

DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
REGION 9  
ALLEGHENY NATIONAL FOREST

CHSP Little Seeker Stewardship – Warner Run & Wagner Run Aquatic Organism  
Passage Culvert Replacement

Project 3 – UNT to Warner Run	Marienville ATV Trail	0.08 Mile Reconditioning
Project 4 – UNT to Wagner Run	Allegheny Snowmobile Loop	0.08 Mile Reconditioning

Marienville Ranger District – Forest & Elk Counties  
Pennsylvania

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Plans are to be used with “Standard Specifications for Construction and Maintenance of Trails” with Special Project Specifications thereto included in this contract.

Prepared By:

Jennifer Dean

Approved by:

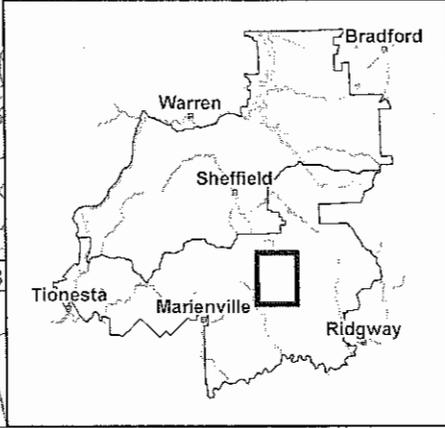
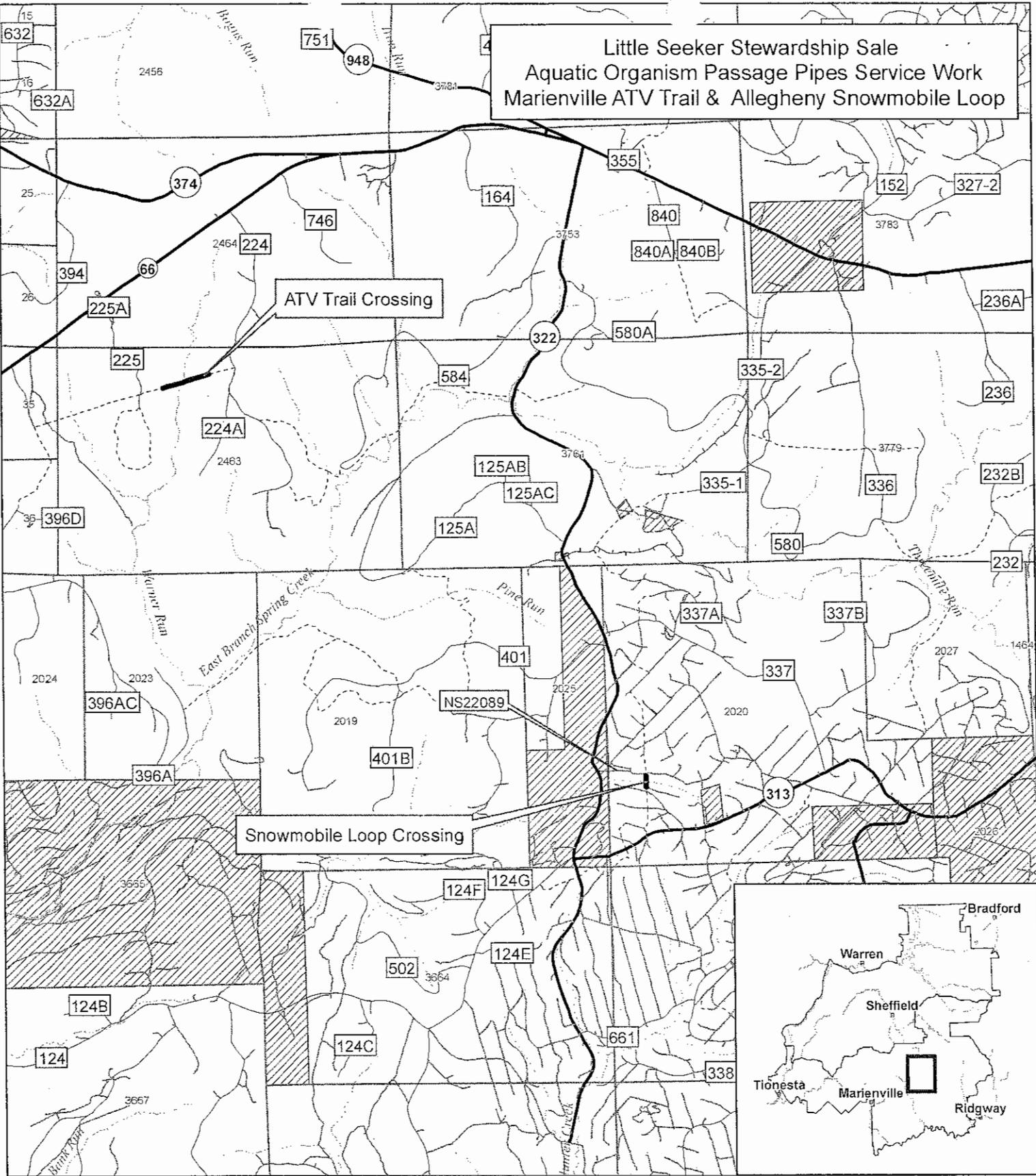
Scott Keel

District Ranger

5/10/13

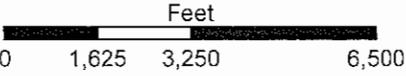
Date

Little Seeker Stewardship Sale  
 Aquatic Organism Passage Pipes Service Work  
 Marienville ATV Trail & Allegheny Snowmobile Loop



- Proposed Trail
- Warrant/Lots
- Other Ownership
- Forest Service
- Municipal Road
- Forest Road
- Decommissioned
- Non-System Road
- Trail

1:40,000



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PROJECT SUMMARY – PROJECTS 3 & 4

SPECIFIED TRAILS

a. Description of Work:

**Reconstruction: Project 3 - Marienville ATV trail – UNT to Warner Run AOP Pipe**  
**Reconstruction: Project 4 - Allegheny Snowmobile Loop – UNT to Wagner Run AOP Pipe**

Culvert Removal and Installation, Mobilization, Seeding & Mulching

b. Construction Costs:

Road Number	Miles
Project 3 – Marienville ATV Trail – UNT to Warner Run	0.08
Project 4 – Allegheny Snowmobile Loop – UNT to Wagner Run	0.08
<b>Total:</b>	<b>0.16</b>

Completion Date: 9/30/2014

## SCHEDULE OF ITEMS FOR PROJECTS 3 & 4

### Project 3 – Marienville ATV Trail – UNT to Warner Run AOP Pipe

ITEM	DESCRIPTION	UNIT	QTY
95101	Mobilization	LS	1
91602	Removal of culvert	Each	1
94101	Aggregate surfacing	LF	400
92101	81 inch span, 59 inch rise aluminized steel, type 2 Corrugated steel pipe, 0.109 inch thickness. <b>Item includes:</b> Bedding, backfill, riprap (SPS705), and limestone to be placed In the pipe as identified in the work description.	LF	28
95506	Seeding, hydraulic or dry method	LS	1

### Project 4 – Allegheny Snowmobile Trail – UNT to Wagner Run AOP Pipe

ITEM	DESCRIPTION	UNIT	QTY
95101	Mobilization	LS	1
91602	Removal of culvert	Each	1
94101	Aggregate surfacing	LF	400
92101	81 inch span, 59 inch rise aluminized steel, type 2 Corrugated steel pipe, 0.109 inch thickness. <b>Item includes:</b> Bedding, backfill, riprap (SPS705), and limestone to be placed In the pipe as identified in the work description.	LF	24
95506	Seeding, hydraulic or dry method	LS	1

## General Notes for Projects 3 & 4

**NOTE:** There are restrictions on construction within both Warner and the UNT to Wagner Run. These are wild trout streams therefore no construction can take place between October 1 and December 31.

-Contractor is responsible for maintenance of all Forest Service roads and trails over which stone or limestone material is hauled. Roads and trails shall be bladed or shaped to restore travel way to the condition found prior to haul.

**\*Prior to any earth disturbing activities, contractor shall call the Pennsylvania One Call System (800-242-1776) and all Oil & Gas Operators in the work area to determine locations of any underground utility lines.**

-Contractor is responsible to coordinate trail closure with the Forest Service.

-Oversize material and boulders encountered during construction or remaining after processing on the finished trail surface will be hauled to a location or placed as directed by Forest Service.

-Aggregate quantities are estimated as compacted in place on the trail.

-Trails shall be completed in such a manner that water shall not pond on trail or in ditch lines.

-The Forest Service will mark clearing limits.

-All removed culverts shall be hauled off Federal lands and become the property of the contractor, unless otherwise indicated for salvage by the Forest Service. Steel pipe casings shall be returned to the Sheffield Work Center unless otherwise directed by the Engineer.

-Contouring, topsoil re-spreading, seeding and mulching of disturbed areas as determined by the Forest Service is required.

-DSA limestone shall be shipped at optimum moisture content not exceeding 15%. Limestone loads that fail test parameters will be rejected.

-Forest Service has obtained the GP-7 permit for both culvert crossings from DEP.

-When replacing culverts in live streams, contractor shall install silt fence and/or silt sock at approaches to live stream crossings to eliminate sediment in the stream course. Any sediment collected will be removed and ground will be stabilized with seed and mulch. Dewatering pumps will be used to redirect water out of the stream course at the time of stream crossing installation. Silt fence and silt sock will be removed only after vegetation is clearly re-established as determined by the Engineer. Contractor is responsible for following the Soil Erosion and Sediment Control Plan as prepared by the Forest Service and enclosed as part of the package. This work will be considered incidental this contract.

-Vegetation cut down during brushing will be pulled beyond the clearing limits and the toe of any roadway or trail template construction. Mixing of soil and cut vegetation shall be avoided. All material will be scattered and lopped within 3' of the ground.

-Aggregate stockpiled will be located on the existing trail surface to assure maximum utilization of the material and eliminate disturbance of existing vegetated areas.

### Project 3 –Marienville ATV Trail – Warner Run AOP Pipe

#### Notes:

1. A track trail dumper/ mini excavator or similar equipment will be needed to complete job due to trail width and bridge crossing limitations.
2. Recondition trail according to Existing Trail Restoration detail
3. Place limestone DSA according to Aggregate Surfacing detail

Station	Road Log/Work Description
0+00	Intersection with FR225
15+66 to 19+66	<b>Recondition trail bed and place DSA limestone 8' wide by 6" deep, taper thickness to accommodate the increased elevation over the new pipe and tie in to the existing trail elevation.</b>
17+66	<b>At the Warner Run Crossing located on the project map, remove existing 36" pipe and install an 81" x 59" x 28' culvert. Bury the inlet 1.2 feet and bury the outlet 1 foot. Construct fill slopes from trail surface to stream bottom at 2:1 slope. Place 5 tons of R4 inside culvert at inlet and 5 tons of R4 inside culvert at outlet and form a channel with banks. Place 3 tons AASHTO #8 gravel and 4 tons of limestone DSA at inlet for streambed simulation inside culvert. Raise trail elevation 1 foot to provide minimum cover. See CULVERT WITHOUT HEADWALLS TYPICAL CROSS SECTION details.</b>
19+66	End of this work item, (Little Seeker Stewardship Sale, 2013)

## Project 4 – Allegheny Snowmobile Trail – UNT to Wagner Run AOP Pipe

### Notes:

1. A track trail dumper/ mini excavator or similar equipment will be needed to complete job due to trail width and bridge crossing limitations.
2. Recondition trail according to Existing Trail Restoration detail
3. Place limestone DSA according to Aggregate Surfacing detail

Station	Road Log/Work Description
0+00	Intersection with NS22089
0+00 to 4+00	<b>Recondition trail bed and place DSA limestone 8' wide by 6" deep, taper thickness to accommodate the increased elevation over the new pipe and tie in to the existing trail elevation.</b>
2+08	<b>At the Wagner Run Crossing located on the project map, remove existing 36" pipe and install an 81" x 59" x 24' culvert. Bury the inlet 1.5 feet and bury the outlet 1.2 feet. Construct fill slopes from trail surface to stream bottom at 2:1 slope. Place 5 tons of R4 inside culvert at inlet and 5 tons of R4 inside culvert at outlet and form a channel with banks. Place 3 tons AASHTO #8 gravel and 4 tons of limestone DSA at inlet for streambed simulation inside culvert. Raise trail elevation 1 foot to provide minimum cover. See CULVERT WITHOUT HEADWALLS and TYPICAL CROSS SECTION details.</b>
4+00	End of this work item, (Little Seeker Stewardship Sale, 2013)

Project 3 - Marienville ATV Trail - UNT to Warner Run AOP Pipe					
Pay Item	Description	Pay Unit	Estimated Quantity	Unit Price	Extended Total
95101	Mobilization	LS	1		
91602	Removal of culverts	Each	1		
94101	Aggregate Surfacing - Reference SPS 703 for Limestone DSA	LF	400		
92101	81 inch span, 59 inch rise aluminized steel, type 2, corrugated steel pipe, 0.109 inch thickness. <b>Item includes:</b> bedding, backfill, Riprap (SPS 705), and Limestone to be placed in the pipe as identified in the work description.	LF	28		
95506	Seeding, mulch, and fertilizer	LS	1		
<b>Total</b>					

Project 4 - Allegheny Snowmobile Trail - UNT to Wagner Run AOP Pipe					
Pay Item	Description	Pay Unit	Estimated Quantity		
95101	Mobilization	LS	1		
91602	Removal of culverts	Each	1		
91501	Aggregate Surfacing - Reference SPS 703 for Limestone DSA	LF	400		
96302	81 inch span, 59 inch rise aluminized steel, type 2, corrugated steel pipe, 0.109 inch thickness. <b>Item includes:</b> bedding, backfill, Riprap (SPS 705), and Limestone to be placed in the pipe as identified in the work description.	LF	24		
95506	Seeding hydraulic or dry method	All	1		
<b>Total</b>					

## EROSION & SEDIMENTATION CONTROL PLAN FOR

*Projects 3 & 4 – CHSP Little Seeker Stewardship*

March 2013

### Prepared by:

U.S.D.A. Forest Service- Allegheny National Forest  
4 Farm Colony Drive  
Warren, PA 16365  
814-728-6169

### GENERAL PLAN DESCRIPTION:

The USDA Forest Service, Allegheny National Forest plans to replace an undersized culvert on Warner Run and remove an aquatic organism barrier. A 36" pipe will be removed and an 81" x 59" x 24' culvert will be installed. Bury the inlet 1.2 feet and bury the outlet 1 foot. The existing culvert is located on an ATV trail on Forest Service property and conveys water from an unnamed tributary of Warner Run in Forest County. The existing culvert is undersized, failing, and in need of replacement. From Marienville, drive northeast on PA-66 for 10.6 miles. Turn Right onto FR 225, Marienville ATV trail head. Drive south for 0.5 miles until you reach the pipeline. Turn left on the pipeline. and drive 0.2 miles and park at the stream crossing

The objective of the project is to replace the crossing with a properly sized pipe that will allow for the passage of high flows and aquatic organisms through the crossings. The existing pipe will be removed and hauled off site and disposed of at a DEP approved waste site. The contributing watershed area is 326 acres. Refer to the enclosed portion of the USGS Russell City, PA quadrangle map for the project location. Watershed area and 100 year flood flow were calculated using USGS StreamStats.

### SOILS TYPES:

The material properties of the native soils have no impact on this project because the proposed excavation will take place in the Forest Service roadway consisting of approximately 1.5 feet of non-native compacted fill material. Disturbance off of the roadway will be minimized as much as possible

The native soil type encountered onsite has been identified using the Soil Map online access information presented by Penn State Cooperative Extension Geospatial Technology Program. The following soils have been identified.

Soil Map Unit- CvC –

Cookport very stony silt loam, 0 to 15 percent slopes. Moderately well drained. 90% of Soil Map Unit: Potential Erosion Hazard (Road/Trail)- Moderate due to slope/erodibility.

### **SITE ALTERATION:**

At the Warner Run Crossing located on the project map, remove existing 36" pipe and install an 81" x 59" x 24' culvert. Bury the inlet 1.2 feet and bury the outlet 1 foot. Earth disturbance activities will be kept to the roadway as much as possible, and will be limited to a 50' x 50' area along the stream. Excess fill material will be removed from the floodway and stockpiled. The proposed crossing will be backfilled with roadway sides sloped at (2:1). Less than 0.1 acre (50' x 50') will be disturbed by the culvert replacement project. The trail width will be maintained at 8 feet wide and an improved DSA surfacing will be placed.

The limits of earth disturbance are shown on the plan map. All construction activities must be performed within the designated disturbance limits.

### **RECEIVING STREAM CLASSIFICATION:**

The existing culvert is located along Wagner Run. The Chapter 93 classification is High Quality-CWF. This stream is a Wild Trout Stream. In-stream work will not be completed between October 1 and December 31.

### **CONSTRUCTION SEQUENCE:**

1. Work in dry or low-flow conditions. Set up a bypass pump system for water diversion (e.g. sandbag dam and bypass pump).
2. Remove existing culvert and excavate trench to accommodate the new culvert. All material excavated during the culvert removal shall be stockpiled away from areas affected by flood waters or wetlands and stabilized within 24 hours.
3. Install new culvert. Refer to the Culvert Section for installation instructions.
4. Backfill and compact fill material around the new culvert.
5. Remove upstream sediment build up and debris from stream bed to smooth transition from upstream channel to culvert. Place excavated stream bed material in culvert as a subgrade material. If there is too much fines or soil in the material, move to stockpile area.
6. In channel excavation material will be placed in the culvert to provide a subgrade material. Place 5 tons of R4 inside culvert at inlet and 5 tons of R4 inside culvert at outlet and form a channel with banks. Place 3 tons AASHTO #8 gravel and 4 tons of limestone DSA at inlet to be spread on top of the R4.
7. Fill roadway side slopes to a finished grade of 2H:1V.
8. Remove waste material stockpile and stabilize area.
9. Permanently seed and mulch all disturbed areas outside of the roadway.

10. Haul the removed pipe and dispose of at a DEP approved waste site.

**NOTE: Site stabilization is achieved when a minimum of 70% perennial vegetated cover is established on all disturbed areas.**

11. After site stabilization is achieved, remove temporary erosion control measures.

### **TEMPORARY CONTROL MEASURES:**

The following erosion and sedimentation control measures are temporary:

1. Compost Filter Socks – used to control sheet flow runoff from disturbed areas or material stockpiles.

### **PERMANENT CONTROL MEASURES:**

The following erosion control measures are permanent controls:

1. Vegetative and mulch surface stabilization

### **Soil Preparation in areas of compacted soils and/or addition of rock/surfacing material:**

Loosen soil to a depth of one inch or depth sufficient to allow soil to seed contact. If rock material is placed for stabilization, it must be scraped-off/removed from planting areas to allow sufficient amount of soil to be exposed/manipulated for planting.

### **Recommended Seed Mixes and Rates of Application:**

ERNMX-181 Native Steep Slope Mix with Annual Ryegrass Seeding Rate 30 lb per acre or 1 lb per 1,000 sq ft. <http://www.ernstseed.com/seed-mix/?category-id=60>

- 24% Little Bluestem, FIG PA Ecotype (Schizachyrium scoparium, FIG PA Ecotype)
- 20% Annual Ryegrass (Lolium multiflorum (L. perenne var. italicum))
- 12% Canada Wild Rye (Elymus canadensis)
- 11% Indiangrass, 'Prairie View', IN Ecotype (Sorghastrum nutans, 'Prairie View', IN Ecotype)
- 8% Virginia Wild Rye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 4% Switchgrass, 'Cave-In-Rock' (Panicum virgatum, 'Cave-In-Rock')
- 3% Autumn Bentgrass, APB (Agrostis perennans, APB)
- 3% Ticklegrass (Rough Bentgrass), PA Ecotype (Agrostis scabra, PA Ecotype)
- 3% Purple Top (Tridens flavus)
- 2% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 2% Wild Bergamot (Monarda fistulosa)
- 2% Tall White Beard Tongue, PA Ecotype (Penstemon digitalis, PA Ecotype)
- 2% Black Eyed Susan, CP NC Ecotype (Rudbeckia hirta, CP NC Ecotype)
- 2% Lance Leaved Coreopsis, CP NC Ecotype (Coreopsis lanceolata, CP NC Ecotype)
- 1% Marsh (Dense) Blazing Star (Spiked Gayfeather) (Liatris spicata)
- 1% Purple Coneflower (Echinacea purpurea)

Total: 100%

## **Mulching**

One ton per acre of straw or hydroseed.  
No fertilizer or lime is to be applied.

**Site stabilization is achieved when a minimum of 70% perennial vegetated cover is established on all disturbed areas.**

## **MAINTENANCE OF EROSION CONTROL FACILITIES:**

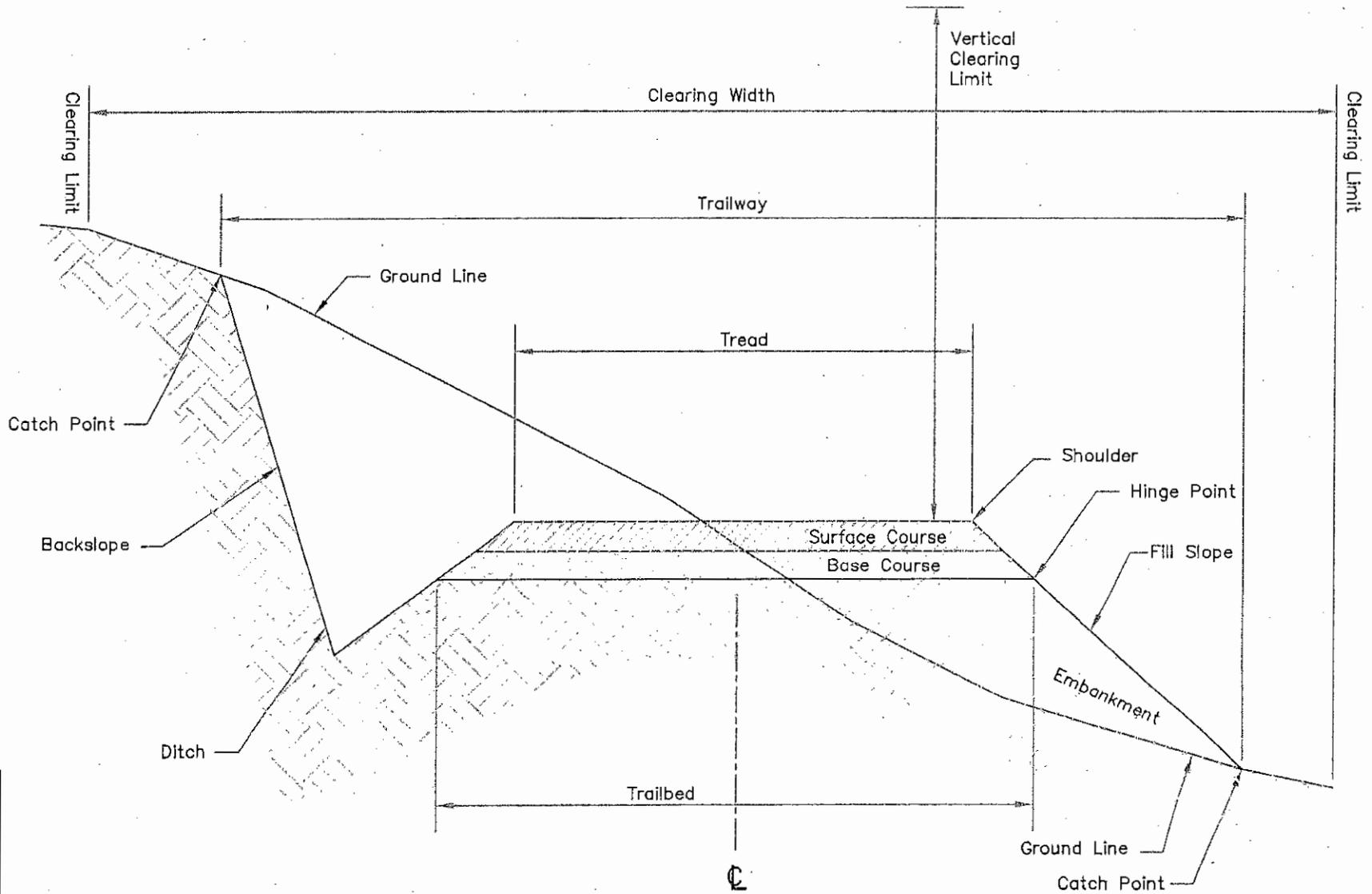
Inspections should be conducted weekly and/or after each significant storm event. All necessary cleaning, repair, and/or maintenance should be made immediately to maintain all erosion control measures. A written report will be completed documenting each inspection and all BMP repair or replacement and maintenance activities.

The following maintenances must be performed until stabilization is achieved onsite.

1. **Compost Filter Socks** - Accumulated Sediment shall be removed when it reaches  $\frac{1}{2}$  the above ground height of the sock and disposed in the manner described elsewhere in the plan. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.
2. **Vegetative Surface Stabilization** – Disturbed area's failing to establish vegetation shall be re-seeded and re-mulched according to the original specifications.
3. **Pump Filter Bag** - A new bag and properly disposed when the bag has been filled to  $\frac{1}{2}$  its total capacity.
4. **Sandbag Headwall** – Inspect sandbag headwall and check for washout. Make necessary repairs maintain the integrity of the dam.

# ILLUSTRATION OF TRAIL STRUCTURE TERMS

NOT TO SCALE

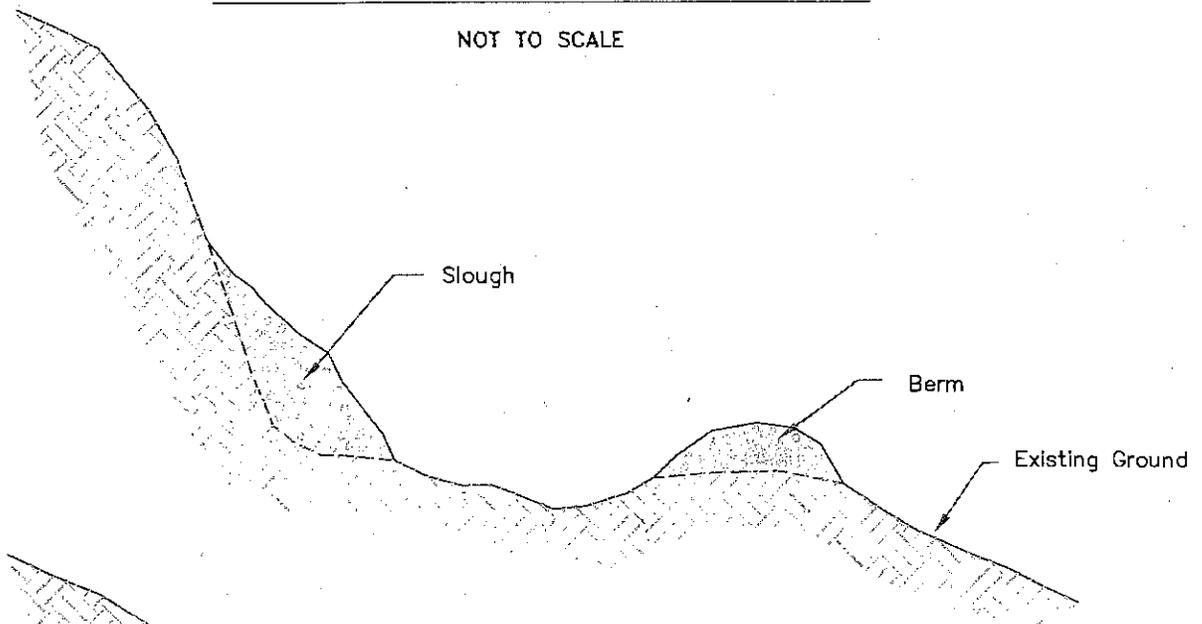


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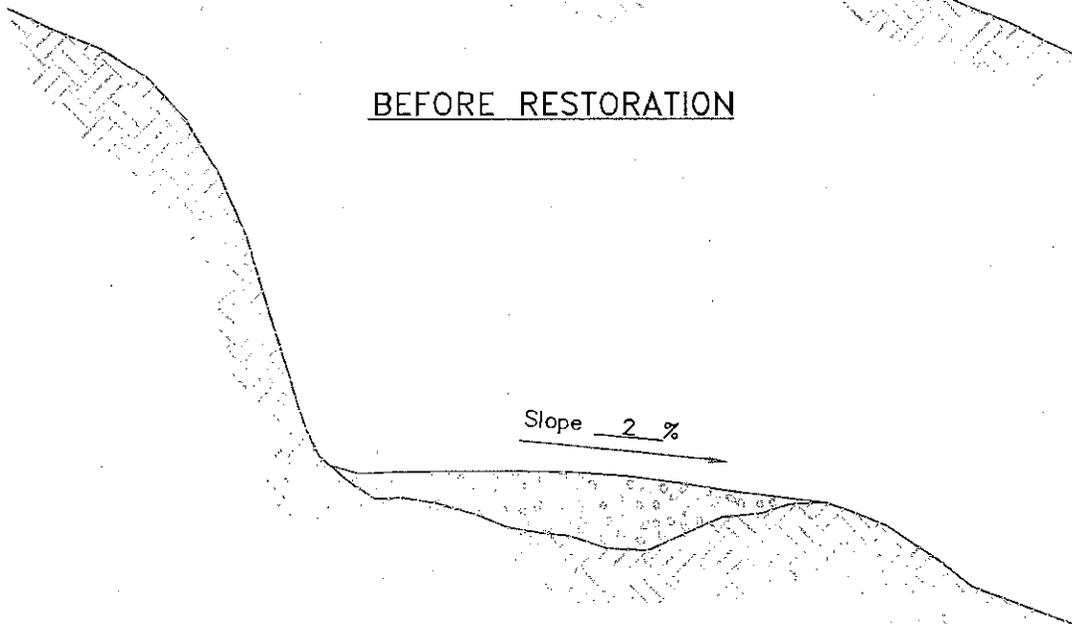
SECTION

# EXISTING TRAIL RESTORATION

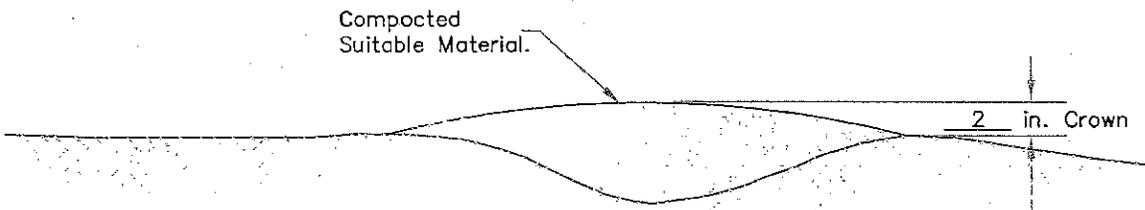
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## BEFORE RESTORATION



## AFTER RESTORATION



## FLAT SLOPES

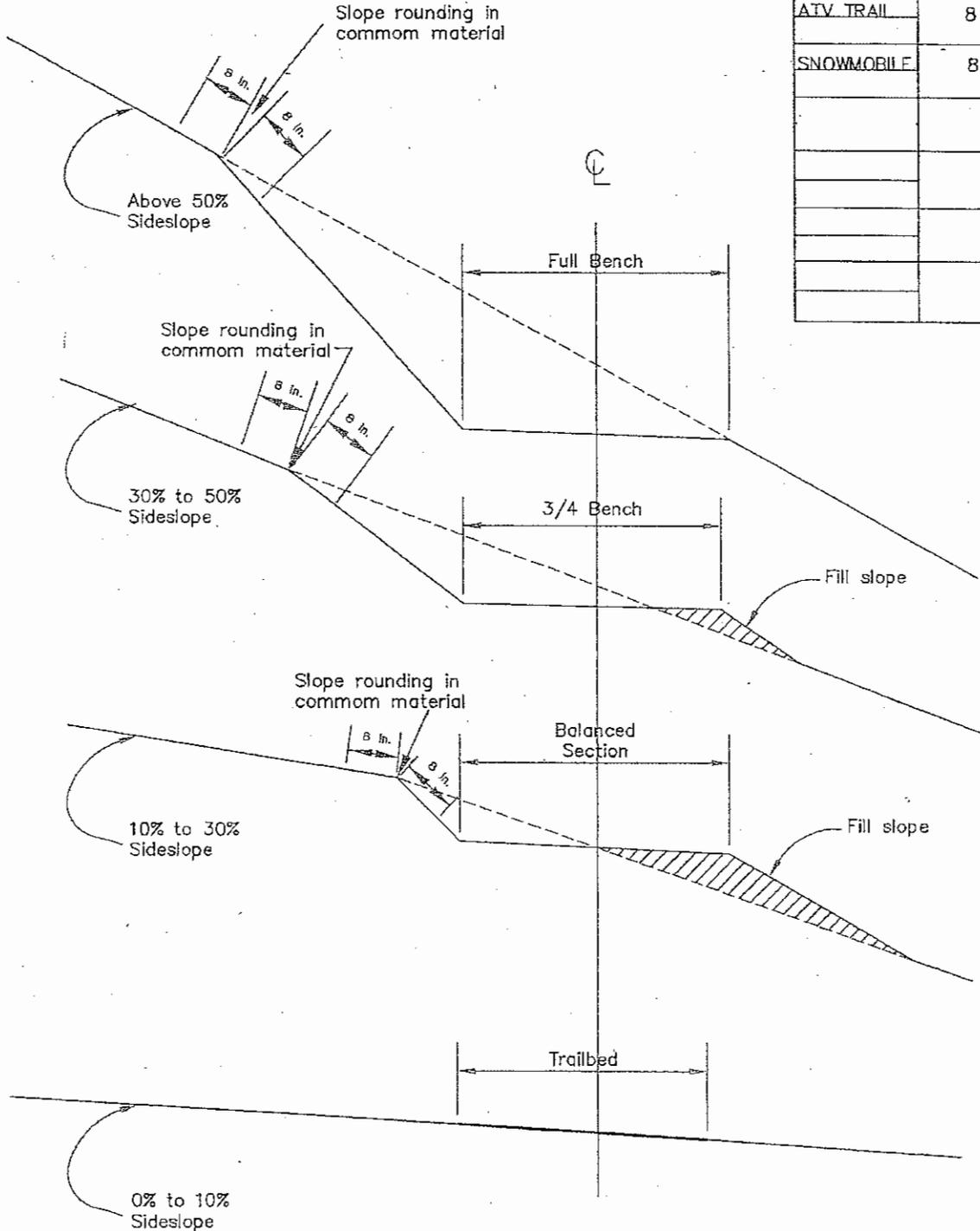
# TYPICAL TRAIL CROSS SECTIONS

NOT TO SCALE

Amount of bench varies with % of sideslope. Outslope trailbed 6-10%.

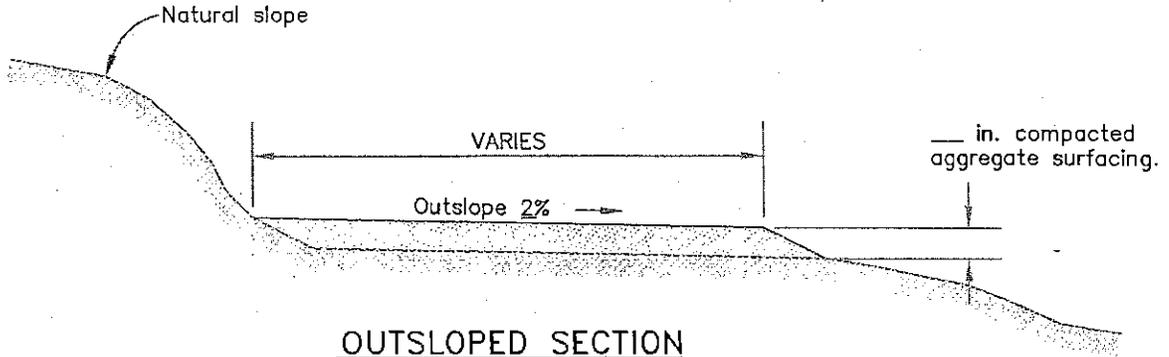
## Trailbed Width

Location	Trailbed Width (ft.)
ATV TRAIL	8
SNOWMOBILE	8

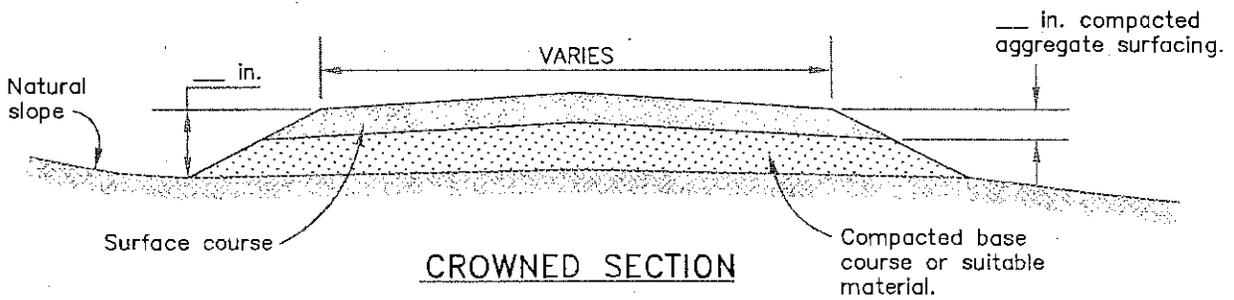


# AGGREGATE SURFACING

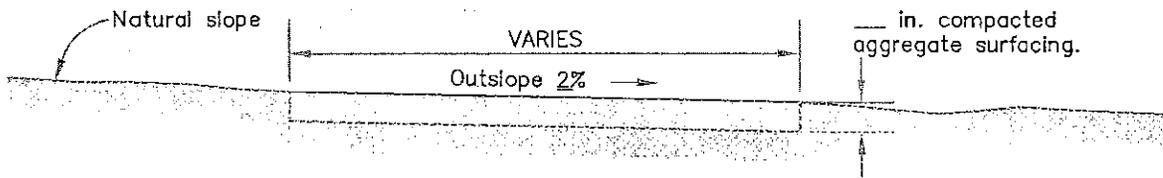
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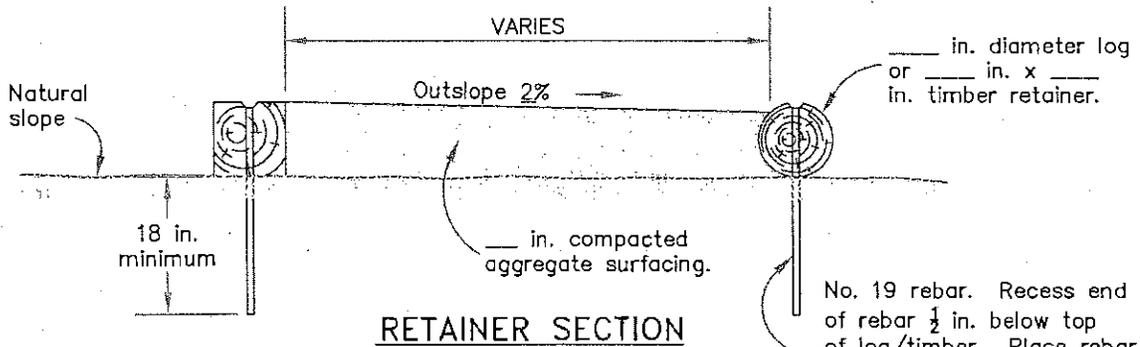
## OUTSLOPED SECTION



## CROWNED SECTION



## EXCAVATED SECTION



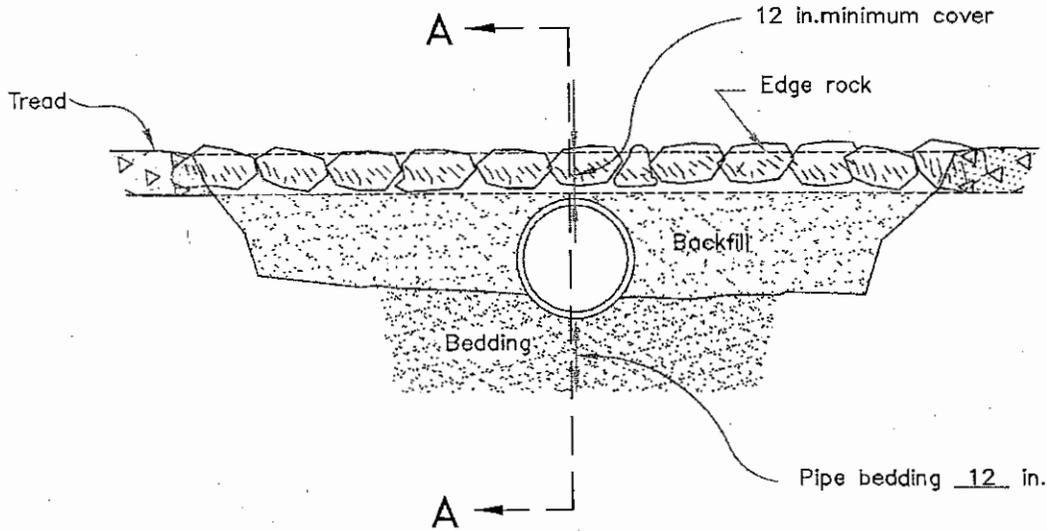
## RETAINER SECTION

No. 19 rebar. Recess end of rebar  $\frac{1}{2}$  in. below top of log/timber. Place rebar 6 in. from each end of log/timber with maximum rebar spacing of 3 ft.

LOCATION	TREAD DEPTH (in.)	TREAD WIDTH (in.)	RETAINER MATERIAL	RETAINER SPECIES	SIZE (in.)	TYPE OF TREATMENT	MINIMUM RETENTION lb/ft <sup>3</sup>

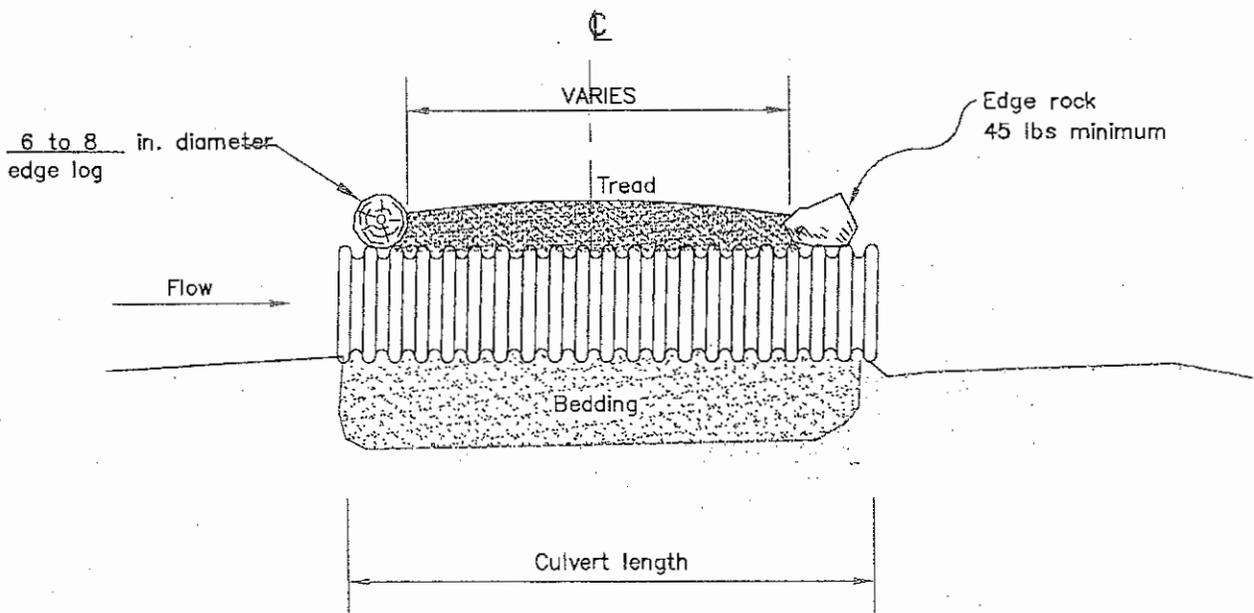
# CULVERT WITHOUT HEADWALLS

NOT TO SCALE



## END VIEW

Headwall rocks:  
45 lbs. minimum  
50% larger than  
65 lbs.



## SECTION A-A

## SEEDING AND FERTILIZING

Perform seeding during the following season:

- 1) APRIL 15th
- 2) OCTOBER 15th

Furnish the kinds of seed as specified:

SEED MIX: FURNISH AND APPLY THE FOLLOWING KINDS AND AMOUNTS OF PURE LIVE SEED FROM ERNST CONSERVATION SEEDS, 9006 MERCER PIKE, MEADVILLE, PA. (800) 873-3221 OR FAX (814) 336-5191 OR WWW.ERNSTSEED.COM NATIVE RIGHT-OF-WAY WOODS SEED MIX WITH ANNUAL RYEGRASS-ERNMX-32-1.

Test Date \_\_\_\_\_  
Apply seed by the DRY method.

Apply fertilizer at a rate of 450 lbs/ft<sup>2</sup> in \_\_\_\_\_ applications by the DRY method. Provide fertilizer meeting the following requirements:

Nutrient	Percent
Nitrogen, N.....	<u>10</u>
Phosphorus, P205...	<u>20</u>
Potassium.....	<u>20</u>

## Specifications List

The following specifications will be used for this contract:

Standard Specifications for Construction and Maintenance of Trails, EM-7720-103, September 1996. The electronic, metric version of these specifications is available on the internet at the following site:  
<http://www.fs.fed.us/database/acad/dev/trails/trailsold.htm>

Supplemental Specifications – These specifications were prepared by the Forest Service and are a supplement to the standard specifications. These are designated SS.

Special Project Specifications – These specifications were prepared by the Forest Service and are intended to supplement this specific project. They are designated SPS.

An English version of the Standard Specifications for Construction and Maintenance of Trails is included here as well as:

SPS703 – Aggregate

SPS705 – Rock

## SPS 703 AGGREGATE

**703.20 Driving Surface Aggregate.** All Driving Surface Aggregate (DSA) is to be derived from natural limestone formations. Stone is defined as rock that has been crushed; rock is defined as consolidated mineral material. For use in this program, both are restricted to that which has been mined or quarried from existing bedrock formations.

All components of the aggregate mix are to be derived from crushed parent rock material that meets program specifications for abrasion resistance, pH and freedom from contaminants. Ninety-eight percent (98%) of the fines passing the #200 sieve must be parent rock material. No clay or silt soil may be added. The amount of particles passing the #200 sieve shall be determined using the washing procedures specified in PTM No. 100.

Size: The required amount and allowed ranges, determined by weight, for various size particles are:

PASSING SIEVE	LOWER%	HIGH%
1 ½ inch	100%	
¾ inch	65%	90%
#4	30%	65%
#16	15%	30%
#200	10%	20%

LA Abrasion: The acceptable limit is measured by weight loss is "less than 40% loss". Los Angeles Abrasion test, AASHTO T-96 (ASTM C 131) shall be used to determine this property. Existing tests made for and approved by PennDOT will be accepted.

Sulfate Test: Soundness or resistance to freeze/thaw (i.e. sulfate test) is not specified for this application because a gravel road driving surface aggregate is not bound within a concrete or asphalt mix.

pH: Aggregate must be within the range of pH 6 to pH 9 as measured by EPA 9045C.

Optimum Moisture: Material is to be delivered and placed at optimum moisture content as determined for the particular source. The optimum percentage moisture is to be identified by the supplier in the bid purchasing documents. Loads with excessive moisture shall be rejected. Water draining from the tailgate, excess material sticking to the roller drum or the inability to compact the material are field indicators of excess moisture. In addition, if a load is too dry or does not have enough fines it will be rejected. Visual inspection of the load and poorly consolidated material after compactive effort are field indicators of low moisture or poor product gradation.

Transport: Tarps are to be used to cover 100% of the load's exposed surface from the time of loading until immediately before dumping. This requirement includes standing time waiting to dump.

Aggregate producers are required by the program to certify that the aggregate they deliver conforms to the program specifications. To eliminate segregation of material, stockpiling of material at jobsite will not be permitted unless authorized by COR.

The following are "Local" sources for this material:

Hawbaker - Turtlepoint, PA. 814-237-1444 or 814-642-2500

New Enterprise Stone & Lime Co. Tyrone, PA 814-695-4405

Road Preparation Specifications: The road surface to receive the aggregate should have template with crown of 2% or  $\frac{1}{4}$  inch per foot. The receiving surface is to be scarified to permit knitting of the aggregate.

Driving Surface Aggregate Placement: Minimum compacted depth of four inches is to be established for driving surface. Driving Surface Aggregate is to be applied by tailgate spreading unless spreader box is specified. Material when placed shall be compacted as follows: Beginning on the lower or berm side of the crown, begin rolling and work your way to the top of the crown by overlapping the successive longitudinal passes. Do not run the roller lengthwise directly on the crown. Compaction with truck tires is not accepted. Steel wheel rollers other than vibratory shall be capable of exerting a force of not less than 250 pounds per inch of width of the compression roller or rollers. Rollers shall be self propelled with a minimum weight of 6 tons. Contractor must have certification in writing that material placed is Driving Surface Aggregate meeting this specification.

1" Minus Aggregate (DSA Gravel non limestone) Size: The required amount and allowed ranges, determined by weight, for various size particles are:

PASSING SIEVE	LOWER%	HIGH%	
1 $\frac{1}{2}$ inch	100%		
$\frac{3}{4}$ inch	65%	95%	
#4	30%	65%	LA Abrasion < 40%
#16	15%	30%	Sulfate Test - Not Applicable
#200	10%	15%	PH between 6 and 9

Material available at Glenn O. Hawbaker - Pittsfield Pit 814-563-7911

**Pennsylvania 2A Gradation:**

The required amount and allowed ranges, determined by weight, for various size particles are:

PASSING SIEVE	LOWER%	HIGH%	
2 inch	100%		
$\frac{3}{4}$ inch	52%	100%	
#4	24%	50%	LA Abrasion < 40%
#16	10%	30%	Sulfate Test - Not Applicable
#200	0%	10%	PH between 6 and 9

**AASHTO 57 Gradation:**

The required amount and allowed ranges, determined by weight, for various size particles are:

PASSING SIEVE	LOWER%	HIGH%
1-1/2 inch	100%	
1 inch	95%	100%
1/2 inch	25%	60%
#4	0%	10%
#8	0%	5%

## SPS 705 - Rock

Replace 705.02 with the following:

705.02 **Riprap Rock.** Furnish rock sound, free from structural defects and foreign substances such as soil, shale, and organic materials. Use rock conforming to the following requirements:

No shale seams

Hard and angular shaped rock with neither width nor thickness less than one-third its length.

Minimum specific gravity of 2.5 as determined according to AASHTO T 85, bulk saturated, but surface-dry basis.

Each load of rock well-graded, from smallest to the largest size

Class, Size No.	Percent Passing (Square Openings)				
	R-7	R-6	R-5	R-4	R-3
Rock Size (inches)					
30	100				
24		100			
18	15-50		100		
12	0-15	15-50		100	
9			15-50		
6		0-15		15-50	100
4			0-15		
3				0-15	15-50
2					0-15
Nominal					
Thickness	36	30	24	18	12

United States  
Department of  
Agriculture

Forest Service

Engineering Staff

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# Standard Specifications for Construction and Maintenance of Trails



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Section 900  
General. Specifications

## Section 901-Abbreviations, Acronyms, and Terms

### 901.01 Terms, Organizations, and Standards

(a) **Specification 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 CO is intended. Similarly, wherever "approved," "acceptable," suitable," "satisfactory," or similar words are used, they mean "approved by," "acceptable to," or "satisfactory to" the CO.

The word "will" generally pertains to decisions or actions of the CO.

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.

### (b) Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ABS	Acrylonitrile-Butadiene-Styrene
AQ	Actual Quantities
APA	American Plywood Association
ASTM	American Society for Testing and Material
AWPA	American Wood Preservers Association
C.F.	Cubic Feet
CO	Contracting Officer
C.Y.	Cubic Yards
DQ	Design Quantities
EA	Each
f O	feet
HDPE	High-Density Polyethylene
gal	gallon
hr	hour
in (")	inches
lb	pouuds
L.F.	Linear Feet
LS	Lump Sum
LSQ	Lump Sum Quantities
mi	miles
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
PE	polyethylene

PS	Product Standard issued by the U.S. Department of Commerce
PVC	polyvinyl chloride
S.F.	square feet
SQ	Staked Quantifies
S.Y	Square Yards
WCLIB	West Coast Lumber Inspection Bureau
W WPA	Western Wood Products Association

(c) Slope notation (horizontal: vertical).

## Section 902-Definitions

When 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:

**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 drawings or on the ground, to be used for embankments and backfilling.

**Bridge.** A structure, including supports, erected over a depression or stream, and having a deck for carry traffic.

**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 Tern.** 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.** A drainage structure composed of rock, metal, or wood that is placed approximately perpendicular to and under the trailway.

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

**Danger Eree.** An unstable tree 5" or greater in diameter at breast height that is likely to fall across the trail.

**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.** Documents showing details for construction of a facility, including but not limited to straight-line diagrams, trail logs, standard drawings, construction logs, plan and profile sheets, cross-sections, diagrams, layouts, schematics, descriptive literature, and similar materials.

**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.

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

**Full Bench.** Trailbed constructed entirely on undisturbed material.

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

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

**Inslope.** Where the trail tread is sloped downward toward the backslope.

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

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

**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 Project Specification.** Specifications that detail the conditions and requirements peculiar to an individual project, including additions and revisions to the standard specifications.

**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.

### **Section 903-Intent of Contract**

903.01 **Intent.** The intent is to provide for the completion of the project described in the contract. Furnish all labor, materials, equipment, tools, transportation, and supplies and perform all work required to complete the project in accordance with drawings, specifications, and provisions of the contract.

## Section 904-Maintenance for Traffic

904.01 General. 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 DRAWINGS or in the SPECIAL PROJECT SPECIFICATIONS.

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.

## Section 905-Control of Materials

905.01 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 DRAWINGS or as otherwise specified. Arrangements for storage on other than designated sites are the responsibility of the contractor.

### 905.02 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 PROJECT SPECIFICATIONS or SHOWN ON THE DRAWINGS 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 DRAWINGS for the purposes designated (such as plant sites, stockpiles, haul roads). Operations are restricted to the confines of the area(s) designated.

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

905.03 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 1' above the ground as measured on the uphill side of the stump.

## 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 meter of front wall face.

Measure structures according to neat lines SHOWN ON THE DRAWINGS 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 DRAWINGS.

Deduct lengths for stairways, turnpike, punchon, retaining walls, wire baskets, switchbacks, bridges, and bridge approaches from the measurement of excavation in Section 912 unless these items are specified as incidental to excavation in Section 912.

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 standard metric 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 prismatic 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 drawings. 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, drawings, 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-Quality Assurance and Quantity Measurement

### Description

907.01. Work. Work consists of providing certification that the quality and quantity of construction conform to the drawings, specifications, and requirements of the contract.

### Construction

#### 907.02 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 DRAWINGS 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.

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

### Measurement

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

### Payment

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

## Section 908-Staking, Flagging, and Cleanup

### Description

908.01 Work. 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 all 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 Method. There will be no separate measurement for this item.

### Payment

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

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Section 910  
Earthwork

## Section 911-Clearing and Grubbing

### Description

911.01 Work. 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 the treatment of damaged trees.

### Construction

911.02 Clearing Limits. Clear to the dimensions SHOWN ON THE DRAWINGS or 12" beyond the fill and backslope catch points, whichever is greater.

911.03 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 DRAWINGS.
- b) Live brush, herbaceous plants, and trees between the trailway and the clearing limits that are less than 12" in height and less than  $\frac{1}{2}$ " in diameter at ground line.

Except as provided above, cut all limbs and branches more than  $\frac{1}{2}$ " 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 DRAWINGS.

Fall and limb designated trees.

911.04 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 DRAWINGS. Remove and dispose of trees with major roots exposed by construction that are rendered unstable.

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

911.06 Disposal of Clearing Slash, Logs, Stumps, Brush, and Roots. Limb all felled trees to a 4" diameter top, including designated trees outside the clearing limits.

Do not place clearing slash, logs, stumps, brush, or roots in concentrated piles. Scatter all logs, limbs, lopped tops, brush, and grubbed stumps and roots below the trailway and outside the clearing limits, with the following exceptions:

- (a) Where the sideslope above the trail is less than 10 percent, material may be scattered above the trail.
- (b) Logs may be left on the uphill side of the trail if they are placed so that they will not move into the clearing limits.

Do not place clearing and grubbing debris in water courses, snow ponds, lakes, meadows, or in locations where it could impede the flows to, through, or from drainage structures.

Measurement

911.07 Method. Measure the quantities in accordance with Section 906.

Payment

911.08 Basis.

Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
911(01) Clearing and Grubbing.....	mi
911(62) Clearing and Grubbing.....	L.F.
911(03) Clearing and Grubbing.....	LS
911(04) Clearing .....	mi
911(05) Clearing .....	L.F.
911(06) Clearing .....	LS
911(07) Grubbing.....	mi
911(08) Grubbing.....	L.F.
911(09) Grubbing.....	LS
911(10) Individual Removal and Disposal .....	EA
911(11) Individual Removal and Disposal .....	LS

## Section 912-Excavation and Embankment

### Description

**912.01 Work.** 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 shallow stream fords and gully crossings, talus and rubble rock sections, and climbing turns.

### Materials

**912.02 Requirements.** Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Material for Timber Structures

964 - Geo synthetics

### Construction

**912.03 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" in depth (unless otherwise SHOWN ON THE DRAWINGS). 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". This includes any material removed in the grubbing operation and deposited in the same area.

Place rocks over 4" 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" lower than the trailbed surface. Ensure that no blockage of drainage or creation of a windrow effect occurs.

**912.04 Trailway Excavation and Embankment.** Minor deviations of  $\pm$  12" in vertical alignment and 36" in horizontal alignment with smooth transitions of at least 30' on each side of the deviation are acceptable unless otherwise SHOWN ON THE DRAWINGS.

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.

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

912.06 Talus Or Rubble Rock Sections. Through talus or rubble rock slide areas, fill all voids with suitable material to the depth SHOWN ON THE DRAWINGS. 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 130lbs. Construct tread by building out rather than by removing material from the inner bank.

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

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

**Measurement**

912.09 Method. Measure the quantities in accordance with Section 906.

**Payment**

912.10 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
912(01) Excavation .....	L.F.
912(02) Excavation .....	mi
912(03) Excavation .....	LS
912(04) Trail Turnout .....	L.F.
912(05) Trail Turnout .....	EA
912(06) Rolling Dip .....	EA
912(07) Shallow Stream Ford and Gully Crossing Structure .....	EA
912(08) Shallow Stream Ford and Gully Crossing Structure .....	LS

912(09)	Ditch .....	L.F.
912(10)	Borrow.....	C.Y.
912(11)	Borrow.....	LS
912(12)	Grade Dip .....	FA
912(13)	Geosynthetics, Type .....	S.Y.
912(14)	Trail Passing Section.....	L.F.
912(15)	Talus or Rubble Rock Section.....	L.F.

## Section 913-Turnpike

### Description

913.01 Work. Work consists of constructing turnpike sections, including excavation, embankment, retainers, geosynthetics, backfill, and drainage features.

### Materials

913.02 Requirements. Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Material for Timber Structures

964 - Geosynthetics

### Construction

913.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 912.

913.04 Retainers. Place log, sawn timber, or rock retainers in a continuous row along each shoulder of the turnpike section as SHOWN ON THE DRAWINGS. Bed the parallel retainers so they are stable and at approximately the same top elevation. When retainers are constructed of logs or sawn timber use lengths greater than or equal to 10'.

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

913.06 Backfill. Backfill and compact with suitable material.

913.07 Drainage. Construct side ditches, cross-drainage, and culverts at locations SHOWN ON THE DRAWINGS 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 DRAWINGS.

### Measurement

913.08 Method. Measure the quantities in accordance with Section 906.

Payment

913.09 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF rFEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
913(01) Turnpike Retainer, Type .....	L.F.
913(02) Side Ditch .....	L.F.
913(03) Geosynthetics, Type .....	S.Y.
913(04) Leadoff Ditches .....	L.F.
913(05) Borrow .....	C.Y.
913(06) Borrow .....	LS

Section 914-Switchbacks

Description

914.01 Work Work consists of construction of switchbacks, including excavation, associated barriers, ditches, retaining walls, and approach sections.

Materials

914.02 Requirements. Use materials meeting the requirements of the following sections:

- 961 - Rock, Grid Pavement Units, and Aggregate
- 962 - Material for Timber Structures

Construction

914.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 912.

914.04 Retaining Walls. When SHOWN ON THE DRAWINGS, construct retaining walls in accordance with Section 934 or Section 935.

914.05 Barriers. When SHOWN ON THE DRAWINGS, construct barriers at each switchback in accordance with Section 953.

914.06 Ditches.. When SHOWN ON THE DRAWINGS, construct ditches in accordance with Section 912.07.

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

Measurement

914.08 Method. Measure the quantities in accordance with Section 906.

Payment

914.09 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
914(01) Switchbacks, Type .....	Ea
914(03) Ditch .....	L.F.
914(05) Barriers, Type .....	L.F.
914(06) Retaining Walls, Type .....	S.Y.

## Section 915-Existing Trail Restoration

### Description

915.01 Work 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 berets.

### Materials

915.02 Requirements. Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Material for Timber Structures

### Construction

915.03 Clearing and Grubbing. Clear and grub in accordance with the requirements of Section 911 and as SHOWN ON THE DRAWINGS.

915.04 Excavation and Embankment. Excavate and place all excavated material in accordance with the requirements of Section 912 and as SHOWN ON THE DRAWINGS.

915.05 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.

915.06 Slough and Berm Removal and Excess Material. Use suitable slough and beret material within the trailway to restore the trailbed as SHOWN ON THE DRAWINGS. Place all unsuitable and excess material beyond the downslope edge of the trailbed and uniformly spread to a depth not exceeding 4" 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' from the outslope edge of finished tread unless otherwise DESIGNATED ON THE GROUND or SHOWN ON THE DRAWINGS.

915.07 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 DRAWINGS.

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

915.08 Drainage. Restore drainage dips and ditches to reestablish drainage as SHOWN ON THE DRAWINGS 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 DRAWINGS.

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

**915.10 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 DRAWINGS and at locations STAKED ON THE GROUND.

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

**915.11 Switchbacks.** Restore switchbacks in accordance with Section 914 and as SHOWN ON THE DRAWINGS.

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

**915.13 Turnpikes.** Restore turnpikes in accordance with Section 913 and as SHOWN ON THE DRAWINGS by replacing missing, rotten, or loose retainer logs and stakes, or missing or loose retainer rocks. Backfill with suitable material.

**915.14 Trail Structures.** Restore all trail structures at locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND.

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

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

**Measurement**

**915.16 Method.** Measure the quantities in accordance with Section 906.

**Payment**

**915.17 Basis.** Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
915(01) Trail Restoration.....	L.F.
915(02) Trail Restoration.....	LS
915(03) Check Dams .....	EA
915(04) Borrow.....	C.Y.

Section 916-Removal of Structures and Obstructions

Description

916.01 Work 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

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

Remove existing structures down to the natural stream bottom, and remove parts outside the water course to at least 12" below natural ground surface or finish ground surface, whichever is lower. Where portions of an existing structure be 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. Matchmark steel and/or wood members and prepare drawings showing the structural location of each member.

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

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

916.05 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.

Measurement

916.06 Method. Measure the quantities in accordance with Section 906.

Payment

916.07 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for the PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
916(01) Removal of Structures and Obstructions .....	LS
916(02) Removal of .....	EA
916(03) Removal of .....	L.F.

Section 920  
Drainage

## Section 921-Culverts

### Description

921.01 Work Work consists of furnishing and installing culverts, including excavation and backfill, selecting and hauling of log and rock materials, and constructing catch basins, and headwalls.

### Materials

921.02 Requirements. Use materials meeting the requirements of the following sections:

- 961 - Rock, Grid Pavement Units, and Aggregate
- 962 - Material for Timber Structures
- 963 - Drainage Pipe
- 964 - Geo synthetics

### Construction

921.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 912.

921.04 Placement. Place culverts to provide for unobstructed inlet and outlet flow. Remove logs, debris, soil, rock, and other obstructions above and below the culvert that would impede flow into the culvert or away from the trailway. Minimize disturbance to streambeds.

Construct a catch basin to facilitate flow from trail ditches into the culvert.

921.05 Pipe Culverts. Install pipe culverts at the locations SHOWN ON THE DRAWINGS or as DESIGNATED ON TILE GROUND.

(a) Placing. Skew ditch relief culverts as staked to provide a downgrade equal to or greater than the uphill ditch. Place culverts at stream crossings in the natural streambed on stream grade.

Attach end sections to the pipe by connecting bands or other means as recommended by the manufacturer.

(b) Bedding. Excavate and remove all unsuitable material and rocks over 3" to a minimum depth of 6" below the pipe invert and to a minimum width of 1.5 pipe diameters. Bed pipe with compacted suitable material free of rocks larger than 3" and in a stable foundation of undisturbed or compacted soil. Make the bed shaped to fit the lower quadrant of the pipe exterior and provide uniform continuous support along the entire length of the pipe.

**921.06 Rock Culverts.** Install rock culverts at the locations SHOWN ON THE DRAWINGS or as DESIGNATED ON THE GROUND.

Firmly embed selected sidewall rocks below the natural ground or streambed as SHOWN ON THE DRAWINGS. Use flat cover rocks long enough to bridge between outside faces of the sidewalls. Select and place rocks so as to fit snugly with firm bearing on underlying rocks. Fill voids with small rock to prevent entry of soil into the culvert.

**921.07 Treated Timber Box Culverts.** Install box culverts at the locations SHOWN IN THE DRAWINGS or as DESIGNATED ON THE GROUND.

Place the box culvert walls on a firm foundation of undisturbed or compacted suitable material shaped to fit the bottom of the culvert walls and free of rocks larger than 3" in size.

**921.08 Backfilling Culverts.** Backfill and compact around culverts with suitable material that is free of rocks over 3". Provide for the cover height as SHOWN ON THE DRAWINGS.

**921.09 Headwalls.** Install headwalls at the locations SHOWN ON THE DRAWINGS or as DESIGNATED ON THE GROUND.

Provide a compacted bench as a foundation for the wall.

Select rocks that have a general rectangular shape with flat top and bottom faces. Place the largest rocks on the bottom. Lay each rock stable on the course that supports it, interlocking with surrounding rocks. Do not break, jar, or displace rocks already set. Place the exposed face of each rock parallel to the face of the wall. Stagger vertical joints a minimum of 4" horizontally from vertical joints in adjoining courses.

**Measurement**

**921.10 Method.** Measure the quantities in accordance with Section 906.

**Payment**

**921.11 Basis.** Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
921(01)          inches Corrugated, Type Pipe -          inches Thickness.....	L.F.
921(02)          inches Non-Corrugated, Type Pipe - _____ inches Thickness .....	L.F.
921(03)          inches End Section, Type .....	EA
921(04) Rock Culverts .....	EA
921(05) Rock Culverts .....	L.F.
921(06) Treated Timber Box Culverts .....	EA

## Section 922-Waterbars

### Description

922.01 Work: This work consists of installing waterbars, including excavation and backfill; selecting log and rock materials; and furnishing treated timber, belting, and other materials.

### Materials

922.02 Requirements. Use materials meeting the requirements of the following sections:

- 961 - Rock, Grid Pavement Units, and Aggregate
- 962 - Material for Timber Structures

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

### Construction

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

922.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 912. Around waterbars, backfill and compact suitable material that is free of rocks larger than 3" 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.

922.05 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.

922.06 Log or Treated Waterbar. Embed peeled native logs or treated timbers into the trailbed to form a waterbar across the trail. Use anchor methods as SHOWN ON THE DRAWINGS at log or timber ends outside the trail tread. Pre-drill pilot holes (for steel pins) through timbers prior to treatment. Anchor stakes firmly in the ground, and tightly nail to the log without splitting. In the absence of a backslope, anchor the upgrade end of the log or timber waterbar in the same manner as the downgrade end.

922.07 Rubber Belting Waterbars: Tightly secure one continuous piece of rubber belting between treated timbers as SHOWN ON THE DRAWINGS.

### Measurement

922.08 Method. Measure the quantities in accordance with Section 906.

Payment

922.09 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
922(01) Native Log Waterbar .....	EA
922(02) Rock Waterbar .....	EA
922(03) Treated Timber Waterbar .....	EA
922(04) Rubber Belting Waterbar .....	EA

## Section 923-Rock Spillways

### Description

923.01 Work. This work consists of constructing rock spillways, including selecting, excavating, and placing rock material.

### Materials

923.02 Requirements. Use materials meeting the requirements of Section 961.

### Construction

923.03 General. Construct rock spillways at locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND. Construct spillways so the flow of water from the facility being drained is centered on and flows down the full length of the spillway.

923.04 Excavation. Excavate for the spillway in accordance with Section 912. Construct a horizontal bench into undisturbed material and compact it as a foundation for the toe of the rock spillway.

923.05 Rock Placement. Construct the spillway by hand-placing rock, with the larger rock in the bottom layers. Place each rock to provide a stable course. Interlock each rock with adjacent rocks, and minimize voids. Use small rocks to fill voids. Do not break, jar, or displace rocks already set.

### Measurement

923.06 Method. Measure the quantities in accordance with Section 906.

### Payment

923.07 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
923(01) Rock Spillway .....	EA
923(02) Rock Spillway .....	S.Y.



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Section 930  
Structures

## Section 931-Log Stringer Bridge

### Description

931.01 Work. This work consists of constructing log stringer bridges, including mud sills, bulkheads, rails, curbs, decking, excavation, backfill, and approach fills as SHOWN ON THE DRAWINGS.

### Materials

931.02 Requirements. The location of trees for native timber materials will be SHOWN ON THE DRAWINGS and DESIGNATED ON THE GROUND. Use materials meeting the requirements of Section 962.

### Construction

931.03 General. Construct log stringer bridges at locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND. Pre-drill holes for fasteners when necessary to prevent splitting and drive spikes flush. Use washers with lag screws and bolts.

931.04 Excavation and Embankment. Perform excavation and embankment in accordance with Section 912.

931.05 Mud Sills. Construct mud sills at each end of the span in the location staked on the ground. Construct mud sills to be level, bedded evenly, and buried to the depth necessary for the bottom of the log stringers to clear the ground surface by a minimum of 6".

Hew sill logs to provide a bearing surface for the log stringers and to provide the log stringers with a level top surface. Do not hew sill logs more than one-third their diameter. Do not level the top surfaces of the log stringers by shimming or notching their ends.

931.06 Stringers. Fasten each log stringer to each mud sill with drift pins that penetrate a minimum of 4" into the mud sill.

When plank decking is used, hew the top surfaces of log stringers up to 2" deep, as necessary, to provide bearing surfaces for deck planks.

931.07 Decking. Spike decking evenly at right angles to each stringer, unless otherwise SHOWN ON THE DRAWINGS.

Lay split log decking alternately flat side down first, then round side down, ending with a flat side down. When the round side is down, provide a bearing surface that is between 1/2" and 2" wide.

Lay split and sawn deck planks on the stringer to provide bearing for the full width of the plank.

Trim protruding ends of the decking to give a straight-line appearance to the edges of the structure, except for decking that extends out to provide handrail support.

931.08 Curbs. Construct curbs with logs or sawn timber as SHOWN ON THE DRAWINGS. Use lengths greater than or equal to 10' and splice with a 6" half-lap joint at a spacer location. Match diameters of logs at lap joints and trim excess to provide a smooth transition between logs.

Counterbore lag screws in curbs so that heads are flush with the surface.

Finish curbs smooth and free from splinters and sharp projections.

931.09 Handrails. Construct rails with logs or sawn timber as SHOWN ON THE DRAWINGS and use lengths greater than or equal to 10'

When rails are constructed of logs, splice them with a 6" half-lap joint at a post location. Notch surfaces of posts and rails 5/8" at connections. Match diameters of rails at lap joints and trim excess to provide a smooth transition between rails. Counterbore lag screws in rails so that heads are flush with the surface. Counterbore lag screws in all round members to provide full bearing for washers.

When rails are constructed of sawn timber, splice them with a diagonal butt joint at a post location. Use S4S sawn timber, for all rails, posts, and top caps. Fasten each rail to each post with two 16d nails and fasten each top cap to the top rail with 16d nails spaced a maximum of 16" on center. Finish handrails and posts smooth and free from splinters and sharp projections.

931.10 Approach Fills. Construct the approach fills with compacted suitable material.

#### Measurement

931.11 Method. Measure the quantities in accordance with Section 906.

#### Payment

931.12 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM .	<u>PAY UNIT</u>
931(01) Log Stringer Bridge, Type .....	EA
931(02) Log Stringer Bridge, Type .....	LS
931(03) Log Stringer Bridge, Type .....	L.F.
931(04) Approach Fills.....	L.F.

## Section 932-Puncheon

### Description

932.01 Work. Work consists of constructing puncheon, including excavation.

### Materials

932.02 Requirements. Use materials meeting the requirements of Section 962. The location of trees for native timber materials will be SHOWN ON THE DRAWINGS and DESIGNATED ON THE GROUND.

### Construction

932.03 General. Construct puncheon at locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND. Pre-drill holes for fasteners when necessary to prevent splitting and drive spikes flush.

932.04 Excavation and Embankment. Perform excavation and embankment in accordance with the requirements of Section 912 and as SHOWN ON THE DRAWINGS.

932.05 Mud Sills. Bury mud sills to a depth that provides a finished walking surface that is less than or equal to 3' above the surrounding ground. Hew sill logs to provide a bearing surface for the log stringers and to provide the log stringers with a level top surface. Do not hew sill logs more than one-third their diameter. Do not level the top surfaces of the log stringers by shimming or notching their ends.

932.06 Log Stringers. Use logs greater than or equal to 10' in length. Use logs greater than or equal to 8" in diameter before the top is flattened. Fasten each stringer to each mud sill with drift pins that penetrate a minimum of 4" into the mud sill unless otherwise SHOWN ON THE DRAWINGS.

When plank decking is used, hew the top surfaces of log stringers up to 2" deep, as necessary, to provide bearing surfaces for deck planks.

932.07 Sawn Timber Stringers. Use sawn timber greater than or equal to 10' in length. Fasten each stringer to each mud sill with drift pins that penetrate a minimum of 4" into the mud sill unless otherwise SHOWN ON THE DRAWINGS.

932.08 Finished Walkway. Construct abutting ends of sections of log or plank puncheon flush with each other. Do not slope the surface of the completed walkway to either side. Construct the puncheon with a grade that does not exceed 6 percent and where no change in grade exceeds 6 percent unless otherwise SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND. Construct the finished walking surface of the puncheon flush with the trail grade at each end of the structure.

932.09 Decking. Spike decking evenly at right angles to each stringer.

Lay split log decking alternately flat side down first, then round side down, ending with a flat side down. When round side is down, notch round log decking to provide a 2"-wide bearing surface.

Lay split and sawn deck planks on the stringer to provide bearing for the full width of the plank.

Trim protruding ends of the decking to give a straight-line appearance to the edges of the structure or as SHOWN ON THE DRAWINGS.

932.10 Curbs. Construct curbs with logs or sawn timber as SHOWN ON THE DRAWINGS. Use lengths greater than or equal to 10' and splice with a 6" half-lap joint at a spacer location. Match diameters of logs at lap joints and trim excess to provide a smooth transition between logs.

Counterbore lag screws in curbs so that heads are flush with the surface.

Finish curbs smooth and free from splinters and sharp projections.

932.11 Approach Fills. Construct the approach fills with compacted suitable material.

**Measurement**

932.12 Method. Measure the set quantities in accordance with Section 90.6.

**Payment**

932.13 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY REM      PAY UNIT

932(01) Puncheon. — Type ..... L.F.

932(02) Puncheon. — Type ..... LS

## **Section 933-Trail Stairways**

### **Description**

933.01 Work. This work consists of excavation and placing embankment and constructing rock, log and treated timber riser, crib-ladder, and pinned stairways and handrails.

### **Materials**

933.02 Requirements. Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Material for Timber Structures

### **Construction**

933.03 General. Construct stairways at locations **SHOWN ON THE DRAWINGS** or **DESIGNATED ON THE GROUND**.

933.04 Excavation and Embankment. Excavate and place embankment in accordance with Section 912. Use and compact suitable material for backfill.

933.05 Overlapping Rock Stairways. Construct steps starting with the bottom rock. Form the entire tread and riser with single rocks and provide two or more contact points for stability.

933.06 Log or Treated Timber Riser Stairways. Use single logs or timbers for the entire riser.

933.07 Rock Riser Stairway. Lay rock with the greatest dimension horizontally and embed a minimum of one-third the height of the rock. Use single rocks to form the entire riser, unless otherwise **DESIGNATED ON THE GROUND**.

933.08 Pinned Stairway. Provide a rock base clean of loose materials, roots, soil, and other obstructions.

Drill two  $\frac{3}{4}$ " holes into the treads from the bottom side to match the positions of the holes in the rock and provide for the correct position of the step. Do not allow holes to penetrate the top of the tread. Hew the bottom of the tread to provide a firm, solid contact with the rock base. This contact does not need to be continuous but must provide a firm solid bearing.

Place the timber tread on the reinforcing bars and drive the tread down to its solid position.

933.09 Crib Ladder Stairway. Construct by laying two carriages parallel to each other, firmly supported for their entire length. Backfill behind the riser with suitable compacted material.

933.10 Plank Stairway. Construct plank stairways by laying two continuous and parallel carriages. Firmly embed the bottom of each carriage in the ground. Support each carriage by a sill at each end.

**Measurement**

933.11 **Method.** When the quantity is measured by the linear foot, measure along the centerline of the **stairway from the front of the bottom** riser to the back of the top riser. Otherwise, measure in accordance with Section 906.

**Payment**

933.12 **Basis.** Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNTT
933 (01) Stairway, Type .....	L.F.
933 (02) Stairway, Type .....	EA
933 (03) Stairway, Type .....	LS

## Section 934-Log Retaining Walls

### Description

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

### Materials

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

962 - Material for Timber Structures

964 - Geosynthetics

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

### Construction

934.03 Excavation. Excavate in accordance with Section 912 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.

934.04 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  $\frac{1}{2}$ " of space between filler and face logs.

934.05 Backfill. Place filler logs before backfilling and compaction. Backfill and compact with suitable material.

### Measurement

934.06 Method. Measure the quantities in accordance with Section 906.

### Payment

934.07 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
934(01) Retaining Wall .....	S.Y.
934(02) Retaining Wall .....	EA
934(03) Retaining Wall .....	LS
934(04) Geosynthetics, Type. ....	S.Y.
934(05) Borrow .....	C.Y.
934(06) Borrow .....	LS

## **Section 935-Rock Retaining Walls**

### **Description**

935.01 Work consists of constructing rock retaining walls, including excavating, placing borrow, backfilling, and trailbed and slope finishing.

### **Materials**

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

961 - Rock, Grid Pavement Units, and Aggregate

964 - Geo synthetics

### **Construction**

935.03 Excavation. Excavate in accordance with Section 912 to provide a full bench foundation.

935.04 Wall Construction. Construct rock retaining walls at locations **SHOWN ON THE DRAWINGS and DESIGNATED ON THE GROUND**. Stagger vertical joints a minimum of 4" 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.

### **Measurement**

935.05 Method. Measure the quantities in accordance with Section 906.

Payment

935.06 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for the PAY UEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
935(01) Rock Retaining Wall .....	S.Y.
935(02) Rock Retaining Wall .....	EA
935(03) Rock Retaining Wall .....	LS
935(04) Borrow .....	C.Y.
935(05) . Geosynthetics, Type .....	S.Y.

## Section 936-Wire Baskets

### Description

936.01 Work. Work consists of furnishing and constructing wire basket structures, including excavating, placing borrow, backfilling, and trailbed and slope finishing.

### Materials

936.02 Requirements. Use materials meeting the requirements of the following subsections:

961 - Rock, Grid Pavement Units, and Aggregate

964 - Geo synthetics

965 - Wire Baskets

### Construction

936.03 Basket Assembly. Do not damage wire coatings during basket assembly, structure erection, cell filling, or backfilling. Rotate the basket panels into position and join the vertical edges with fasteners. Where lacing wire is used, wrap the wire with alternating single and double loops every other mesh opening. Where spiral binders are used, crimp the ends to secure the binders in place. Where alternate fasteners are used, space the fasteners in every other mesh opening.

Rotate the diaphragms into position and join the vertical edges with fasteners, lacing wire, or spiral binders as specified above.

936.04 Structure Erection. Place the empty baskets on the foundation and interconnect the adjacent baskets along the top and vertical edges using fasteners.

Where lacing wire is used, wrap the wire with alternating single and double loops every other mesh opening. Install the other fasteners according to Subsection 936.03, but space alternate fasteners in every other mesh opening.

In the same manner, interconnect each horizontal layer of baskets to the underlying layer of baskets along the front, back, and sides. Stagger the vertical joints between the baskets of adjacent rows and layers by at least one cell length.

936.05 Cell Filling. Remove all kinks and folds in the wire mesh and properly align all the baskets. Place rock carefully in the basket cells to prevent the baskets from bulging and to minimize voids in the rock fill.

Maintain the basket alignment and shape by placing the basket in tension during the filling operation.

Place internal connecting wires in each unrestrained exterior basket cell greater than 12" in height. This includes interior basket cells left temporarily unrestrained. Place internal connecting wires concurrently with rock placement.

Fill the cells in any row or layer so that no cell is filled more than 12" above an adjacent cell. Repeat this process until the basket is full and the lid bears on the final rock layer.

Secure the lid to the sides, ends, and diaphragms according to Subsection 936.04. Make all exposed basket surfaces smooth and neat, with no sharp rock edges projecting through the wire mesh.

936.06 Geotextile Installation. Place the geotextile as SHOWN ON THE DRAWINGS. Ensure that the surfaces upon which geotextile is to be placed have a uniform slope and are reasonably smooth and free of obstructions, depressions, and debris that could damage the geotextile. Have the surface approved by the CO before placing geotextile.

Loosely lay the geotextile without wrinkles or creases. Sew or overlap adjacent strips a minimum of 12" at joints.

Insert securing pins through both strips of overlapped geotextile at maximum intervals of 36", but no closer than 2" to each edge, to prevent the geotextile from being displaced.

936.07 Basket Mattresses. Construct wire baskets for mattresses less than 12" thick according to Subsections 936.03 through 936.05. Note that alternate fasteners for basket assembly may be used for structure erection. Anchor the mattress in place as SHOWN ON THE DRAWINGS. Place geotextile against the vertical edges of the mattress and backfill against the geotextile, using structural backfill material or other approved material.

#### Measurement

936.08 Method. The method of measurement, as described in Section 906, will be SHOWN IN THE SCHEDULE OF ITEMS. Base area computations on surface measurements. Do not include overlap quantities.

#### Payment

936.09 Basis. Pay for the accepted quantities at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
936(01) Baskets, galvanized or aluminized coated .....	S.F.
936(02) Baskets, epoxy or polyvinylchloride coated .....	S.F.
936(03) Baskets, galvanized or aluminized coated .....	C.F.
936(04) Baskets, epoxy or polyvinylchloride coated .....	C.F.
936(05) Geotextiles, Type.....	S.F.

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Section 940  
Surfacing

## **Section 941-Aggregate Surfacing and Base Course**

### **Description**

**941.01 Work.** This work consists of furnishing, hauling, watering, placing, and compacting aggregate surfacing or base course; furnishing and installing retainers; and geosynthetics.

### **Materials**

**941.02 Requirements.** Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Material for Timber Structures

964 - Geosynthetics

Produce aggregate by pit run, screening, or crushing. Obtain materials from sources **SHOWN ON THE DRAWINGS** or other sources approved by the CO in writing.

**941.03 Handling Materials.** Stockpile, remove, transport, and spread aggregates in a manner that will preserve specified gradation and avoid contamination. Do not intermingle stockpiles of aggregate having different gradations.

**941.04 Sampling Aggregate.** Submit test results and a Certificate of Compliance verifying that aggregate gradation meets contract requirements.

Sample the material before incorporation into the work as follows:

(a) for onsite-produced materials at crushing or screening plants, after additions of any necessary blending material.

(b) for commercially produced aggregates, at the producer's plant or stockpile.

The sampling will not be considered a final acceptance and will not preclude later sampling and testing after final processing of the material. Such sampling does not relieve the contractor of responsibility of providing quality control measures to ensure compliance with contract requirements.

### **Construction**

**941.05 Preparation of Subgrade.** Prepare and finish bailed as required under Section 912. Obtain written approval of the CO before placing aggregate.

941.06 Spreading and Compacting. Use aggregate that is uniformly mixed at optimum moisture content and spread and compact in layers to the final thickness and width SHOWN ON THE DRAWINGS. The maximum thickness of any one layer shall be 3". Obtain compaction by one of the following methods as SHOWN IN THE SCHEDULE OF ITEMS:

- (a) by hand, using non-mechanized compaction tools over the full area of each layer until visual displacement ceases;
- (b) by mechanical vibratory compactors over the full area of each layer until visual displacement ceases, but not fewer than three complete passes;
- (c) by using a roller or mechanical hand tamper until the density is at least 90 percent of the maximum density, as determined by AASHTO T 99, Method C or D.

Immediately following final spreading, smoothing, and compacting, correct any irregularities or depressions that develop by adding or removing material until the surface is smooth, uniform, and compacted.

941.07 Acceptance, Testing, Sampling, and Tolerances. Do not vary the total compacted thickness of the aggregate by more or less than 1/2" from the specified thickness or place it consistently below or above the specified depth.

Do not vary the aggregate width by more than  $\pm 3$ " from the specified width or place it consistently narrower or wider than the specified width.

941.08 Timber, Log, or Rock Retainers. Bed retainers along their entire length and as SHOWN ON THE DRAWINGS.

#### Measurement

941.09 Method. Measure the quantities in accordance with Section 906.

#### Payment

941.10 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price of each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

**Make payment under:**

<u>PAY ITEM</u>	<u>PAY UNIT</u>
941(01) Aggregate Surfacing, Grading ..... Compaction Method	L.F.
941(02) Aggregate Surfacing, Grading ..... Compaction Method	C.Y.
941(03) Aggregate Surfacing, Grading ..... Compaction Method	Ton
941(04) Aggregate Surfacing, Grading ..... Compaction Method	LS
941(05) Base Course, Grading ..... Compaction Method	L.F.
941(06) Base Course, Grading ..... Compaction Method	C.Y.
941(07) Base Course, Grading ..... Compaction Method	Ton
941(08) Base Course, Grading ..... Compaction Method	LS
941(09) Watering.....	LS
941(10) Retainers, Type .....	L.F.
941(11) Geosynthetics Type .....	S.Y.

## Section 942-Hot Bituminous Plant Mix Trail Surfacing

### Description

942.01 Work This work consists of constructing a single course of hot bituminous plant mix on a prepared base course or trailbed and furnishing or installing retainers and geosynthetics.

### Materials

942.02 Requirements. Use materials meeting the requirements of the following sections:

962 - Material for Timber Structures

964--Geo synthetics

Use hot plant mix design that is currently in use by the local State department of transportation, the county, or city, and submit a certificate of compliance that the mix meets their requirements. Certify the locations of past projects for the CO's inspection prior to approval.

### Construction

942.03 Weather Limitations. Do not place the bituminous mixture when weather conditions prevent the proper compaction of the mixture, the base course is frozen, or the average temperature of the underlying surface upon which the bituminous mixture is to be placed is less than 55°F. Do not place when it is raining or snowing.

942.04 Mixing. Do not allow the temperature of the mix to exceed 320°F when discharging from the mixer.

942.05 Surface Preparation. Remove loose aggregate, soil, or other deleterious materials from the surface to be paved. Prepare base or trailbed by shaping, watering, and compacting before placing plant mix. Obtain the CO's approval before placing plant mix on prepared base.

942.06 Placement and Compaction. Place and compact plant mix to meet the lines, grades, and thicknesses SHOWN ON THE DRAWINGS. Avoid segregation of the mix. Hand or small machine placement of mix is permitted, except where the use of bituminous paving machines is required for areas SHOWN ON THE DRAWINGS. Use only self-contained, power propelled paving machine units, provided with an adjustable activated screed or strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix to the required widths and thicknesses.

Start compaction when the mix is above 230 °F. Compact the mix with at least three passes over the entire trail surface. Use a steel wheel power roller that is of a minimum weight of 1 ton. Use vibratory plate compactors in areas that are not accessible to rollers. Continue compaction over the full width of the layer until visible deformation of the layer ceases.

942.07 Thickness. Do not vary the thickness of the compacted hot mix by more or less than 15 percent from the thickness SHOWN ON THE DRAWINGS and not consistently above or below the specified thickness.

942.08 Retainers. Bed retainers along their entire length and as SHOWN ON THE DRAWINGS.

**Measurement**

942.09 Method Measure the quantities in accordance with Section 906.

**Payment**

942.10 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for the PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
942(01) Hot Bituminous Plant Mix Trail Surfacing .....	S.Y.
942(02) Hot Bituminous Plant Mix Trail Surfacing .....	Ton
942(03) Retainers .....	L.F.
942(04) Geosynthetics .....	S.Y.

## Section 943-Cold Bituminous Mix Trail Surfacing

### Description

943.01 Work This work consists of constructing a single course of cold bituminous mix on a prepared base course or trailbed and finishing and installing retainers.

### Materials

943.02 Requirements. Use cold bituminous mix design that is currently in use by the local State department of transportation, the county, or city, and submit a certificate of compliance that the mix meets their requirements. Certify the locations of past projects for the CO's inspection prior to approval.

Use either MC250 liquid asphalt that conforms to AASHTO M 82 or CMS-2 emulsion that conforms to AASHTO M 208.

For the cold bituminous mix, use aggregate with a maximum size of 3/4" and no more than 10 percent by weight passing the .075 mm sieve.

### Construction

943.03 Weather Limitations. Place cold asphalt concrete on an unfrozen, reasonably dry surface. Place when the air temperature in the shade is above 50°F, the temperature of the road surface is above 39°C, and it is not raining or snowing or predicted to rain or snow within 24 hours after placement.

943.04 Surface Preparation. Clean the surface to be paved of all loose aggregate, soil, or other deleterious materials. Shape, water, and compact the base course or trailbed with a compactor to prepare the base and subgrade just before placing cold mix. Obtain the CO's approval before placing mix on prepared bases.

943.05 Mixing. If liquid asphalt is used, use aggregate that contains no more than 3 percent moisture and is at a temperature between 59 and 221°F during mixing. If emulsified asphalt is used, use aggregate that is at a temperature between 50 and 176°F during mixing.

Mix the aggregate and bituminous material until the aggregates are thoroughly coated and the mass is a uniform color.

943.06 Placement and Compaction. Place and compact the mix to meet the lines, grades, and cross-section SHOWN ON THE DRAWINGS. Avoid segregation of the mix. Hand or small machine placement of mix is permitted, except where the use of bituminous paving machines is required for areas SHOWN ON THE DRAWINGS. Use self-contained, power-propelled paving machine units, provided with an adjustable activated screed or strike off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous mix to the required widths and thicknesses.

Compact the mix with at least three passes over the entire trail surface. Use a steel wheel power roller that is of a minimum weight of 1 ton. Use vibratory plate compactors in areas that are not accessible to rollers. Continue compaction over the full width of the layer until visible deformation of the layer ceases.

943.07 Thickness. Do not vary the thickness of the compacted hot mix by more or less than 15 percent from the thickness SHOWN ON THE DRAWINGS and not consistently above or below the specified thickness.

Measurement

943.08 Method. Measure the quantities in accordance with Section 906.

Payment

943.09 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
943(01) Cold Mix Trail Surfacing .....	S.Y.
943(02) Cold Mix Trail Surfacing .....	Ton
943(03) Geosynthetics.....	S.Y.
943(04) Retainers .....	Ft

Section 944-Grid Pavement Units

Description

944.01 Work This work consists of furnishing and installing grid pavement units, including excavation, backfilling, and geosynthetics.

Materials

944.02 Requirements. Use materials meeting the requirements of the following sections:

- 961 - Rock, Grid Pavement Units, and Aggregate
- 964 - Geo synthetics

Construction

944.03 Excavation and Embankment. Perform excavation and embankment in accordance with Section 912 and as SHOWN ON THE DRAWINGS.

Excavate to the depth of the grid. pavement units to be installed after first removing all duff and debris.

Stockpile all excavated suitable material adjacent to the trail for later use as backfill.

Obtain approval before placing grid pavement units.

944.04 Laying Grid Block. Place and bed blocks so they interlock, are stable, and form a smooth and uniform tread surface. Fill void areas to full depth with fractured or cut pieces of block on curves or where needed to establish the grid pavement units in which native surface areas are no larger than 6" in greatest dimension. Bury beginning and ending blocks at a 30° angle to the tread.

Dispose of unused block material by removing from Government-adminis-tread lands to an appropriate. site or by burying it at a location DESIGNATED ON THE GROUND.

944.05 Backfilling. After approval of the grid block installation by the CO, place and compact suitable material into holes between and around grid pavement units. For block surfacing used in shallow stream fords and gully crossings, substitute native gravels for suitable materials.

Measurement

944.06 Method. Measure the quantities in accordance with Section 906.

Payment

944.07 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
944(01) Grid Pavement Units, Type	..... S.F.
944(02) Grid Pavement Units, Type	..... L.F.

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Section 950  
Incidental  
Construction

**Section 951-Mobilization**

**Description**

951.01 Work. 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**

951.02 Basis. Pay for the accepted work at the contract unit price for the PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make progress payments for mobilization as follows:

- (a) Reimburse for bond premiums before issuing the Notice to Proceed if evidence of payment is received.
- (b) When 5 percent or more of the original contract amount is earned from other PAY ITEMS, pay mobilization at the rate of 50 percent, or up to 5 percent of the original contract amount, whichever is less.
- (c) When 10 percent or more of the original contract amount is earned from other PAY ITEMS, pay mobilization at the rate of 100 percent, or up to 10 percent of the original contract amount, whichever is less.
- (d) Pay any unpaid amount for mobilization upon final acceptance of all work items.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
951(01) Mobilization.....	LS

## Section 952-Sign, Post, and Cairn Installation

### Description

952.01 Work This work consists of furnishing and installing signs and posts and constructing rock cairns:

### Materials

952.02 Requirements. Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Material for Timber Structures

### Construction

952.03 General. Erect signs, posts, and cairns at the locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND.

952.04 Sign Installation. Tighten hardware snug, but do not damage the sign panel surface.

952.05 Post Installation. Dig post hole width not more than three times the width of the post and to the depth SHOWN ON THE DRAWINGS. If necessary because of obstacles, the post hole may be moved within the tolerances SHOWN ON THE DRAWINGS, or stabilize the post with concrete or rock mounds built in accordance with rock cairn specifications.

Compact suitable material between the post and the post hole in 4" layers to produce a solid and plumb installation.

952.06 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

952.07 Method. Measure the quantities in accordance with Section 906.

Rock cairns built to support signposts will be considered incidental to the PAY ITEM for signposts, and separate payment will not be made.

### Payment

952.08 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
952(01) Install Sign Panel, Government-Furnished .....	EA
952(02) Furnish and Install Sign Panel .....	EA
952(03) Treated Posts, Length ' - Dia. " .....	EA
952(04) Native Posts Length ' .....	FA
952(05) Steel Posts, Type Length Gauge .....	EA
952(06) Steel Tubing Posts, Type Length Gauge .....	EA
952(07) Plastic Posts, Type Length .....	EA
952(08) Composite Posts, Type Length ' .....	FA
952(09) Rock Cairns .....	EA

**Section 953-Barriers**

**Description**

**953.01 Work** Work consists of constructing barriers, including subgrade widening, debris disposal, and excavation.

**Materials**

**953.02 Requirements.** Use materials meeting the requirements of the following sections:

- 961 - Rock, Grid Pavement Units, and Aggregate
- 962 - Material for Timber Structures

**Construction**

**953.03 General.** Construct barriers at locations **SHOWN ON THE DRAWINGS** or **DESIGNATED ON THE GROUND.**

Use logs in which the true centerline deviates no more than 4" from the line between the centers of the ends of the log.

**Measurement**

**953.04 Method.** Measure the quantities in accordance with Section 906 and include spaces between individual units in each barrier section as **SHOWN ON THE DRAWINGS.**

**Payment**

**953.05 Basis.** Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each **PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.**

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
953 (01) Barrier, Type .....	L.F.

## Section 954-Obliteration of Abandoned Trailways

### Description

954.01 Work. This work consists of obliteration of trailways, construction of drainage structures, and reestablishment of natural drainage patterns and vegetation.

### Construction

954.02 General. Obliterate trailways in locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND.

954.03 Trail Closure. Block trailway entrances to traffic by placing rocks, logs, tree branches, and duff across the trailway. Place rocks, logs, branches, and duff to conceal the abandoned trailway and discourage future use. Use rocks and other materials that are available in the areas to be obliterated.

954.04 Drainage Structures. Leave existing water bars on the abandoned trail segments in place unless designated for removal. Construct additional drainage structures in locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND.

954.05 Check Dams and Ditches. Construct check dams and ditches in locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND.

954.06 Scarify. Scarify the trail to promote the establishment of vegetation at locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND. Scarification is defined as breaking up the compacted soil to a depth and maximum clod size as SHOWN ON THE DRAWINGS.

954.07 Contour Restoration. Backfill trail sections where SHOWN ON THE DRAWINGS. On sidehill sections, pull fill material from the lower side of the trail, or the upper cut area, and place fill material in the original cut area to restore a natural-appearing contour and a natural drainage pattern.

954.08 Trench Backfill. Backfill trenched trail sections with compact suitable material until flush with the adjacent ground surface. Obtain backfill material from designated borrow sources.

### Measurement

954.09 Method. Measure the quantities in accordance with Section 906.

Payment

954.10 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
954(01) Obliteration .....	LS
954(02) Obliteration .....	L.F.
954(03) Closure.....	LS
954(04) Closure.....	L.F.
954(05) Drainage Structures, Removal .....	EA
954(06) Scarify .....	L.F.
954(07) Trench Backfill.....	L.F.
954(08) Contour Restoration .....	L.F.

## Section 955-Seeding and Mulching

### Description

955.01 Work This work consists of preparing seedbeds and furnishing and placing required seed, fertilizer, mulch, net, and blanket material.

### Materials

955.02 Seed. Do not use seed that is wet, moldy, or has been damaged in transit or storage.

Furnish seed, separately or in mixture, in standard containers with (1) seed name, (2) lot number, (3) net weight, (4) percentages of purity and germination, and (5) percentage of maximum weed seed content clearly marked for each kind of seed. Certify that seed meets the type as SHOWN ON THE DRAWINGS. Furnish the CO with duplicate copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of the date of delivery. Include in the certificate (1) name and address of the laboratory, (2) date of test, (3) lot number for each kind of seed, and (4) results of tests as to name, percentage of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of mixture, the proportions of each kind of seed.

955.03 Fertilizer. Use standard commercial-grade fertilizer and provide the minimum percentage of available nutrients as SHOWN ON THE DRAWINGS.

Furnish fertilizer in new, clean, and sealed containers with the name, weight, and guaranteed analysis of contents clearly marked. Fertilizer failing to meet the specified analysis may be used providing sufficient materials are applied to supply the specified nutrients without additional cost to the Government.

955.04 Mulch. Use commercially produced mulch as SHOWN ON THE DRAWINGS.

955.05 Erosion Control Blanket. Use erosion control materials of the type and in the locations SHOWN ON THE DRAWINGS.

(a) Burlap. Use burlap of standard weave with a weight of 4,±1/2 oz/SY.

(b) Excelsior Blanket. Use excelsior blanket consisting of a machine-produced mat or curled wood excelsior of 80-percent, 8" or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the blanket. Use blanket with mesh dimensions of 1" by 2" f25 percent. Provide blanket with average weight of 8 oz/SY f10 percent at time of manufacture.

### Construction

955.06 Seeding Seasons. Seed during the seeding dates as SHOWN ON THE DRAWINGS. Do not apply seeding materials during windy weather or when the ground is excessively wet or frozen.

955.07 Soil Preparation. Shape and finish cutslopes, fillslopes, embank-meets, or other areas to be seeded as required by other applicable sections or as SHOWN ON THE DRAWINGS. Prepare soil as specified in other sections.

955.08 Mulch. Spread mulch immediately after seeding, or after seeding and fertilizing, to a loose depth of 1" to 2" at locations SHOWN ON THE DRAWINGS.

955.09 Erosion Control Blankets. Install erosion control blankets in accordance with manufacturer's recommendations at locations SHOWN ON THE DRAWINGS.

Measurement

955.10 Method. Measure the quantities in accordance with Section 906.

Payment

955.11 Basis. Pay for the accepted quantities in accordance with Section 906 at the contract unit bid price for each PAY ITEM SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
955(01) Seeding .....	acre
955(02) Seeding .....	LS
955(03) Fertilizer.....	LS
955(04) Mulch .....	LS
955(05) Erosion Control Blanket, Type.....	acre
955(06). Seeding, Mulch, and Fertilizer .....	LS

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Section 960  
Materials

**Section 961-Rock, Grid Pavement Units, and Aggregate**

**961.01 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 DRAWINGS.

**961.02 Wire Basket Rock** Ensure that rock conforms to the requirements of Section 961.01 and the following specifications.

(a) Unit weight of a filled basket: 3,500lb/C.Y. min.

(b) Gradation:

(1) Baskets 12" or greater in the vertical dimension:

- Maximum dimension of rock..... 8<sup>1</sup>/<sub>2</sub>"
- Minimum dimension of rock ..... 4"

(2) Baskets less than 12" in the vertical dimension:

- Maximum dimension of rock ..... 6"
- Minimum dimension of rock ..... 3<sup>1</sup>/<sub>2</sub>"

**961.03 Concrete Grid Pavement Units.** Use concrete grid pavement units with a minimum compressive strength of 4495<sup>1</sup>/<sub>in<sup>2</sup></sub> that meet the National Concrete Masonry Association (NCMA) Designation: A-15-82: Specifications for Grid Pavers.

**961.04 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.

**961.05 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.

**961.06 Crushed Aggregate for Base or Surface Course.** Use crushed aggregate meeting the requirements of tables 961-1 and 961-2 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 961-1-Crushed and screened aggregate grading requirements for base or surface courses.

Sieve	Percent Passing (AASHTO T 11 and T 27)			
	Grading A	Grading B	Grading C	Grading D
1 1/2"				
3/4"	100	100		
1/2"	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 961-2.-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 962-Material for Timber Structures**

**962.01 Timber.** Select timber from designated sites on Government-administered land. Select the species and sizes of materials as **SHOWN ON THE DRAWINGS**. Select timber that is 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 DRAWINGS**. Scatter the debris from the processing of timber away from the trail and so it will not block the trail or plug water courses.

**962.02 Structural Lumber.** Use structural lumber meeting the requirements of AASHTO M 168.

**962.03 Hardware.** Use drift pins and dowels meeting the requirements of the American Society for Testing and Material (ASTM) A307 and galvanized hardware meeting the requirements of AASHTO M 232.

Use nails of standard form or as **SHOWN ON THE DRAWINGS**.

**962.04 Preservative.** Use wood preservative treatment methods meeting the requirements of AASHTO M 133 as **SHOWN ON THE DRAWINGS**. Completely and accurately fabricate all treated timber before treatment. Provide treated timber that is clean and free of dripping treatment liquids.

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 millimeters and retention in kilograms per cubic meter (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.

Except for pine, incise before treatment all surfaces greater than 2" in width and all Douglas fir and western larch surfaces. Field treat, as **SHOWN ON THE DRAWINGS**, any area hewn, notched, cut, or drilled after the initial preservative treatment.

## **Section 963-Drainage Pipe**

**963.01 General.** Use pipe, coupling bands, and special sections such as elbows, tees, and wyes made of the same material and of the same thickness as the conduit to which they are joined, unless otherwise specified.

### **963.02 Corrugated Steel Pipe and Pipe Arches**

(a) **Riveted Pipe and Pipe Arches.** Use pipes-meeting the requirements of AASHTO M 36.

(b) **Welded Pipe and Pipe Arches.** Use corrugated metal pipe and pipe arches fabricated by resistance spot welding meeting the applicable requirements of AASHTO M 36.

(c) **Helical Pipe.** Use un-perforated helically corrugated pipe with continuous lock or welded seams meeting the applicable requirements of AASHTO M 36.

(d) **Coupling Bands.** Use coupling bands meeting the requirements of AA SHTO M 36.

(e) **Special Sections.** Use special sections such as elbows, tees, and wyes meeting the same thickness as the conduit to which they are joined and meeting the applicable requirements of AA SHTO M 36.

(f) **Flared-End Sections.** Use flared-end sections for inlet and outlet ends of pipe and pipe arch culverts meeting the, applicable requirements of AA SHTO M 36.

**963.03 Corrugated Steel Pipe for Underdrains.** Use perforated galvanized pipe meeting the requirements of AA SHTO M 36. Use polymer-perfoated perforated underdrains meeting the requirements of AASHTO M 245

**963.04 Corrugated Aluminum Alloy Culvert Pipe, Pipe Arches, and Underdrains.** Use pipe meeting the requirements of AASHTO M 196.

**963.05 Aluminum-Coated (Aluminized Type 2).** Use pipe and coupling bands meeting the requirements of AA SHTO M 36 except that they must be made from material meeting the requirements of AA SHTO M 274.

**963.06 Polyvinylchloride (PVC) Pipe.** Use PVC drain and perforated pipe meeting the requirements of AASHTO M 278.

**963.07 Plain or Corrugated Polyethylene (PE) Pipe.** Use corrugated PE pipe and connections 1' through 3' in diameter meeting the requirements of AASHTO M 294

**963.08 Acrylonitrile-butadiene-styrene (ABS) and PVC Composite Pipe.** Use ABS and PVC pipe and connections meeting the requirements of AASHTO M 264.

## Section 964-Geosynthetics

### Materials

#### 964.01 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 ..... 0.355 kN min.
  - (2) Seam Strength,  
ASTM D 4632 ..... 0.310 kN
  - (3) Puncture Strength,  
ASTM D4833-88 ..... 0.110 kN min.
  - (4) Mullen Burst,  
ASTM D 3786-87 ... ..... 130 lbf/in<sup>2</sup> min.
  - (5) Trap Tear Strength,  
ASTM D4533-91 ..... 0.110 kN
- (b) Use geotextile meeting the following critical physical properties, unless otherwise SHOWN ON THE DRAWINGS.
- (1) Material Structure ..... Nonwoven (all purposes)  
or Slit Film (for reinforcement  
or separation)
  - (2) Polymer Composition ..... Polypropylene
  - (3) Apparent Opening,  
ASTM D 4751-87 ..... .01 in. max.
  - (4) Permittivity, ASTM  
D4491-92 ..... 100 gal./minute/S.F. min.
  - (5) Ultraviolet Degradation..... 70 at150 hours

964.02 Geonet. Use geonet meeting the following critical physical proper ties unless otherwise SHOWN ON THE DRAWINGS.

- (a) Polymer Composition of Core  
(Net or Mesh)..... Medium PE or HDPE
- (b) Permeability..... 004 in/second min.
- (c) Geotextile ..... Must meet all Section  
964.01 requirements
- (d) Compressive Strength  
of Core, ASTM D1621:..... 72.5 lbf/in<sup>2</sup>, min.
- (e) Transmissivity with Gradient  
at 0.1, Pressure at 1.5 lbf/in<sup>2</sup>..... 0.01 S.F./second min.

**964.03 Geogrids.** Use geogrids made from polypropylene or coated polyester that meet 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/m<sup>2</sup> min.
- (c) Maximum Aperture Size
  - (1) Direction (MD) ..... 4"
  - (2) Cross-Direction (XD) ..... 3°
- (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.

**964.04 Geocells.** Use geocells meeting the following physical properties.

- (a) Composition ..... PE or HDPE
- (b) Geocell Weight expanded: .....: 1.70 kg/m<sup>2</sup> min.
- (c) Minimum Cell Seam Peel Strength, U.S. Army Corps of Engineers Technical Report G:-86-19, Appendix A, ..... 800 N/mm.
- (d) Expanded Dimensional Properties.- ..... AS SHOWN ON DRAWINGS

**964.05 Sheet Drains.** Use sheet drains meeting the following critical physical properties.

- (a) Core Polymer Composition ..... Polystyrene, HDPE, or polypropylene attached
- (b) Geotextile ..... Nonwoven on one side if core solid; on both sides if core perforated. Must meet all Section 964.01 requirements
- (c) Core Thickness, ASTM D5199 ..... 1/2" min.
- (d) Core Compressive Strength at Yield, ASTM D1621 ..... 650 kPa max.

**964.06 Fasteners.** Use anchors or fasteners of the design recommended by the manufacturer, and install per manufacturer's specifications.

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

**964.08 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 965-Wire Baskets

### Materials

965.01 Baskets. Twist or weld the mesh from galvanized steel wire, Class 3, soft temper, conforming to ASTM A641M, or aluminized steel wire, soft temper, conforming to ASTM A 809. Use wire with a minimum tensile strength of 400 megapascals when tested in accordance with ASTM A 370. The zinc or aluminum coating may be applied after the mesh fabrication.

Fabricate baskets from either twisted wire mesh or welded wire mesh. Make the mesh openings with a maximum dimension of less than 5" and an area of less than 7,000 mm<sup>2</sup>. Furnish baskets in the dimensions required with a dimension tolerance of + 5 percent.

Where the length of the basket exceeds 1.5 times its width, equally divide the basket into cells less than or equal to the basket width using diaphragms of the same type and size mesh as the basket panels. Prefabricate each basket with the necessary panels and diaphragms secured so they rotate into place.

(a) Wire Baskets 0.3 M or Greater in the Vertical Dimension. Fabricate the mesh for galvanized or aluminized coated basket from wire with a diameter of 3.0 mm or greater in nominal size, and fabricate the mesh for epoxy or PVC-coated baskets from wire with a diameter of 2.7 mm or greater in nominal size.

- (1) Twisted Wire Mesh. Form the mesh in a uniform hexagonal pattern with nonraveling double twists. Tie the perimeter edges of the mesh for each panel to a selvage wire with a diameter of 3.9 mm or greater, or a selvage wire with a diameter of 3.4 mm or greater for epoxy- or PVC-coated baskets, so that the selvage is at least the same strength as the body of the mesh. Furnish selvage wire from the same kind and type of material used for the wire mesh.
- (2) Welded Wire Mesh. For mesh from galvanized or aluminized wire with a diameter of 12" or greater in nominal size, weld each connection to obtain a minimum average weld shear strength of 2,600 N, with no value less than 2,000 N. For mesh for epoxy- or PVC-coated baskets from wire with a diameter of 2.7 mm in nominal size, weld each connection to obtain a minimum average weld shear strength of 2,100 N, with no value less than 1,600 N.

(b) Wire Baskets Less Than 12 Inches in the Vertical Dimension. Fabricate the mesh from wire with a diameter of 2.2 mm or greater in nominal size.

- (1) Twisted Wire Mesh. Form the mesh in a uniform hexagonal pattern with nonraveling double twists. Tie the perimeter edges of the mesh for each panel to a selvedge wire with a diameter of 2.7 mm or greater so that the selvedge is at least the same strength as the body of the mesh. Furnish selvedge wire from the same kind and type of material used for the wire mesh.
- (2) Welded Wire Mesh. Weld each connection to obtain a minimum average weld shear strength of 1,300 N, with no value less than 1,000 N.

(c) Epoxy-or-PVC-Coated Baskets. Use either the fusion bonding or extrusion coating process to coat the galvanized or aluminized mesh.

Make the coating at least 0.18 mm in thickness for epoxy, and 0.38 mm in thickness for PVC. Make the color black or gray and conform to the following:

(1) For epoxy coating meet:

- Abrasion resistance, ASTM D 1242, maximum weight loss 0.19 g.
- Salt crock, ASTM G 8, maximum disbondment diameter 45 mm, and at 90 days, 1.5 volts, and 3 percent solution.
- Chemical resistance, ASTM G 20, with 45 days at 70°F, 3 molar CaCl<sub>2</sub>, 3 molar NaOH, saturate Ca(OH)<sub>2</sub>, and no coating loss.
- Weatherometer, ASTM G 23, with a surface chalk and 2,000 hours.

(2) For PVC coating meet:

- Specific gravity ASTM D 792 ..... 1.20 to 1.40
- Tensile strength, ASTM D 638 ..... 15.7 MPa, min.
- Modulus of elasticity, ASTM D 638 ..... 13.7 MPa, min. at  
100 strain
- Hardness-shore "A," ASTM D 2240 ..... 75 min.
- Brittleness temperature, ASTM D 746 ..... 15°F max.
- Abrasion resistance, ASTM D 1242 ..... 12 percent maximum method B,  
at 200 cycles, weight loss  
CSI-A abrader tape, 80 grit
- Salt spray (ASTM B 117) and ..... No visual effect  
Ultraviolet Light exposure ..... (c) D < 6 percent  
(ASTM D 1499 and G 23 using ..... (d) D < 25 percent  
apparatus type E and 145°F) for ..... (e) D < 25 percent  
3,000 hours ..... (h) D < 10 percent
- Mandrel bend, 360° bend at 0°F. No breaks or cracks in coating around a mandrel  
10 times the wire diameter.

965.02 Fasteners. For lacing wire, use wire with a diameter of 2.2 mm in nominal size that is of the same type, strength, and coating as the basket mesh.

For welded wire mesh panels, form the spiral binders with wire that has at least the same thickness and coating as the basket mesh.

Furnish alternate fasteners that are acceptable to the basket manufacturer and that remain closed when subjected to a 2,600-N tensile force when confining the maximum number of wires to be confined. Submit installation procedures and fastener test results.

965.03 Internal Connecting Wire. Use lacing wire as described in Subsection 965.02 to reinforce side panels. Alternate stiffeners that are acceptable to the basket manufacturer may also be used

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# Maintenance Sections

## Section 981-Brush Cutting

### Description

981.01 Work. This work consists of removing brush, trees less than 100 mm in diameter, and shrubs within the clearing limits.

### Requirements

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

Gut and remove from the clearing limits all woody plants exceeding 6" in stem diameter or 12" in height. The maximum size material to be cut under this specification is 4" in diameter when measured at a height of 6" 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".

Remove all woody material for a minimum of 3" 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, drainageways, ditches, culvert inlets, or other locations where they would prevent the free flow of water away from the trailbed.

### Measurement

981.03 Method. Determine the quantity of brush cutting units by measuring the slope distance along the trail centerline.

### Payment

981.04 Basis. Make payments, for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
981(01) Brush Cutting.....	mi
981(02) Brush Cutting .....	LF.
981(03) Brush Cutting .....	LS

## Section 982-Logging Out

### Description

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

### Requirements

982.02 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 railway or moved across the trail to the lower side and scattered outside the clearing limits.

Fell all trees over 4" in diameter that are leaning into the clearing limits and that are within 10' above the trailbed. Stump height of leaning trees that are cut outside the clearing limits shall not exceed 12" 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 railway 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" in diameter and 12" in length that have fallen onto the trailbed.

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

### Measurement

982.03 Method. Determine the quantity of logging out units by measuring the slope distance along the trail centerline or by actual count of those units designated for removal.

### Payment

982.04 Basis. Make payment, for all units inspected and accepted, at the unit prices SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
982(01) Logging Out .....	mi
982(02) Logging Out Diameter.....	EA
982(03) Logging Out .....	L.F.
982(03) Logging Out .....	LS

**Section 983-Danger Tree Removal**

**Description**

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

**Requirements**

983.02 Danger 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 DRAWINGS. Cut designated danger trees so that stump heights do not exceed 12" as measured on the uphill side of the stump. Maximum stump height of designated trees within 4' of the trail centerline is 4". 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' of either side of the trail centerline and scatter a minimum distance of 4' beyond and below the trail centerline.

**Measurement**

983.03 Method. Determine the quantity of danger tree removal units by actual count of those trees marked.

**Payment**

983.04 Basis. Make payment, for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
983(01) Danger Tree Removal .....	EA

**Section 984-Loose Rock Removal**

**Description**

**984.01 Work.** This work consists of removal and disposal of loose rock from the trail tread.

**Requirements**

**984.02 General.** Remove loose rocks that are larger than 2" 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".

Fill any holes remaining from rock removal with suitable material and compact. If the rock removed is not needed for other items of main-tenance 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.

**Measurement**

**984.03 Method.** Determine the quantity of loose rock removal units by measuring the slope distance along the trail centerline.

**Payment**

**984.04 Basis.** Make payment, for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<b>PAY ITEM</b>	<b><u>PAY UNIT</u></b>
<b>984(01) Loose Rock Removal .....</b>	<b>L.F.</b>

Section 985-Rock and Root Removal

Description

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

Requirements

985.02 Rock Removal. Remove surface rocks that are larger than 2" at their greatest dimension, and rocks that project more than 2" 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".

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.

985.03 Root Removal. Remove exposed tree roots on or in the trail tread that are greater than 1" in diameter. Cut embedded roots that project more than 2" 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 DRAWINGS or DESIGNATED ON THE GROUND.

Measurement

985.04 Method. Determine the quantity of rock and root removal units by measuring the slope distance along the trail centerline.

Payment

985.05 Basis. Make payment, for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE

Make payment under:

PAY ITEM

PAY UNIT

985(01) Rock and Root Removal ..... L.F.

**Section 986-Borrow**

**Description**

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

**Materials**

986.02 Requirements. Obtain borrow materials from locations SHOWN ON THE DRAWINGS 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 50 mm in the greatest dimension.

**Requirements**

986.03 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 DRAWINGS.

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

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" 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 1'3:1.

**Measurement**

986.04 Method. Determine the quantity of borrow units by measuring the slope distance along the trail centerline.

**Payment**

986.05 Basis. Make payment, for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
986(01) Borrow.....	L.F.
986(02) Borrow.....	C.Y.

Section 987-Slide Maintenance

Description

987.01 Work. 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.

Requirements

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

Place all excess and unsuitable material beyond the downslope edge of the trailbed. Uniformly spread unsuitable material to a depth not exceeding 4" 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 DRAWINGS.

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 DRAWINGS.

Measurement

987.03 Method. Determine the quantity of slide maintenance units by measuring the slope distance along the trail centerline. The measured distance will be that portion of the trail that is covered by slide material.

Payment

987.04 Basis. Pay for the accepted quantities at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

<u>PAY ITEM</u>	<u>PAY UNIT</u>
987(01) Slide Maintenance.....	L.F.
987(02) Slide Maintenance .....	LS

Section 988-Slough and Berm Removal

Description

988.01 Work. Work consists of the removal and disposal of slough and berm material that has accumulated on the trailway.

Requirements

988.02 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' from the upslope edge of the finished tread unless otherwise DESIGNATED ON THE GROUND or SHOWN ON THE DRAWINGS. Conserve and use suitable material to restore the trail tread as SHOWN ON THE DRAWINGS.

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

Measurement

988.03 Method. Determine the quantity of slough and berm removal units by measuring the slope distance along the trail centerline.

Payment

988.04 Basis. Pay for the accepted quantities at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

<u>PAY ITEM</u>	<u>PAY UNIT</u>
988(01) Slough and Berm Removal .....	L.F.
988(02) Slough and Berm Removal.....	LS

Section 989-Turnpike Maintenance

Description

989.01 Work. This work consists of maintaining trail turnpike sections.

Materials

989.02 Requirements. Use materials meeting the requirements of the following sections:

- 961 - Rock, Grid Pavement Units, and Aggregate
- 962 - Material for Timber Structures
- 964 - Geosynthetics

Requirements

989.03 General. Obtain logs, staking material, and suitable material for backfill from locations SHOWN ON THE DRAWINGS or DESIGNATED ON THE GROUND.

Replace missing rocks, or missing or decayed retaining logs or lumber, with rocks, logs, or dimensional lumber as SHOWN ON THE DRAW-INGS. Secure loose or dislocated retainers. Drive stakes 2-3" in diameter and 18-24" in length along the outside edge of each log or lumber retainer to hold them in place. Shape the trailway with suitable material to provide a 2" crown measured from the top of the crown at the centerline to the top of the retainers.

Clear all drainage structures of obstructions, silt, and debris so as to permit the free flow of water away from the trail. If necessary, use suitable material removed from the drainage structures to build up the crown.

Measurement

989.04 Method. Determine the quantity of maintain trail turnpike units by measuring the slope distance along the trail centerline.

Payment

989.05 Basis. Make payment for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

<u>PAY ITEM</u>	<u>PAY UNIT</u>
989(01) Maintain Trail Turnpike.....	L.F.
989(02) Maintain Trail Turnpike.....	LS

Section 990-Switchback Maintenance

Description

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

Materials

990.02 Requirements. Use materials meeting the requirements of the following sections:

- 961 - Rock, Grid Pavement Units, and Aggregate
- 962 - Material for Timber Structures

Requirements

990.03 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.

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

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

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

Measurement

990.07 Method. Determine the quantity of switchback units by actual count.

Payment

990.08 Basis. Make payment, for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
990(01) Maintain Switchbacks .....	EA
990(02) Switchback Ditches.....	L.F.

## Section 991-Drainage Maintenance

### Description

991.01 Work. This work consists of cleaning culverts, waterbars, drainage dips, ditches, rock spillways, stream fords, and gully crossings; directing water from the trail where washing of the trailbed is or has been occurring; and draining low spots in the trailbed that tend to hold water.

### Materials

991.02 Requirements. Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Materials for Timber Structures

### Requirements

991.03 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" minimum deep and 12" 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' or more beyond and below the trail or drainage facility and out of water courses.

991.04 Culverts. Remove debris and soil from catch basins and inlet and outlet ditches and inside culverts to permit the unobstructed flow of water into, through, and away from the culvert. Replace any missing or loose rocks or logs in culvert headwalls.

Fit replacement rocks for rock culverts so that they have a firm bearing on adjacent and underlying rocks. Place rocks snugly and fill voids with small rocks to prevent material from sifting into the drain. Fill and compact with suitable material all disturbed areas in the trail tread over or adjacent to rock culverts.

991.05 Waterbars. Clean the upgrade side of all existing waterbars and maintain them as SHOWN ON THE DRAWINGS. 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.

991.06 Drainage Dips. Clean deposited material and restore drainage dips as SHOWN ON THE DRAWINGS. 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" at its greatest dimension. .  
Compact all material placed in the trail tread.

991.07 Rock Spillways. Maintain rock spillways to conform as SHOWN ON THE DRAWINGS. Replace missing rocks, interlocking each rock with adjacent rocks. Place the rocks to ensure that the water flows down the spillway and away from the facility being drained. Use small rocks to fill voids. Clean all material from the spillway that restricts the flow of water away from the trail.

991.08 Stream Fords and Gully Crossings. Maintain stream fords and gully crossings as SHOWN ON THE DRAWINGS. Remove debris and loose rocks over 3" 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" 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.

#### Measurement

991.09 Method. Determine the quantity of drainage maintenance units by measuring the slope distance along the centerline. Measure other items by a count of those designated.

#### Payment

991.10 Basis. Make payment for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

Make payment under:

PAY ITEM	PAY UNIT
991(01) Drainage Maintenance .....	mi
991(02) Drainage Maintenance .....	LS
991(03) Maintain Waterbars .....	EA
991(04) Maintain Drainage Dips.....	EA
991(05) Rock Spillways .....	EA
991(06) Stream Fords and Gully Crossings.....	EA

**Section 992-Rock Retaining Wall**

**Description**

992.01 Work. This work consists of replacing rock that has become displaced from rock retaining walls.

**Materials**

992.02 Requirements. Use materials meeting the requirements Section 961.

**Requirements**

992.03 General. 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.

Stagger joints at least 4" horizontally from the adjacent joint in the next course.

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

**Measurement**

992.04 Method. Measure the quantity of rock retaining wall units by the square meter of front wall face.

**Payment**

992.05 Basis. Make payment for all units inspected and accepted at the unit price.

Make payment under:

<b>PAY ITEM</b>	<b>PAY UNIT</b>
993(01) Rock Retaining Wall .....	L.F.
993(02) Rock Retaining Wall .....	LS

## Section 993-Sign Repair and Replacement

### Description

993.01 Work. This work consists of refastening existing signs to existing sign support posts, resetting existing sign support posts, and installing new replacement signs and new sign support posts.

### Materials

993.02 Requirements. Use materials meeting the requirements of Section 962.

### Requirements

993.03 General. Repair signs at locations SHOWN ON THE DRAW-INGS or DESIGNATED ON THE GROUND. Reattach designated signs that are out of their original position so that the lines of the sign legend are horizontal. Reset sign support posts to a plumb position and firmly tamp in place. Set sign posts designated for replacement in the ground to a depth of 30" to 36" at the approximate location of the original post.

Tighten sign mounting bolts or lag screws to hold the sign snugly in place. Do not damage sign surface.

Reset existing posts that are out of plumb and firmly tamp in place. Set posts that need to be reset and new replacement posts in a plumb position and to a depth of 30" to 36".

For signs mounted on trees, remove obstructing limbs and notch the outer bark to provide a flat surface at the sign mounting position. Avoid removing the inner bark or cutting the cambium.

Use 50-penny galvanized nails or spikes to refasten signs to trees.

Pre-drill replacement signs before mounting.

Backfill and tamp holes from which posts are removed.

### Measurement

993.04 Method. Determine the quantity of sign repair and replacement units by actual count of those designated by the Government.

### Payment

993.05 Basis. Make payment, for all units inspected and accepted, at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

<u>PAY ITEM</u>	<u>PAY UNIT</u>
993(01) Sign Repair.....	EA
993(02) Sign Replacement .....	EA
993(03) Post Replacement.....	EA

**Section 994-Barrier Maintenance**

**Description**

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

**Materials**

994.02 Requirements. Use materials meeting the requirements of the following sections:

961 - Rock, Grid Pavement Units, and Aggregate

962 - Material for Timber Structures

**Requirements**

994.03 General. Restore rock, log, and timber barriers to their original lines and grades unless otherwise SHOWN ON THE DRAWINGS.

994.04 Rock Barriers. Replace missing rocks, using rocks of general rectangular shape between 45 lb. and 120 lb., 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.

994.05 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 DRAWINGS. 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.

**Measurement**

994.06 Method. Determine the quantity of rock, log, and timber barrier units by measuring the slope distance along the barrier centerline.

**Payment**

994.07 Basis. Pay for the accepted quantities at the unit price SHOWN IN THE SCHEDULE OF ITEMS.

PAY ITEM	PAY UNIT
994(01) Barrier Maintenance, Type .....	L.F.
994(02) Barrier Maintenance, Type .....	LS