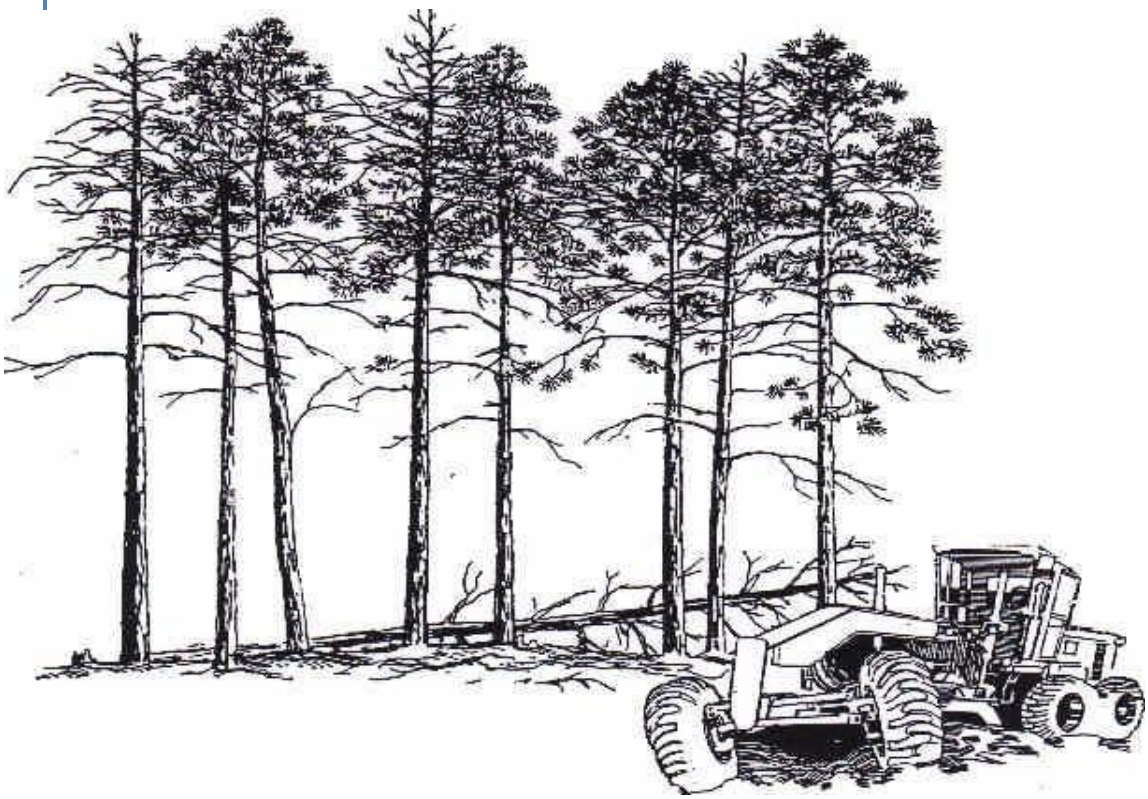
USDA Forest Service Pacific Southwest Region

Specifications for Maintenance of Roads

Service Contracts



R5 Regional Office – USFS

10/2016

TYPICALS

801-1 ILLUSTRATION OF ROAD MAINTENANCE TERMS 5

834-1 DITCH RELIEF CULVERT AND CATCH BASIN MAINTENANCE 6

837-1 DRAINAGE DIP 7

838-1 CROSS DITCH 8

838-3 HAZARD REMOVAL 9

838-4 TREATMENT OF SLIDES AND SLOUGH 10

838-5 TREATMENT OF SLUMPS AND ROADBED CRACKS 11

838-6 WATER BAR 12

CONTRACT INFORMATION

DEFINITIONS 14

ABBREVIATIONS 17

QUANTITY MEASUREMENT TERMS 18

SPECIFICATIONS

803 SNOW REMOVAL (10/16) 22

805 MOBILIZATION / EQUIPMENT MOVING (10/16) 24

807 EQUIPMENT RENTAL (10/16) 25

808 WORK AREA MANAGEMENT (10/16) 27

811 BLADING (10/16) 29

812 DUST ABATEMENT (10/16) 33

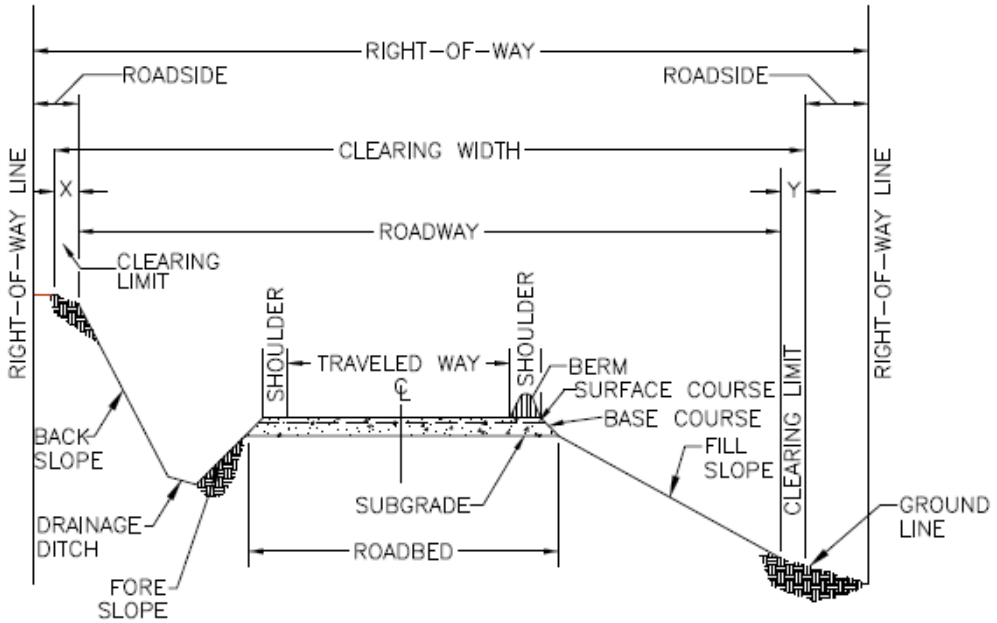
813 SPOT SURFACING (10/16) 36

814 ASPHALT PAVEMENT PATCHING (10/16) 38
815 PAVED SURFACE CLEANING (10/16) 40
816 MAINTENANCE OF UNPAVED SHOULDERS (10/16) 41
818 ASPHALT CRACK CLEANING AND SEALING (10/16) 42
831 DITCH MAINTENANCE (10/16) 44
832 REMOVE AND END HAUL MATERIALS (10/16) 46
834 DRAINAGE STRUCTURE MAINTENANCE (10/16) 48
835 ROADWAY DRAINAGE MAINTENANCE (10/16) 49
836 ROAD DECOMMISSIONING (10/16) 51
837 DRAINAGE DIP MAINTENANCE (10/16) 57
838 MAINTENANCE FOR LIMITED USE (10/16) 59
839 RESTORE DRAINAGE (10/16) 62
840 CORRUGATED METAL SPILLWAYS AND FLUME (10/16) 65
841 VEGETATION ESTABLISHMENT (10/16) 67
841-1 VEGETATION ESTABLISHMENT, SPECIAL PROJECT SPECIFICATION (10/16) 70
842 CUTTING ROADWAY VEGETATION (10/16) 72
851 LOGGING OUT (10/16) 75
854 HAZARD REMOVAL AND CLEANUP (10/16) 77
861 MAINTENANCE OF CATTLEGUARDS (10/16) 79
861-1 MAINTENANCE OF CATTLEGUARDS, SPECIAL PROJECT SPECIFICATION (10/16) 81
862 MAINTENANCE OF TRAFFIC GATES (10/16) 82
872 SIGN MAINTENANCE (10/16) 83
891 WATER SUPPLY AND WATERING (10/16) 86
892 BITUMINOUS PRODUCTS (10/16) 88
893 AGGREGATE (10/16) 91
893-1 AGGREGATE, SPECIAL PROJECT SPECIFICATION (10-16) 94
LIST ELIGIBLE PAY ITEMS 96

This page is left blank.

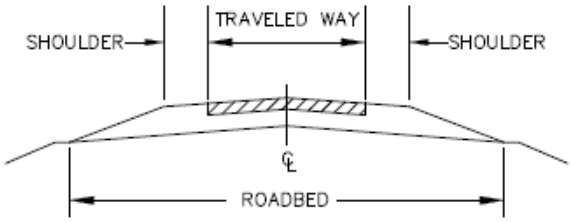
TYPICALS

ROAD STRUCTURE DETAILS

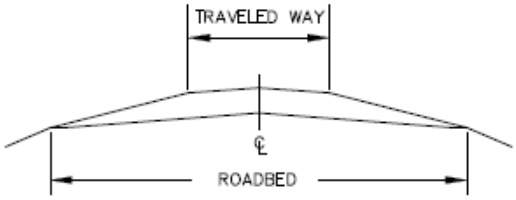


DEFINITIONS BY SURFACING TYPE

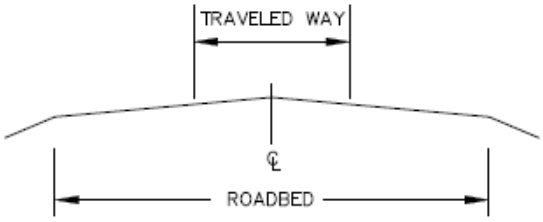
AGGREGATE SURFACING SECTION



ASPHALT PAVED SURFACE SECTION

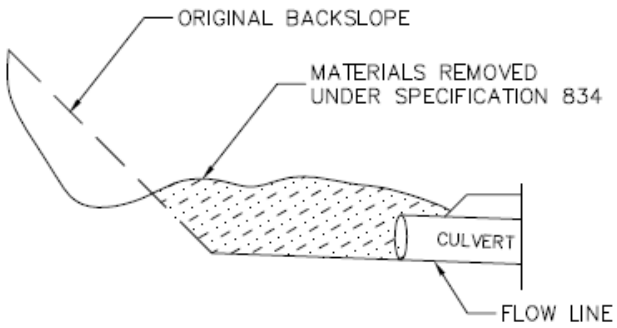


NATIVE MATERIAL SURFACING SECTION

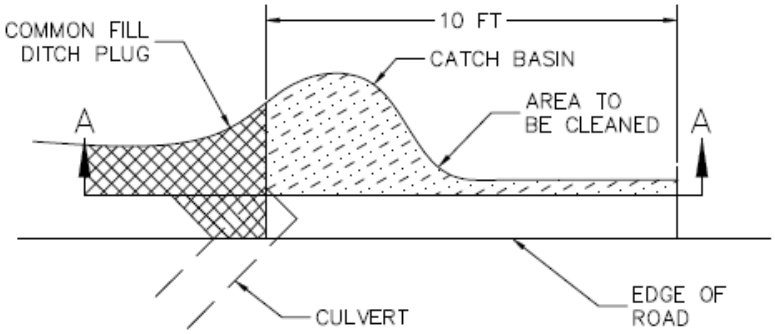


	U.S.D.A. FOREST SERVICE R–5	NOT TO SCALE
	TITLE: ILLUSTRATION OF ROAD MAINTENANCE TERMS	DWG NO: 801–1

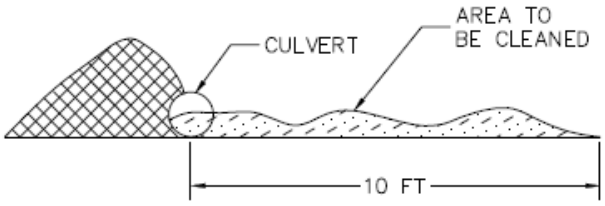
TYPICAL SECTION OF CATCH BASINS AND TRANSITIONAL AREAS



CROSS SECTION VIEW

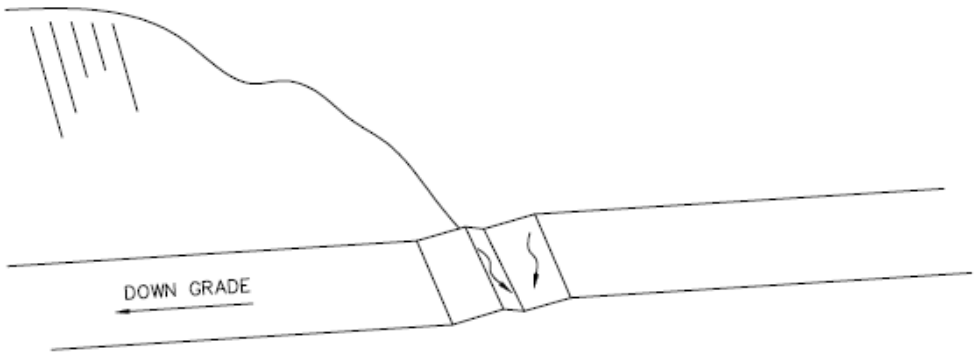


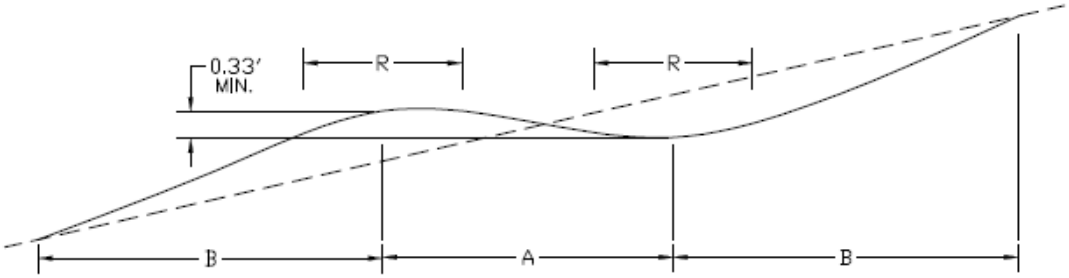
PATH VIEW ALONG DITCH



SECTION A – A

	U.S.D.A. FOREST SERVICE R–5	NOT TO SCALE
	TITLE: DITCH RELIEF CULVERT AND CATCH BASIN MAINTENANCE	DWG NO: 834–1





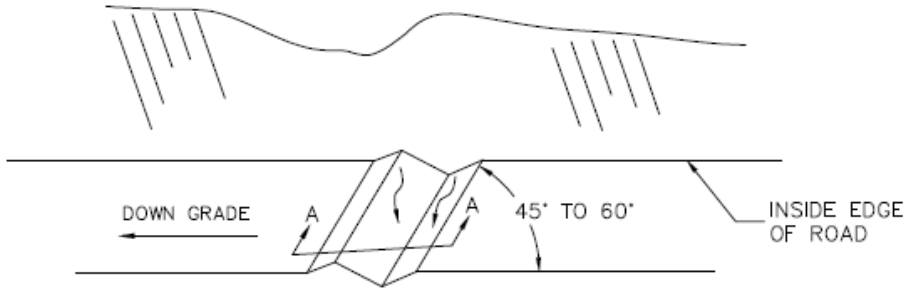
DRAIN DIP TYPICAL SECTION

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

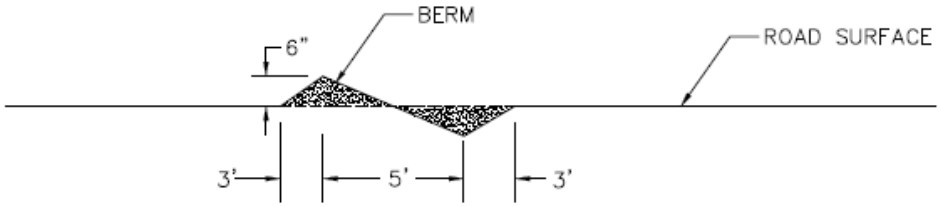
NOTES:

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

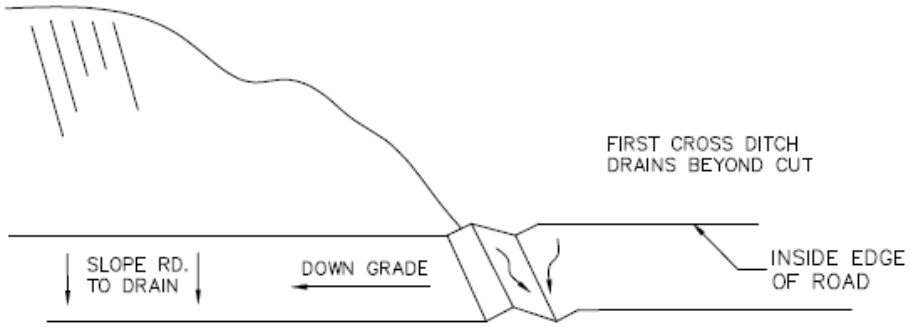
	U.S.D.A. FOREST SERVICE R–5	NOT TO SCALE
	TITLE: DRAINAGE DIP	DWG NO: 837–1



TYPICAL CROSS SECTION

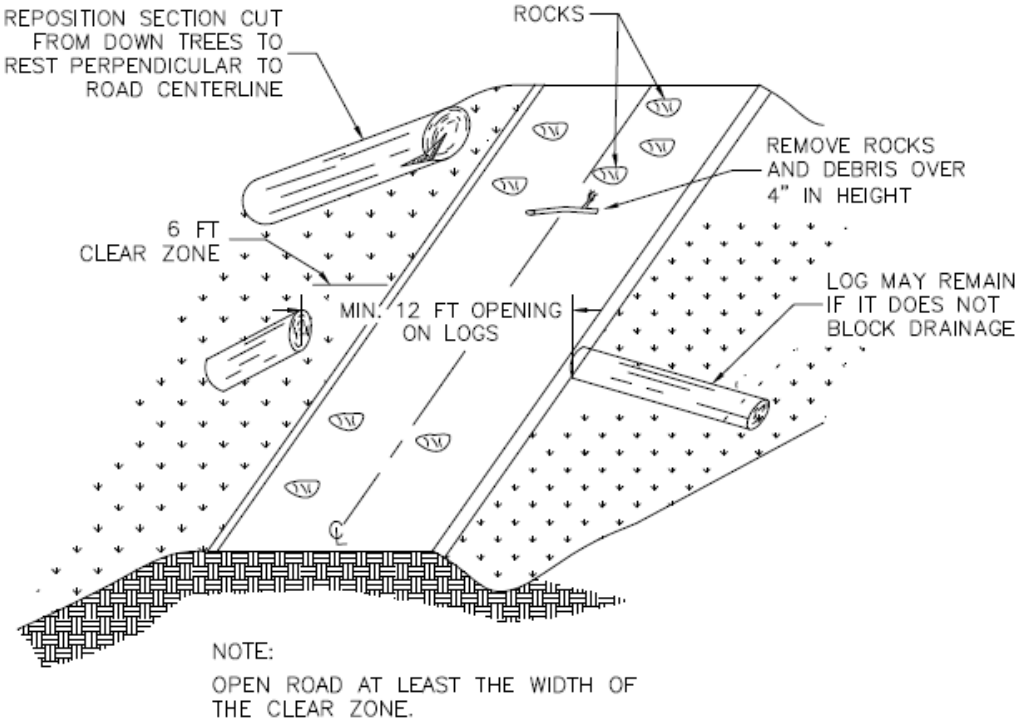


SECTION A–A

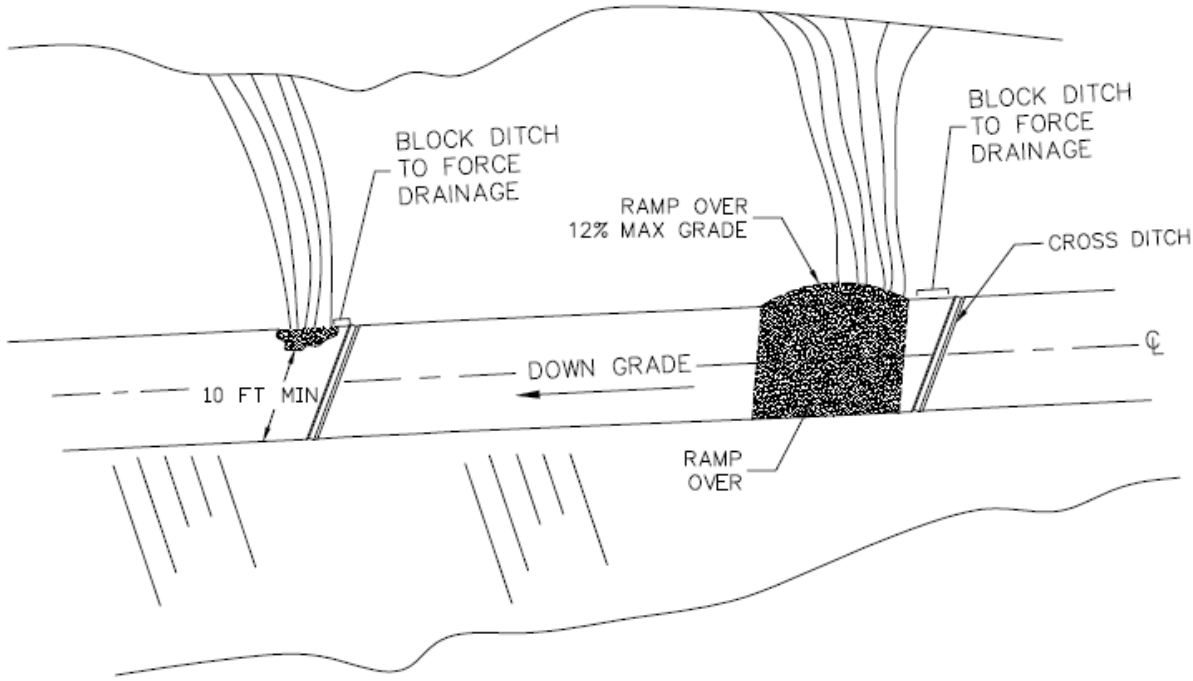


INSLOPE OR OUTSLOPE IN THROUGH CUT

	U.S.D.A. FOREST SERVICE R–5	NOT TO SCALE
	TITLE: CROSS DITCH	DWG NO: 838–1



	U.S.D.A. FOREST SERVICE R-5	NOT TO SCALE
	TITLE: HAZARD REMOVAL	DWG NO: 838-3



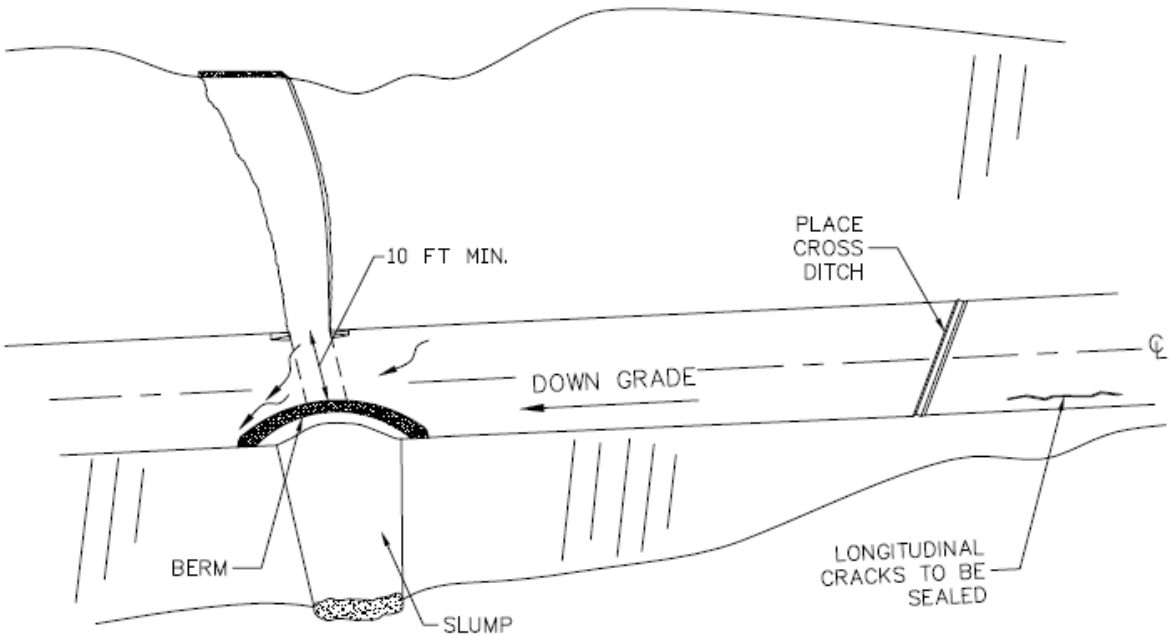
NOTES:

OPEN ROAD BY HAULING MATERIALS OFF ROAD OR BY MOVING SLIDE MATERIAL TO A MINIMUM OF 10 FT OPENING AND SLOPES NOT STEEPER THAN 1:1

CROSS DITCH SHALL BE INSTALLED IMMEDIATELY UPGRADE OF ROADBED WHERE SLOUGH AND SLIDES ARE LEFT IN PLACE.

RAMPS SHALL NOT HAVE AN OUT SLOPE EXCEEDING 6%

	U.S.D.A. FOREST SERVICE R-5	NOT TO SCALE
	TITLE: TREATMENT OF SLIDES AND SLOUGH	DWG NO: 838-4

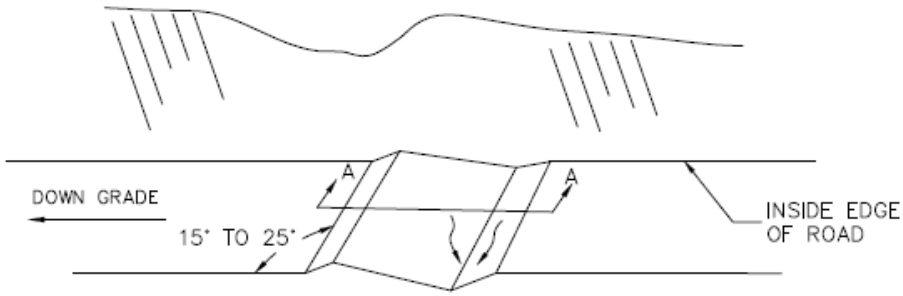


NOTES:

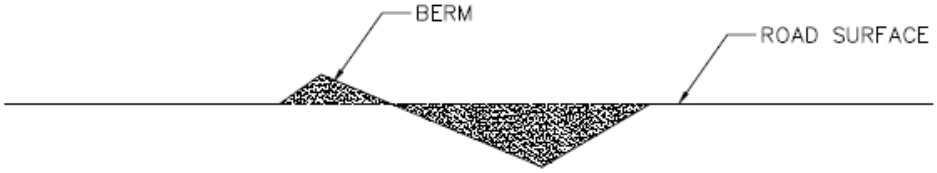
THE ROADBED IMMEDIATELY UPGRADE OF SLUMPS SHALL BE CROSS DITCHED. THE CROSS DITCH SHALL BE LOCATED SO THAT THE OUTLET WILL ALLOW RUNOFF TO SPILL OFF ONTO THE FILL SLOPE WITHOUT CAUSING ADDITIONAL DAMAGE OR EROSION.

PLACE BERMS OF AT LEAST 6 INCH IN HEIGHT TO DIVERT DRAINAGE AROUND SLIDE

	U.S.D.A. FOREST SERVICE R-5	NOT TO SCALE
	TITLE: TREATMENT OF SLUMPS AND ROADBED CRACKS	DWG NO: 838-5



TYPICAL CROSS SECTION



SECTION A–A

NOTES:

1. WATER BAR SHALL BE COMPACTED PER SPECIFICATION 811 METHOD B
2. 4% OUTSLOPE SHALL BE MAINTAINED THE LENGTH OF THE STRUCTURE
3. WATERBAR SHALL CATCH DRAINAGE FROM ROADWAY, INCLUDING DITCHES.
4. ASSOCIATED DITCHES SHALL BE CONSTRUCTED WHERE SPECIFIED

	U.S.D.A. FOREST SERVICE R–5	NOT TO SCALE
	TITLE: WATERBAR	DWG NO: 835–1

CONTRACT INFORMATION

DEFINITIONS

Wherever 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:

1. **Agreed or Approved** - Official agreement or approval by use of a written document issued by the Government. Agreements also require signature of Contractor's Representative and are dated.

2. **Base Course** - The layer or layers of specified or selected material of designed thickness placed on a subbase or a subgrade to support a surface course. (See Drawing 801-1, Illustration of Road Maintenance Terms)

3. **Berm** - A curb or dike which controls roadway runoff water, or delineates traffic direction. Berms are commonly placed parallel to road centerline; however, on Limited Use Roads (Section 838) may be placed diagonally across the roadbed. (See Drawing 801-1, Illustration of Road Maintenance Terms)

4. **Channel** - A natural waterway leading into or away from a culvert or bridge.

5. **Contract Amendment** - A bilateral written supplemental agreement between the Government and the Contractor, documenting a modification outside the scope of the contract and establishing an equitable adjustment therefor.

6. **Contractor** - The individual, partnership, joint venture, or corporation undertaking the execution of the work under the terms of the contract.

7. **Culvert** - Any structure, not classified as a bridge that provides an opening under the roadway.

8. **Cross Ditch** - A shallow ditch placed across the roadbed to remove water from the roadbed surface which can be driven across by full-size pickups or other high clearance vehicles; usually placed diagonal to the centerline. (See Section Drawing 838-1, Cross Ditching of Limited use Roads)

9. **Lead-off Ditch** - A ditch used to remove water from roadside drainage ditches, the roadway, cattleguards, or drainage structures such as culverts and drainage dips.

10. **Ditch** - A relatively long narrow excavation placed to collect or disperse water, located parallel to and abutting the roadbed. (See Drawing 801-1, Illustration of Road Maintenance Terms)

11. **Drainage Structure** - A term identifying man-made devices placed to control water movements.

12. **Drawings** - Illustrations showing detailed maintenance required.

13. **Equipment** - All machinery, operating supplies and tools necessary for the proper performance and acceptable completion of the work.

14. **Excess Material** - Material from the roadway excess to that needed for maintenance of roadway.

15. **Fore Slope** - The slope of the ditch section nearest to the traveled way. (See Drawing 801-1, Illustration of Road Maintenance Terms)

16. **Government** - The Contracting Officer or the duly authorized Contracting Officer's Representative (COR) with authority to sign orders.

17. **Grade** - The vertical alignment of the top surface of the road.

18. **Inspector** - The Government's authorized representative designated in writing, assigned to make detailed inspections of contract performance, but not to sign orders to the Contractor.

19. **Materials** - Any substances specified for use in the performance of the work.

20. **Measurement** – The process of identifying the dimensions, quantity, or capacity of an item.

21. **Nominal Dimensions or Weights** - The numerical values shown on the drawings or in the specifications as measurements for the work.

22. **Order** - A written order by the Government directing fulfillment of work requirements under the terms of the contract.

23. **Original Contract Quantities** - Those estimated quantities shown in the Schedule of Items as awarded.

24. **Patching** - Minor repairs to the roadway surface.

25. **Paved Surface or Pavement** - Denotes asphalt, concrete, or other stabilized materials excluding natural aggregates. Dust palliative treatments are not considered as pavement.

26. **Reasonably Close Conformity** - Means compliance with customary maintenance tolerances where working tolerances are not specified.

27. **Right-of-Way** - A general term denoting land, property, or interest therein acquired for or devoted to a road. (See Drawing 801-1, Illustration of Road Maintenance Terms)

28. **Roadbed** - The portion of a road between the intersection of the subgrade and side slopes, excluding that portion of the ditch below the subgrade. (See Drawing 801-1, Illustration of Road Maintenance Terms)

29. **Road Listing** - A preliminary listing of road locations and any established work priorities.

30. **Roadside** – All area within the right-of-way excluding the traveled way and shoulders (See Drawing 801-1, Illustration of Road Maintenance Terms)

31. **Schedule of Items** - Schedule containing a listing and description of maintenance items, quantities, units of measure, unit price, and amount.

32. **Shoulder** - As used in this contract, the term is restricted to roads having a paved surfacing. The portion of the roadway contiguous to the traveled way for the accommodation of stopped vehicles, for emergency use, and for lateral support of the pavement structure (See Drawing 801-1, Illustration of Road Maintenance Terms)

33. **Slough or Slide** - Material deposited on the roadway which may need to be repositioned or removed.

34. **Slump** - A localized portion of the roadbed which has slipped or otherwise become lower than that of the adjacent roadbed and constitutes a hazard to traffic.

35. **Special Project Specifications** - Specifications which detail conditions and requirements to a particular individual project.

36. **Standard Specifications** - Specifications for specific divisions of work.

37. **Subgrade** - Top surface of roadbed upon which subbase, base course, or surface course was constructed. (See Drawing 801-1, Illustration of Road Maintenance Terms)

38. **Traveled Way** - The portion of the roadway for the movement of vehicles. For purpose of this contract, traveled way includes turnouts and curve widening. (See Drawing 801-1, Illustration of Road Maintenance Terms)

39. **Turnouts** - A short auxiliary lane on a one-lane road provided for passage of meeting vehicles.

40. **Unit of Measure** - The unit and fractions of units shown in the Schedule of Items.

41. **Unsuitable Material** - Material removed during maintenance which must be disposed of in designated locations. Includes material with substantial amounts of vegetation or other objectionable material.

42. **Waterbar** - A deeper type cross ditch which is not intended for passage of standard passenger vehicles. This structure intercepts runoff from both the road surface and ditch adjacent to the roadbed.

43. **Work Schedule** - The Contractor's current schedule for work progression.

ABBREVIATIONS

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 or specification shall mean the latest addition or amendment thereto in effect on date of Invitation for Bids.)

1. AASHTO - American Association of State Highway and Transportation Officials.

2. CS - Commercial Standard Issued by U.S. Department of Commerce.

3. EPA - Environmental Protection Agency.

4. FAR - Federal Acquisition Regulation System.

5. FED SPEC - Federal Specifications.

6. FSS - Federal Specifications and Standards.

7. MSHA - Mine Safety Health Administration.

8. MUTCD - Manual of Uniform Traffic Control Devices.

9. NBS - National Bureau of Standards.

10. OSHA - Occupational Safety and Health Act.

11. PS - Product Standard issued by the U.S. Department of Commerce.

12. UL - Underwriter's Laboratories, Inc.

13. ASTM – American Society for Testing and Materials

QUANTITY MEASUREMENT TERMS

Measurement under the contract shall be according to the United States standard measure.

The methods of measurement and computation will be those necessary to accurately determine the quantities of materials furnished and work performed. Measurement will be made of each item or unit of work, as shown in the Schedule of Items, completed and accepted in accordance with the contract provisions, specifications, and drawing.

1. All items which are measured by the linear foot, will be measured parallel to its longitudinal centerline, unless otherwise shown on the drawings.

2. A station when used as a definition of term or measurement will be 100 linear feet

3. Miles will, in the absence of known distances from existing plans or surveys, be determined by the Government using a calibrated survey odometer or equal substitute operated on the traveled way at or parallel to road centerline. Single lane mile measurement will mean the product of the road length in miles times the equivalent number of continuous traveled way lanes on the road. On two (2) lane roads, the lane miles will be twice the length of the road segment maintained. On one (1) lane roads, the added length of turnouts will be determined by using a factor that includes the cumulative length of the turnouts. Unless a different factor is established in Special Project Specifications or listed for each affected one (1) lane road in the Road Listing, forty percent (40%) of the road will be considered as having turnouts; this yields a factor of one point four (1.4) times the length in miles of the road segment maintained. This adjustment applies only to work performed under Section 811.

4. The term "ton" will mean the short ton consisting of 2,000 pounds avoirdupois. Trucks used to haul material measured by truck weight shall be weighed empty at least once daily, and each truck shall bear a plainly legible identification mark. Weigh tickets furnished by the Contractor from certified scales will be used to determine weight measurements.

5. Materials measured by the cubic yard in the hauling vehicle shall be measured therein at the point of delivery. Vehicles may be of any size or type, provided that the box is of such shape that the actual volume may be readily and accurately determined.

6. Measurement by the acre will use the length and width treated. Measurement of width will approximate significant slope breaks, but will not include minor deviations along the slopes. The measured slope distance for width will be multiplied by the length treated and converted to a standard 43,560 square foot acreage value of the surface area treated.

7. Volume of bituminous products will be measured at 60° F, using ASTM D-1250 for asphalts except the quantity of emulsified asphalt will be determined by measuring the emulsified asphalt at a temperature of 60° F, or by converting the gallonage measured at another temperature to gallonage at 60° F by means of the following formula:

$$\text{Gallons. at } 60^\circ \text{ F} = \frac{\text{Gallons at A}^\circ \text{ F}}{1+0.00025\ (\text{A}^\circ \text{ F} - 60^\circ \text{ F})}$$

In which A° F is the temperature of the material at the time the gallonage is measured.

8. The term "<u>lump sum</u>" when used in the Schedule of Items will mean the complete unit as required by or described in the contract.

SPECIFICATIONS

803 SNOW REMOVAL (10/16)

1. DESCRIPTION

This Section provides for removal of snow from roads to facilitate logging or construction operations and safe use.

2. MAINTENANCE REQUIREMENTS

a. Perform work in a manner to preserve and protect roads and appurtenances, and prevent erosion damage to roads, streams, and other Forest values.

b. Do not undercut banks. Do not blade gravel or other surfacing material off the road.

c. Keep roadbed drainage ditches, drain dips, and culverts functional when needed during operations and upon completion of operations.

d. Control snow removal to identify the usable traveled way having roadbed support. Reshape over-width plowing as necessary to define the usable width.

e. Space, construct, and maintain drainage holes in the dike of snow or berm caused by snow removal operations. Place drain holes to obtain surface drainage without discharging on erodible fills.

f. Snow removal for public access:

   Remove snow from all of the traveled way (including turnouts) for safe and efficient use for public use. Remove intruding windfalls, debris, or slough and slide material for the full width of the traveled way and deposit out of drainage's at locations designated by the Contracting Officer.

g. When directed by the Contracting Officer, replace in kind within sixty (60) days after the start of the Normal Operating Season, any surfacing material which has been bladed off the road, unless otherwise agreed. Contracting Officer will notify Contractor in writing as to the cubic yard equivalent of bladed off material by the start of the Normal Operating Season.

3. EQUIPMENT

Contractor may use any type of equipment to remove snow, providing:

a. Equipment is of the size and type commonly used to remove snow and will not cause damage to the road.

b. The use of plows or dozers to remove snow requires written approval by the Contracting Officer. Equip plows or dozers to remove snow requires written approval by the Contracting Officer. Equip plows or dozers with shoes or runners to keep the dozer blade a minimum of 2 inches above the road surface unless otherwise approved by the Contracting Officer.

4. ICE CONTROL

Ice control may be performed by Contractor when approved by the Contracting Officer in writing. Such approval will include ice control materials, application rates, and any specific requirements of use.

5. MEASUREMENT

Measurement for snow removal will be single-lane mile measured along the centerline of the roadway measured to the nearest one-tenth (0.1) miles including turnouts.

6. PAYMENT

a. The accepted quantities will be paid for at the contract unit prices shown in the Schedule of Items

b. Payment will be made under:

Pay Item	Description	Pay Unit
803 (1)	Snow Removal	Single-Lane Mile

805 MOBILIZATION / EQUIPMENT MOVING (10/16)

1. DESCRIPTION

This Section consists of one or more mobilizations of personnel, equipment, supplies, and incidentals to the project site, or sites listed in the Schedule of Items.

2. REQUIREMENT

a. Make equipment available for inspection before it is used on National Forest System lands.

b. Moving is complete, when the contractor has moved from the present work site to the ordered work site and returned to the previous location.

c. Equipment will be clean and weed free before it arrives on National Forest System lands.

3. LOCATION OF WORK

As specified on roads listed on the Road Listing, Shown on the Plans, or as ordered by the Contracting Officer.

4. MEASUREMENT

Measurement under this Section will be made by the total number of units for each item listed in the Schedule of Items completed and accepted.

Mile: work activity will be measured along the shortest feasible route to the nearest one (1) mile, from the starting location of the move, to the ordered work site.

5. PAYMENT

a. The accepted quantities will be paid at the contract price per unit of measurement for the Section 805 pay items listed in the schedule of items. Mobilization is complete when all equipment, personnel, and materials are moved to the project site and work has been started. Payment will be full compensation for the work prescribed in this Section. Mobilization is incidental unless ordered for a specific project at a specific time.

b. Payment will be made under:

Pay Item	Description	Pay Unit
805 (1)	Mobilization	Mile
805 (2)	Mobilization	Each
805 (3)	Mobilization	Lump Sum

807 EQUIPMENT RENTAL (10/16)

1. DESCRIPTION

This Section establishes the basis for the Government to equipment with operators to accomplish road maintenance work.

2. PERFORMANCE STANDARD

Make equipment available for inspection and approval before use.

3. LOCATION OF WORK

As specified on roads listed on the task orders, shown on the plans, or as ordered by the Contracting Officer.

4. ACCEPTABLE QUALITY LEVELS

a. Equipment shall be weed free before used on National Forest System Lands, see contract section H Control of Noxious Weeds-Cleaning of Equipment.

b. Equipment shall be well maintained, free of leaks, capable of operating at least 90% of the time, and meet all state and federal regulations.

c. Equipment under this Section, shall be provided fully operated by the Contractor and includes subcontractor equipment performing work under the contract. The equipment shall be operated by a fully trained, qualified, and competent operator at all times.

5. HOURS OF OPERATION

Hours of operation shall be the same as for the Contractor's regular work shift, unless otherwise directed in writing by the Government.

6. MEASUREMENTS

a. The accepted quantities will be paid at the established hourly rate, rounded to the nearest half (1/2) hour, that the equipment is in operation.

b. Non-operable equipment or equipment dependent on another piece of non-operable equipment will not be paid for.

c. Hours of operation shall be the same as for the Service Provider’s regular work shift, unless otherwise directed in writing by the Contracting Officer.

d. Moving of equipment will be paid at the established hourly rate. Pay item for Mobilization may be used if additional transport is shown in the task order.

7. PAYMENT

a. The quantities measured and accepted will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
807 (1)	Excavator with Operator, in one or more of the following classes:	
	121-160 FWHP	Hour
	161-200 FWHP	Hour
	201-280 FWHP	Hour
807 (2)	Backhoe with Operator	Hour
807 (3)	Grader with Operator	Hour
807 (4)	Crawler Tractor (Dozer) with Operator, in one or more of the following classes:	
	80-120 FWHP	Hour
	121-180 FWHP	Hour
	181-269 FWHP	Hour
807 (5)	Dump Truck with Operator	Hour
807 (6)	Brush Cutter with Operator	Hour
807 (7)	Roller with Operator	Hour
807 (8)	Trailer	Hour
807 (9)	Laborer	Hour

808 - WORK AREA MANAGEMENT (10/16)

1. DESCRIPTION

This Section establishes Contractor responsibilities for traffic control and equipment requirements in work areas.

2. REQUIREMENTS

a. Traffic Conditions - Roads other than those listed for work under Section 835 shall be open to traffic with not more than fifteen (15) minutes maximum delay time unless otherwise provided in Special Project Specifications.

b. Work which interferes with use of traveled roadways shall not be initiated or performed until a plan for satisfactory handling of traffic has been approved by the Government.

3. TRAFFIC CONTROL DEVICES

a. The Contractor shall provide signs and other devices complying with National Standards as contained in Part VI of the Manual of Uniform Traffic Control Devices (MUTCD). Traffic control for occupied work areas shall be in accordance with these specifications. All signs and devices remain the property of the Contractor.

b. Traffic devices shall be kept current with maintenance operation and removed upon its completion.

c. Traffic approaching the work area from either direction and side accesses having standard Government rectangular -or trapezoidal- shaped route markers with horizontal numbering shall be warned by signing.

d. Required signs may be mounted on portable or temporary mountings. Standard MUTCD shapes, colors, sizes, and legends shall be used.

e. Hazards incidental to the work within or on the traveled way, shoulders, or turnouts shall be marked with hazard identification markers, illuminated beacons, and other MUTCD devices to safely guide road users through the area. Work segments not completed on a daily basis shall be marked appropriately for night travel. Contractor shall obtain authorization before commencing work at night.

f. Advisory speed plates may be used to control traffic through the work area.

g. Flaggers - Properly equipped flag person(s) shall be provided where the traffic is required to stop before proceeding. Traffic shall be stopped in locations which provide width enough for passage of traffic and reasonable protection for vehicles. When flag control is used, advance warning signs are required.

4. CONTRACTOR'S EQUIPMENT

a. All vehicles and machinery operating on or from the traveled way or road shoulder shall have flashing lights, strobes, or rotary beacons operated continuously while work is in progress. Truck headlights shall be on while operating. Back-up horns shall be required on all self-propelled equipment in excess of 10,000 lbs. gross weight.

b. Vehicles and machinery not currently used in the maintenance operation shall be parked off the traveled way at approved locations to minimize interference with normal use.

5. MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for meeting requirements of this Section. All work and materials shall be incidental to paid work in this contract.

811 BLADING (10/16)

1. DESCRIPTION

This work consists of

a. Surface blading native or aggregate roadbed to a condition to facilitate traffic and provide proper drainage.

b. Smooth blading to remove loose surfacing materials from the wheel paths and store the removed materials in a recoverable windrow.

Blading includes shaping the crown or slope of traveled way, berms, and drainage dips in accordance with this specification. Compaction is required when ordered by the Contracting Officer.

2. MAINTENANCE REQUIREMENTS

a. Timing

Surface blading shall be performed during the contract period as ordered by the Government.

b. General

1) The existing traveled way and shoulders, including turnouts unless otherwise ordered, shall be bladed and shaped to produce a surface which is uniform, consistent to grade, and crowned or cross-sloped as indicated by the character of the existing surface unless otherwise shown in the Road Listing, to at least one half inch (1/2") per foot of width, but not more than three quarter inch (3/4") per foot of width. Surfacing materials shall be thoroughly loosened to no less than 2 inch depth or the depth of potholes or corrugations. Scarification to facilitate cutting to the full depth of potholes or corrugations may be elected by the Contractor but will be considered incidental to blading. Scarification shall not go deep enough to cause contamination of the surfacing.

2) When Section 891 is included in the Road Listing, the Contractor shall apply water during blading when sufficient moisture is not present to prevent segregation. Water supply, hauling, and application shall be in accordance with Section 891 and shall be incidental to blading unless Pay Items for Section 891 are included in the Schedule of Items.

3) Existing native, rock or aggregate surfaced drainage dips shall be shaped incidental to blading to divert surface runoff to existing outlet devices, ditches and discharge locations.

4) The Contractor shall establish a blading pattern which provides a uniform driving surface, retains the surfacing on the roadbed and provides a thorough mixing of the materials within the completed surface width. Upon final blading, no disturbed rock

shall protrude more than two (2) inches above the adjacent surface unless otherwise provided in the contract. Material not meeting this dimension shall be removed and placed outside the roadbed so as not to obstruct drainage ways or structures. This material may be scattered off the roadbed if there is free drainage.

5) Watering will not be required for smooth blading. Smooth blading shall be accomplished without distorting the existing cross-slope or crown of the traveled way. Loose surfacing materials shall be moved and stored on the high side of super-elevated curves and sections with uniform inslope or outslope. In crowned sections, the material shall be stored on either or both sides as elected. Stored materials shall be windrowed and shall be placed to provide not less than eleven (11) feet of smoothed traveled way on one- lane segments or twenty (20) feet of smoothed traveled way on two-lane or sections with turnouts. Windrows which may collect water on the road shall have holes cut through for drainage at least every 500 feet.

c. Routine Blading

1) Upon completion of blading, the surfaces shall conform to the dimensions shown in the Special Project Specifications 811-3.

2) Roadbed width in excess of the dimensions shown shall be shaped only as needed to provide drainage away from the traveled way. Established grasses and other vegetation shall not be removed from the excess width except as incidental to providing drainage or unless otherwise provided in the contract.

d. Compaction

Roads requiring compaction will be included in the Road Listing. Unless otherwise specified, all traveled ways requiring compaction shall be compacted by breaking track while operating equipment on the traveled way.

e. Intrusions

Where the minimum width shown in the Special Project Specifications is not available, the Contractor will construct berms where ordered and marked on the ground. Material to provide berms will come from sources designated in the Special Project Specifications.

f. Undercutting

Roadway back slope shall not be undercut.

g. Intersections

1) At intersections, the roadbeds of side roads which are not closed or restricted from vehicular use shall be bladed to assure smooth transitions.

2) Field evidence of closure or restrictions shall be considered to be signing, cross ditching in the road surface (traveled way), earth berms or other devices placed

to discourage or eliminate use by passenger cars, also roads listed for work under Sections 835 or 838 shall be considered restricted.

3) Side roads listed for work under this Section shall be considered as not restricted.

h. Cleaning of Structures

Materials resulting from work under this Section shall not be allowed to remain on or in structures, such as bridges, culverts, cattleguards, or drainage dips.

i. Berms

Existing berms shall be maintained to the condition of adjacent segments when ordered by the Government.

3. MEASUREMENT

a. Measurement under this Section will be made by the total number of units for each item listed in the Schedule of Items completed and accepted.

b. Measurement for blading will be single-lane mile measured along the centerline of the roadway (see quantity measurement terms). Two-lane roads will be measured as two (2) single-lane miles. Measurement will be measured to the nearest one-tenth (0.1) mile.

c. Each intersection bladed under 2.g. will be equivalent to one-tenth (0.1) single-lane mile; however, when the intersecting side road is scheduled for subsequent blading under this Section, no measurement will be made.

d. Berm maintained or established will be measured by linear foot.

e. No measurement will be made under this Section for compaction method specified in 2.d. For roads needing compaction with special compaction equipment (ie. pneumatic or steel roller), use pay items in Section 807 for additional compaction efforts.

4. PAYMENT

a. The quantities measured and accepted will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
811 (1)	Blading Surfaced Roads	Single-Lane Mile
811 (2)	Blading Native and Pit Run Roads	Single-Lane Mile
811 (3)	Smooth Blading	Single-Lane Mile
811 (4)	Berm Maintained	Linear Foot
811 (5)	Establishing Berms	Linear Foot

Blading Dimensions

Road Number	Standard Width	Minimum Width	Maximum Width	Tangent Width	Curve Width	Turnout Width	Aggregate Edge Slope

812 DUST ABATEMENT (10/16)

1. DESCRIPTION

This work consists of applying dust palliatives on roads shown in the Road Listing.

2. MATERIALS

The dust palliative materials shall be as shown in the road listing unless shown as Option (OPT) for Contractor's election from the following materials:

a. Water (H_2O) for dust abatement will be incidental to hauling under this contract and shall be obtained from sources listed in Special Project Specification to Section 891 Water Supply, unless otherwise agreed.

b. Lignin Sulfonate (LIG S) shall be the chemical residue produced as a by-product of the acid sulfite pulping process, and supplies as a water solution. The base solution shall be ammonia, calcium, or sodium and shall be water soluble to allow field dilution. Contractor shall provide certification that:

   1) Solids determination has been made in accordance with the modified Technical Association of the Pulp and Paper Industry Standard T629-M53 or by a specific gravity/percent solids versus temperature graph that correlates with the Standard.

   2) The pH of the delivered material is at 4.5 minimum as determined by AASHTO-T200.

c. Magnesium Chloride ($MgCl_2$) shall be the liquid residue of evaporative mineral recovery processes.

   1) The chemical analysis shall meet the following requirements:

Chemical	**Percent by Weight of Brine**
Magnesium (Mg)	7.0 minimum
Chloride (Cl_2)	20.4 minimum
Sulfate (SO_4)	3.5 maximum
Nitrate	5.0 maximum
The pH shall be between 4.5 and 10.0	

   2) Solids determination shall be made from suppliers provided graph of specific gravity/percent solids versus temperature.

d. Petroleum derivatives shall be used only when shown in the Schedule of Items. Materials, equipment and maintenance requirements are specified in Section 892 and in

Special Project Specifications. Materials shown for each listed road in the Road Listing shall be the only acceptable product(s).

3. WEATHER LIMITATIONS

a. Water applications are not limited by weather forecast or temperature.

b. Commercial petroleum palliatives, Lignin Sulfonate and Magnesium Chloride shall be applied only when atmospheric temperature in the shade is a minimum 45 degrees Fahrenheit, and steady or rising. The material shall not be applied when rain is anticipated within twenty-four (24) hours of treatment application.

4. EQUIPMENT

a. Application equipment for spreading commercial palliatives shall be so designed, equipped, maintained, and operated that the material is uniformly applied at the rate and traveled way widths shown in the Road Listing.

b. Dilution of commercial palliatives shall be accomplished within the application vehicle with the water source protected from contamination. The resulting mixture shall be circulated at least five (5) minutes to assure uniform mixing prior to application.

5. MAINTENANCE REQUIREMENTS

a. Water applications shall be limited to abatement for hauling vehicles under this contract and shall be provided at a frequency and rate which controls dust such that vehicle tail lights and turn signals remain visible. Rates of application shall be varied as needed but shall be low enough to avoid forming rivulets. Frequency of application shall be sufficient to accomplish the abatement without saturating and softening the traveled way. Compacted or glazed road surface or wheel tracks may be loosened as needed for water penetration.

b. Commercial palliatives shall be applied at the rates determined by the Government to be appropriate at the time of application. The Road Listing shows the expected average application rate and may be varied to meet field conditions.

1) Lignin Sulfonate rates of application are shown in the Road Listing as gallons per square yard of the undiluted product at fifty percent (50%) solids.

2) Magnesium Chloride rates of application are shown in the Road Listing as gallons per square yard of the undiluted product at thirty-three percent (33%) solids.

3) Prior to initial application, when needed the road will be ordered bladed and shaped under Section 811, Blading.

4) Required subsequent applications may be applied to the existing road surface without blading unless it is ordered.

5) Contractor shall not apply commercial palliatives in a manner that spatters or mars adjacent structures or trees. Palliatives shall not be placed on or across cattleguards or

bridges. Dust abatement material shall be discharged only on roads approved by the Government.

6. MEASUREMENT

a. Lignin Sulfonate measurement shall be the tonnage of lignin sulfonate solids supplied as determined by manufacturer's certificate or by tests on job samples obtained during application.

b. Magnesium Chloride measurement shall be the undiluted tonnage (as corrected to 33 percent solids) as determined by manufacturer's certificate.

c. Bituminous material will be measured prior to any ordered dilution by the ton or gallon as provided in the Schedule of Items and the Special Project Specifications.

d. Addition of water to dilute commercial palliatives shall be incidental.

7. PAYMENT

a. The accepted quantities will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
812 (1)	Dust Abatement – Lignin Sulfonate Solids	Ton
812 (2)	Dust Abatement – Magnesium Chloride	Ton

813 SPOT SURFACING (10/16)

1. DESCRIPTION

This work consists of placing surface aggregate as staked on the ground, or designated by the Government. It includes preparing the area, furnishing, hauling, and placing all necessary materials and other work necessary to blend with the adjacent road cross section.

2. MATERIALS

a. Materials will be Government furnished when stated in the task order.

b. Materials furnished by the Contractor shall conform to the gradation requirements shown in the task order and the quality requirements of Section 893.

3. MAINTENANCE REQUIREMENTS

The area to be spot surfaced shall be thoroughly loosened to a minimum depth of one inch (1") prior to placement of aggregate.

4. MIXING AND PLACING

a. When scheduled coincident with work under Section 811, spot surfacing and existing aggregate, when ordered, shall be mixed with water until a uniform mixture is obtained prior to final shaping and compaction.

b. The material shall otherwise be spread on the prepared area in layers no more than four (4) inches in depth. When more than one (1) layer is required, each layer shall be shaped and compacted before the succeeding layer is placed. Upon completion, the spot surfacing shall reasonably conform to the adjacent cross section and provide smooth transitions in the road profile.

c. Compaction shall be accomplished by breaking track while operating equipment on the traveled way

5. MEASUREMENT

a. The quantity will be the weight of the actual aggregate placed in tons, cubic yards of aggregate measured in place, or square yards of aggregate measured in place, whichever is shown in the Schedule of Items.

b. Hauling is considered incidental.

6. PAYMENT

a. The accepted quantities will be paid for at the contract unit prices shown in the Schedule of Items

b. For payment by weight, certified weight ticket shall be submitted to the Contracting Officer.

c. Payment will be made under:

Pay Item	Description	Pay Unit
813 (1)	Spot Surfacing, Grading__, Commercial Source	Ton
813 (2)	Spot Surfacing, Grading__, Commercial Source	Cubic Yard
813 (3)	Spot Surfacing, Grading__, Commercial Source	Square Yard
813 (4)	Spot Surfacing, Grading__, Government Source	Ton
813 (5)	Spot Surfacing, Grading__, Government Source	Cubic Yard
813 (6)	Spot Surfacing, Grading__, Government Source	Square Yard

814 ASPHALT PAVEMENT PATCHING (10/16)

1. DESCRIPTION

This work consists of patching potholes and skin patching of asphalt surfaces. The work includes preparing the area to be patched, furnishing and placing all necessary materials and work. All areas to be patched will be marked by the Government.

2. MATERIALS

Materials used for asphalt patching shall conform to the requirements in Sections 892 and 893. Bituminous mixture material shall conform to requirements of Special Project Specifications.

3. MAINTENANCE REQUIREMENTS

a. Potholes

1) Existing materials shall be removed to a minimum of two (2) inches or as necessary to reach firm support, but limited to maximum twelve (12) inch depth. If firm support for a patch is not available, the hole shall be barricaded and the Government shall be notified. Prior to Contractor placing any materials, Government will determine corrections to be made.

2) The edges of the prepared hole shall be extended to form a vertical face in un-fractured asphalt surfacing. The prepared hole shall generally be round or rectangular in shape and cleaned of all loose material. The bottom and sides shall be sprayed with an emulsified asphalt.

3) Prepared potholes shall be patched or barricaded immediately.

4) The bituminous mixture shall be placed in layers not exceeding four (4) inches. Each layer shall be compacted thoroughly with hand tampers, mechanical tampers, or rollers.

5) Finished surface shall, as a minimum, be compacted with a tamper or an 8- to 10-ton steel roller or comparable vibratory roller. Upon completion, the compacted pothole patch shall be flush with or not more than one quarter (1/4) inch above the level of the adjacent pavement.

b. Disposal

All materials removed from pothole and skin patching operations shall be removed to a disposal site designated by the COR or shown on the drawings.

4. MEASUREMENT

a. Bituminous Mixture

1) Hot and cold bituminous mixture acceptable placed will be measured by the ton. Bituminous materials incorporated into the mixture will be incidental to the item.

2) Ton Measure - The quantity of mixture will be the number of tons in the accepted work. Any material rejected in the field as not meeting specifications shall be deducted based on estimated quantities. Rejected quantities shall be reconciled between the Government and the Contractor each day. If not reconciled each day, the Government's figures will apply.

b. The following work is incidental:

1) Cleaning of surfaces.

2) Haul and compaction of bituminous mixture.

3) Material removal and disposal.

4) Emulsified asphalt used on existing surfaces will be measured by the gallon prior to dilution. Dilution materials shall be considered incidental.

5. PAYMENT

a. The accepted quantities will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
814 (1)	Pothole Patching	Ton
814 (2)	Emulsified Asphalt	Gallon

815 PAVED SURFACE CLEANING (10/16)

1. DESCRIPTION

This work consists of removing loose material from paved, traveled way, including bridge decks and paved shoulders.

2. EQUIPMENT

a. Equipment shall have the capability of removing all loose material from paved surfaces without damage to the surface.

b. Use of hydraulic flushing equipment will not be permitted within a horizontal distance of two hundred (200) feet from a live stream, unless approved by the Government.

3. MAINTENANCE REQUIREMENTS

The paved surface shall be cleaned to the width stated in 4(a) or 4(c) for the Pay Item or as ordered under 4(b). Materials shall be moved away from road centerline on double-lane roads. Bridge deck cleaning shall require all materials be moved longitudinally off the deck.

4. MEASUREMENT

a. Measurement for Pay Item 815(1), will be by the pass mile, determined by the product of the number of five (5) foot wide increments times the length to the nearest one-tenth (0.1) mile.

b. Partial width passes ordered under Pay Item 815(1) will be measured as full five (5) foot passes. Additional width incidentally produced by Contractor's equipment will not be considered as a partial pass.

c. Measurement for Pay Item 815(2) will be lane miles measured to the nearest one-tenth (0.1) miles for cleaning the entire width of the paved surface, including turnouts.

d. Measurement for Pay Item 815(3) will be for cleaning the entire length and width of the surface of each bridge and paved approaches.

5. PAYMENT

a. The ordered and accepted quantities shall be paid for at the unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
815 (1)	Paved Surface Cleaning	Pass Mile
815 (2)	Paved Surface Cleaning	Single-lane Mile
815 (3)	Bridge Deck Cleaning	Each

816 MAINTENANCE OF UNPAVED SHOULDERS (10/16)

1. DESCRIPTION

This work consists of maintaining unpaved shoulders adjacent to a paved traveled way. Work area will be identified by the Government.

2. MAINTENANCE REQUIREMENTS

Existing shoulder material shall be bladed and shaped the entire width to drain away from the traveled way. Vegetative or other unsuitable materials may be bladed onto slopes adjacent to the roadbed unless otherwise required in Special Project Specifications. The shoulder material shall be moistened if necessary for compaction. The shoulder shall be compacted adjacent to paved surface edge prior to final shaping. Grader wheels may be used for this compaction. Final shaping shall provide a smooth transition to the paved surface edge. Upon completion, the paved surface shall be cleaned of loose materials in accordance with Section 815 and is incidental.

3. MEASUREMENT

Measurement of unpaved shoulder maintenance will be the number of side miles of each shoulder completed and accepted. Measurement will be to the nearest one-tenth (1/10) mile determined along the centerline.

4. PAYMENT

a. The ordered and accepted quantities shall be paid for at the unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
816 (1)	Unpaved Shoulder Maintenance	Side Mile

818 ASPHALT CRACK CLEANING AND SEALING (10/16)

1. DESCRIPTION

This work shall consist of cleaning and filling cracks in existing asphalt concrete surfaces that are 1/4-inch wide and wider. This work shall be performed and paid for in accordance with the following specifications.

2. EQUIPMENT

a. All methods employed in performing the work and all equipment, tools and machinery used for handling the material and executing any part of the work shall be subject to the approval of the Government before the work is started, and whenever unsatisfactory, they shall be changed or improved as required. All equipment, tools, machinery and containers must be kept clean and maintained in satisfactory condition.

b. Sealing equipment shall consist of a double boiler type machine, capable of maintaining the temperature of the material in the range of 350 to 400 degrees Fahrenheit, with continuous circulation and agitation. Material shall never be heated above 400 degrees Fahrenheit.

3. MATERIALS

The sealing material shall comply with the requirements of ASTM D 3405-78 and AASHTO M 301-85. The Contractor shall submit a certificate of compliance signed by the manufacturer certifying that the material meets these requirements. The certificate shall be submitted prior to the use of the material in the work.

4. MAINTENANCE REQUIREMENTS

a. Cleaning of cracks:

The cracks shall be steel wire brushed, broomed, cleaned using compressed air or pressurized water jet, or cleaned and dried using a hot lance (use of a back-pack hot air blower will not be sufficient), as shown in the Schedule of Items, in order to remove all loose material, vegetation, and other objectionable material.

b. Filling:

Filling of cracks and voids shall not commence until they are clean and dry. When the use of a hot lance is required, filling should closely follow cleaning. The cracks shall be sealed from the bottom up. The filler material shall be placed within 1/8-inch of the top of the crack. Any excess material shall be leveled flush to the surface with a "V" shaped squeegee device. The excess material will be squeegeed so as not to exceed 1 1/2-inches on each side of the crack. Excess material remaining in the squeegee at the end of the crack will be distributed over the crack in a return motion. If settlement of the filler material occurs, the cracks shall be refilled until they are again within 1/8-inch of the

finished surface. No excess build-up of filler material will be permitted. Any spillage or loose material shall be removed from the surface.

c. Weather Limitations:

The filler material shall not be applied when it is raining, excessive moisture is present, or either atmospheric or pavement temperature is 45 degrees Fahrenheit and falling. Filler material may be applied when moisture is not present and either the atmospheric or pavement temperature is 40 degrees Fahrenheit and rising.

5. MEASUREMENT

The quantity will be measured by the linear foot or pound of filler material used as shown in the Schedule of Items. When measurement by the pound is specified, the Government may require the weighing of equipment for determination of actual quantities of material used. Payment by the pound will not include any materials wasted or not used as specified.

6. PAYMENT

a. Payment shall be made at the contract unit price for cracks repaired as specified. This payment shall be full compensation for all labor, equipment, materials, traffic control, tools and incidentals necessary to complete the work.

b. Payment will be made under:

Pay Item	Description	Pay Unit
818 (1)	Crack Cleaning and Sealing	Linear Foot
818 (2)	Crack Cleaning and Sealing, Hot Lance Cleaning Only	Linear Foot
818 (3)	Crack Filling Material, Commercial Source	Pound

831 DITCH MAINTENANCE (10/16)

1. DESCRIPTION

This Section provides for routine maintenance of various types of ditches to provide a waterway which is unobstructed, as shown on the road listing or marked on the ground. Drainage ditch maintenance is limited to materials contained within the ditch below the elevation of the adjacent edge of the traveled way or shoulder.

2. MAINTENANCE REQUIREMENTS

a. During ditch maintenance care shall be taken to retain existing low growing vegetative cover (primarily grasses and forbs).

b. Ditches shall be maintained by removing rock, soil, wood, and other materials. Upon completion the maintained ditch shall be of the same character as abutting segments that were not required to be maintained.

c. Back slopes shall not be undercut by removal operations.

d. Suitable material up to four (4) inches in greatest dimension removed from the ditches may be blended into existing native road surface and shoulder or placed in designated berm.

e. Material from ditch cleaning operations shall not be blended into or bladed across aggregate surfaced roads nor bladed onto or across bituminous surfaced roads.

f. Material in excess of 2(d) or subject to 2(e) will be ordered hauled to a designated waste area under Section 832. Excess materials temporarily stored on the ditch slope or edge of the shoulder shall be removed daily.

g. Limbs and wood chunks in excess of one (1) foot in length or three (3) inches in diameter shall be removed from ditches and placed outside the roadway.

h. Paved surfaces shall be cleaned of all materials resulting from Contractor's ditch maintenance work. Paved surface cleaning shall be in accordance with Section 815.

i. Lead-off ditches shall be shaped to drain away from the traveled way.

3. MEASUREMENT

a. Drainage ditch maintenance will be measured to the nearest one-tenth (0.1) mile. Segments of less than one-tenth (0.1) mile will be counted as a full one-tenth (0.1) mile. Lead off ditches shall be measured by the number of ditches completed.

b. Ordered haul of excess material will be measured and paid under Section 832.

4. PAYMENT

a. The accepted quantity will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
831(1)	Clean and Reshape Drainage Ditch	Ditch Mile
831(2)	Clean and Reshape Lead off Ditch	Each

832 REMOVE AND END HAUL MATERIALS (10/16)

1. DESCRIPTION

Work consists of ordered loading, hauling, and placing of slide, slough, or excess materials such as rock, soil, vegetation, and other materials to designated disposal sites.

2. MAINTENANCE REQUIREMENTS

a. Excess materials generated by work under other Sections of this contract may be ordered for removal, haul, and disposal under this Section. Removal and disposal under all Sections will be ordered without haul when a distance of less than two hundred (200) feet is involved.

b. Slide and slough materials to be removed shall include those in the area extending approximately six (6) feet vertically above the road surface and that area extending not more than four (4) feet down slope from the roadbed. Material shall be disposed of at designated sites as shown on Drawings or identified in Special Project Specifications.

c. The slope which generated the slide material shall be reshaped as nearly as practical to its original condition by equipment operating from road surface. Reshaping of roadside ditches in slide area shall be in accordance with Section 831.

d. When ordered by the Government, slumps shall be filled by compacting selected materials into roadway depressions. Compaction shall be by Method (2).

e. All materials removed and placed in disposal sites shall be placed by one or more of the following methods as shown in Road Listing, Special Project Specifications, or Drawing.

   1) Method 1: Side Casting and End Dumping. Material may be placed by side casting and end dumping. Where materials include large rocks, a solid fill shall be provided by working smaller pieces and fines into voids. The finished surfaces shall be shaped to drain.

   2) Method 2: Layer Placement - Surfaces on which materials are to be placed shall be stepped or roughened prior to placing any material. Materials shall be placed in approximately horizontal layers no more than twelve (12) inches thick. Each layer shall be compacted by operating hauling and spreading equipment over the full width of each layer.

3. MEASUREMENT

a. Removal will be measured by the cubic yard, determined by equipment measure, for materials acceptably removed.

b. Except as provided in 2(a) of this Section, haul of materials will be measured by the cubic yard mile, determined by the number of miles hauled times the cubic yards. Mileage will be measured one way rounded to the nearest 1/10 mile.

c. Placement of materials in disposal sites will be measured by the cubic yard in the hauling vehicle for materials acceptably placed.

4. PAYMENT

a. The accepted quantity will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
832 (1)	Remove	Cubic Yard
832 (2)	Haul	Yard Mile
832 (3)	Disposal, Placement Method 1	Cubic Yard
832 (4)	Disposal, Placement Method 2	Cubic Yard

834 DRAINAGE STRUCTURE MAINTENANCE (10/16)

1. DESCRIPTION

This work consists of cleaning and reconditioning culverts and other drainage structures.

2. MAINTENANCE REQUIREMENTS

a. Drainage structures, inlet structures, culverts, catch basins, and outlet channels shall be cleaned when required by the Government. Catch basins shall be cleaned by removing the material within the area shown on Drawing 834-1.

b. The transition from the ditch line to the catch basin shall be cleaned a distance of ten (10) feet. Outlet channels and lead-off ditches shall be cleaned a distance of six (6) feet. Debris and vegetation shall be removed and placed so as to not enter the channel or ditch or obstruct traffic. Debris and vegetation ordered to be hauled shall be hauled to a designated disposal area in accordance with Section 832.

c. Hydraulic flushing of drainage structures is not allowed unless provided for in Special Project Specifications.

d. Cleaning and reconditioning is limited to the first four (4) feet of inlet and outlet determined along the top of the structure. Damaged culverts shall be reported to the Government in writing upon completion of work on each road in the Road Listing. Any damaged by the Contractor shall be repaired.

3. MEASUREMENT

a. Measurement will be the number of units of each culvert type including cleaning of inlet and outlet ditches or channels and catch basins completed and accepted.

b. Reconditioning and cleaning of drainage structures will be incidental to cleaning.

c. Ordered haul of materials will be measured under Section 832.

4. PAYMENT

a. Quantities as determined above will be paid at the contract unit price.

b. Payment will be made under:

Pay Item	Description	Pay Unit
834 (1)	Clean Culverts 24" Diameter and Under	Each
834 (2)	Clean Culverts 24" through 48" Diameter	Each
834 (3)	Clean Culverts Over 48" Diameter	Each

835 ROADWAY DRAINAGE MAINTENANCE (10/16)

1. DESCRIPTION

This work consists of maintaining existing drainage on roads that have been physically closed to traffic.

2. MAINTENANCE REQUIREMENTS

a. Access

1) The Government will provide for access through locked gates and also provide any special devices other than standard wrenches or tools, required for removal or replacement of fabricated barricades.

2) Other work associated with Contractor's access shall be the responsibility of the Contractor. The entrance shall not be left available for access to persons not associated with this contract; temporary barricades shall be used during the active performance of work.

b. Drainage

1) Upon completion of work, the roadway shall be shaped to provide for the removal of surface water, but need not be passable to vehicles. Waterbars, barriers or berms existing prior to the Contractors operation shall be repaired or reinstalled. Areas where water is ponded by existing centerline profile sags in through cuts may be left untreated.

2) Continuous blade shaping of the roadbed is not required under this specification.

3) Work to be done at staked locations shall be as indicated on the stake and/or stated in Special Project Specifications.

4) Any of the following methods are acceptable for use at eroded or rutted locations.

a) Method A: Outsloping the roadbed at not less than one-half (1/2) inch per foot.

b) Method B: Insloping the roadbed at not less than one-half (1/2) inch per foot of width.

5) Drainage structures located in through fills and natural watercourses shall be fully functional without obstructions, including inlet and outlet channel within twenty (20) feet of the structure.

6) Culverts and other fabricated structures providing drainage from road ditches shall either be cleaned and the ditch made. Fabricated drainage structures discharging on natural ground within three (3) feet of roadbed elevation may be removed at Government's option to provide the waterbar. Removed structures shall become Contractor's property to be removed from National Forest Land. Contractor-installed temporary drainage structures, if any, shall be removed and replaced with a water bar.

c. Slides, Slumps and Slough

1) Slides and slough may be left in place provided they do not potentially impound water or divert water from watercourses. Reshaping of the various surfaces shall be done as necessary to provide drainage.

2) Drainage shall be provided to effectively decrease or eliminate the entry of surface water into slides, slumps, and roadbed surface cracks. The Contractor shall place berms, waterbars or ditches as needed to intercept and remove runoff water from the roadbed. Cracks shall be surface sealed by covering over with native soil materials to prevent additional water entry and compacting with equipment tires.

d. Entrance Devices

Upon completion of work, entrance devices shall be replaced to effectively eliminate access by motorized vehicles having four (4) wheels and a width in excess of fifty (50) inches.

e. Seeding

All disturbed areas shall be seeded and fertilized in accordance with requirements set forth in Section 841 and are incidental.

3. MEASUREMENT

Measurement for the ordered and accepted work will be the length of the road in miles as shown on the Road Listing.

4. PAYMENT

a. The accepted quantity will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
835 (1)	Roadway Drainage Maintenance	Mile

836 ROAD DECOMMISSIONING (10/16)

1. DESCRIPTION

This work shall consist of closing designated roads to use by vehicles over 42 inches wide and returning the roadway to resource production using one or a combination of the following items as specified in a written order, listing, or shown on an attached map: removing drainage structures, seeding, fertilizing, scarification, ripping with wing rippers, outsloping roadbed, constructing water bars, earth barricade, slashing, and camouflaging road junction.

2. MAINTENANCE REQUIREMENTS

a. Remove Drainage Structures

1) All designated drainage structures such as culverts, metal or wooden open top water diverters, and rubber water diverters shall be removed. Dips and waterbars shall not be removed.

2) Culverts 24 inches or less in diameter shall be smashed and buried (covered with a minimum of one foot of compacted native material) in the roadbed, unless disposal sites for specific culverts are designated on an attached map. If disposal sites have been designated the culverts shall be hauled to the designated site or other agreed to location.

3) Culverts over 24 inches in diameter shall be hauled to the designated site shown on attached map or to other agreed to location.

4) Wooden open top water diverters, metal open top water diverters, and rubber water diverters shall be treated the same as culverts 24 inches or less in diameter.

5) Stream channel width after drainage structures have been removed shall be no less than that of existing channel in the vicinity of the inlet and outlet. Stream banks shall be sloped to 3:1 or flatter unless agreed to otherwise. This work is incidental to structure removal.

6) Waterbed roadbed at locations staked on the ground or as ordered by the Contracting Officer. Construct in accordance with Dimensions Table and Drawing 838-6.

Waterbar Dimensions

Percent Road Grade	Length (ft) EF	Length (ft) BC	Rise (ft) at B	Rise (ft) at E
5° & Less	10	20	1.5	1.0
6°	15	25	1.6	1.1
7°	20	30	1.7	1.2
8°	25	35	1.8	1.3
9°	30	40	1.9	1.4
10°	35	45	2.0	1.5

b. Seeding

1) This work consists of furnishing and placing required seed mix on all areas disturbed under this contract and on any other areas specified. Seeding may not be done until all other ground disturbing work on the road has been completed and accepted. Unless a specific seeding season is listed below, seeding shall be done as soon as other ground disturbing work is accepted.

   Seeding season:_____to_____

2) The seed shall be applied in the following amounts and mixtures:

Species	% of Mixture	Application Rate (lb./acre)

3) Hand operated seeding devices, or other devices approved by the Government, shall be used to apply seed.

4) Seed shall meet the requirements of Federal Specification JJJ-S-181. Seed shall be furnished separately or in mixture in standard containers with (1) seed name; (2) lot number; (3) net weight; (4) percentages of purity and of germination (in case of legumes, percentage of germination to include hard seed); and (5) percentage of maximum weed seed content clearly marked for each kind of seed. The contractor shall furnish the Government duplicate signed copies of a statement by the vendor, certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 12 months of date of delivery. This statement shall include (1) name and address of laboratory, (2) date of test, (3) lot number for each kind of seed, and (4) results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Legume seed shall be inoculated with approved cultures in accordance with the instructions of the manufacturer.

c. Fertilizing

1) This work consists of furnishing and placing dry fertilizer on all areas disturbed under this contract and on any other areas specified. The contractor shall apply fertilizer as soon as all other ground disturbing work on the road has been completed and accepted, but not before seeding has been completed.

2) The minimum percentage of available nutrients shall be:

% Nitrogen	% Phosphorus	% Potassium	% Sulfur

3) Fertilizer shall be applied at _____ lbs/acre.

4) Hand operated fertilizing devices, or other devices approved by the Government, shall be used to apply the fertilizer.

d. Scarification

1) This work shall consist of seedbed preparation on an existing roadbed by scarification.

2) Scarification shall be accomplished by rippers spaced not more than 6 inches apart and/or with heavy duty gang discs.

3) Scarification depth shall not be less the 3 inches or deeper than 12 inches unless otherwise agreed.

e. Ripping with Wing Rippers

1) This work shall consist of subsoiling an existing roadbed by ripping with a winged ripper.

2) The distance between ripper shanks shall not exceed 36 inches. Each shank shall be equipped with a shoe and wings which have a total width of at least 18 inches.

3) The design of the shank and wing will be such that the treated soils are slightly lifted and well fractured rather than plowed, mixed or displaced.

4) Ripping shall be accomplished to a minimum depth of 20 inches. The Government may agree to a lesser depth when excessive rock is encountered.

f. Outsloping Roadbed

1) Designated roads or segments of roads shall be outsloped by pulling the fill shoulder towards the cut bank. Excavated material shall be spread over the roadbed forming a minimum outslope equal to the existing road grade percent. The Government may agree to a lesser outslope percent if soil conditions warrant.

2) Any existing ditches at the toe of the cut shall be filled with the material excavated during outsloping.

g. Earth Barricade

1) Earth barricades shall be constructed in locations specified in accordance with the attached drawings.

2) Multiple barricades at one site may be specified.

h. Slashing

1) This work shall consist of placing woody material over the roadbed to discourage vehicle traffic.

2) Woody material shall be dead timber and slash removed from an area within twenty five (25) feet of the road shoulders in the vicinity of the areas where it is to be placed.

3) Material shall be placed randomly over the roadbed to give a similar appearance of the surrounding area and may include rocks and other material.

i. Camouflaging Road Junction

This work shall consist of manipulating the cut and fill slopes of the designated road so the road template is not obvious. One or more of the following methods will be specified:

1) When the designated roadway section is a cut-fill section, excavate the fill slope section and place material against the cut section so the designated road is not obvious. The height of the replaced material shall be equal to the existing cut or a maximum of six (6) feet.

2) When the designated roadway section is a fill section, remove the road fill and place the material as a berm along the road junction, creating what appears to be a cut section.

j. Transplanting Native Trees

This work shall consist of transplanting native trees designated by the Government from areas adjacent to the road to areas designated by the Government on the roadbed. Transplanting will be limited to trees less than 4 inches in diameter. Transplanting must be done with a tree spade or other equipment specifically designed for transplanting trees with minimal damage to the root system. No damage to the tree stem will be permitted. No more than 20 percent of the limbs may be damaged during the transplanting operation. The north side of trees to be transplanted shall be marked before the trees are removed. When the trees are transplanted they shall be oriented with the north side facing north. Transplanting shall be limited to the period from October 15 to May 31 annually. Transplanted trees shall be watered liberally immediately after transplanting.

3. MEASUREMENT

Measurement under this Section will be made by the total number of units for each item listed in the Schedule of Items that is completed and accepted.

a. Measurement for Pay Items 836 (01) through 836 (05), item 836 (11), Item 836(13) item 836 (15) and 836 (16) will be the actual count of the number of items.

b. Measurement for Pay Items 836 (06) and 836 (07) will be by the acre, measured along sloped

c. Measurement for Pay Item 836 (08) will be determined by the number of twelve (12) foot wide passes. The length of each pass shall be determined to the nearest one-tenth (1/10) mile.

d. Measurement for Pay Item 836 (09) will be determined by the number of six (6) foot wide passes. The length of each pass shall be determined to the nearest one-tenth (1/10) mile.

e. Measurement for Pay Items 836 (10), 836 (12) and 836 (13) will be measured along the centerline of the roadway. Distance will be measured to the nearest one-tenth (1/10) mile.

f. Measurement for Pay Item 836 (14) includes any hauling of items removed under pay item 836 (02) only, and will be determined by the distance along the centerline of the most direct feasible route, from the point of origin to the point of deposition. Measurement will be measured to the nearest one-tenth (1/10) mile. Separate payment will be made for each structure hauled. Haul of any other items will be incidental to that item.

4. Payment

a. The accepted quantity will be paid for at the contract unit price. This payment will be full compensation for all labor, equipment, tools, and incidentals necessary to complete the work.

b. Payment will be made under:

Pay Item	Description	Pay Unit
836 (01)	Removal of 24" or less diameter culvert	Each
836 (02)	Removal of culvert greater than 24" diameter	Each
836 (03)	Removal of wooden open top water diverters	Each
836 (04)	Removal of metal open top water diverters	Each
836 (05)	Removal of rubber water diverters	Each
836 (06)	Seeding, dry method (without mulch)	Acre
836 (07)	Fertilizer	Acre
836 (08)	Scarification	Scarification Pass Mile
836 (09)	Ripping with Wing Rippers	Ripping Pass Mile
836 (10)	Outsloping Roadbed	Mile
836 (11)	Earth Barricade	Each
836 (12)	Slashing	Mile

836 (13)	Camouflaging Road Junction	Each
836 (14)	Haul	Mile
836 (15)	Transplanting Native Trees	Each
836 (16)	Construct Waterbar	Each

837 DRAINAGE DIP MAINTENANCE (10/16)

1. DESCRIPTION

This work consists of separately ordered maintenance of existing drainage dips and special outlet structures on all types of roads. Included in this are rolling dips on native, aggregate, and paved roads.

2. MATERIALS

Materials used in maintenance shall conform to the requirements of the applicable Sections for the materials within the structure.

3. MAINTENANCE REQUIREMENTS

a. Special outlet structures such as aprons, culverts, and flumes shall be removed if necessary prior to maintaining the drainage dip, or the finished dip shall be oriented to the structure for alignment and gradient.

b. Hand work may be necessary to obtain a smooth surface and uniform cross section. Any special outlet structure removed shall be reinstalled to the flow line grade established by the completed drainage dip. The first six (6) feet of any lead-off ditch or channel shall be cleaned incidental to this Section.

c. Native material drainage dips shall be shaped to reasonably conform with the lines, grades, and cross sections shown in Drawing 837-1 or staked on the ground. Removed materials shall be distributed uniformly over the downgrade road surface adjacent to the dip. Rocks shall not project more than two (2) inches above the final surface.

d. Aggregate or rock surfaced drainage dips shall be cleaned. When the Government determines the drainage dip requires shaping to conform to Drawing 837-1, existing surfacing materials shall be conserved for reuse upon completion of shaping. Conserved surfacing shall be placed and compacted with equipment prior to reinstalling any special outlet structures. Watering when required, will be in accordance with Section 891. Additional surfacing, if required, will be ordered under Section 813.

e. Bituminous surfaced drainage dips shall be cleaned.

4. MEASUREMENT

Measurement of drainage dips maintained will be the number of units of each type completed and accepted.

5. PAYMENT

a. The quantities will be paid for at the contract unit price as shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
837 (1)	Clean and Shape Drainage Dip, Native Surface	Each
837 (2)	Clean Drainage Dip, Aggregate Surface	Each
837 (3)	Reshape Drainage Dip, Aggregate	Each
837 (4)	Clean Bituminous Drainage Dips	Each

838 MAINTENANCE FOR LIMITED USE (10/16)

1. DESCRIPTION

This work consists of making the roadway passable for use by full-size pickups and providing drainage from the traveled way and roadbed.

2. MAINTENANCE REQUIREMENTS

a. Timing

Maintenance shall be performed during the contract period as often as indicated by the accepted schedule or subsequently ordered by the Government. The Contractor shall commence maintenance within two (2) weeks after receipt of written order unless otherwise stated in the order.

b. Drainage

1) Drainage shall be provided at existing drainage structures. Culverts providing drainage from road ditches shall have at least two thirds of the end area usable. Culverts in live streams or natural watercourses requiring cleaning shall have the end area fully usable.

2) Cross ditches conforming to Drawing 838-1 shall be placed at staked locations to provide drainage across the full width of the roadbed. Except as provided in 2.c herein, materials removed from cross ditches and cleaning of existing drainage dips shall be bermed downgrade on the roadbed. Cross ditches shall be angled and shall discharge at points of least fill height or on natural ground.

c. Intersections

Intersections shown in the Road Listing for work under this Section shall be cross ditched to drain over the full width of the listed road and define the traveled way of the adjacent road. Material removed from this cross ditch shall be placed as a berm on the roadbed and traveled way away from the intersection. A second cross ditch conforming to Drawing 838-1 shall be placed within sight of the intersection when possible, but in no case more than one hundred feet (100') from the intersection.

d. Objects on Roadbed (See Drawing 838-3)

1) Upon completion, no object extending over four (4) inches above the road surface shall remain within ten (10) foot usable traveled way width. Larger objects shall be selectively removed or repositioned to provide the usable width and lateral clearance required (See Drawing 838-3). The usable width shall be centered on the roadbed or positioned away from the fill slope.

2) Logs and down trees shall be cut to provide not less than twelve (12) feet of opening for vehicle passage provided the remaining ends are in ground contact and do not interfere

with drainage. The portion to be removed may be cut into chunks or left as one piece and placed in a stable position where it will not restrict drainage or vehicle passage. Limbs shall be selectively removed to provide stability or ground contact and shall be scattered down slope outside of the roadbed and drainage ways.

3) Rocks and other objects outside the ten (10) foot usable width may remain if drainage is provided from the road surfaces.

e. Slough and Slides (See Drawing 838-4)

1) Slough and slides may be left in place when surface drainage is provided for and at least ten (10) feet of width is available for vehicle passage. The roadbed immediately upgrade shall be cross ditched. Any roadside ditch between the cross ditch and the remaining materials shall be filled and shaped to drain.

2) The Contractor may reposition or ramp over slides and slough when the traveled way is less than ten (10) feet (See Drawing 838-4), providing the material is capable of supporting vehicles. Ramp profile gradient shall not exceed twelve (12) percent nor have an out slope exceeding six (6) percent. Ramped crossings shall be drained and bermed to a height of at least six (6) inches on the outside of the ramped area.

3) Slough or slide materials which are not capable of supporting a vehicle shall be repositioned on the roadbed to provide the ten (10) foot width unless the Government orders it removed under Section 832.

f. Slumps (See Drawing 838-5)

1) The roadbed immediately upgrade of slumps shall be cross-ditched. The cross ditch shall be located so that the outlet can allow the runoff to spill off onto the fill slope without causing additional damage or erosion.

2) Slumps at the edge of the roadbed shall not be considered a part of the usable width. Usable width may be reduced to eight (8) feet provided a berm of at least six (6) inches in height is placed on the undisturbed roadbed to divert surface water and provide a curb on the downhill side.

3) Roadbed slumps shall be ramped on both ends onto undisturbed roadbed to provide at least eight (8) foot usable width. No material shall be placed on the slumped area. Removed materials shall be bermed on the roadbed to guide vehicles to the ramp location, used to block any abutting ditches, and to divert water from entering the slump area. Ramp profile gradient shall not exceed twelve (12) percent. Areas within the slumps that could pond water shall be drained.

4) Roadbed cracks shall be sealed with native soil and wheel or tamper compacted to reduce the introduction of surface water.

g. Cutting Vegetation

1) Trees, brush and limbs shall be cut and removed to provide at least twelve (12) feet of usable width centered on the existing usable road surface.

2) Encroaching limbs shall be removed to a height of ten (10) feet above the traveled way surface extending into the passageway from the side. Limbs extending laterally into the twelve (12) foot width shall be cut within six (6) inches of the trunk. Limbs extending down into the ten (10) foot height limitation may be cut or lopped as needed to meet the height requirement.

3) Brush and trees within the twelve (12) foot usable width corridor shall be cut parallel to and within two (2) inches of the traveled way surface.

4) Materials shall be scattered down slope outside the roadway.

3. MEASUREMENT

Measurement for all work under this section will be by the mile of existing centerline length expressed to the nearest one-tenth (1/10) mile.

4. PAYMENT

a. The accepted quantities will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
838 (1)	Maintenance for Limited Use	Mile

839 RESTORE DRAINAGE (10/16)

1. DESCRIPTION

This work consists of log, limb and debris removal; blading and shaping of the roadbed to restore drainage function. This work includes shoulders, ditches, drainage dips, leadoff ditches, turnouts, and intersections; cleaning drainage facilities; removing washes and sloughs that inhibit drainage.

2. MAINTENANCE REQUIREMENTS

a. General

The existing traveled way and shoulders, including turnouts unless otherwise ordered, shall be bladed and shaped to produce a surface which is uniform, consistent to grade, and crowned or cross-sloped as indicated by the character of the existing surface unless otherwise Marked on the Ground, to at least one half inch (1/2") per foot of width, but not more than three quarter inch (3/4") per foot of width. Surfacing materials shall be thoroughly loosened to a depth of no less than 2 inches or the depth of potholes or corrugations. Corrugations are washboarding and similar defects.

Scarification to facilitate cutting to the full depth of potholes or corrugations may be elected by the Contractor but will be considered incidental to blading. Scarification shall not go deep enough to cause contamination of the surfacing.

When Section 891 is included in the Road Listing, the Contractor shall apply water during blading when sufficient moisture is not present to prevent segregation. Water supply, hauling, and application shall be in accordance with Section 891 and shall be incidental to blading unless Pay Items for Section 891 are included in the Schedule of Items.

Existing native, rock or aggregate surfaced drainage dips shall be cleaned and shaped incidental to blading to divert surface runoff to existing outlet devices, ditches and discharge locations.

The Contractor shall establish a blading pattern which provides a uniform driving surface, retains the surfacing on the roadbed and provides a thorough mixing of the materials within the completed surface width.

b. Drainage Facilities

Cleaning existing drainage facilities includes roadside drainage ditches, drainage dips, inlet and outlet ditches, overside drains and flumes, inverts and interiors of culverts, culvert catch basins, drop inlets, trash racks, and sediment basins. Slash and debris shall be disposed of as in 839e. Sediment basin clean out shall be disposed for the unit price as shown in the Schedule of Items for Section 832.

Drainage structures not included under this specification are bridges, cattle guards, and culverts over 72 inches in diameter.

c. Ditches, Lead Off and Roadside

Wood, rock, trees, brush and other debris shall be removed from ditches to provide unobstructed flow of water. Slash and debris (woody or organic) shall be scattered in such a manner as not to impede the flow of water. The backslope of ditches shall not be undercut by cleaning operations. Existing ditch blocks shall be restored, reshaped, and compacted as needed for effective drainage through culverts. Catch basins shall be cleaned of material above the invert of the culvert.

d. Dips (Also called intercepting dips or rolling dips)

Existing drainage dips shall be cleaned and the outslope gradient sufficiently restored to remove surface water from roadbed, conducting the water through drainage facilities.

e. Culverts

Inlet and outlet ends, as well as four feet inside each end, of existing culvert, shall be cleaned to provide unobstructed flow of water. Natural drain culvert channels shall be cleared of all down trees, limbs, stumps, brush, rocks and other debris, that restricts the flow of water, 6 feet in width for 15 linear feet at each end. Slash and debris (woody or organic) shall be scattered in such a manner as not to impede the flow of water. The channel shall be shaped to natural streambed with constant grade at inlet and outlet ends.

f. Overside Drains and Flumes

Overside drains shall be cleaned of debris to provide an unobstructed flow of water. Debris (woody or organic) shall be scattered in such a manner as not to impede the flow of water.

g. Designed Earth Berms

Berm breaches of less than 5 cubic yards shall be filled, shaped, and compacted by wheel rolling. Fill material shall be located within 500 feet of breach or by ripping to the depth and width necessary to obliterate such defects; providing a smooth transition to adjacent satisfactory roadbed. Filling with loose material will not be acceptable.

h. Settlements

Settlements 12 inches or less in depth shall be scarified and then repaired by cutting from the roadbed on each end of the settled area, filling and wheel rolling the material into the settled area providing a smooth transition to adjacent satisfactory roadbed.

i. Washouts

Washouts in roadway of less than five cubic yards shall be filled and compacted by wheel rolling. Fill material shall be located within 500 feet of washout or as directed by the Contracting Officer.

3. METHOD OF MEASUREMENT

Measurement for maintenance will be “by the mile”, measured by slope distance along the centerline of the roadway. Measurement will be to the nearest one-tenth mile. No separate measurement will be made for any of the elements of work described in the foregoing

4. PAYMENT

a. Payment will be made for all units inspected and accepted at the unit price shown on the schedule of items.

b. Payments will be made under:

Pay Item	Description	Pay Unit
839 (1)	Restore Drainage Function, Without Water	Mile
839(2)	Restore Drainage Function, With Water	Mile

840 CORRUGATED METAL SPILLWAYS AND FLUME (10/16)

1. DESCRIPTION

This work consists of cleaning, reconditioning, and re-installing, or the replacement of existing corrugated metal spillway inlet assemblies, flume, and other appurtenances associated with the installation requirements.

2. MATERIALS

a. Materials shall be furnished by the contractor, unless otherwise indicated. Spillway inlet assemblies, flume, and connectors shall be of the type and thickness specified by the Task Order or shown in supplemental drawings, and shall be constructed of galvanized corrugated sheet metal meeting the requirements indicated on the drawings.

b. Anchors shall be as shown in the Task Order.

3. MAINTENANCE REQUIREMENTS

a. Re-installation of existing overside drains:

1) Re-install inlet and starter section to the grade and flow line established by the drainage dip.

2) Adjacent earth berms shall be filled shaped, and compacted to provide a continuous drainage channel to the inlet structure.

3) Structures not approved for reuse shall be removed from Government land at the Contractor's expense.

4) Prior to re-installing flume, ensure that voids have been filled and the embankment compacted to provide a smooth, continuous grade from the inlet to the outlet of drainage structure.

b. Replacement of existing overside drains:

1) Remove existing structure and backfill and compact any wash-outs beneath the inlet and starter.

2) Re-establish the embankment for flume replacement by backfilling wash-outs and voids, and compacting to provide a smooth, continuous grade from the inlet to the outlet of the drainage structure.

3) Install new drainage structure as specified by the Task Order.

4) Re-establish earth berm. Shape and compact to provide a continuous drainage channel to the inlet of the drainage structure.

4. MEASUREMENT

a. Measurement of inlet and starter assemblies will be for each unit specified and installed as a whole. Costs included are for materials, labor for fabrication and installation, and delivery.

b. Measurement will be made for each lineal foot of flume specified and installed. Measurement for anchors shall be considered incidental to flume installation.

c. Cost for disposal of removed inlets, starters, flumes, and appurtenances shall be considered incidental to the work in this specification.

5. PAYMENT

a. Accepted quantities will be paid for at the contract unit prices shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
840 (1)	Clean Inlet and Starter	Each
840 (2)	Reinstall Inlet and Starter	Each
840 (3)	Replace Inlet and Starter ___ (12, 18, 24, or 36) Inches	Each
840 (4)	Clean Flume	Each
840 (5)	Reinstall Flume	Linear Foot
840 (6)	Replace Flume, ____ (12, 18, 24, or 36) Inches	Linear Foot
840 (7)	Replace Flume, ___” by ___ ft. Long	Each

841 VEGETATION ESTABLISHMENT (10/16)

1. DESCRIPTION

This work consists of applying seed, fertilizer, mulch and plantings singularly or in specified combinations to roadways and disposal areas. Work area may be limited to designated portions of the roadway and roadside or include treatment of the entire area bounded by the outer limits of the roadsides.

2. MATERIALS AND APPLICATION RATES

The Contractor shall provide the following listed materials:

a. Fertilizer: Fertilizer shall be a standard commercial grade and provide the minimum percentage of available nutrients designated.

% Nitrogen	% Phosphorus	% Potassium	% Sulfur

Fertilizer shall be furnished in sealed containers with the composition, weight, and guaranteed analysis of contents clearly marked. Application shall be at the rate of pounds per acre.

b. Seed: Grass, forb, or small shrub seeds shall be packaged separately from fertilizer and contain the designated types of seed for application at the designated rates. When legumes are designated, the seed shall be properly inoculated immediately prior to application.

Seed Type	Lbs./Acre

Seed shall be furnished separately or in mixture with other designated seed types in standard sealed containers with certification of (1) seed name, (2) lot number, (3) net weight, (4) percentages of purity and germination, and (5) maximum percentage of weed seed content clearly marked on each seed type.

c. Mulch: Mulch materials and application rate shall be as shown below:

Mulch Type	Application Rate

d. Timing: Materials shall be applied as scheduled below:

Road No. (Location)	Date	Road No. (Location)	Date

3. **MAINTENANCE REQUIREMENTS**

a. Schedule

1) The designated treatment shall be scheduled to start upon completion of other work under other Sections scheduled under this contract.

2) The treatment shall not be applied when the ground is frozen or excessively wet. Application shall be terminated during periods when there is too much wind to allow consistent treatment rates and control of the treatment area to the designated limits

b. Roadside and Slope Treatment

1) Roadsides will not require advance preparation unless established in Special Project Specifications or Drawings.

2) The designated treatment shall be applied by hand or machine. When both roadbed (under 3c(1)) and slopes are listed for treatment, application may be done at the same time.

3) The Contractor will not be required to operate self-propelled equipment beyond the defined roadbed. Treatment materials shall not be applied to the fore slope of ditches unless roadbed treatment (under 3c(1)) is also required.

c. Roadbed Treatment

1) Portions of the roadbed not previously disturbed and left loose under Section 835 shall be scarified to a minimum depth of four (4) inches unless bedrock is encountered at a lesser depth. The maximum distance between furrows formed by scarification shall be twelve (12) inches.

2) Barrier mounds placed under Section 835 shall be treated while in a roughened condition.

d. Mulching

Required mulch materials shall be applied in accordance with 2c.

e. Plantings

Required plantings shall be in accordance with Special Project Specification 841-1.

4. MEASUREMENT

a. Measurement will be by the acre for seeding, fertilizing and/or mulching of roadside, slopes and roadbeds. Roadbed areas will be computed based on centerline length without deduction for structures removed under Section 835 nor additional slope distances resulting from removal of structures.

b. Measurement for plantings will be the actual count of plants ordered and acceptably placed.

5. PAYMENT

a. The accepted quantities will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
841 (1)	Treating Roadside and Slopes	Acres
841 (2)	Treating Roadbed	Acres
841 (3)	Plantings	Each

SPECIAL PROJECT SPECIFICATION (10/16)
841-1 VEGETATION ESTABLISHMENT

Additional requirements applicable to roads listed for planting work under Section 841 are hereby established:

1. DESCRIPTION

Vegetation establishment shall consist of planting containerized or bare root plant stock.

2. PLANTINGS (SPACING)

a. The designated woody plant materials shall be planted at the staked locations or designated spacings.

b. Containerized plant stock shall be placed in an appropriately sized hole formed by a dibble or other device to place the roots at the proper depth.

c. Bare root plant stock shall be placed in a slotted cut formed by a mattocks, pulaski or other edged tool. The crown of the stem shall be placed at ground level and the roots shall not be bent or broken.

d. The area adjacent to the hole shall be compressed by foot or special tool to form a depression up and down slope from the stem and force the soil against the container or roots with no air voids.

e. The plantings shall be held firmly by the soil. When checked by pulling upward on the top one-half (1/2) inch of the plant stem, the planting shall either break at the hold point or the area compressed against the roots show evidence of movement. Plantings that are not held firmly by the soil shall be removed and replaced with fresh stock.

3. PLANT STOCK

a. The Contractor shall furnish the following listed plant materials:

b. Government will provide the following listed materials provided at least ten (10) days notice is available:

Materials will be provided at:

Item No.	Species	Size	Bare Root	Containerized

4. **TIMING**

Plantings shall be placed as scheduled below:

Road No. (Location)	Item No.	Date	Road No. (Location)	Item No.	Date

842 CUTTING ROADWAY VEGETATION (10/16)

1. DESCRIPTION

This work consists of cutting all vegetative growth including trees and other vegetation less than four (4) inches in diameter.

2. MAINTENANCE REQUIREMENTS

a. General

1) Brush, trees, and other vegetation less than four (4) inches in diameter within each area treated shall be cut to a maximum height of six (6) inches above the ground surface or obstruction such as rocks or existing stumps. When work is performed under this Section, the Contractor shall remove all limbs which extend into the treated area or over the roadbed to a height shown in the Special Project Specifications.

2) Signs, markers, and other road appurtenances are designated to be retained. Other items to remain will be marked on the ground.

3) The width of the vegetation to be cut shall be as shown in the Special Project Specifications.

4) Work may be performed either by hand or mechanically unless specifically shown in the Road Listing and Schedule of Items. Self-propelled equipment shall not be allowed on cut and fill slopes or in ditches.

5) Damage to trunks of standing trees caused by Contractor's operation shall be corrected by Contractor, either by treatment with a commercial nursery sealer or by removing the tree as directed by the Government.

6) Mechanical brush cutters shall not be operated when there are non-Contractor personnel or occupied vehicles within a hazardous distance of immediate operating area.

7) Trees within the cutting limits which are over four (4) inches in diameter shall be limbed in lieu of cutting

8) When trees are limbed, limbs shall be cut within four (4) inches of the trunk

b. Cutting Side Vegetation

1) Pass mile work cutting limits shall be established as follows:

a) Fill and daylighted (wide roadbed) section cutting shall commence at the edge of the traveled way and proceed away from the road centerline.

b) Drainage ditched section cutting shall commence at the bottom of the existing ditch and proceed away from the road centerline. Cutting on ditch foreslopes is not required.

c) Unditched cut section cutting shall commence at the intersection of the cutbank and the roadbed and proceed away from centerline.

2) Side mile work will be ordered in uniform width for the length of the listed segments of roads.

3) Unless otherwise included in Special Project Specifications work shall commence at the edge of the traveled way and proceed away from the road centerline. For roads without a defined traveled way the starting point for cutting will be marked in the field or defined in Special Project Specifications.

4) Transitions between differing increments of cutting width shall be provided. Transitions shall be accomplished in a taper length of not less than fifty (50) nor more than seventy (70) feet

c. Requirement Table

The width and height of the vegetation cutting shall be:

Road No.	From Mile	To Mile	Width	Height

d. Debris

1) Materials resulting from the cutting operation in excess of one (1) foot in length or three (3) inches in diameter, shall not be allowed to remain on roadway slopes within the treated area, in ditches, or within water courses.

2) Limbs and chunks in excess of three (3) inches in any dimension shall be removed from the traveled way and shoulders.

3) Materials may be scattered downslope from the roadbed, outside of the work area and drainages. Concentrations shall be rescattered or removed.

3. MEASUREMENT

a. Measurement for cutting vegetation by the pass mile will be determined by the number of four (4) foot passes ordered and accepted. Partial increments ordered to complete the outside edge of backslope or fill slope cutting and transitions will be measured as full

passes. The length of each pass will be determined to the nearest one-tenth (1/10) mile on each road.

b. Measurement for cutting side vegetation by the side mile will be the length of roads or segments ordered and accepted. The length will be determined to the nearest one-tenth (1/10) mile on each side of each road.

c. No reduction in the mileage between road terminal shown on the road listing will be made for areas where there is little or no vegetation to be cut.

4. PAYMENT

a. The accepted quantities will be paid at the unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
842 (1)	Cutting Side Vegetation	Pass Mile
842 (2)	Cutting Side Vegetation	Side Mile

851 LOGGING OUT (10/16)

1. DESCRIPTION

This work consists of ordered removal of fallen trees and snags which encroach into the roadway or the two (2) foot roadside abutting the roadway on the cut side.

2. MAINTENANCE REQUIREMENTS

a. Fallen timber, when marked with paint, shall be limbed and cut into standard log lengths shown in the Special Project Specifications. Resulting logs shall be decked at designated locations.

b. Unmarked materials shall be limbed and may be cut into lengths for handling and shall be decked outside ditches and drainage's, off of the traveled way and turnouts or at staked locations.

c. Unmarked materials and any remaining trunks from marked materials shall be cut at the toe of the fill and two feet above the top of cut slope.

d. All materials remain the property of the Government, unless otherwise stated in the contract.

e. Woody debris and slash in excess of one (1) foot in length or three (3) inches in diameter shall not remain in ditches, drainage channels, or on back slopes, traveled way, shoulders or turnouts. Accumulations of debris may be ordered hauled and paid under Section 832. Materials not ordered hauled shall be scattered down slope from the roadbed, avoiding any drainage ways or concentrations.

3. MEASUREMENT

Measurement will be the number of trees ordered and acceptably logged out under this Section. Diameter size will be measured at the largest cut. Miles will be measured to the nearest tenth of a mile.

4. PAYMENT

a. The quantity accepted will be paid at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
851 (1)	Logging Out Marked Trees Less Than 24 Inches Diameter	Each
851 (2)	Logging Out Marked Trees 24 Inches Diameter and over	Each
851 (3)	Logging Out Unmarked Trees Less Than 24 Inches Diameter	Each
851 (4)	Logging Out Unmarked Trees 24 Inches Diameter and Over	Each
851 (5)	All trees	Mile

854 HAZARD REMOVAL AND CLEANUP (10/16)

1. DESCRIPTION

This work consists of removing and disposing of marked hazards such as danger trees, rocks, and stumps.

2. MAINTENANCE REQUIREMENTS

Removal of trees shall include the felling and subsequent treatment of danger trees designated by the Government.

a. Trees and snags felled away from and at right angles to the road centerline and resting entirely beyond the roadside limits of five (5) feet beyond roadway slopes shall be limbed to provide ground contact over two-thirds (2/3) or more of its length. When the ground contact condition cannot be met, additional bucking will be done to achieve the two-thirds (2/3) contact control. Trees and snags falling cross slope shall be limbed and bucked into manageable lengths, and re-oriented at right angles to the road centerline.

b. Trees or snags falling into the roadway shall be limbed, bucked, and decked off of the roadbed.

c. All materials remain the property of the Government unless otherwise provided in the contract.

d. Woody debris and slash in excess of one (1) foot in length or three (3) inches in diameter shall not remain in ditches, drainage channels, or on back slopes, traveled way, shoulders or turnouts. Large accumulations of materials may be ordered hauled under 832. Materials not ordered hauled shall be hand piled or scattered down slope from the roadbed, avoiding any concentrations or drainage's.

e. Marked rocks and stumps shall be removed.

f. Resulting holes outside the roadbed shall be back filled with native materials and mounded to drain after settlement.

g. Removed rocks and stumps shall be hauled to the disposal site designated in the contract.

3. MEASUREMENT

Measurement will be the number of marked hazards removed. Ordered haul of materials shall be under Section 832.

4. PAYMENT

a. The quantity accepted will be paid at the unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
854 (1)	Removal of Danger Trees	Each
854 (2)	Removal of Rocks & Stumps	Each
854 (3)	Removal of Rocks & Stumps	Mile

861 MAINTENANCE OF CATTLEGUARDS (10/16)

1. DESCRIPTION

This work consists of cleaning and restoring cattleguards and appurtenances.

2. MATERIALS

a. The Government may furnish replacements for damaged or defective cattleguard components which can be replaced incidental to reassembly. Government-furnished materials and location are listed in Special Project Specifications.

b. Barbed or smooth wire, welding materials, tools, fasteners, and other materials shall be incidentally furnished by Contractor.

c. Government will furnish component replacements when specified in the task order.

   a) Components availability shall be coordinated between the Contractor and the Contracting Officer.

   b) Contractor shall be responsible for loading and transport of the furnished components and returning old components to the Government unless documented as missing prior to Contractor's work, or was ordered to be disposed of by the Contracting Officer.

   c) The following

3. MAINTENANCE REQUIREMENTS

a. The cattleguard deck shall be removed prior to cleaning and reinstalled upon completion.

b. Where there is no bypass at a one-lane installation, delay for traffic shall not exceed two (2) hours contingent on at least two (2) week days advance notice to the Government of the planned work.

c. The area beneath the cattleguard deck shall be cleaned of dirt and other materials to the full depth of the foundation over the entire width of the installation. Where there are existing leadoff or drainage ditches, cleaning shall include removing material from the ditch to provide for water flow through the installation.

d. Materials removed from the area beneath the cattleguard deck and any ditches shall be placed down slope from the road within 200 feet of the installation and shaped to drain unless removal and end haul is ordered under Section 832.

e. Roadbed and surfacing materials disturbed by Contractor's operations shall be conserved separately, replaced and compacted by tamping to provide support and surface texture consistent with the abutting traveled way. Upon completion of deck

reinstallation the deck surface shall be flush with or not more than one half (1/2) inch above the adjacent traveled way surface and parallel with the normal road gradient.

f. Loose fasteners on the cattleguard and rigid gate shall be tightened. Ruptured welds shall be rewelded and localized cracks welded.

g. Attached fences and barbed wire gates within the roadway shall be maintained by tightening the wires or resplicing. Wire splices shall have at least one (1) foot of overlap on each wire. Apparent wire sag shall be eliminated between posts. Wire gates shall be able to be opened and closed.

h. The Contractor shall inspect the cattleguard components, fences and gates, and report remaining deficiencies to the Government.

4. MEASUREMENT

Measurement will be the number of cattleguards cleaned.

5. PAYMENT

a. The quantity accepted will be paid at the unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
861(1)	Cleaning One-Lane Cattleguard	Each
861(2)	Cleaning Two-Lane Cattleguard	Each

SPECIAL PROJECT SPECIFICATIONS
861-1 MAINTENANCE OF CATTLEGUARDS (10/16)

2. MATERIALS

Add the following:

c. The Government will provide replacement decks for cattleguards listed for payment under this specification. These decks are available and will be available between the hours of _____ a.m. and _____ p.m. on Monday through Friday, except legal holidays. The decks are located at _____.

d. The Government will provide the Contractor with written authorization for obtaining decks from the storage location. The authorization shall be presented on the agreed date to the Government employee designated on the authorization. Upon obtaining the deck(s) from storage, the Contractor shall assume all responsibility for transportation and protection of materials from damage or theft including return of the old deck(s) to the storage location. Upon return of the old deck to the storage location, the designated Government employee will receipt the original authorization and provide the driver with a copy for the Contractor's record. The Contractor may elect to obtain decks up to the contract amount at one time or, as needed, for daily progress of work, provided the authorization is requested at least two (2) weekdays in advance of the date the deck(s) is to be obtained.

e. The Contractor shall additionally be responsible for loading and unloading operations within the storage location.

4. MEASUREMENT

a. Add the following:

b. Measurement for Pay Items under their Special Project Specification will be the number of cattleguards cleaned having decks replaced with Government supplied replacement decks.

5. PAYMENT

Add the following to Paragraph b:

Pay Item	Description	Pay Unit
861 (3)	Clean and Replace Deck One-Lane Cattleguard	Each
861 (4)	Clean and Replace Deck Two-Lane Cattleguard	Each

862 MAINTENANCE OF TRAFFIC GATES (10/16)

1. DESCRIPTION

This work consists of cleaning and restoring traffic gates and appurtenances.

2. MATERIALS

a. The Government may furnish replacements for damaged or defective gates components which can be replaced. Government-furnished materials and location are listed in Special Project Specifications.

b. Paint, welding materials, tools, fasteners, cleaning materials, and other materials shall be incidentally furnished by Contractor.

3. MAINTENANCE REQUIREMENT

a. Loose fasteners on the rigid gates shall be tightened. Ruptured welds shall be rewelded and localized cracks welded.

b. Each gate must be cleaned and painted with a commercial rust inhibitor paint. Color shall be as shown in the Special Project Specifications.

c. The Contractor shall inspect the gates and report remaining deficiencies to the Government.

d. Government will furnish component replacements as follows:

1) Components will be available Monday through Friday, between the hours of 8:00 a.m. and 4:30 p.m. except on legal holidays. Contractor shall give 48 hours notice before obtaining materials.

2) Contractor shall be responsible for loading and transport of the furnished components and removal and disposal of old components.

4. MEASUREMENT

Measurement will be the number of traffic gates maintained.

5. PAYMENT

a. The quantity accepted will be paid at the unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
862 (1)	Maintenance of Traffic Gates	Each

872 SIGN MAINTENANCE (10/16)

1. DESCRIPTION

This work consists of cleaning, replacing, and reconditioning signs, posts, and markers.

2. MATERIALS

a. Posts, fittings, metal foil backing, reflective sheeting, and direct applied (Type L-3) characters will be furnished by the Government as provided in the Special Project Specifications.

b. Cleaning solutions shall be biodegradable, having no adverse effect on existing sheeting.

c. Government furnished materials will be available upon request. Specific time of availability and loading times shall be coordinated with the Contracting Officer.

3. EQUIPMENT

Use of steam cleaners and high-pressure washers are prohibited.

4. MAINTENANCE REQUIREMENTS

a. Cleaning Sign Faces

Sign faces ordered for cleaning shall be thoroughly cleaned with a solution of water, including cleaning compound, and rinsed to remove dirt and grime.

b. Reconditioning Sign Faces

1) Reconditioning of existing designs and markers includes cleaning, the treatment of holes, and patching of reflective sheeting and legend contained thereon. Not more than eight patches per sign face shall be made.

2) Holes and dents in metal signs shall be pounded out to provide a smooth face when the area involved is thirty six (36) square inches or less. Signs with areas exceeding this shall be left untreated and the Government notified within twenty-four (24) hours. Bent metal signs shall be straightened and patched.

3) Holes in metal or wood signs shall be initially patched with an adhesive backed metal foil over a dry face to provide backing for reflectorized sheeting.

4) All metal foil backing shall be covered with a patch of Class 1 sheeting sized at least one (1) inch larger, but not more than two (2) inches larger than the backing material. The patched area shall be free of air bubbles and be oriented to the pattern, if any, of the reflective sign face.

5) Where patching overlaps the existing legend or there is other damage to the legend, the affected letter/numerals shall be restored to full legibility with Type L-3 direct

applied characters of the color, size, type, and series used on the sign. The applied characters shall be free of air bubbles.

6) Contractor shall check for missing items on signs such as bolts, washers, nuts and lag screws. If such items are missing contractor shall replace them with fittings provided by the Government.

c. Apply New Sign Faces

1) When listed in the Schedule of Items, the Government will furnish 3M Series 9800 Reflective Sheeting or equivalent, mounted on a 0.005-0.010 inch aluminum substrate and bearing the appropriate legend for the installation(s).

2) Bent signs shall be straightened. Holes and dents in metal-backed signs shall be pounded out to provide a smooth face. The existing sign face shall be cleaned, degreased and any loose reflective sheeting removed.

3) The new sign face shall be applied over the prepared surface by peeling the protective backing, orienting the material and pressing it in place with a roller, working from the center to the edges. Mounting bolt holes may be pre-punched or formed after application by cutting or punching with a suitable tool; use of mounting bolts to form the holes will not be considered acceptable

i. Broken or vandalized posts shall be replaced. The usable sign/marker, if recovered, or a Government-furnished replacement shall be mounted in conformance with MUTCD Standards. Where the post is usable but the sign is gone or requires replacement, the Contractor shall install a Government-furnished sign and hardware on the existing post. Existing posts shall be plumbed. Removed signs and posts remain the property of the Government. Sign posts shall be installed plumb with the sign plate firmly fastened to the post. Post holes shall be excavated to minimum depth of 24 inches and back filled by tamping of suitable material in lifts not exceeding 6 inches in depth.

ii. Signs and markers which cannot be maintained in accordance with this Section shall be identified as to their location and legend and such information provided to the Government weekly.

5. MEASUREMENT

The quantity to be measured will be the completed number of units of the various items listed in the Schedule of Items and accepted under this Section.

6. PAYMENT

The accepted quantities will be paid at the contract unit price shown in the Schedule of Items.

Payment will be made under:

Pay Item	Description	Pay Unit
872 (1)	Clean Sign Face	Each
872 (2)	Recondition Sign Face	Each
872 (3)	Replace Single Post and Sign	Each
872 (4)	Replace Double Post and Sign	Each
872 (5)	Remount Sign	Each
872 (6)	Apply New Sign Face	Each

891 WATER SUPPLY AND WATERING (10/16)

1. DESCRIPTION

This work consists of providing facilities to furnish an adequate water supply, hauling and applying water, including times outside normal work hours.

2. MATERIALS

Suitable and adequate water sources and use restrictions are designated in the Drawings or Special Project Specifications. If the Contractor elects to provide water from other than designated sources, the Contractor shall be responsible to obtain the right to use the water including any cost for royalties involved. The rate of applications shall be based on the gallons per mile ordered by the Government.

Suitable and adequate water sources designated available for Contractor's use under this contract as follows:

Map Key No.	Location: Road No.	Location: Milepoint	Use Restriction

3. EQUIPMENT

a. Mobile watering equipment shall have watertight tanks of known capacity. If tank capacity is not known, it shall be measured and certified by the Contractor prior to use.

b. Positive control of water application is required. Equipment shall provide uniform application of water without ponding or washing.

c. An air gap or positive anti-siphon device shall be provided between the water source and the vehicle being loaded if the vehicle has been used for other than water haul if the source is a domestic potable water supply, or the water is used for tank mixing with any other materials.

d. The designated water sources may require some work prior to their use. Such work may include cleaning ponded areas, installing temporary weirs, or sandbags, pipe repair, pump installation or other items appropriate to the Contractor's operations. Flowing

streams may be temporarily sandbagged or a weir placed to pond water. Contractor shall obtain approval on improvements for sandbags or weirs prior to placement.

4. MEASUREMENT

a. Unless specified in the Schedule of Items, development of water supply sources shall be incidental to work ordered. If in the Schedule of Items, measurement for development of water supply sites will be the number of sites ordered and accepted. When the Contractor elects to furnish water from other than the site designated, the elected source will be measured as a water supply site.

b. Unless specified in the Schedule of Items as watering for a specific Section of these specifications, measurement of water haul and application will be incidental. If indicated in the Schedule of Items, measurement shall be M-GALLONS (1,000 gallons) using calibrated tanks, distributors, or accurate water meters furnished by the Contractor. Hauling shall be incidental. In no case will payment be made for more gallons than ordered by the Government.

5. PAYMENT

a. The accepted quantities will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment will be made under:

Pay Item	Description	Pay Unit
891 (1)	Developing Water Supply Sites	Each
891 (2)	Water For Section _____	M-Gallons

892 BITUMINOUS PRODUCTS (10/16)

1. Asphalt Cements

Asphalt cement shall meet the requirements of AASHTO M 20 for penetration graded asphalt cement and to AASHTO M 226 for viscosity graded asphalt cement.

2. Liquid Asphalts

Liquid asphalts shall meet the requirements of the following specifications:

Rapid Curing Liquid Asphalts	AASHTO M 81
Medium Curing Liquid Asphalts	AASHTO M 82
Slow Curing Liquid Asphalts	AASHTO M 141

3. Emulsified Asphalts

Emulsified asphalts shall meet the requirements of the following specification:

Emulsified Asphalt (Anionic)	AASHTO M 140 (ASTM D
Emulsified Asphalt (Cationic)	AASHTO M 208* (ASTM D 2397)

4. Bituminous Dust

Bituminous dust palliatives shall meet the requirements listed in Table 892.06

5. Certificate of Compliance

a. In accordance with the requirements of Contract, the following format is established.

Consignee _____ Designation _____

Contract Number _____ Date _____

Identification (Truck No., Car No., Etc.) _____

Type and Grade _____ With Additive (%, brand) _____

Loading Temperature _____ Net Weight _____

Net Gallons _____

b. The shipment of bituminous material identified above and covered by the bill of lading complies with Government Standard Specification as modified by Special Project Specifications applicable to this project.

Producer _____ Signed _____

(Producer's Representative)

6. Application Temperatures

Bituminous materials shall be applied within the temperature ranges indicated in Table 892.06.

TABLE 892.06 - Application Temperatures

Application Temperature Range # (Degrees F)		
Type & Grade of Material	**Spray Min./Max**	**Mix Min./Max.**
RT 1-2-3	60-130	60-130
RT 4-5-6	85-150	85-150
RT 7-8-9	150-225	50-225
RT 10-11-12	175-250	175-250
RTCB 10-11-12	60-120	60-120
RC-MC-SC 70	105-185	90-155
RC-MC-SC 250	140-225	125-200
RC-MC-SC 800	175-265	160-225
RC-MC-SC 3000	215-290	200-260
DO-1-2-3	80-125	
DO-4	80-175	
Emulsified Asphalts:		
RS-1, SS1, SS-1H, & CRS-1, CSS-1, CSS-1H	75-130	70-160
RS-2, MS-2, CR-2, & CMS-2S, CMS-2	110-160	70-160
DO-6-7-8	50-140	
Asphalt Cement (All Grades)	400 Max.	250-325
As required to achieve viscosity of 75-150 seconds. Saybolt-Furol or as required to achieve a Kinematic viscosity of 150-300 centistrokes.		

7. Equipment

The Contractor shall provide equipment for heating and applying the bituminous material. The bituminous distributor shall be self-powered and mounted on pneumatic tires. It shall be equipped with a pump and a circulating spray bar. The unit shall include a tachometer, pressure gauges, accurate volume measuring devices such as a visual volume dial or gauge calibrated to the tank, and a tank thermometer. All equipment shall be standard, commercial types, of proven performance.

8. Weather Limitations

Bituminous dust palliative treatment shall be applied only when the surface to be treated contains sufficient moisture to get uniform dispersion of the dust palliative when the road surface and atmospheric temperature are 50 degrees F or more and rising, or above 60 degrees F if falling; and when the weather is not foggy, rainy, or stormy.

893 AGGREGATE (10/16)

1. Gradations

a. Gradations for aggregates are included in Special Project Specifications for contracts where the aggregates are not provided by the Government.

b. The inclusion of aggregate gradations does not constitute a warranty by the Government that commercial sources in the area are producing the gradation indicated. Aggregates commercially produced to meet State or County gradations and specifications for similar materials will be considered an equal alternate to the gradation in the contract provided the following quality requirements are met. Contractor shall provide testing and certification of supplied materials.

2. Aggregate for Bituminous Plant-Mix

a. Coarse Aggregate - Coarse aggregate (retained on the No. 8 sieve) shall be crushed stone or crushed or natural gravel and shall conform to the quality requirements of AASHTO M 63. Gradation shall conform to the provisions of the Special Project Specifications.

b. Fine Aggregate - Fine aggregate (passing the No. 8 sieve) shall be manufactured and conform to the quality requirements of AASHTO M 29 (ASTM D 1073). It shall be of such a gradation that when combined with the other required aggregate fractions in the proper proportion, the resultant mixture will meet the gradation required.

3. Aggregate for Bituminous Road Mix

a. Aggregates for bituminous road mix shall be crushed stone, or crushed or natural gravel which meets the quality requirements of AASHTO M 62 or M 63 for the specified gradation, except the sodium sulfate soundness loss shall not exceed 9 percent. The swell test will not be required.

b. Gradation shall be as shown in the Special Project Specifications. When crushed gravel is used, not less than 50 percent by weight of the particles retained on the No. 4 sieve shall have at least one fractured face.

4. Aggregate for Spot Surfacing

a. Aggregates for spot surfacing shall be crushed stone, crushed slag, or crushed or natural gravel which conforms to the quality requirements of AASHTO M 147, or as specified in the Special Project Specifications, except as noted below: The requirements of M 147 shall apply, except that the liquid limit shall not exceed 35 and the plasticity index shall be not be less than 4 nor more than 9.

b. Aggregate gradation shall conform to the provisions of the Special Project Specifications and AASHTO M 147.

c. When crushed gravel is used, not less than 50 percent by weight of the particles retained on the No. 4 sieve shall have at least one fractured face.

d. Gradations of each designated size of aggregates shall be obtained by crushing, screening, and blending processes as may be necessary.

e. Materials otherwise meeting the requirements of this subsection will be acceptable whenever the gradations of such materials are within the tolerances corresponding to the selected sieve sizes required by the Special Project Specifications and whenever such materials produce a compacted course meeting density requirements as specified in Specification Section 811(2)(e).

5. Aggregate for Bituminous Concrete - General

a. Coarse Aggregate

1) Coarse aggregate (retained on the No. 8 sieve) shall be crushed stone, crushed slag, or crushed or natural gravel, and unless otherwise stipulated, shall conform to the quality requirements of AASHTO M 79.

2) Lightweight aggregate, if required or permitted by the Special Project Specifications, shall meet the requirements of AASHTO M 195.

3) When crushed gravel is used, it shall also meet the requirements of Section 2.1 of AASHTO M 62 and not less than 50 percent by weight of the particles retained on the No. 4 sieve shall have at least one fractured face. The coarse aggregate shall be of such gradation that when combined with other required aggregate fractions in proper proportion, the resultant mixture shall meet the gradation required under the composition of mixture for the specific type under contract.

b. Fine Aggregate

1) Fine aggregate (passing the No. 8 sieve) shall consist of natural sand, stone screenings, or slag screenings, or a combination thereof, and unless otherwise stipulated shall conform to the quality requirements of AASHTO M 29 (ASTM D 1073). Fine aggregate shall be of such gradation that when combined with other required aggregate fractions in proper proportion, the resultant mixture shall meet the gradation required under the composition of mixture for the specific type under contract.

c. Lightweight aggregate If required or permitted by the Special Project Specifications, shall meet the requirements of AASHTO M 195.

6. Aggregate for Bituminous Hot Plant-Mix

a. The provisions of 5(a) and 5(b) herein shall apply.

b. The several aggregate fractions for the mixture shall be sized, and blended to meet one of the grading requirements of the Special Project Specifications as specified on the drawings.

7. Aggregate for Cold Plant-Mix Bituminous Pavement

The provisions of 5(a) and 5(b) herein shall apply.

a. Aggregate for Pavement - The several aggregate fractions for the mixture shall be sized, graded, and combined in such proportions that the resulting composite blend meets one of the grading requirements of the Special Project Specifications as specified on the drawings.

b. Aggregate for Top Dressing

   1) The material for the top dressing shall consist of dry sand, stone screenings, or slag screenings meeting the grading requirements of the Special Project Specifications as specified on the drawings.

   2) Lightweight aggregate, if required or permitted by the Special Project Specifications, shall meet the pertinent requirements of AASHTO M 195.

8. Aggregate for Road Mix Bituminous Pavement

a. Aggregates for road mix bituminous pavement construction shall be crushed stone, crushed slag, or crushed or natural gravel which meet the quality requirements of AASHTO M 62 or M 63 for the specified gradation, except that the sodium sulfate soundness loss shall not exceed 12 percent.

b. When crushed gravel is used, at least 50 percent by weight of the particles retained on the No. 4 sieve shall have at least one fractured face. Gradation shall conform to the grading requirements of the Special Project Specifications as specified on the drawings.

c. Lightweight aggregate, if required or permitted by the Special Project Specifications, shall meet the pertinent requirements of AASHTO M 195.

9. Aggregate for Cover Coats, Surface Treatments, and Bituminous Preservative Treatment

a. Aggregates shall meet the quality requirements of AASHTO M 78.

b. When tested in accordance with AASHTO T 182 (ASTM D 1664), aggregate shall have a retained bituminous film above 95 percent.

c. Aggregates which do not meet this requirement may be used for bituminous surface treatments and seal coats provided an approved chemical additive or wetting agent is used to provide a water resistant film.

d. Lightweight aggregate if required or permitted by the Special Project Specifications, shall meet the pertinent requirements of AASHTO M 195.

e. When crushed gravel is used, not less than 50 percent by weight of the particles retained on the No. 4 sieve shall have at least one fractured face. Aggregates shall meet one of the grading requirements of the Special Project Specifications.

SPECIAL PROJECT SPECIFICATION
893-1 AGGREGATE (10-16)

4. AGGREGATE FOR SPOT SURFACING

Add the following to paragraph b.:

Crushed Aggregate for Base Course: Crushed aggregate for base course shall be crushed stone, slag or gravel, and shall be free of organic matter and other deleterious substances.

Crushed aggregate for base course shall meet the following quality requirements:

Resistance (R-Value), AASHTO T 190 . . .	78 Minimum
Sand Equivalent, AASHTO T 176	25 Minimum
Durability Index, Coarse and Fine, AASHTO T 210	35 Minimum

Crushed aggregate for base course shall meet the requirements of Table 893-1 below, for the grading shown in the SCHEDULE OF ITEMS.

Crushed aggregate grading requirements for base course:

Table 893-1 Percent Passing (AASHTO T-11 and T-22)

Sieve	1 ½" Max	¾" Max
2-inch	100	-
1 1/2-inch	90-100	-
1-inch	-	100
3/4-inch	50-85	90-100
No. 4	25-45	35-60
No. 30	10-25	10-30
No.200	2-9	2-9

5. AGGREGATE FOR BITUMINOUS CONCRETE – GENERAL

Add paragraph c.:

c. AGGREGATE FOR DENSE-GRADED HOT BITUMINOUS PAVEMENT. All aggregate shall be clean and free from decomposed material, organic material and other deleterious substances. The aggregate shall meet the following requirements.

1) Coarse Aggregate. Coarse aggregate shall consist of crushed stone or crushed gravel retained on the No. 4 sieve. At least 25 percent by weight shall be crushed particles having more than one fractured face, and at least 50 percent by weight shall have at least one fractured face.

2) Fine Aggregate. Fine aggregate shall consist of material passing the No. 4 sieve. At least 20 percent by weight of the particles passing the No. 4 sieve and retained on the No. 8 sieve shall be crushed particles having at least one fractured face. The remainder may consist of natural fine aggregate.

3) Combined Aggregate. The combined aggregate shall not have a percent wear greater than 50 when tested in accordance with AASHTO I 96, and shall not have a sand equivalent of less than 45 when tested in accordance with AASHTO T 176, When there is a difference of 0.20 or more between the bulk specific gravity (AASHTO T 85) of the coarse aggregate and the apparent specific gravity (AASHTO T 84) of the fine aggregate, the blend of aggregates shall be modified by California Test No. 105. The combined aggregate gradation shall meet the requirements of Table 893-2 below for the grading shown in the SCHEDULE OF ITEMS.

Table 893-2--Crushed aggregate grading requirements for dense graded (DG) hot bituminous pavement.

Percent Passing (AASHTO T-11 and T-27)

Sieve	Grading DG-1 (3/4in.Maximum)	Grading DG-2 (1/2in.Maximum)	Grading DG-3 (3/8in. Maximum)	Grading DG-4 (No.4 Maximum)
1-inch	100	-	-	-
3/4-inch	95-100	100	-	-
1/2-inch	-	95-100	100	-
3/8-inch	65-80	80-95	95-100	100
No. 4	44-59	54-71	67-83	95-100
No. 8	31-45	38-54	52-69	66-83
No. 30	13-26	17-32	23-40	30-50
No. 200	3-8	3-8	3-10	3-12

LIST OF ELIGIBLE PAY ITEMS

Pay Item	Description	Pay Unit
803 (1)	Snow Removal	Single-Lane Mile
805 (1)	Mobilization	Mile
805 (2)	Mobilization	Each
805 (3)	Mobilization	Lump Sum
807 (1)	Excavator with Operator, in one or more of the following classes:	
	121-160 FWHP	Hour
	161-200 FWHP	Hour
	201-280 FWHP	Hour
807 (2)	Backhoe with Operator	Hour
807 (3)	Grader with Operator	Hour
807 (4)	Crawler Tractor (Dozer) with Operator, in one or more of the following classes:	
	80-120 FWHP	Hour
	121-180 FWHP	Hour
	181-269 FWHP	Hour
807 (5)	Dump Truck with Operator	Hour
807 (6)	Brush Cutter with Operator	Hour
807 (7)	Roller with Operator	Hour

807 (8)	Trailer	Hour
807 (9)	Laborer	Hour
811 (1)	Blading Surfaced Roads	Single-Lane Mile
811 (2)	Blading Native and Pit Run Roads	Single-Lane Mile
811 (3)	Smooth Blading	Single-Lane Mile
811 (4)	Berm Maintained	Linear Foot
811 (5)	Establishing Berms	Linear Foot
812 (1)	Dust Abatement – Lignin Sulfonate Solids	Ton
812 (2)	Dust Abatement – Magnesium Chloride	Ton
813 (1)	Spot Surfacing, Grading__, Commercial Source	Ton
813 (2)	Spot Surfacing, Grading__, Commercial Source	Cubic Yard
813 (3)	Spot Surfacing, Grading__, Commercial Source	Square Yard
813 (4)	Spot Surfacing, Grading__, Government Source	Ton
813 (5)	Spot Surfacing, Grading__, Government Source	Cubic Yard
813 (6)	Spot Surfacing, Grading__, Government Source	Square Yard
814 (1)	Pothole Patching	Ton
814 (2)	Emulsified Asphalt	Gallon
815 (1)	Paved Surface Cleaning	Pass Mile
815 (2)	Paved Surface Cleaning	Single-lane Mile
815 (3)	Bridge Deck Cleaning	Each
816 (1)	Unpaved Shoulder Maintenance	Side Mile

818 (1)	Crack Cleaning and Sealing	Linear Foot
818 (2)	Crack Cleaning and Sealing, Hot Lance Cleaning Only	Linear Foot
818 (3)	Crack Filling Material, Commercial Source	Pound
831 (1)	Clean and Reshape Drainage Ditch	Ditch Mile
831 (2)	Clean and Reshape Lead off Ditch	Each
832 (1)	Remove	Cubic Yard
832 (2)	Haul	Yard Mile
832 (3)	Disposal, Placement Method 1	Cubic Yard
832 (4)	Disposal, Placement Method 2	Cubic Yard
834 (1)	Clean Culverts 24” Diameter and Under	Each
834 (2)	Clean Culverts 24” through 48” Diameter	Each
834 (3)	Clean Culverts Over 48” Diameter	Each
835 (1)	Roadway Drainage Maintenance	Miles
836 (1)	Removal of 24” or Less Diameter Culvert	Each
836 (2)	Removal of Culvert Greater than 24” Diameter	Each
836 (3)	Removal of Wooden Open Top Water Diverters	Each
836 (4)	Removal of Metal Open Top Water Diverters	Each
836 (5)	Removal of Rubber Water Diverters	Each
836 (6)	Seeding, Dry Method (without mulch)	Acre
836 (7)	Fertilizer	Acre
836 (8)	Scarification	Scarification Pass Mile

836 (9)	Ripping with Wing Rippers	Ripping Pass Mile
836 (10)	Outsloping Roadbed	Mile
836 (11)	Earth Barricade	Each
836 (12)	Slashing	Mile
836 (13)	Camouflaging Road Junction	Each
836 (14)	Haul	Mile
836 (15)	Transplanting Native Trees	Each
836 (16)	Construct Waterbar	Each
837 (1)	Clean and Shape Drainage Dip, Native Surface	Each
837 (2)	Clean Drainage Dip, Aggregate Surface	Each
837 (3)	Reshape Drainage Dip, Aggregate	Each
837 (4)	Clean Bituminous Drainage Dips	Each
838 (1)	Maintenance for Limited Use	Mile
839(1)	Restore Drainage Function, Without Water	Mile
839(2)	Restore Drainage Function, With Water	Mile
840 (1)	Clean Inlet and Starter	Each
840 (2)	Reinstall Inlet and Starter	Each
840 (3)	Replace Inlet and Starter ___ (12, 18, 24, or 36) Inches	Each
840 (4)	Clean Flume	Each
840 (5)	Reinstall Flume	Linear Foot
840 (6)	Replace Flume, ____ (12, 18, 24, 36) Inches	Linear Foot

840 (7)	Replace Flume __” by __Ft. Long	Each
841 (1)	Treating Roadside and Slopes	Acres
841 (2)	Treating Roadbed	Acres
841 (3)	Plantings	Each
842 (1)	Cutting Side Vegetation	Pass Mile
842 (2)	Cutting Side Vegetation	Side Mile
851 (1)	Logging Out Marked Trees Less Than 24” Diameter	Each
851 (2)	Logging Out Marked Trees 24” Diameter and Over	Each
851 (3)	Logging Out Unmarked Trees Less Than 24” Diameter	Each
851 (4)	Logging Out Unmarked Trees 24” Diameter and Over	Each
851 (5)	All Trees	Mile
854 (1)	Removal of Danger Trees	Each
854 (2)	Removal of Rocks & Stumps	Each
854 (3)	Removal of Rocks & Stumps	Mile
861 (1)	Cleaning One-Lane Cattleguard	Each
861 (2)	Cleaning Two-Lane Cattleguard	Each
861 (3)	Clean and Replace Deck One-Lane Cattleguard	Each
861 (4)	Clean and Replace Deck Two-Lane Cattleguard	Each
862 (1)	Maintenance of Traffic Gates	Each
872 (1)	Clean Sign Face	Each
872 (2)	Recondition Sign Face	Each

872 (3)	Replace Single Post and Sign	Each
872 (4)	Replace Double Post and Sign	Each
872 (5)	Remount Sign	Each
872 (6)	Apply New Sign Face	Each
891 (1)	Developing Water Supply Sites	Each
891 (2)	Water for Section _____	M-Galons