stockpiles, and haul roads). Operations are restricted to the confines of the area(s) designated.

Comply with the requirements of 30 CFR 56, subparts B and H. When required, re-establish vegetation in disturbed areas according to section 981.

(b) Contractor-Furnished Sources. Furnish material that produces an end product equivalent in performance to that specified.

904.03 Restoration. Shape and grade borrow areas on Government-administered land to make them stable and to minimize future erosion. Dispose of debris resulting from development of material sources by scattering, unless otherwise specified. Do not scatter debris within the clearing limits of trails or within roadsides. Cut off stumps to less than 12 inches above the ground as measured on the uphill side of the stump.

Section 905—Quality Assurance and Quantity Measurement

Description

905.01 This work consists of providing certification that the quality and quantity of construction conform to the plans, specifications, and requirements of the contract.

Construction

905.02 Certification and Measurements

(a) Offsite-Produced Materials. Furnish signed certificates executed by the manufacturer, supplier, or vendor, stipulating that all offsite-produced materials incorporated in the work meet applicable requirements SHOWN ON THE PLANS or stated in the specifications. Furnish a certificate for each commodity or invoice.

(b) Quantity Measurements. Submit quantities to the CO for periodic progress payments, and the CO will compute payments. Quantities are subject to verification.

905.03 Records. Maintain a set of contract plans depicting as-built conditions resulting from approved changes. Maintain the plans in a current condition and indicate changes from the original contract plans in red. Give the plans to the CO upon the completion of the contract work.

Measurement

905.04 Method. There will be no separate measurement for this item.

Payment

905.05 Payment will be considered incidental to other pay items in this contract.

Section 906—Measurement and Payment

906.01 General. Measurement and payment for contract work will be made only for and under those pay items included in the SCHEDULE OF ITEMS. All other work and materials will be considered incidental and included in the payment of the PAY ITEMS in the SCHEDULE OF ITEMS.

When more than one class, size, or thickness is specified in the SCHEDULE OF ITEMS for any PAY ITEM, suffixes will be added to the item number to differentiate between the items.

906.02 Determination of Quantities. The following measurements and calculations are to be used to determine contract quantities for payment:

Make measurements for seeding, geotextiles, and erosion control blankets along slope lines.

For retaining walls, measure by the square foot of front wall face.

Measure structures according to neat lines SHOWN ON THE PLANS or as altered by the CO in writing to fit field conditions. Make measurements along the centerline and parallel to the specified grade or foundation or as SHOWN ON THE PLANS.

Deduct lengths for stairways, turnpike, puncheon, retaining walls, wire baskets, switchbacks, bridges, and bridge approaches from the measurement of excavation in Section 911 unless these items are specified as incidental to excavation in Section 911.

For standard manufactured items, such as fence, wire, plates, rolled shapes, and pipe conduits identified by gage, weight, section dimensions, and the like, such identification shall be considered the nominal weights or dimensions. Manufacturer's tolerances will be accepted unless controlled by tolerances in the cited specifications.

906.03 Units of Measurement. Payment will be made by units defined and determined according to U.S. Customary measure and by the following:

- (a) Cubic Yard. A measurement computed by one of the following methods:
 - (1) Excavation, embankment, or borrow. The measurement computed by the average-end-area method from measurements made longitudinally along a centerline or other reference line.
 - (2) Material in place or stockpiled. The measurement computed with the dimensions of the in-place material using average-end-area method or prismoidal formula.
 - (3) Material in the Delivery Vehicle. The measurement computed using measurements of material in the hauling vehicles at the point of delivery.

Vehicles shall be loaded to at least their water-level capacity. Leveling of the loads may be required when vehicles arrive at the delivery point.

- (b) Each (EA). One complete unit, which may consist of one or more parts.
- (c) Lump Sum (LS). The quantities that denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job.

906.04 Methods of Measurement. One of the following methods of measurement for determining final payment is DESIGNATED ON THE SCHEDULE OF ITEMS for each PAY ITEM:

(a) Designed Quantities. These quantities denote the final number of units to be paid for under the terms of the contract. They are based upon the original design data available prior to advertising the project. Original design data include the preliminary survey information, design assumptions, calculations, and plans. Changes in the number of units DESIGNATED IN THE SCHEDULE OF ITEMS may be authorized under the following conditions:

- (1) As a result of changes in the work approved by the CO.
- (2) As a result of the CO determining that errors exist in the original design that cause a PAY ITEM quantity to change by 15 percent or more.
- (3) As a result of the contractor submitting to the CO a written request showing evidence of errors in the original design that cause a PAY ITEM quantity to change by 15 percent or more. The evidence must be verifiable and consist of calculations, plans, or other data that show how the designed quantity is believed to be in error.

- (b) Staked Quantities (SQ). These quantities are determined from staked measurements prior to the construction.
- (c) Actual Quantities (AQ). These quantities are determined from measurement of completed work.
- (d) Vehicle Quantities. These quantities are measured or weighed in hauling vehicles.
- (e) Lump Sum Quantities (LSQ). These quantities denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job.

906.05 Government-Furnished Materials. When materials are furnished by the Forest Service, the note "Government-Furnished Materials" will be added to the description of the PAY ITEM.

Section 907—Mobilization

Description

907.01 This work consists of moving personnel, equipment, material, and incidentals to the project and performing all work necessary before beginning work at the project site. Mobilization includes the costs associated with obtaining permits, insurance, and bonds. Mobilization is not intended to pay for the costs of materials before they are used on the project site.

Payment

907.02 The accepted quantity, measured as provided in Subsection 906.02, will be paid at the contract price per unit of measurement for the Section 907 pay item shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Progress payments for mobilization lump sum will be paid as follows:

- (a) Bond premiums will be reimbursed according to FAR Clause 52.232-5, Payments Under Fixed-Price Construction Contracts, after receipt of the evidence of payment. Reimburse for bond premiums before issuing the Notice to Proceed if evidence of payment is received.
- (b) When 5 percent of the original contract amount is earned from other bid items, 50 percent of the mobilization item, or 5 percent of the original contract amount, whichever is less, will be paid.
- (c) When 10 percent of the original contract amount is earned from other bid items, 100 percent of the mobilization item, or 10 percent of the original contract amount, whichever is less, will be paid.
- (d) Any portion of the mobilization item in excess of 10 percent of the original contract amount will be paid after final acceptance. Pay any unpaid amount for mobilization upon final acceptance of all work items.

Section 908—Construction Staking, Flagging, and Cleanup

Description

908.01 This work consists of establishing any control points needed in addition to existing staking, and removing and disposing of all construction stakes, tags, flagging, and plastic ribbon from the project area.

Construction

908.02 General. The Government will set initial construction stakes or flagging, and control points, and furnish the contractor with all necessary information relating to lines, slopes, and grades. These stakes and flagging constitute the field control.

Furnish and maintain additional stakes, flagging, templates, batter boards, and other materials and supplies necessary for marking and maintaining points and lines established. Do not perform work in the absence of control points. If any construction control points are destroyed, displaced, or erroneous, notify the CO. Uniformly contour alignment and construct grade from control point to control point.

Remove all construction stakes, tags, flagging, and plastic ribbon from the project area within 7 days after the final inspection of all other work on the project. Dispose of all stakes, tags, flagging, and plastic ribbon off Government-administered lands unless otherwise designated.

Measurement

908.03 There will be no separate measurement for this item.

Payment

908.04 Trail staking, flagging, and cleanup will be considered incidental to other pay items in this contract, and additional payment will not be made.

Section 909— Maintenance for Traffic and Temporary Construction Access

Description

909.00.01 This work consists of maintaining existing trails that are undergoing improvements open and maintained in such a condition as to safely accommodate traffic and providing temporary construction access to the site. Maintaining the trail for traffic and temporary access may be covered by subsection:

- 909.10 Maintenance for Traffic
- 909.20 Temporary Construction Access

Measurement

909.00.02 There will be no separate measurement for these items.

Payment

909.00.03 Maintaining the trail for public access and providing temporary construction access will be considered incidental to other pay items in this contract, and additional payment will not be made.

909.10 - Maintenance for Traffic

Description

909.10.01 Keep existing trails that are undergoing improvements open and maintained in such a condition as to safely accommodate traffic. Provide and maintain temporary detours, approaches, or crossings and intersections with trails, roads, businesses, parking lots, and campgrounds in a safe and passable condition. Perform no work that interferes or conflicts with traffic until a plan for handling traffic has been submitted and approved. Specific requirements for detours or closures are SHOWN ON THE PLANS or in the SPECIAL CONTRACT REQUIREMENTS.

Before any suspension of work, take precautions necessary to prevent damage to the project, such as temporary detours, approaches, crossings, or intersections, and make provisions for normal drainage and to minimize erosion. Leave all trailways in a condition suitable for traffic unless otherwise specified.

The Government may permit use of portions of the project during periods when operations are shut down. All maintenance attributable to permitted use during periods of work suspension will be provided by the Government. The contractor is responsible for any maintenance that is not attributable to use or that is necessary during suspensions resulting from fault or negligence of the contractor.

909.20 - Temporary Construction Access

Description

909.20.01 The government may provide temporary access for the contractor from another route or trail other than the trail being constructed. The contractor will be responsible for maintaining the temporary access, removing and rehabilitating the temporary access route and any damaged area after construction is completed.

Section 910—Trailways

Section 911 - Trail and Prism

Description

911.00.01 This work consists of constructing trails, restoration of existing trails or obliteration of abandoned trails. The earthwork and associated trail tread and prism work may be covered by one or more of the following subsections:

911.10.	Excavation and Embankment
911.20.	Borrow
911.30.	Existing Trail Restoration
911.40.	Slide Maintenance
911.50.	Slough and Berm Removal
911.60.	Obliteration of Abandoned Trails
911.70.	Retainers

Measurement

911.00.02 Measure the section 911 items listed in the bid schedule according to subsection 906.

Payment

911.00.03 The accepted quantities will be paid at the contract price per unit of measurement for the section 911 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

911.10 - Excavation and Embankment

Description

911.10.01 This work consists of the excavation and placement of excavated material, regardless of its nature, from within the trailway or from other sources, except for material included under other pay items SHOWN IN THE SCHEDULE OF ITEMS.

Includes excavation, embankment, and backfill construction required to shape and finish the trailbed, ditches, backslopes, fill slopes, drainage dips, trail passing sections, and turnouts. Also includes excavation and embankment work required to construct culverts, trail bridges, shallow stream fords and gully crossings, talus and rubble rock sections, and climbing turns.

Materials

911.10.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

911.10.03 Use and Disposal of Excavated Material. Conserve and use all suitable material for specified work. Conserve excess excavated rock suitable for specified project work and use in place of materials from designated sources.

Remove all duff and debris from within trailway limits and uniformly spread outside the clearing limits, not more than 4 inches in depth (unless otherwise SHOWN ON THE PLANS). Do not obstruct drainage or create piles, berms, or windrows of debris.

Place excess and unsuitable excavation beyond the downslope edge of the trailbed Do not obstruct drainage and spread to a depth not exceeding 4 inches. This includes any material removed in the grubbing operation and deposited in the same area.

Place rocks over 4 inches in greatest dimension not used in construction beyond the hinge point on the downslope side. Place rocks so that the tops are at least 6 inches lower than the trailbed surface. Ensure that no blockage of drainage or creation of a windrow effect occurs.

911.10.04 Trailway Excavation and Embankment. Minor deviations of \pm 12 inches in vertical alignment and 36 inches in horizontal alignment with smooth transitions of at least 30 feet on each side of the deviation are acceptable unless otherwise SHOWN ON THE PLANS.

Construct embankments with suitable compacted material. Compact all disturbed soil within the trailbed area.

Remove any rock within or above the backslopes that is unstable. Use or dispose of rock in accordance with Subsection 912.03.

Leave the finished slope in a uniform and roughened condition.

Make necessary adjustments of horizontal or vertical alignment, within the tolerances specified in this subsection, to produce the designed trailway section and balance earthwork. Such adjustments shall not be considered as changes.

911.10.05 Trailbed Finish. Fill holes with suitable material, compact, and cut high points to provide a uniform trailbed finish.

911.10.07 Ditches. Construct ditches to be free of loose rocks, roots, sticks, and other obstructions.

911.10.08 Geosynthetics. Where SHOWN ON THE PLANS, place geosynthetics flat and parallel to centerline of the trail before placing embankment. Overlap geosynthetics a minimum of 24 inches. Install anchors or fasteners as recommended by the geosynthetic manufacturer.

911.20 - Borrow

Description

911.20.01 This work consists of placing select borrow material on the trailbed.

Materials

911.20.02 Requirements. Obtain borrow materials from locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Obtain CO's approval before using borrow from other locations. Suitable material from slough and berm removal may also be used as borrow material. Use suitable borrow material and aggregate under 2 inches in the greatest dimension.

Construction

911.20.03 General. On sideslopes where water can drain away from the trailbed, provide a sufficient depth of borrow material to obtain the outslope as SHOWN ON THE PLANS.

Across meadows and on turnpike sections, provide a sufficient depth of borrow material to produce a crowned trailbed as SHOWN ON THE PLANS.

Compact all material placed. Compact borrow material placed on the approaches of bridges and puncheon to provide a smooth surface and a smooth transition from the structure to the adjoining trail tread surface.

Cover any culvert surfaces that have become exposed with a minimum depth of 6 inches of suitable material over the full length of the exposed culvert and of sufficient length along the trail to present a uniform trail grade.

Provide free-draining borrow sites and backslopes no steeper than 1 1/3:1.

911.30-Existing Trail Restoration

Description

911.30.01 This work consists of restoring the original trail template, including clearing, removing slough and berm, borrow, filling ruts and troughs, reshaping backslopes, excavation, reshaping trail tread, restoring drainage and other trail structures, constructing check dams, and removing protruding rocks, roots, stumps, slough, and berms.

Construction

911.30.03 Clearing and Grubbing. Clear and grub in accordance with the requirements of section 912 and as SHOWN ON THE PLANS.

911.30.04 Excavation and Embankment. Excavate and place all excavated material in accordance with the requirements of section 911.10.04 and as SHOWN ON THE PLANS.

911.30.05 Rock and Root Removal. Uniformly scatter the removed rocks and roots below the trailway and distribute to ensure no blockage of watercourses or creation of a windrow. Fill holes with suitable material and compact.

911.30.06 Slough and Berm Removal and Excess Material. Use suitable slough and berm material within the trailway to restore the trailbed as SHOWN ON THE PLANS. Place all unsuitable and excess material beyond the downslope edge of the trailbed and uniformly spread to a depth not exceeding 4 inches and so as not to obstruct drainage or interfere with the drainage of outsloped tread.

Remove berm when daylight can be obtained within a distance of 5 feet from the outslope edge of finished tread unless otherwise DESIGNATED ON THE GROUND or SHOWN ON THE PLANS.

911.30.07 Fill Material and Borrow. Use suitable material to fill ruts, troughs, and potholes in the tread that cannot be leveled and outsloped through performance of work in Subsection 915.06. Compact and shape as SHOWN ON THE PLANS.

Obtain borrow from areas SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

911.30.08 Drainage. Restore drainage dips and ditches to reestablish drainage as SHOWN ON THE PLANS by removing obstructions such as rocks, roots, and sticks to make ditches and culverts free draining.

Restore rock spillways in accordance with section 923 and as SHOWN ON THE PLANS.

911.30.09 Stream Channel Cleaning. Clean channel of obstructions in areas SHOWN ON THE PLANS. Remove debris and rocks from the stream channel and scatter outside of the side slopes of the stream channel and beyond the clearing limits.

911.30.10 Check Dams. When constructing check dams for gullies, use dimensional lumber, sound peeled logs, or a row of stones placed across the gully in the subgrade with the ends securely embedded in the banks as SHOWN ON THE PLANS and at locations STAKED ON THE GROUND.

Use suitable material for backfill as SHOWN ON THE PLANS. Place and compact backfill to meet the density of the existing trailbed and to form a smooth tread.

911.30.11 Switchbacks. Restore switchbacks in accordance with section 914 and as SHOWN ON THE PLANS.

911.30.12 Waterbars. Restore waterbars in accordance with section 922 and as SHOWN ON THE PLANS. Reestablish drainage by removing accumulated material and replacing loose or missing rocks, unsuitable logs, and deteriorated rubber belting.

911.30.13 Turnpikes. Restore turnpikes in accordance with section 913 and as SHOWN ON THE PLANS by replacing missing, rotten, or loose retainer logs and stakes, or missing or loose retainer rocks. Backfill with suitable material.

911.30.14 Trail Structures. Restore all trail structures at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

911.30.15 Reshaping and Finishing Trailbed and Backslopes. Provide a firm and uniformly finished trailbed in accordance with cross-sections SHOWN ON THE PLANS.

Provide a uniform and roughened surface on disturbed backslopes in accordance with cross-sections SHOWN ON THE PLANS. Cut all roots flush.

911.40 - Slide Maintenance

Description

911.40.01 This work consists of the removal and disposal of slide material from the trailbed and the restoration of all sections of trail that have been damaged.

Maintenance

911.40.02 General. Conserve and use suitable material from the slide on the trailbed for tread surfacing. Spread this material at a maximum depth of 3 inches for a distance not exceeding 100 feet in each direction from the site of the slide unless otherwise SHOWN ON THE PLANS.

Place all excess and unsuitable material beyond the downslope edge of the trailbed. Uniformly spread unsuitable material to a depth not exceeding 4 inches and do not obstruct drainage.

Reshape the backslope that contributed to the slide to reduce future sloughing and to conform to adjacent undamaged sections unless otherwise SHOWN ON THE PLANS.

Re-grade sections of trailbed that have been damaged to a width and finish that conform to adjacent undamaged sections unless otherwise SHOWN ON THE PLANS.

911.50 - Slough and Berm Removal

Description

911.50.01 This work consists of the removal and disposal of slough and berm material that has accumulated on the trailway.

Construction

911.50.02 Slough and Berm Removal and Excess Material. Remove all slough material within the trailway. Remove all material from the trailbed when daylight can be obtained within a distance of 4 feet from the outsloped edge of the finished tread unless otherwise DESIGNATED ON THE GROUND or SHOWN ON THE PLANS. Conserve and use suitable material to restore the trail tread as SHOWN ON THE PLANS.

Place all excess and unsuitable material beyond the downslope edge of the trailbed. Uniformly spread to a depth not exceeding 4 inches and do not obstruct drainage or interfere with the drainage of outsloped tread.

911.60 - Obliteration of Abandoned Trails

Description

911.60.01 This work consists of removal and disposal of existing structures, including turnpikes, walkways, bridges, culverts, signs and posts, and other material within the trailway, above or below ground. Work also includes salvaging DESIGNATED materials and backfilling the resulting trenches, holes, and pits.

Construction

911.60.02 Removal of Culverts and Bridges. Remove existing culverts within embankment areas at locations SHOWN ON THE PLANS.

Remove existing structures down to the natural stream bottom, and remove parts outside the water course to at least 12 inches below natural ground surface or finish ground surface, whichever is lower. Where portions of an existing structure lie wholly, or in part, within the limits of a new structure, remove parts to accommodate the installation of the proposed structure.

Avoid damage to bridges being dismantled for salvage. Match mark steel and/or wood members and prepare drawings showing the structural location of each member.

911.60.03 Signs and Posts. Remove signs, posts, and associated hardware at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND. Backfill post hole, compact, and contour area to match existing ground.

911.60.04 Removal of Other Obstructions. Remove other obstructions at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

911.60.05 Disposal. Dispose of native log and rock material by scattering below the trailway and outside clearing limits. Do not place debris in water courses, snow ponds, lakes, meadows, or locations where it could impede the flow to, through, or from the drainage structures. Dispose of metal, treated timber, and other manufactured products by removing from Government-administered lands and placing in approved waste disposal sites.

911.70 - Retainers

Description

911.70.01 This work consists of furnishing and installing log, sawn timber and rock retainers, including excavation and backfill, wood stakes and/or metal anchors and selecting and hauling of retainer materials.

Materials

911.70.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Construction

911.70.03 General. Place log, sawn timber, or rock retainers in continuous rows. Bed retainers along their entire length and so they are stable. When retainers are constructed of logs or sawn timber use lengths greater than or equal to 10 feet.

Section 912 - Clearing Limits

Description

912.00.01 This work consists of clearing, grubbing, trimming, removing, and treating trees, logs, limbs, branches, brush, plants, and other vegetation along with removal of rocks, undermined roots and hazard trees within the clearing limits. Clearing and removal of trees, vegetation and rocks may be covered by one or more of the following subsections:

912.10.	Clearing and Grubbing
912.20.	Brush Cutting
912.30.	Logging Out
912.40.	Hazard Tree Removal
912.50.	Loose Rock Removal
912.60.	Rock and Root Removal

Measurement

912.00.02 Measure the section 912 items listed in the bid schedule according to subsection 906.

Payment

912.00.03 The accepted quantities will be paid at the contract price per unit of measurement for the section 911 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

912.10 - Clearing and Grubbing

Description

912.10.01 This work consists of clearing, grubbing, trimming, removing, and treating trees, logs, limbs, branches, brush, plants, and other vegetation within the clearing limits. Work includes the felling and treatment of designated trees outside the clearing limits. Also, included are the protection from injury or defacement of trees and other objects not designated for removal and treatment of damaged trees.

Construction

912.10.02 Clearing Limits. Clear to the dimensions SHOWN ON THE PLANS or 12 inches beyond the fill and backslope catch points, whichever is greater.

912.10.03 Material to Be Cleared. Remove and dispose of trees, logs, limbs, branches, brush, herbaceous plants, and other vegetation within the clearing limits, except for the following:

- a) Live, sound, and firmly rooted trees of the size SHOWN ON THE PLANS.
- b) Live brush, herbaceous plants, and trees between the trailway and the clearing limits that are less than 12 inches in height and less than ½ inch in diameter at ground line.

Except as provided above, cut all limbs and branches more than ½ inch in diameter that extend into the clearing limits. Cut limbs flush with the tree trunks or stems or cut at the ground surface as SHOWN ON THE PLANS.

Fall and limb designated trees.

912.10.04 Damaged Trees. When felling, cutting, or trimming, do not cause bark damage to standing timber. If damage does occur to standing trees, treat the injured trees as SHOWN ON THE PLANS. Remove and dispose of trees with major roots exposed by construction that are rendered unstable.

912.10.05 Removal of Stumps. Remove all stumps within the trailbed. Remove stumps located between the edge of the trailbed and the edge of the trailway that cannot be cut flush with the finished slope or that are not tightly rooted.

912.20 - Brush Cutting

Description

912.20.01 This work consists of removing brush, trees less than 4 inches in diameter, and shrubs within the clearing limits.

Construction

912.20.02 General. Remove all limbs of shrubs and trees that extend across or into the clearing limits as SHOWN ON THE PLANS. Saw or cut limbs flush with the tree trunk. Make cuts in a manner that will not tear or strip bark from the trees.

Cut and remove from the clearing limits all woody plants exceeding ½ inch in stem diameter or 12 inches in height. The maximum size material to be cut under this specification is 4 inches in diameter when measured at a height of 6 inches above the ground on the uphill side of the stump.

Cut all brush and small, woody plants as near flush to the ground surface as possible. When impractical to cut plants flush, the maximum stem length shall be 2 inches.

Remove all woody material for a minimum of 3 inches below the trail tread surface. Fill holes in the trail tread caused by removing woody material with suitable material.

Scatter the clearing debris removed from the clearing limits outside and below the clearing limits. Do not place materials in stream channels, drainage ways, ditches, culvert inlets, or other locations where they would prevent the free flow of water away from the trailbed.

912.30 - Logging Out

Description

912.30.01 This work consists of removing brush, logs, and down trees from the clearing limits.

Construction

912.30.02 Clearing Out. Cut and remove all logs that extend across or into the clearing limits. The portions of cut logs that remain on the upper side of the trail shall be either firmly anchored to prevent sliding or rolling onto the trailway or moved across the trail to the lower side and scattered outside the clearing limits.

Fell all trees over 4 inches in diameter that are leaning into the clearing limits and that are within 10 feet above the trailbed. Stump height of leaning trees that are cut outside the clearing limits shall not exceed 12 inches as measured on the uphill side of the stump. Disposal and payment for the leaning trees described above will be the same as for down logs and trees. Remove roots and stumps from trees within the trailway that have been uprooted.

Rerouting the trail around windfalls, uprooted trees, and other obstacles will not be permitted. Ramp or reroute sections of the trail tread that have been damaged by uprooted stumps as necessary to provide safe passage on the trail. Payment for such work will be incidental to the specified work item, and no extra payment will be made.

Remove sticks or wood chunks exceeding 2 inches in diameter and 12 inches in length that have fallen onto the trailbed.

Scatter the down trees on the lower side of the trailway outside the clearing limits. Do not place such materials in stream channels, drainage ways, ditches, culvert catch basins or other locations where they would prevent the free flow of water away from the trailbed.

912.40 - Hazard Tree Removal

Description

912.40.01 This work consists of felling, bucking, and limbing trees and scattering slash.

Construction

912.40.02 Hazard Trees. Remove trees and snags that are broken off or that are in a leaning, unstable position over the trailway to designated areas as SHOWN ON THE PLANS. Cut designated danger trees so that stump heights do not exceed 12 inches as measured on the uphill side of the stump. Maximum stump height of designated trees within 4 feet of the trail centerline is 4 inches. Do not leave felled trees parallel with the trail unless there are sufficient barriers to keep them from rolling or sliding onto the trail. Lop limbs to reduce slash concentration and scatter the clearing debris outside and below the clearing limits. If the trunk or a portion thereof, falls within the trailway, remove that portion within 4 feet of either side of the trail centerline and scatter a minimum distance of 4 feet beyond and below the trail centerline.

912.50 - Loose Rock Removal

Description

912.50.01 This work consists of removal and disposal of loose rock from the trail tread.

Construction

912.50.02 General. Remove loose rocks that are larger than 2 inches at their greatest dimension from the trailbed. Remove any loose rock in drainage dips or ditches that may impede water flow off the trail. Loose rocks are rocks that are not firmly embedded in the trail and can be removed by hand. Where the trailbed consists predominantly of rock with little or no soil present, remove all loose rock larger than 3 inches.

Fill any holes remaining from rock removal with suitable material and compact. If the rock removed is not needed for other items of maintenance work, scatter the rock by side-casting to the lower side of trailway beyond the clearing limits, and distribute rock to ensure that no blockage of drainage or creation of a windrow occurs. Do not dispose of waste materials in water courses.

912.60 - Rock and Root Removal

Description

912.60.01 This work consists of removal and disposal of rocks and roots from the tread.

Construction

912.60.02 Rock Removal. Remove surface rocks that are larger than 2 inches at their greatest dimension, and rocks that project more than 2 inches above the surface of the trail tread, when removal can be accomplished by hand or when rocks can be pried out with a pick mattock, shovel, pry bar, or similar tool. Where the trailbed consists predominantly of rock with little or no soil present, remove loose rock in excess of 3 inches.

Shatter any protruding rocks in trail tread that are too large to be pried out with a pick and bar by using either a rock sledge or explosives. Remove the protrusion down to the level of the tread surface. Fill any resulting depressions with suitable material and compact by tamping. If rock removed is not needed for other items of maintenance work, scatter the rock by side-casting to the lower side of the trailway and beyond the clearing limits and distribute rock to ensure that no blockage of drainage

or creation of windrow occurs. Do not dispose any waste material in water courses.

912.60.03 Root Removal. Remove exposed tree roots on or in the trail tread that are greater than 1 inch in diameter. Cut embedded roots that project more than 2 inches above the trail tread flush with the trail tread. Scatter removed roots on the lower side of the trailway beyond the clearing limits and outside of water courses.

Fill holes caused by rock and root removal with suitable material and compact to form a smooth trail tread.

Maintain trail tread to the width as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

915 - Talus Section

Description

915.00.01 This work consists of furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail. Construction or maintenance of the talus section may be covered by one or more of the following subsections:

- 915.10. Talus Section
- 915.20. Talus Section Maintenance

Materials

915.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

915.00.03 Preparation of Subgrade. Prepare and finish trailbed as required under section 911. Obtain written approval of the CO before placing aggregate

915.00.04 Talus or Rubble Rock Sections. Through talus or rubble rock slide areas, fill all voids with suitable material to the depth SHOWN ON THE PLANS. Use cap rocks that weigh a minimum of 130 lbs and have a length of at least twice their width. At least 50 percent of all hand-placed outer rocks should weigh a minimum of 130 lbs. Construct tread by building out rather than by removing material from the inner bank.

Measurement

915.00.05 Measure the section 915 items listed in the bid schedule according to subsection 906.

Payment

915.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the section 915 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

915.10 - Talus Section

Description

915.10.01 This work consists of construction of talus section, including furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail.

Construction

915.10.02 Construct talus section as required under the construction section 915.00., and and/or as SHOWN ON THE PLANS.

915.20 - Talus Section Maintenance

Description

915.10.01 This work consists of maintenance of talus section, including furnishing, hauling, and placing rock and aggregate, and compacting aggregate surfacing and through talus or rubble rock sections of trail.

Maintenance

915.10.02 Perform maintenance of talus section as required under the construction section 915.00., and/or as SHOWN ON THE PLANS.

917 – Fords

Description

917.00.01 This work consists of construction or maintenance of fords or stepping stones, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections. Construction or maintenance of the ford or stepping stones may be covered by one or more of the following subsections:

- 917.10. Natural Ford
- 917.20. Constructed Ford
- 917.30. Stepping Stones

917.40. Ford Maintenance

Materials

917.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

917.00.03 Preparation of Subgrade. Prepare and finish trailbed as required under section 911 and 912 and/or as SHOWN ON THE PLANS. Obtain written approval of the CO before placing aggregate.

917.00.04 Retaining Walls. When SHOWN ON THE PLANS, construct retaining walls in accordance with section 935.

917.00.05 Barriers. When SHOWN ON THE PLANS, construct barriers at each ford in accordance with section 933.

917.00.06 Ditches. When SHOWN ON THE PLANS, construct ditches in accordance with section 925.

Measurement

917.00.07 Measure the section 917 items listed in the bid schedule according to subsection 906.

Payment

917.00.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 917 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this section. See Subsection 906.04.

917.10 - Natural Ford

Description

917.10.01 This work consists of construction of natural ford, approaches and surfacing, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

917.10.02 Construct natural ford, approaches and surfacing as required under the construction section 917.00., and/or as SHOWN ON THE PLANS.

917.20 - Constructed Ford

Description

917.20.01 This work consists of construction of ford, approaches and surfacing, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

917.20.02 Construct ford, approaches and surfacing as required under the construction section 917.00., and/or as SHOWN ON THE PLANS.

917.30 - Stepping Stones

Description

917.30.01 This work consists of construction of stepping stones and approaches, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, ditches, retaining walls, and approach sections.

Construction

917.30.02 Construct stepping stones and approaches as required under the construction section 917.00., and/or as SHOWN ON THE PLANS.

917.40 – Ford Maintenance

Description

917.40.01 This work consists of maintenance of fords and approaches, including excavation, furnishing, hauling, and placing rock and aggregate, compacting aggregate surfacing, and associated barriers, retaining walls, and approach sections to bring the ford up to good condition.

Maintenance

917.40.02 Maintain stream fords and gully crossings as SHOWN ON THE PLANS. Remove debris and loose rocks over 3 inches from existing stream crossings to provide the tread width. Maintain and replace missing or rotted log or rock barriers that form the dam at fords and gully crossings. Level and smooth the stream bottom with gravel or rock less than 3 inches in greatest dimension to provide a crossing.

Re-grade or fill the approaches to the stream fords and gully crossings to provide for safe use. Replace missing stepping stones.

Section 920—Drainage Structures

922 - Waterbars

Description

922.00.01 This work consists of installing and maintaining waterbars, including excavation and backfill; selecting and hauling of log and rock materials; and furnishing treated timber, belting, and other materials. Construction and maintenance of waterbars may be covered by one or more of the following subsections:

922.10.	Rock Waterbar
922.20.	Log or Treated Timber Waterbars
922.30.	Belted Waterbar
922.40.	Waterbar Maintenance

Materials

922.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Drainage Pipe	992
Geosynthetics	994
Material for Timber Structures	995

Use rubber belting that is single-ply, non-reinforced material 3/8 inch to 1/2 inch thick.

Construction

922.00.03 General. Install waterbars of the types and at the locations SHOWN ON THE PLANS or as DESIGNATED ON THE GROUND.

922.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911. Around waterbars, backfill and compact suitable material that is free of rocks larger than 3 inches in size. Compact material on the downgrade side of rock, log, and treated timber waterbars, flush with the top of waterbars.

Outslope the trailbed on the upgrade side of the waterbar with a slope equal to or greater than the trail grade leading into the waterbar. Provide a uniform outsloped plane that forms a gutter against the waterbar.

Measurement

922.00.05 Measure the Section 922 items listed in the bid schedule according to section 906.

Payment

922.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 922 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

922.10 - Rock Waterbar

Description

922.10.01 This work consists of installing rock waterbars, including excavation and backfill; selecting and hauling of rock materials; and other materials.

Construction

922.10.02 Install rock waterbars as required under construction section 922.00 and/or as SHOWN ON THE PLANS.

922.10.03 Rock Waterbar. Tightly embed selected rocks into the trailbed. Place waterbar rocks with tops relatively even, with no sharp points. Use rocks with lengths greater than or equal to 1.5 times the width.

922.40. - Waterbar Maintenance

Description

922.40.01 This work consists of maintenance of waterbars, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls.

Maintenance

922.40.02 General. Where trail drainage facilities have been plugged and the water has been diverted from the intended channel, remove the debris causing the diversion and return the drainage to the channel. Divert water off and away from the trailbed. If washing or ponding of water has been or is occurring, dig a shallow ditch sloped 2 percent to 5 percent to the downstream side of the trail and 3 inches minimum deep and 12 inches minimum wide across the trail at the point where water enters the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

922.40.03. Clean the upgrade side of all existing waterbars and maintain them as SHOWN ON THE PLANS. Remove material accumulated against rubber belting waterbars. Use and compact suitable material removed from the upgrade side of all waterbars to bring the trail tread flush with the top of those waterbars on the downgrade side. Remove all debris from the lead-off

area of all waterbars that restricts the free flow of water away from the trail. Firmly embed replacement rocks for rock waterbars into the trailbed and fit the rocks together. Make the tops of the rocks even, with no sharp points. Peel native replacement logs before using them. Anchor stakes tightly in the ground without splits and nail tightly to the log.

925 – Ditches

Description

925.00.01 This work consists of construction and maintenance of ditches, including excavation and backfill. Construction and maintenance of ditches may be covered by one or more of the following subsections:

- 925.10. Side Ditch
- 925.20. Leadoff Ditch
- 925.30. Ditch Maintenance

Construction

925.00.02 General. Construct ditches at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

925.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

Measurement

925.00.04 Measure the Section 925 items listed in the bid schedule according to section 906.

Payment

925.00.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 925 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

925.10. - Side Ditch

Description

925.10.01 This work consists of construction of side ditches, including excavation and backfill.

Construction

925.10.02 Construct side ditches as required under construction section 925.00 and/or as SHOWN ON THE PLANS.

925.20. - Leadoff Ditch

Description

925.20.01 This work consists of construction of leadoff ditches, including excavation and backfill.

Construction

925.20.02 Construct leadoff ditches as required under construction section 925.00 and/or as SHOWN ON THE PLANS.

925.30. - Ditch Maintenance

Description

925.30.01 This work consists of maintenance of leadoff ditches, including excavation and backfill.

Maintenance

925.30.02 General. Where ditches have been plugged and the water has been diverted from the intended ditch, remove the debris causing the diversion and return the drainage to the ditch. Clean deposited material and restore ditches as SHOWN ON THE PLANS. Remove all debris from the lead-off ditches that restricts the free flow of water away from the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

927 - Drain Dips

Description

927.00.01 This work consists of construction and maintenance of drainage dips, including excavation and backfill. Construction and maintenance of drainage dips may be covered by one or more of the following subsections:

- 924.10. Drain Dip
- 924.20. Drain Dip Maintenance

Materials

927.00.02 Materials. Use materials meeting the requirements of the following sections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics	994
Material for Timber Structures	995

Construction

927.00.03 General. Construct drainage dips at locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

927.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

Measurement

927.00.05 Measure the Section 924 items listed in the bid schedule according to section 906.

Payment

927.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 924 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

927.10. - Drain Dip

Description

926.10.01 This work consists of constructing drain dips and associated drainage ditches, including excavation and backfill.

Construction

926.10.02 Construct drain dips as required under construction section 927.00 and/or as SHOWN ON THE PLANS.

927.20. - Drain Dip Maintenance

Description

927.20.01 This work consists of maintenance of drain dips, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls.

Maintenance

927.20.02 General. Where trail drainage facilities have been plugged and the water has been diverted from the intended channel, remove the debris causing the diversion and return the drainage to the channel. Divert water off and away from the trailbed. If washing or ponding of water has been or is occurring, dig a shallow ditch sloped 2 percent to 5 percent to the downstream side of the trail and 3 inches minimum deep and 12 inches minimum wide across the trail at the point where water enters the trail.

Clean ditches to permit the free flow of water into culverts and away from the trail.

Scatter all unusable or unneeded material that is cleared from the drainage structures 3 feet or more beyond and below the trail or drainage facility and out of water courses.

927.20.03 Clean deposited material and restore drainage dips as SHOWN ON THE PLANS. Remove all debris from the lead-off area of dips that restricts the free flow of water away from the trail. Use suitable material obtained by cleaning dips for fill on the downgrade side, removing rock more than 3 inches at its greatest dimension. Compact all material placed in the trail tread.

Section 930 – Trail Structures

Section 931 – Switchbacks

Description

931.00.01 This work consists of construction and maintenance of switchbacks, including excavation, associated barriers, ditches, retaining walls, and approach sections. Construction and maintenance of switchbacks may be covered by one or more of the following subsections:

- 931.10. Type 1 – Radius Switchback
- 931.20. Type 2 – Circular Landing Switchback
- 931.30. Type 3 – Rectangular Landing Switchback
- 931.40. Switchback Maintenance

Materials

931.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Construction

931.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

931.00.04 Retaining Walls. When SHOWN ON THE PLANS, construct retaining walls in accordance with Section 935.

931.00.05 Barriers. When SHOWN ON THE PLANS, construct barriers at each switchback in accordance with Section 933.

931.00.06 Ditches. When SHOWN ON THE PLANS, construct ditches in accordance with Section 925.

931.00.07 Limits of Switchback. Beginning and ending of switchback will be as SHOWN ON THE PLAN or as DESIGNATED ON THE GROUND.

Measurement

931.00.08 Measure the Section 931 items listed in the bid schedule according to section 906.

Payment

931.00.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 931 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

931.10 - Type 1 – Radius Switchbacks

Description

931.10.01 This work consists of construction of radius switchbacks, including excavation, associated barriers, ditches, retaining walls, and approach sections.

Construction

931.10.02 Construct radius switchback as required under construction section 931.00 and/or as SHOWN ON THE PLANS.

931.40 - Switchback Maintenance

Description

931.40.01 This work consists of replacing or maintaining retaining walls, trail tread, barriers, and drain ditches on existing switchbacks.

Maintenance

931.40.02 General. Perform maintenance on switchbacks as required under construction section 931.00 and/or as SHOWN ON THE PLANS.

931.40.03 Retaining Walls. When needed in rock retaining wall maintenance, use replacement rock that is sound, durable, and free from rifts, seams, laminations, and minerals that could cause deterioration through weathering.

931.40.04 Barriers. Perform barrier maintenance where needed. Use the same type of materials as in the original construction.

931.40.05 Ditches. Clear switchback ditches to permit the free flow of water. Construct ditches as SHOWN ON THE PLANS.

931.40.06 Tread. Maintain trail tread to the original designed tread width.

Section 932 – Turnpikes

Description

932.00.01 This work consists of construction and maintenance of turnpike sections, including excavation, embankment, retainers, geosynthetics, backfill, and drainage features. Construction and maintenance of turnpike sections may be covered by one or more of the following subsections:

932.10.	Type 1 – Standard Turnpike
932.20.	Type 2 – Standard Turnpike with Foundation
932.30.	Turnpike Maintenance

Materials

932.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics materials	994
Material for Timber Structures	995

Construction

932.00.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

932.00.04 Retainers. Construct retainers in accordance with Section 911.70 and as SHOWN ON THE PLANS. Place retainers in a continuous row along each shoulder of the turnpike section as SHOWN ON THE PLANS. Bed the parallel retainers so they are stable and at approximately the same top elevation.

932.00.05 Geosynthetics. Where SHOWN ON THE PLANS, place geosynthetics flat and parallel to centerline of the trail before placing embankment. Overlap geosynthetics a minimum of 2 feet. Install anchors or fasteners as recommended by the geosynthetic manufacturer.

932.00.06 Backfill. Backfill and compact with suitable material.

932.00.07 Drainage. Construct side ditches, cross-drainage, and culverts at locations SHOWN ON THE PLANS and/or DESIGNATED ON THE GROUND. Provide leadoff ditches from side ditches on the lower side of trail at points DESIGNATED ON THE GROUND or SHOWN ON THE PLANS.

Measurement

932.00.08 Measure the Section 932 items listed in the bid schedule according to section 906.

Payment

932.00.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 932 pay items listed in the bid schedule. Payment will

be full compensation for the work prescribed in this Section. See Subsection 906.04.

932.10 - Type 1 – Standard Turnpikes

Description

932.10.01 This work consists of construction of standard turnpike sections, including excavation, embankment, retainers, geosynthetics, backfill, and drainage features.

Construction

932.10.02 Construct standard turnpike sections as required under construction section 932.00. and/or as SHOWN ON THE PLANS.

932.20 - Type 2 – Standard Turnpikes with Foundation

Description

932.20.01 This work consists of construction of standard turnpike sections with foundation, including excavation, embankment, retainers, geosynthetics, rocks, backfill, and drainage features.

Construction

932.20.02 Standard turnpike sections with foundation as required under construction section 932.00. and/or as SHOWN ON THE PLANS.

932.30 - Turnpike Maintenance

Description

932.30.01 This work consists of maintaining turnpike sections.

Maintenance

932.30.02 General. Perform maintenance on turnpikes as required under construction section 932.00. and/or as SHOWN ON THE PLANS.

932.30.03 Obtain logs, staking material, and suitable material for backfill from locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

932.30.04 Replace missing rocks, or missing or decayed retaining logs or lumber, with rocks, logs, or dimensional lumber as SHOWN ON THE PLANS. Secure loose or dislocated retainers. Drive stakes 2-3 inches in diameter and 18-24 inches in length along the outside edge of each log or lumber retainer to hold them in place at a maximum of 3 feet.

932.30.05 Clear all drainage structures of obstructions, silt, and debris so as to permit the free flow of water away from the trail.

932.30.06 If necessary, use suitable material removed from the drainage structures to build up the crown. Shape the tread with suitable material to

provide a 2 inch crown measured from the top of the crown at the centerline to the top of the retainers.

Section 933 – Side Barriers

Description

933.00.01 This work consists of construction and maintenance of side barriers, including excavation, embankment, widening, debris disposal and backfill. Construction and maintenance of side barriers may be covered by one or more of the following subsections:

933.10.	Stacked Rock Barrier
933.20.	Masonry Rock Barrier
933.30.	Barrier Rail on Grade
933.40.	Barrier Rail on Posts
933.50.	Curb
933.60.	Guardrail

Materials

933.00.02 Materials. Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
Material for Timber Structures	995

Construction

933.00.03 General. Construct barriers of the type and at the locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Use logs in which the true centerline deviates no more than 2 inches from the line between the centers of the ends of the log.

933.00.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 911.

933.00.05 Backfill. Backfill and compact with suitable material.

Measurement

933.00.06 Measure the Section 933 items listed in the bid schedule according to section 906.

Payment

933.00.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 933 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

933.10. – Stacked Rock Barrier

Description

933.10.01 This work consists of construction of stacked rock barrier, including excavation, embankment, widening, debris disposal and backfill.

Construction

933.10.02 Construct stacked rock barrier as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.70 – Side Barrier Maintenance

Description

933.70.01 Work consists of maintaining rock, log, and timber barriers.

Maintenance

933.70.02 General. Perform maintenance on barriers as required under construction section 933.00. and/or as SHOWN ON THE PLANS.

933.70.03 Restore rock, log, and timber barriers to their original lines and grades unless otherwise SHOWN ON THE PLANS.

933.70.04 Rock Barriers. Replace missing rocks, using rocks of general rectangular shape between 45 lbs and 120 lbs, with the larger rocks placed on the bottom. Use rock chips to wedge larger rocks in place to form a stable wall. Stagger all vertical joints.

Stabilize and reset loose rocks.

Form a continuous grade with the top of the restored barrier consistent with adjacent segments of the barrier.

933.70.05 Log or Timber Barriers. Replace missing, damaged, and unsound logs or timbers using material similar to that used in the original barrier unless otherwise SHOWN ON THE PLANS. The location of trees for native timber materials will be DESIGNATED ON THE GROUND.

Stabilize and re-attach loose logs or timbers that are in sound condition.

935 - Retaining Walls

Description

935.00.01 Work consists of construction or maintenance of retaining walls, including excavating, placing borrow, backfilling, geosynthetics, trailbed construction and slope finishing. Construction and maintenance of retaining walls may be covered by one or more of the following subsections:

935.10.	Log Crib
935.20.	Stacked Rock Retaining Wall
935.30.	Wire Basket Retaining Wall
935.40.	Masonry Rock Retaining Wall
935.50.	Cast-in-place Concrete Retaining Wall
935.60.	Post and Plank Retaining Wall (Soldier Pile)
935.70.	Retaining Wall Maintenance

Materials

935.00.02 Requirements. Use materials meeting the requirements of the following section:

Rock, Grid Pavement Units, and Aggregate	991
Geosynthetics Materials	994
Material for Timber Structures	995
Wire Basket Material	996

The location of trees for native timber materials is SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

Construction

935.00.03 Installation. Install retaining walls of the types and at the locations SHOWN ON THE PLANS or as DESIGNATED ON THE GROUND.

935.00.04 Excavation. Excavate in accordance with Section 911 to provide a full bench foundation of stable undisturbed soil or compacted suitable material. Construct the finished foundation grade parallel with the trail profile grade.

935.00.05 Backfill. Place geosynthetics before backfilling and compaction. Backfill and compact with suitable material.

Measurement

935.00.06 Measure the Section 935 items listed in the bid schedule according to section 906.

Payment

935.00.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 935 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

935.10 - Log Crib

Description

935.10.01 This work consists of constructing log or split timber retaining walls. Work includes excavation, notching, pre-drilling, pinning, borrow, backfilling, tread and slope finishing.

Construction

935.10.02 Install retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.10.03 Log Notching. Notch logs only on bottom side.

Do not notch sill and filler logs. Individually notch all face, rear, and header logs to fit as the wall construction proceeds vertically. Do not pre-notch.

Provide a notch depth between one-fourth and one-third the log diameter. Vary notching depth and width as required to obtain a snug fit between interlocking logs of varying diameter. Do not exceed 1/2 inch of space between filler and face logs.

935.20 - Stacked Rock Retaining Wall

Description

935.20.01 This work consists of constructing stacked rock retaining walls, including excavating, placing borrow, backfilling, tread and slope finishing.

Construction

935.20.02 Install retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.20.03 Wall Construction. Construct rock retaining walls at locations SHOWN ON THE PLANS and DESIGNATED ON THE GROUND. Stagger vertical joints a minimum of 4 inches horizontally from vertical joints in adjoining courses.

Use uniformly distributed header rocks for at least 25 percent of the rocks in the front and rear faces of the wall each having a length at least 2.5 times its width. Place all header rocks with the greatest dimension extending into the wall (at right angle to trail centerline), except at corners. At corners, lay alternating courses containing headers with greatest dimension parallel with wall.

Place the exposed face of each rock parallel to the face of the wall in which it is set.

Stabilize each rock on the course that supports it. Do not break, loosen, or displace rocks already set.

Use rocks of a general rectangular shape. Fill voids with small rock fragments or fine aggregate.

935.70 - Retaining Wall Maintenance

Description

935.70.01 This work consists of maintenance and repair of retaining wall sections.

Maintenance

935.70.02 General. Perform maintenance on retaining walls as required under construction section 935.00. and/or as SHOWN ON THE PLANS.

935.70.03 Obtain logs, rocks, and suitable material for backfill from locations SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

935.70.04 Replace missing rocks, or missing or decayed logs or lumber, with rocks, logs, or dimensional lumber as SHOWN ON THE PLANS. Secure loose or dislocated rocks and logs.

935.70.05 Repair walls back to a height that will provide a uniform grade consistent with segments of trail adjacent to each side of the damaged wall.

950. Signs and Markers

Section 955 – Cairns

Description

955.00.01 This work consists of furnishing and installing or maintaining cairns. Construction and maintenance of cairns may be covered by one or more of the following subsections:

955.10.	Cairns
955.20.	Cairn Maintenance

Material

955.00.02 Conform to the following Sections and Subsections:

Rock, Grid Pavement Units, and Aggregate	991
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Construction

955.00.03 General. Erect cairns of the type and at the locations as SHOWN ON THE PLANS or DESIGNATED ON THE GROUND.

955.00.04 Rock Cairn Construction. Slope each rock layer toward the center. Place each rock with at least three points of contact. Do not wedge small rocks into cracks between large rocks to stabilize the large rocks.

Measurement

955.00.05 Measure the Section 955 items listed in the bid schedule according to section 906.

Payment

955.00.06 The accepted quantities will be paid at the contract price per unit of measurement for the Section 955 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 906.04.

955.10 – Cairns

Description

955.10.01 This work consists of furnishing and installing cairns.

Construction

955.10.02 Construct cairns as required under construction section 955.00 and/or as SHOWN ON THE PLANS.

955.20 – Cairn Maintenance

Description

955.20.01 This work consists of maintenance of cairns.

Maintenance

955.20.02 Perform maintenance on cairns as required under construction section 955.00 and/or as SHOWN ON THE PLANS.

980. Incidentals

990. Materials

Section 990 - Materials

990.01 General. Materials specification not found in this section will be covered by the most current version of *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*, U.S. Department of Transportation, Federal Highway Administration.

Section 991 - Rock, Grid Pavement Units, Aggregate and Asphalt

991.01 Rock. Use sound, durable rock free of rifts, seams, laminations, and minerals that could deteriorate as a result of weathering. Dress rock to remove thin or weak portions before use.

Furnish rock of the size, shape, weight, and face area necessary to produce the general characteristics and appearance SHOWN ON THE PLANS.

991.04 Pit-Run Aggregate. Use pit-run aggregates consisting of native materials that can be placed on the trail without crushing or screening. No gradation, other than a maximum size, will be required. Provide pit-run aggregate with a maximum size as SHOWN IN THE SCHEDULE OF ITEMS.

991.05 Screened Aggregate. Use screened material consisting of gravel, talus, rock, sand, shale, or other suitable material that is reasonably hard, durable, and free of organic material, mica, clay lumps, or other deleterious material. Use screened aggregate meeting the gradation requirements shown in table 961-1 and of the grading SHOWN IN THE SCHEDULE OF ITEMS.

991.06 Crushed Aggregate for Base or Surface Course. Use crushed aggregate meeting the requirements of tables 991-1 and 991-2 and SHOWN IN THE SCHEDULE OF ITEMS.

At least 50 percent, by weight, of the aggregate retained on the No.4 sieve is to have one fractured face. Naturally fractured faces may be included in the 50-percent requirement.

The CO may approve other gradations if they are similar to those specified Grade aggregate from coarse to fine within the gradation band.

Table 991-1-Crushed and screened aggregate grading requirements for base or surface courses.

Percent Passing
(AASHTO T 11 and T 27)

Sieve	Grading A	Grading B	Grading C	Grading D
1"				
¾"	100	100		
½"	50-90	70-100		
3/8"			100	100
No.4	30-65	45-75	60-85	70-90
No.8	25-55	30-60	35-70	45-70
No.30		15-40		20-40
No.200	6-12	6-20	5-20	5-20

Table 991-2.-Crushed Aggregate Quality Requirements

Description	AASHTO Test Method	Requirement
Percent Wear	T 96	40 Max.
Durability Index, Coarse and Fine	T 211	35 Min.
Liquid Limit	T 89	35 Max.
Plasticity Index	T 91	2-11

Section 994 - Geosynthetics

994.01 Geotextiles

- (a) Use geotextiles, alone or in combination with other geosynthetics that meet the following Class B requirements for subsurface drainage as specified in AASHTO M288.
- (1) Grab Strength at 50 percent elongation
ASTM D4632-91 355 N min.
 - (2) Seam Strength,
ASTM D 4632 310 N min.
 - (3) Puncture Strength,
ASTM D4833-88 110 N min.
 - (4) Mullen Burst,
ASTM D 3786-87 900 kPa min.
 - (5) Trap Tear Strength,
ASTM D4533-91 110 N min.
- (b) Use geotextile meeting the following critical physical properties, unless otherwise SHOWN ON THE PLANS.
- (1) Material Structure Nonwoven (all purposes)
or Slit Film (for reinforcement)

or separation)

- (2) Polymer Composition Polypropylene
- (3) Apparent Opening,
ASTM D 4751-8730 mm max.
- (4) Permittivity, ASTM
D4491-92 4060 liters/minute/m² min.
- (5) Ultraviolet Degradation 70 at 150 hours

994.02 Geonet. Use geonet meeting the following critical physical properties unless otherwise SHOWN ON THE PLANS.

- (a) Polymer Composition of Core
(Net or Mesh)..... Medium PE or HDPE
- (b) Permeability 0.001 cm/second min.
- (c) Geotextile Must meet all Section
994.01 requirements
- (d) Compressive Strength
of Core, ASTM D1621..... 500 kPa min.
- (e) Transmissivity with Gradient
at 0.1, Pressure at 10 kPa..... 0.0009 m²/second min.

994.03 Geogrids. Use geogrids made from polypropylene or coated polyester that meets the following critical physical properties.

- (a) Polymer Type HDPE, Polypropylene, or
Polyester with Acrylic or PVC
coating
- (b) Mass per Unit Area, ASTM D5261-92... 175 g/m² min.
- (c) Maximum Aperture Size
 - (1) Direction (MD) 100 mm
 - (2) Cross-Direction (XD) 75 mm
- (d) Wide-Width Strip Tensile Strength
at 5 percent Strain, ASTM D4595-86
 - (1) Machine Direction (MD) 8 kN/m min.
 - (2) Cross-Direction (XD) 6 kN/m max.

994.04 Geocells. Use geocells meeting the following physical properties.

- (a) Composition PE or HDPE
- (b) Geocell Weight expanded: 1.70 kg/m² min.
- (c) Minimum Cell Seam Peel Strength,
U.S. Army Corps of Engineers
Technical Report G:-86-19,
Appendix A 800 N min.

(d) Expanded Dimensional Properties..... AS SHOWN ON PLANS

994.07 Certification. Furnish a certificate or affidavit signed by an official from the company manufacturing the geosynthetic, verifying that the geosynthetic meets specifications.

994.08 Delivery, Storage, and Handling. During shipment and storage, wrap all geosynthetics to protect them from sunlight. When storing geosynthetics, protect them from mud, soil, dust, and debris. If materials are not installed immediately after delivery to site, do not store them in direct sunlight.

Section 995 - Material for Timber Structures

995.01 Untreated Structural Timber and Lumber. Conform to AASHTO M 168. Furnish an inspection certification from an agency accredited by the American Lumber Standards Committee for the species and grade. Mark all pieces with the inspection service, grade designation, species, and inspector identity.

Season and dry all structural timber and lumber before fabrication. Do not use material that is twisted, curved, or otherwise distorted.

Do not use boxed-heart pieces of Douglas fir or redwood in outside stringers, floor beams, caps, posts, sills, or rail posts. Boxed-heart pieces are defined as timber so sawed that at any point in the length of a sawed piece the pith lies entirely inside the four faces.

Select native log stringers from designated sites on Government-administered land. Select the species and sizes of materials as SHOWN ON THE PLANS. Select native log stringers that are straight, sound, and free of defects. Obtain CO approval of logs and trees before felling or moving them to the site. Fell trees to prevent damage to standing timber and to minimize breakage of trees to be used. Buck logs from felled trees in such a way to minimize waste and to obtain the required length and diameter.

Peel logs, square the ends, and trim the knots and limbs flush unless otherwise SHOWN ON THE PLANS. Scatter the debris from the processing of timber away from the trail and so it will not block the trail or plug water courses.

Field treat the following untreated timber surfaces in accordance with AWWA standard M4.

- (a) All ends and tops, and all contact surfaces of posts, sills, and caps.
- (b) All ends, joints, and contact surfaces of bracing and truss members.
- (c) All surfaces of timber bumpers and the back faces of bulkheads.
- (d) All other timber that will be in contact with earth.
- (e) All ends of log stringers.

995.02 Holes for Bolts, Dowels, Rods & Lag Screws. Bore all holes before preservative treating the wood.

Bore holes for round drift bolts and dowels 1/16 inch smaller in diameter than that of the bolt or dowel to be used. Ensure that the diameter of holes for square drift bolts or dowels is equal to the side dimension of the bolt or dowel.

Bore holes for machine bolts 1/16 inch larger than the diameter, except when galvanized bolts are specified. In this case, drill all holes 1/8 inch greater than the bolt size.

Bore holes for lag screws 1/16 inch larger for the shank portion of the lag screw and drill the remainder of the hole approximately 75 percent of the shank diameter to a depth of 1 inch less than the length of the screw.

995.03 Hardware. Use nails of standard form (ASTM F 1667), wood screws (ANSI/ASME B 18.6.1), hex headed bolts and nuts (ASTM A307), lag screws (ASTM A307 and ANSI/ASME B18.2.1), carriage bolts (ASTM A307), and drift pins and dowels (ASTM A307) as SHOWN ON THE PLANS.

Fabricate washers from gray iron or malleable iron castings unless structural washers are specified. Use malleable iron washers with a diameter approximately four times the bolt diameter under all bolt heads or nuts in contact with wood, unless otherwise SHOWN ON THE PLANS.

Galvanize all hardware according to AASHTO M 232 or cadmium plate all hardware according to ASTM B 766 class 12, type III, unless otherwise SHOWN ON THE PLANS, except for the glued laminated deck panel dowels. Ensure that all fasteners, including nails, spikes, bolts, washers, and timber connectors, other than malleable iron, are galvanized.

Final tighten all nuts to provide proper bearing and snug tight condition. Snug tight is defined as sufficient tightness to bring faces of members into firm contact with each other. Cut off excess bolt lengths of more than 1 inch. After final tightening, check or burr all bolts effectively with a pointing tool to prevent loosening of the nuts.

995.04 Treated Structural Timber and Lumber. Furnish wood according to Subsection 995.01. Incise all wood and make all dimensional cuts and holes in the wood before pressure treatment. Use wood preservative treatment methods meeting the requirements of AASHTO M 133 as SHOWN ON THE PLANS. Treat dimensional lumber, sawn timber and glued laminated timber members according to AWWA Standards as SHOWN ON THE PLANS.

All treated stringers, decking, running planks, and handrails shall be treated after fabrication in accordance with AWWA U1, *Use Category System*, using Pentachlorophenol or Copper Naphthenate (CuN) in Light Oil, (Type C Solvent) for Use Category UC3B.

All treated substructures (sills, backing planks, cribs, timber walls, etc.) shall be treated after fabrication in accordance with AWWA U1 *Use Category System*, using Pentachlorophenol or Copper Naphthenate (CuN) in Heavy Oil (Type A Solvent) for Use Category UC4B.

Treat timber members shall comply with the requirements of the current edition of WWPI's *Best Management Practices for the Use of Treated Wood in Aquatic Environments*.

Except for pine, incise before treatment all surfaces greater than 2 inches in width and all Douglas fir and western larch surfaces. Field treat all cuts, abrasions, drilled

holes, and recesses that occur after initial preservative treatment in accordance with the requirements specified in AWWA standard M4, *Standard for the Care of Pressure-Treated Wood Products*. Plug all unused holes with preservative-treated plugs. Perform all field-applied preservation treatment with necessary precautions so as to prevent soil and/or water contamination.

All treated timber members must have an approved American Lumber Standards Committee quality mark, individually or sealed pallets, assuring that treatment conforms to the appropriate AWWA standards.

Submit a certified copy of the lot certification, by a qualified independent inspection and testing agency, to the CO for each charge of preservative, stating penetration in inches and retention in pounds per cubic foot (assay method). In addition, provide a written certification from the producer of the treated products that "Best Management Practices for Treated Wood in Western Aquatic Environments," published by the Western Wood Preservers Institute and Canadian Institute of Treated Wood, were utilized. Include a description and appropriate documentation of the Best Management Practices used.

Handle treated timber according to the Consumer Information Sheet published by AWWA. Do not cut, frame, or bore treated timber after treatment unless approved by the CO. Handle treated timbers carefully and do not drop, damage outer fibers, or penetrate the surface with tools. Do not use cant dogs, hooks or pike poles. In coastal waters, do not cut or bore timber below the highwater mark.

Appendix D Flowdown Provisions

NFF Funding Code: 1593150

NFF Funding Name: CCS GAOA GMUG Crag Crest

Funder Agreement ID: 24-CS-11020400-031

U.S. FOREST SERVICE ACKNOWLEDGED IN PUBLICATIONS, AUDIOVISUALS AND ELECTRONIC MEDIA.

Award Recipient or Contractor shall acknowledge U.S. Forest Service support in any publications, audiovisuals, and electronic media developed as a result of this agreement.

TRAINING, EVALUATION, AND CERTIFICATION OF SAWYERS USED BY COOPERATORS.

Any employee, contractor, or volunteer of the cooperator who will use chain saws or crosscut saws on National Forest System lands under this agreement must be trained, evaluated, and certified in accordance with Forest Service Manual 2358. The cooperator is responsible for providing sawyer training, evaluation, and certification for the cooperator's employees, contractors, and volunteers, unless the U.S. Forest Service and the cooperator determine it is not in the best interest of the partnership for the cooperator to provide sawyer training and evaluation. In these circumstances, the U.S. Forest Service, upon request and upon availability of Agency resources, may assist with conducting sawyer training and evaluation for the cooperator's employees, contractors, and volunteers. Cooperator employees, contractors, and volunteers who will use chain saws and/or crosscut saws on National Forest System lands must be certified by the cooperator. Only those cooperator organizations with an approved sawyer training, evaluation, and certification program may conduct sawyer training, evaluation, and certification. Any employee, contractor, or volunteer of the cooperator who will use other types of saws, such as handsaws to cut small diameter material, brush saws, and pole saws, must be trained in accordance with Forest Service Handbook 6709.12, Chapter 40, section 41.3. The cooperator is responsible for providing that training.

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All non federal government entities working on this agreement will adhere to the below provisions found in the Consolidated Appropriations Act, 2016, Pub. L. 114-113, relating to reporting fraud, waste and abuse to authorities:

1. The recipient may not require its employees, contractors, or subrecipients seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting them from lawfully reporting that waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.
2. The recipient must notify its employees, contractors, or subrecipients that the prohibitions and restrictions of any internal confidentiality agreements inconsistent with paragraph (a) of this award provision are no longer in effect.
3. The prohibition in paragraph (a) of this award provision does not contravene requirements applicable to any other form issued by a Federal department or agency governing the nondisclosure of classified information.
4. If the Government determines that the recipient is not in compliance with this award provision, it:
 - a. Will prohibit the recipient's use of funds under this award, in accordance with sections 743, 744 of Division E of the Consolidated Appropriations Act, 2016, (Pub. L. 114-113) or any successor provision of law; and
 - b. May pursue other remedies available for the recipient's material failure to comply with award terms and conditions.