Bumblebee Revised Stewardship IRSC
(Marble Mountain Area)

APPENDIX C

C5.31# -- ROAD MAINTENANCE REQUIREMENTS (9/04) Contractor shall maintain roads in accordance with the following Contract Road Maintenance Requirements Summary:

Road	Termini		Miles	Applicable **PRE-HAUL** Road Maintenance Specifications							
	From	To		T801	T802	T805	T806	T808	T810	T811	T812
2N05Y	TBD	TBD	TBD								
2N05YA	TBD	TBD	TBD				C				
2N06	TBD	TBD	TBD	C		C					
2N07	TBD	TBD	TBD	C	C	C				C	
2N07C	TBD	TBD	TBD			C	C				
2N14Y	TBD	TBD	TBD	C	C	C					
2N14YA	TBD	TBD	TBD	C	C	C					
2N17	TBD	TBD	TBD	C	C	C					
2N50	TBD	TBD	TBD				C				
2N55	TBD	TBD	TBD	C	C	C				C	
2N91	TBD	TBD	TBD			C					
2N98Y	TBD	TBD	TBD		C	C					
3N01	TBD	TBD	TBD						C	C	C
3N07	TBD	TBD	TBD		C	C		C	C	C	C
3N07C	TBD	TBD	TBD								
3N08	TBD	TBD	TBD		C	C	C				
3N40Y	TBD	TBD	TBD	C	C	C					
3N42Y	TBD	TBD	TBD			C					
3N42YA	TBD	TBD	TBD			C					
3N42YB	TBD	TBD	TBD			C					
3N79	TBD	TBD	TBD								
3N86	TBD	TBD	TBD	C	C	C					

C = Contractor Performance Item
TBD = To Be Determined after the completion of layout in the Marble Mountain Area

Road	Termini		Miles	Applicable **DURING-**Haul Road Maintenance Specifications			
	From	To		T803	T806	T809	T810
2N05Y	TBD	TBD	TBD		C	C	
2N05YA	TBD	TBD	TBD			C	
2N06	TBD	TBD	TBD			C	
2N07	TBD	TBD	TBD			C	
2N07C	TBD	TBD	TBD			C	
2N14Y	TBD	TBD	TBD			C	
2N14YA	TBD	TBD	TBD			C	
2N17	TBD	TBD	TBD			C	
2N50	TBD	TBD	TBD			C	
2N55	TBD	TBD	TBD			C	
2N91	TBD	TBD	TBD			C	
2N98Y	TBD	TBD	TBD			C	
3N01	TBD	TBD	TBD	C			
3N07	TBD	TBD	TBD			C	
3N07C	TBD	TBD	TBD			C	
3N08	TBD	TBD	TBD			C	
3N40Y	TBD	TBD	TBD			C	
3N42Y	TBD	TBD	TBD			C	
3N42YA	TBD	TBD	TBD			C	
3N42YB	TBD	TBD	TBD			C	
3N79	TBD	TBD	TBD			C	
3N86	TBD	TBD	TBD			C	

Road	Termini		Miles	Applicable **Post-**Haul Road Maintenance Specifications						
	From	To		T805	T807 Asphalt	T808	T810	T811	T812	T814
2N05Y	TBD	TBD	TBD	C						
2N05YA	TBD	TBD	TBD	C						
2N06	TBD	TBD	TBD	C						
2N07	TBD	TBD	TBD	C						
2N07C	TBD	TBD	TBD	C						
2N14Y	TBD	TBD	TBD	C						
2N14YA	TBD	TBD	TBD	C						
2N17	TBD	TBD	TBD	C						
2N50	TBD	TBD	TBD	C						
2N55	TBD	TBD	TBD	C						
2N91	TBD	TBD	TBD	C						
2N98Y	TBD	TBD	TBD	C						
3N01	TBD	TBD	TBD		C	C	C	C	C	
3N07	TBD	TBD	TBD	C		C	C	C	C	
3N07C	TBD	TBD	TBD	C						
3N08	TBD	TBD	TBD	C				C		
3N40Y	TBD	TBD	TBD	C				C		C
3N42Y	TBD	TBD	TBD	C						
3N42YA	TBD	TBD	TBD	C						
3N42YB	TBD	TBD	TBD	C						

3N79	TBD	TBD	TBD	C						
3N86	TBD	TBD	TBD	C						

Road Maintenance T-Specifications for Stewardship Contracts

Spec #	Title
T-801	Vegetation Removal–Roadway
T-802	Vegetation Removal–Roadside
T-803	Pavement Cleaning
T-804	Bridge Deck and Curb Cleaning
T-805	Road Grading
T-806	Slide Removal and Slump Repair
T-807	Surface Repair (Bituminous)
T-808	Surface Repair (Aggregate & Native)
T-809	Dust Abatement
T-810	Ditch Maintenance
T-811	Drainage Structures
T-812	Miscellaneous Structures
T-813	Waterbar
T-814	Closure Devices

Definitions

Wherever the road maintenance specifications use the following terms (figure 1), the user shall interpret the intent and meaning as follows:

Base course. Material used to reinforce subgrade or, as shown on drawings, placed on subgrade to distribute wheel loads. Base course usually consists of aggregate (treated or untreated). It serves as the immediate support for the surface course and may be built directly on subgrade if no subbase is called for. The requirements for building on subgrade are more stringent than for building with a subbase.

Berm. A curb or dike constructed to prevent uncontrolled roadway runoff water from discharging onto fillslope.

Bituminous. Of or containing bitumen.

Borrow. Material taken from designated borrow sites.

Crown, inslope, and outslope. The cross slope of the roadway, which aids in drainage and traffic maneuverability.

Culvert. A conduit or passageway under a road or trail.

Drainage dip. A dip in the roadway that intercepts and diverts surface water runoff. A drainage dip does not block the movement of traffic.

Drainage structure. A manufactured structure that controls the runoff of water from the roadway, including (but not limited to) overside drains, aprons, flumes, down drains, downpipes, and culverts.

Lead-off ditch. A ditch used to transmit water from a drainage structure or drainage dip outlet to the natural drainage area.

Maintenance activity. Items of work leading to the upkeep of a road within the right of way and necessary to sustain the road's anticipated traffic.

Maintenance specifications. Specifications that detail conditions and requirements peculiar to the individual project in addition to requirements identified in the national specifications.

Roadbed. The portion of a road between the intersection of subgrade and side slopes, excluding that portion of the ditch below subgrade. Roadbed consists of suitable native soil. It supports the base course and surface course.

Roadside. A term denoting the area adjoining the outer edge of the roadway.

Roadway. A term denoting the area consisting of the traveled way and shoulders.

Shoulder. That portion of roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and lateral support of base and surface course, if any.

Slide. A concentrated deposit of soil, rock, and other debris from the cut slope, often extending onto the roadway, whether caused by mass land movement or accumulated raveling.

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.

Subbase. Consists of either compacted granular material (treated or untreated) or a compacted layer of treated soil. It may help protect the base course and surface course from intrusion of fine-grained roadbed soils, damage from frost, and accumulation of water in or below the pavement structure. The pavement structure consists of the subbase, base course, and surface coarse.

Subgrade. Top surface of roadbed upon which subbase, base course, or surface course is constructed. For roads without subbase, base course, or surface course, that portion of roadbed prepared as the finished

roadway. **Subgrade** consists of suitable native soil (treated or untreated). It serves as the top of the roadbed where the subbase or base course is constructed.

Surface course. The material placed on the base course or subgrade to enhance traction, distribute concentrated wheel loads and resist abrasion and the effects of climate. Surface course may be referred to as surfacing. **Surface course** consists of an aggregate mixture that may include a binder (plastic fines or bituminous material). It must carry the traffic load, provide a smooth riding surface, and resist skidding and traffic wear while keeping water from penetrating into pavement structure.

Traveled way. That portion of roadway, excluding shoulders, used for the movement of traffic.

Turnouts. Short sections of traveled way constructed with additional width to allow for safe passing of traffic.

Waterbar. A constructed feature in the roadbed that intercepts surface runoff and diverts the water off the roadway. A waterbar is not designed to be traversable by traffic.

Water source. A place designated in individual projects for acquiring water for road maintenance purposes.

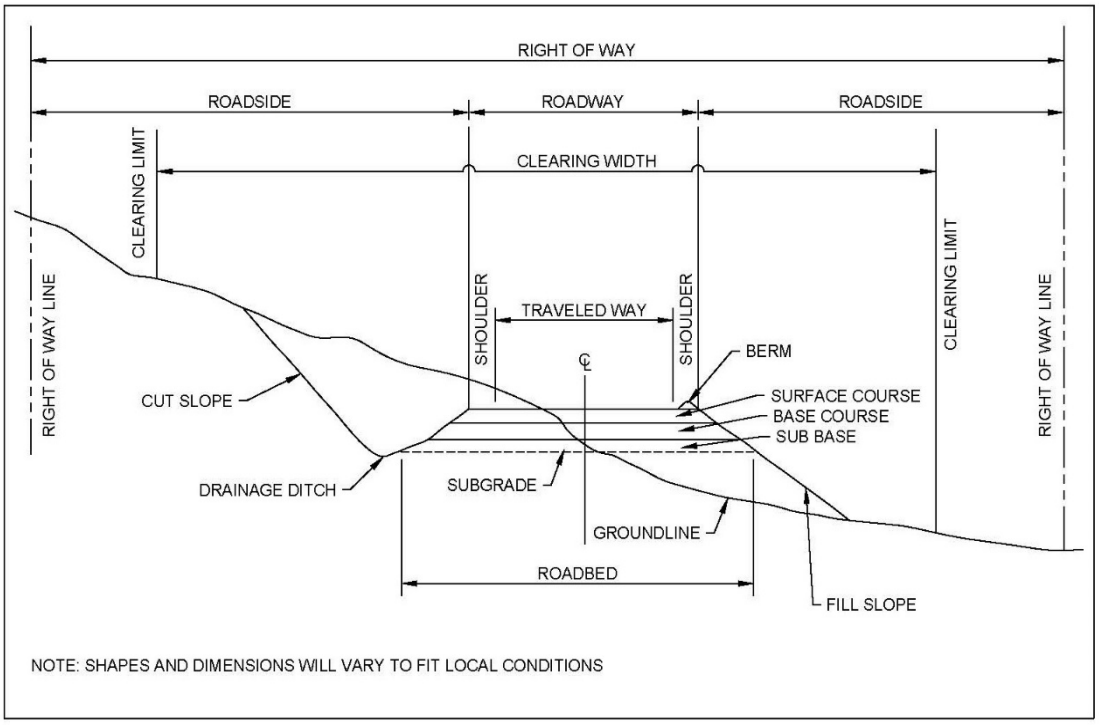


Figure 1—Road structure terms.

T–801 Vegetation Removal—Roadway

801.01 Description

Work consists of removing fallen trees and snags that encroach within 5 feet of the roadway.

801.02 Maintenance Requirements

A. Deck portions of trees that meet utilization standards in A/AT2 along the roadside at locations that do not impair the traveled way or sight distance (agreed to in writing).

B. Limb sub-merchantable material and cut it into lengths for handling. Scatter the material outside ditches and drainages, off the roadway and turnouts, or at staked locations.

C. Do not leave woody debris and slash on the roadway or concentrations that may plug ditches, culverts, or drainage channels.

D. Place residual root wads in an upright position out of the clearing limits.

T–802 Vegetation Removal—Roadside

802.01 Description

Work consists of cutting and disposing of vegetation that reduces the operational capability of the road, including compromised visibility of signing, gates, or approach railings on bridges. Work also includes removing vegetation for the purpose of restoring site distance to an acceptable level.

802.02 Maintenance Requirements

A. Remove vegetative matter that reduces sight distance, impedes vehicular travel, or interferes with road maintenance operations (such as surface blading, ditch and culvert cleaning, and bridge deck and curb cleaning) to a maximum height of 6 inches and a minimum of 5 feet outside of the roadway.

B. No need to remove low shrubs and brush which do not restrict sight distance and do not impede road maintenance if the road surface can be adequately maintained without doing so. This is not applicable to bridge sites.

C. For bridge sites, remove roadway vegetation within a minimum of 20 feet from abutments as measured along the center line of the road. Cut vegetation to provide a vertical clearance of 14 feet from the road and bridge surface elevation by trimming any encumbering tree limbs.

D. Do not leave woody debris and slash on the roadway or concentrations which may plug ditches, culverts, or drainage channels.

T–803 Pavement Cleaning

803.01 Description

Work consists of removing loose material from paved traveled ways, paved shoulders, and paved turnouts.

803.02 Maintenance Requirements

A. Clean the surface to the extents of the existing pavement without obstructing surface drainage.

B. Move materials away from the road centerline on double-lane roads.

C. When paved road structure includes aggregate lateral support, pavement cleaning shall leave (as much as practicable) the aggregate in its original form and assure support material is not adversely affected.

803.03 Equipment

A. Equipment shall have the capability of removing all loose material from paved surfaces without damage to the surface. Surface damage includes but is not limited to:

   a. Divots in the paved surface

   b. Peeling of surface material

   c. Cracking or breaking pavement edges

B. Use of hydraulic flushing equipment will not be permitted within a horizontal distance of _____ from a live stream, unless approved by the Forest Service.

T–804 Bridge Deck and Curb Cleaning

804.01 Description

Work consists of cleaning bridge decks and curbs.

804.02 Maintenance Requirements

A. Maintain bridges and associated components as identified on the sale area map or as indicated in Table 1.

B. Bridge deck and curbs.

   a. Remove debris and sediment from the bridge deck, running planks, and the top and roadside face of the curbs. Ensure that all scuppers and drainage openings on the bridge are clear and operating as intended.

   b. Do not allow debris and sediment to enter the stream or stream channel.

   c. Haul sediment and other debris to a disposal area designated by the Forest Service in accordance with Section T–806 Slump Removal and Slump Repair.

C. Vegetation removal.

   a. Remove and dispose of vegetation at the bridge in accordance with T–802 Vegetation Removal.

Table 1—Bridge identification

Bridge name	Road number	Milepost
N/A		

T–805 Road Grading

805.01 Description

Work consists of keeping a native or aggregate roadbed in a condition that facilitates traffic and provides proper drainage. It includes maintaining the crown, inslope, outslope or drainage dips of the traveled way; maintaining turnouts and shoulders; repairing berms; and blending approach road intersections.

805.02 Maintenance

A. Road grading shall be performed as often as necessary, per C/CT 5.31, to facilitate safe use and proper drainage.

B. Road grading shall preserve the existing cross-section. Surface irregularities shall be eliminated and the surface left in a free-draining state and to a smoothness needed to facilitate traffic. On aggregate-surfaced roads, thoroughly loosen surfacing material to no less than a 2-inch depth or the depth of defects. Scarification to facilitate cutting to the full depth of potholes or corrugations may be elected but will be considered incidental to blading. Do not scarify to a depth that will cause contamination of the surfacing. Surface material that has been displaced to the shoulders or turnouts shall be returned to the traveled way. A grading pattern shall be established to retain surface material on the roadbed and to provide for a thorough mixing of the materials within the completed surface width.

C. Unless otherwise shown in table 2, compaction of the traveled ways will be accomplished using compaction method A and will commence immediately following blading.

    a. Compaction method A: adjust the moisture content of the material to a content suitable for compaction. Fill the interstices around rock with earth or other fine material, as practical. Operate hauling and spreading equipment uniformly over the full width of each layer until there is no visible evidence of further consolidation.

    b. Compaction method B: operate a 7- to 10-ton pneumatic, steel, or equivalent vibratory roller to cover the full width three times. Adjust the moisture content of the material to a moisture content

suitable for compaction. Fill the interstices around rock with earth or other fine material, as practical.

D. Smooth blading may be used as an interim measure on aggregate-surfaced roads to remove loose surfacing material from the wheel paths. Store removed materials in a recoverable windrow until blade processing (as described above) is feasible. Watering is not required for smooth blading. Accomplish smooth blading without distorting the existing cross-slope or crown of the traveled way.

E. Move and store loose surfacing materials on the high side of super-elevated curves and sections with uniform inslope or outslope. In crowned sections, store the material on either or both sides, as elected. Windrow and place stored materials to provide not less than 12 feet of smooth traveled way on one-lane segments, or 20 feet of smooth traveled way on two-lane segments or segments with turnouts. Place holes through windrows for drainage every 500 feet or less to provide drainage.

F. Water, taken from water sources designated on the sale area map, shall be applied during blading if sufficient moisture is not present to cut, mix, or compact the surface material.

G. On native-surfaced roads, material generated under other maintenance specifications may be blended with the surface material being worked. On aggregate surfaced roads this material shall not be blended with surface or base course material unless otherwise agreed.

H. Roadway cut slopes or berms shall not be undercut, nor shall new berms be established unless otherwise agreed.

I. Berms shall be repaired by placing material, as needed to restore the berm, to reasonably blend with existing line, grade, and cross-section.

J. Drainage dips shall be cleaned and maintained to reasonably blend with existing line, grade, and cross-section. Lead-off ditches shall be maintained in accordance with T-810 Ditch Maintenance.

K. Intersecting road junctions that are not closed or restricted from vehicular use shall be bladed to assure proper blending of the two riding surfaces.

L. Rocks or other material remaining on the traveled way after the final pass that are larger than 4 inches in diameter or are larger than the maximum size of imported surfacing shall be removed. Unless otherwise designated by the Forest Service, the oversized material shall be removed and placed outside the roadway; do not obstruct drainage ways or structures. Placement into streams, lakes, or water courses will not be permitted.

M. Material resulting from work under this specification shall not remain on or in structures, such as culverts, overside drains, cattleguards, ditches, and drainage dips.

N. Material resulting from work under this specification, plus any accumulated debris, shall be removed from bridge decks and the deck drains opened.

Table 2—Compaction requirement

Road number	Beginning milepost	Ending milepost
N/A		

Note: Roads listed in this table require compaction method B, as specified in 805.02-C.

T–806 Slide Removal and Slump Repair

806.01 Description

Work includes excavating, loading, hauling, placing, and compacting waste or replacement material. Work under T–806 is work that cannot be handled by a motor grader during T–805 Road Grading or T–810 Ditch Maintenance.

806.02 Maintenance Requirements

A. Slide material, including soil, rock, and vegetative matter that encroaches into the roadway shall be removed. The slope which contributed the slide material shall be reshaped as practicable to reduce future sliding, as agreed to with the Forest Service. Slide material on the fill slope and below the roadway will not be removed unless needed for slope stability or to protect adjacent resources.

   a. Surface and base courses shall not be excavated during T–806 Slide Removal operations.

   b. Slide material which cannot be used for other beneficial purposes shall be placed at disposal sites shown on the sale area map or designated by the Forest Service. Compact material shall be placed in disposal sites only if required by the Forest Service.

B. Material for slump repair is from agreed upon borrow sites, placed in layers no more than 12-inches thick, and compacted in accordance with T–805 method A or other methods approved by the Forest Service.

   a. Existing aggregate surfacing shall be salvaged when practical and replaced after depressions have been filled.

   b. Damaged aggregate base, aggregate surfacing, and bituminous pavement shall be repaired under T–807 Surface Repair (Bituminous) and T–808 Surfacing Repairs.

   c. Following slide removal, the roadway shall be shaped to reasonably conform to its original cross-section.

T–807 Surface Repair (Bituminous)

807.01 Description

Work consists of bituminous surface repair and includes repairing potholes or small, failed areas within the roadway. Includes preparing the area, furnishing, hauling, and placing all materials, and other work necessary for repairing the bituminous surface within the traveled way.

807.02 Maintenance Requirements

A. Unless otherwise specified, the purchaser is responsible for furnishing all needed material to complete the work (table 3). Bituminous product mix type shall be hot mix, unless otherwise specified.

B. The Forest Service will mark the areas to receive bituminous surface repairs on the road surface before the purchaser performs the work.

C. Soft spots and potholes require the excavation of surface and base course material necessary to reach firm, suitable material. The minimum depth of excavation shall be 2 inches and the maximum depth shall be to the top of the subgrade. The edges of the prepared hole shall be extended to form a vertical face in unfractured asphalt surfacing. Shape shall be generally circular or square, dry, and cleared of all loose material.

D. The prepared hole should be patched immediately or barricaded in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) until patched.

E. The faces of the hole shall be prepared by thoroughly applying emulsified asphalt tack coat.

F. The bituminous mixture shall be placed in layers not to exceed a compacted depth of 2 inches. Each layer shall be compacted thoroughly with hand or mechanical tampers or rollers. Compaction shall not be accomplished using equipment wheels.

G. The completed, compacted patch in the pothole shall be flush, with an allowable tolerance up to ½ inch above the level of the adjacent pavement.

H. Skin patches required for surface sealing shall uniformly distribute the bituminous mixture with feathered edges in even layers.

I. Damaged segments of asphalt berm shall be removed and the exposed ends beveled at 45 degrees from vertical. The berm foundation shall be cleaned and patched as necessary. The foundation and adjoining surfaces shall be prepared by thoroughly applying emulsified asphalt tack coat. Asphalt mix shall be placed and compacted to conform to the shape and alignment of the undamaged segment.

J. Unsuitable material shall be disposed of only at locations designated by the Forest Service or as shown on the sale area map.

Table 3—Material types

Road number	Material type
4N12	Asphalt Concrete, CA State DOT, 1/2in. Type A HMA, PG 64-16

T–808 Surface Repair (Aggregate/Native)

808.01 Description

Work consists of repairing potholes, minor washouts, and soft areas on aggregate- or native-surfaced roads. Includes preparing the area; removing unsuitable material; furnishing, hauling, and placing all materials; and other work necessary to make the repair and blend into the adjacent surface section to provide a uniform cross section.

808.02 Maintenance Requirements

Table 4 identifies material sources.

Prepare the area as approved by the Forest Service. Soft spots on native- or aggregate-surfaced roads shall be repaired by placing the imported material on top of the soft spot in layers until a firm surface is produced, as evident by no surface deflection under normal operating loads. Repair material shall be uniformly distributed in layers not to exceed 6 inches compacted depth. Ensure adequate moisture. Material placement shall not cause surface irregularities and shall preserve the existing cross section.

Unsuitable material shall be disposed of at locations designated by the Forest Service or shown on the sale area map.

Material provided shall be certified weed-free.

Table 4—Specified material sources

Road number	Material type	Source	Gradation
N/A			

T–809 Dust Abatement

809.01 Description

Work consists of preparing the traveled way and furnishing and applying materials to abate dust.

809.02 Material

A. A dust abatement plan must be agreed on before hauling on roads that require dust abatement, as shown in C/CT5.31#. The plan must include the type of dust abatement material to use, the rates of application, and the frequency of applications. Table 5 shows special requirements for dust abatement that the dust abatement plan should include.

B. The sale area map designates the locations of approved water sources. The Forest Service may approve alternate water sources.

C. Dust abatement materials shall meet the following requirements:

   a. Magnesium chloride liquid—ASTM D 1298, Type S, 28 percent min. by mass, specific gravity 1.29 to 1.33

   b. Calcium chloride liquid—AASHTO M 144, Type L, 35 percent min. by mass

   c. Calcium chloride flake—AASHTO M 144, Type S Grades 1, 2, or 3, Class A

   d. Lignosulfonate liquid—Dry solids 50 percent, specific gravity 1.20 min. (ASTM D1475), pH (ASTM E70 3.0 to 8.0)

D. Certification of magnesium or calcium chloride brine, calcium chloride flake, and lignosulfonate liquid shall be in accordance with the concentrations listed above.

809.03 Maintenance Requirements

A. Dust abatement materials shall be applied to the road surface as necessary to control road surface loss, provide for road user safety, and minimize damage to adjacent resources.

B. The traveled way shall be prepared and finished in accordance with the manufacturer's requirements or recommendations.

C. Dust abatement materials other than water shall be applied within tolerances specified by the manufacturer.

D. Dust abatement materials shall not be applied when it is raining. Lignosulfonate and magnesium chloride shall be applied when the atmospheric temperature is 40 °F or above.

E. The designated water sources may require some work before use. Such work may include cleaning ponded areas, installing temporary weirs or sandbags, pump installation, or other items appropriate to the purchaser's operations. Water source preparation requires contracting officer approval before use.

Table 5—Dust abatement application rate

Road number	Material type
All Native Surface Roads (see **C/CT5.31#**)	Water

T–810 Ditch Maintenance

810.01 Description

Work consists of routine maintenance to provide unobstructed drainage for various types of ditches.

810.02 Maintenance Requirements

A. Maintain existing ditches by removing rock, soil, wood, and other materials to provide unobstructed flow.

B. Do not undercut backslopes during ditch maintenance operations.

C. Remove suitable material up to 4 inches in greatest dimension from the ditches and blend it into the existing native road surface and shoulder or place it in a designated berm.

D. Do not blend material from ditch cleaning operations into aggregate surfaced roads. Do not blade material across bituminous surfaced roads, unless approved in writing by the Forest Service.

E. Dispose of excess material which cannot be used for other beneficial purposes at disposal sites shown on the sale area map or at sites designated by the Forest Service. Material placed in disposal sites does not require compaction, unless required by the Forest Service.

F. Remove limbs and wood chunks that exceed 12 inches in length or 3 inches in diameter from ditches and place outside the roadway.

G. Clean paved surfaces of all materials resulting from ditch maintenance work.

H. Shape lead-off ditches to drain away from the traveled way.

T–811 Drainage Structures

811.01 Description

Work consists of maintaining drainage structures such as culverts, armored crossings, surface water deflectors, inlet and outlet channels, related ditches, existing riprap, trash racks, and drop inlets. This includes overside drains and cattleguards that function as drainage structures.

811.02 Maintenance Requirements

A. Drainage structures and related items shall be cleared of all foreign material that has been deposited above the bottom of the structure and all vegetative growth that interferes with the flow pattern.

B. Culvert inlets and outlets shall be cleaned a minimum of 3 feet, as measured along the invert, unless otherwise directed by the Forest Service.

   a. Recondition culvert inlets and outlets by field methods such as jacking out or cutting away damaged metal that obstructs water flow. Treat cut metal edges with a zinc-rich coating, according to AASHTO M 36 and ASTM A849.

   b. Clean catch basins by removing the material within the basin floor to conform to the original grade from the invert and shape the basin to reasonably match the original catch basin cutslope.

   c. Clean the inlet channel transition from the drainage ditch to the catch basin and outlet ditches a minimum of 10 feet, or a sufficient distance to allow free drainage of water.

C. Ditches shall be cleaned to conform to previous line, grade, and cross section for positive drainage.

D. Drainage dip maintenance consists of cleaning existing dips on native- and aggregate-surfaced roads. Drainage dips shall be shaped to a depth and width to provide positive drainage and to reasonably conform to the original lines, grades, and cross sections, unless otherwise agreed upon. Lead-off ditches shall be cleaned a minimum of 10 feet from the drainage dip.

E. Riprap shall be maintained in good condition, including the replacement of riprap, if necessary, to previous line, grade, and cross section.

F. Headwalls, aprons, inlet assemblies, overside drains, riprap, geotextiles, trash racks, and other facilities related to the drainage structure shall be maintained to ensure proper function.

G. Material removed, if suitable, may be blended into existing native road surfaces or shoulders. On aggregate surface roads, care must be taken to ensure the material is not mixed into the existing aggregate. Haul unsuitable material to a disposal area designated by the Forest Service in accordance with Section T–806, or as otherwise agreed. Side casting into streams, lakes, or watercourses is not permitted.

T–812 Miscellaneous Structures

812.01 Description

Work consists of maintaining miscellaneous structures—including cattleguards, gates, and other similar, previously installed structures—to ensure safe and efficient operation of the road.

812.03 Maintenance Requirements

A. Cattleguards.

   a. Loose rail or wing elements shall be straightened and welded or bolted back in place.

   b. Excess material carried into the cattleguard shall be removed when drainage is blocked or when it reaches 6 inches from the bottom of the cattleguard frame. Drainage into and from the cattleguard shall be kept open according to T–811 Drainage Structures.

B. Gates.

   a. Gates shall be kept in good repair and made to swing easily. Hinges or latches shall be repaired if not operating properly and hinges shall be oiled. Vegetation and debris shall be removed from within the swinging radius according to T–802 Vegetation Removal—Roadside.

   b. Loose wire gate ends and internal stays shall be maintained in good condition. Gate wire shall be maintained as necessary to ensure proper operation of the gate both as a vehicular passageway and as a barrier to cattle movement.

C. Other miscellaneous structures shall be maintained as needed to ensure safe and efficient operation of the road.

T–813 Waterbar

813.01 Description

Work consists of restoring waterbars in the roadbed.

813.02 Maintenance Requirements

A. Waterbars shall be restored in accordance with figure 2.

B. All material excavated shall be used in the restoration of the waterbar. Berm material shall be compacted by operating heavy equipment over the entire length and width of the berm.

C. Waterbars may need to be restored between seasons of use and then removed when haul is resumed. Waterbar restoration may also be required when use of a road is complete.

D. Waterbar restorations shall be as agreed upon in the purchaser's plan of operations (B/BT6.311) or as directed by the Forest Service.

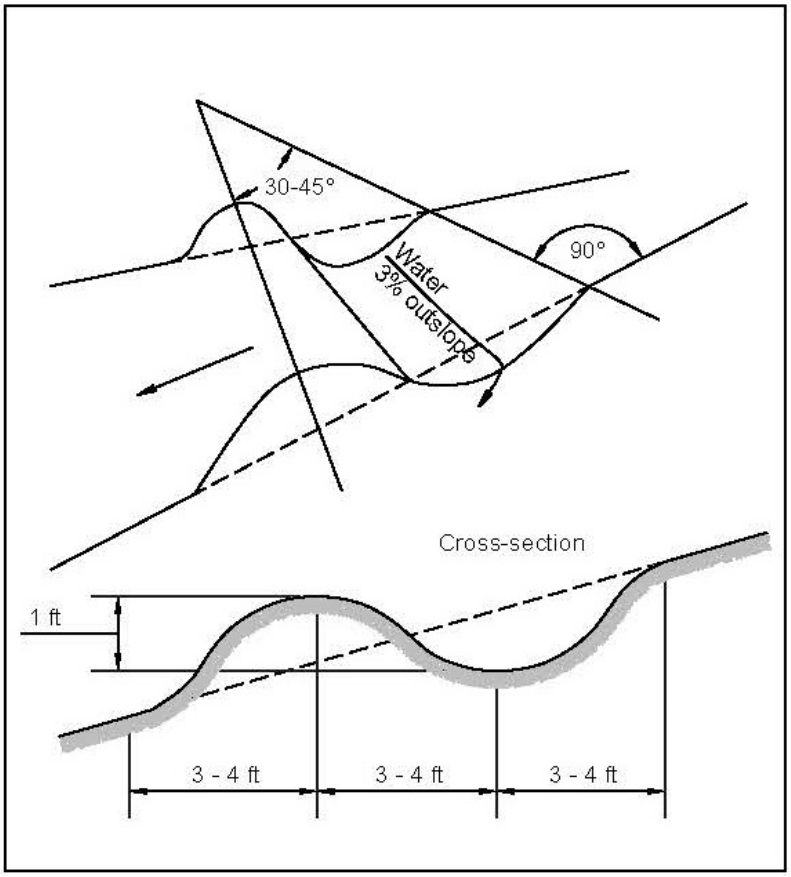


Figure 2—A waterbar (typical).

Source:

- The National Engineering Roads Drawing Library

  https://fsweb.sdtdc.wo.fs.fed.us/programs/eng/natlib/drawings/

- Water Bar—Driveable-G3-3

  https://fsweb.sdtdc.wo.fs.fed.us/programs/eng/natlib/drawings/pdf/G3/C-GROUP_3_G3-3_WATER_BAR-DRIVEABLE.pdf

- Note: The drawing here has a minor modification from the original.

T–814 Closure Devices

814.01 Description

Work consists of furnishing, installing, or removing barriers to facilitate road closures. Gates are not included.

814.02 Maintenance Requirements

A. Barriers shall be removed or installed in accordance with table 6, or as otherwise provided by the Forest Service.

B. Earthen barriers shall be installed such that excavation areas drain, ditch lines do not impede flow, and as indicated in figure 3.

C. Other barrier types shall be installed as directed by the Forest Service.

D. The sale area map or stakes on the ground show the location of barriers to be removed or installed. Table 6 also identifies this information. Installation or removal may occur as often as road use is terminated or resumed.

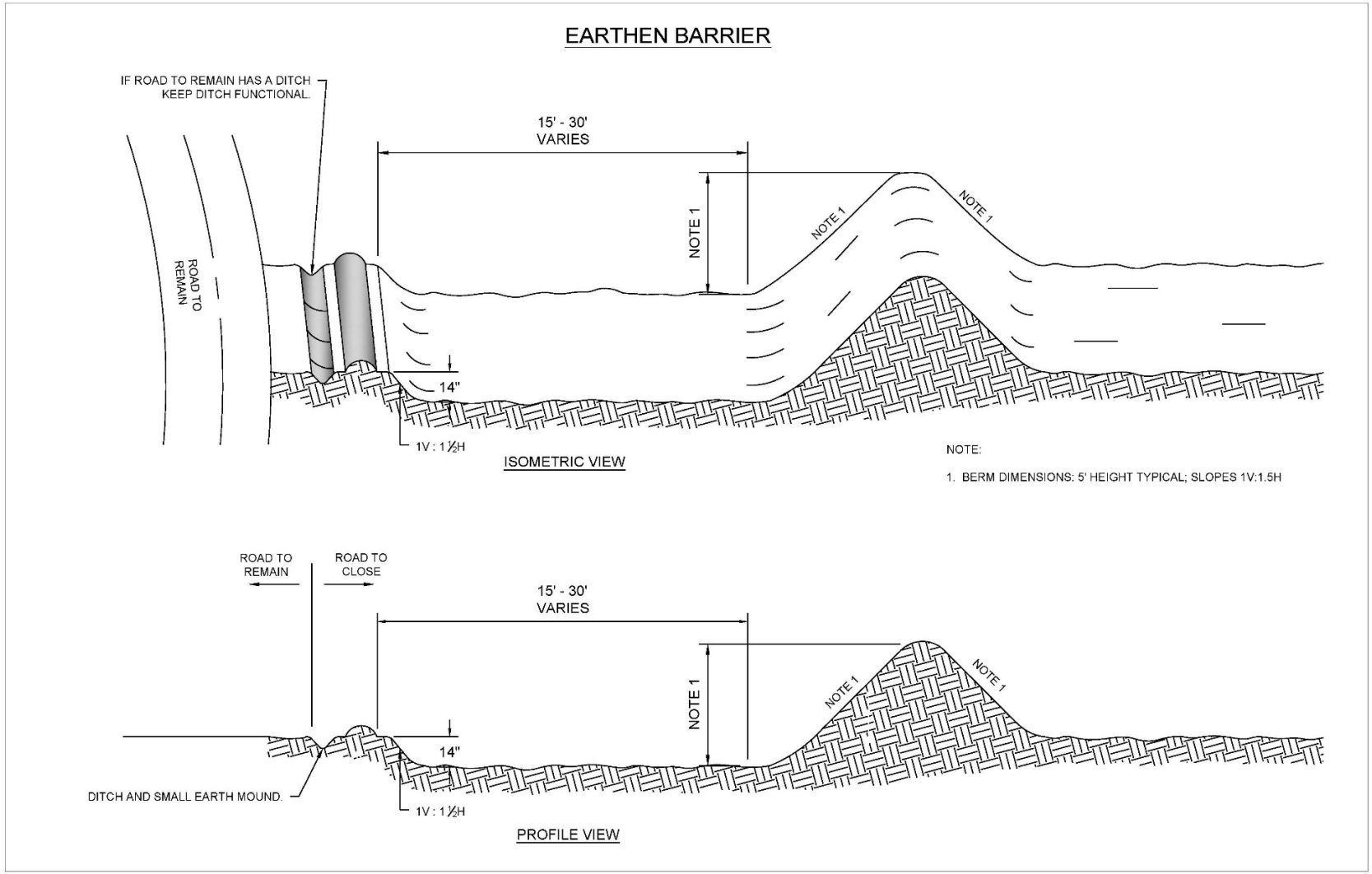


Figure 3—An earthen barrier.

Source:

- The National Engineering Roads Drawing Library

  https://fsweb.sdtdc.wo.fs.fed.us/programs/eng/natlib/drawings/

- Earthen Barrier-G3-4

  https://fsweb.sdtdc.wo.fs.fed.us/programs/eng/natlib/drawings/pdf/G3/C-GROUP_3_G3-4_EARTHEN_BARRIER.pdf

- Note: Note: The drawing here has a minor modification from the original.

Table 6—Closure devices and locations

Road number	Location(s)	Closure device	Furnished by	Work
4N52Y	MP 0.01	Double earth barrier at entrance with Bollards	Onsite Material	Remove / Install as necessary for Haul
5N46Y	MP 0.00	3 Boulders	Onsite Material	Remove / Install as necessary for Haul

Traffic Control Plan Required for Integrated Resource Service Contracts

Contractor shall furnish, install, and maintain all temporary traffic controls (TTC) which providethe user with adequate warning of hazardous or potentially hazardous conditions, associated with the Contractor/Purchaser operations. The following are specific requirements that must be met on this contract during all phases of operations for road construction or maintenance as well as logging.

1. All required warning signs are to meet specifications as outlined in the "2012 CA Manual on Uniform Traffic Control Devices for Street and Highways" (see Attachments). For all contract related activities, this means:
   a. All signs shall have an orange retro-reflective background with black letters.
   b. Signs shall be diamond shaped and be a minimum of 30 " X 30" in size, (see Item #9 below.)
   c. Lettering shall be a minimum of 4 inches in height, (larger lettering for larger signs.)
   d. Letters are to be stencil painted or press-on and not hand-written.
   e. Signs must be Retro-reflective or Illuminated if any TTC is in place for more than one daylight period.
   f. TTC zone signs used at night shall maintain retro-reflectivity at or above the minimum levels shown on Table 2A-3 in the manual.

2. Truck warning signs shall be posted on all roads that give access to the public onto the haul route. These signs shall be posted prior to usage by the trucks.

3. Equipment working or road construction signs shall also be posted as stipulated in item 2 above for road construction or maintenance.

4. When falling operations are occurring, signs shall be posted at both ends of the area being worked. Any time a tree is being felled that could reach the roadway, either a flagman shall regulate traffic or the road shall be blocked until the tree is on the ground. All debris will be removed from roadway.

5. All signs shall be moved and placed in the current areas of operation. They shall not be left posted in areas of no activity unless they are covered during the periods of inactivity.

6. All warning signs shall be posted in highly visible locations and at a height easily seen by motorist. At times, this may mean that signposts will be necessary.

7. All warning signs shall be posted prior to the beginning of any operation.

8. All KO roads are to be continuously kept open unless otherwise agreed in writing.

9. Sign size is dictated by traffic volume and speed. A 30"x30" sign may be used on low traffic volume of < 400 vehicles per day with maxi mum speed of 35 MPH. A 36"x36" sign will be used on conventional road where traffic volume is >400 vehicles with speed greater than 35 MPH. Highway/Freeway sign size will be 48"x48"for speeds greater than 45 MPH.

10. On the attached sign drawings, the ''Text 4C" represents 4inch tall text with a C stroke width. The stroke width for C series is 31/64". The Standard Highway Sign book contains other series sizes.

CHAPTER 6G. TYPE OF TEMPORARY TRAFFIC CONTROL ZONE ACTIVITIES

Section 6G.01 Typical Applications

Support:

01 Each TTC zone is different. Many variables, such as location of work, highway type, geometrics, vertical and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, and cars), and road user speeds affect the needs of each zone. The goal of TTC in work zones is safety with minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment.

02 Typical applications (TAs) of TTC zones are organized according to duration, location, type of work, and highway type. Table 6H-1 is an index of these typical applications. These typical applications include the use of various TTC methods, but do not include a layout for every conceivable work situation.

03 Well-designed TTC plans for planned special events will likely be developed from a combination of treatments from several of the typical applications.

Guidance:

04 *For any planned special event that will have an impact on the traffic on any street or highway, a TTC plan should be developed in conjunction with and be approved by the agency or agencies that have jurisdiction over the affected roadways.*

05 *Typical applications should be altered, when necessary, to fit the conditions of a particular TTC zone.*

Option:

06 Other devices may be added to supplement the devices shown in the typical applications, while others may be deleted. The sign spacings and taper lengths may be increased to provide additional time or space for driver response.

Support:

07 Decisions regarding the selection of the most appropriate typical application to use as a guide for a specific TTC zone require an understanding of each situation. Although there are many ways of categorizing TTC zone applications, the four factors mentioned earlier (work duration, work location, work type, and highway type) are used to characterize the typical applications illustrated in Chapter 6H.

Section 6G.02 Work Duration

Support:

01 Work duration is a major factor in determining the number and types of devices used in TTC zones. The duration of a TTC zone is defined relative to the length of time a work operation occupies a spot location.

Standard:

02 **The five categories of work duration and their time at a location shall be:**

A. Long-term stationary is work that occupies a location more than 3 days.

B. Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.

C. Short-term stationary is daytime work that occupies a location for more than 1 hour within a single daylight period.

D. Short duration is work that occupies a location up to 1 hour.

E. Mobile is work that moves intermittently or continuously.

Support:

03 At long-term stationary TTC zones, there is ample time to install and realize benefits from the full range of TTC procedures and devices that are available for use. Generally, larger channelizing devices, temporary roadways, and temporary traffic barriers are used.

Standard:

04 **Since long-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in long-term stationary TTC zones.**

Guidance:

05 *Inappropriate markings in long-term stationary TTC zones should be removed and replaced with temporary markings.*

Support:

06 In intermediate-term stationary TTC zones, it might not be feasible or practical to use procedures or devices that would be desirable for long-term stationary TTC zones, such as altered pavement markings, temporary traffic barriers, and temporary roadways. The increased time to place and remove these devices in some cases could significantly lengthen the project, thus increasing exposure time.

Standard:

07 **Since intermediate-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in intermediate-term stationary TTC zones.**

Support:

08 Most maintenance and utility operations are short-term stationary work.

09 As compared to stationary operations, mobile and short-duration operations are activities that might involve different treatments. Devices having greater mobility might be necessary such as signs mounted on trucks. Devices that are larger, more imposing, or more visible can be used effectively and economically. The mobility of the TTC zone is important.

Guidance:

10 *Safety in short-duration or mobile operations should not be compromised by using fewer devices simply because the operation will frequently change its location.*

Option:

11 Appropriately colored or marked vehicles with high-intensity rotating, flashing, oscillating, or strobe lights may be used in place of signs and channelizing devices for short-duration or mobile operations. These vehicles may be augmented with signs or arrow boards.

Support:

12 During short-duration work, it often takes longer to set up and remove the TTC zone than to perform the work. Workers face hazards in setting up and taking down the TTC zone. Also, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed.

Option:

13 Considering these factors, simplified control procedures may be warranted for short-duration work. A reduction in the number of devices may be offset by the use of other more dominant devices such as high-intensity rotating, flashing, oscillating, or strobe lights on work vehicles.

Support:

14 Mobile operations often involve frequent short stops for activities such as litter cleanup, pothole patching, or utility operations, and are similar to short-duration operations.

Guidance:

15 *Warning signs and high-intensity rotating, flashing, oscillating, or strobe lights should be used on the vehicles that are participating in the mobile work.*

Option:

16 Flags and/or channelizing devices may additionally be used and moved periodically to keep them near the mobile work area.

17 Flaggers may be used for mobile operations that often involve frequent short stops.

Support:

18 Mobile operations also include work activities where workers and equipment move along the road without stopping, usually at slow speeds. The advance warning area moves with the work area.

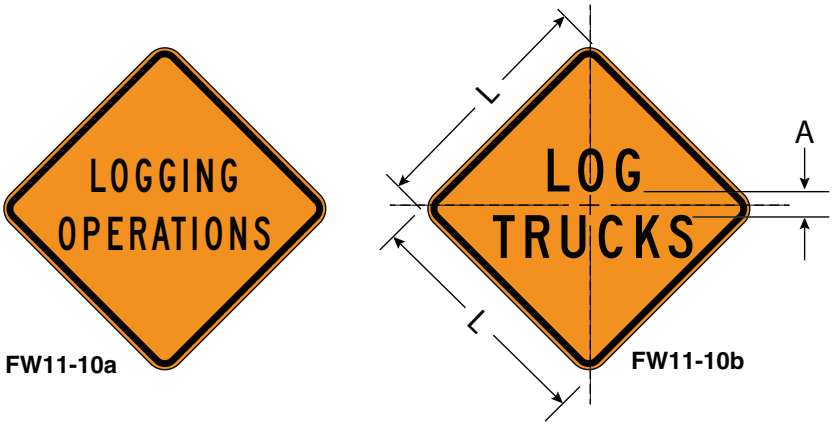
Guidance:

19 *When mobile operations are being performed, a shadow vehicle equipped with an arrow board or a sign should follow the work vehicle, especially when vehicular traffic speeds or volumes are high. Where feasible, warning signs should be placed along the roadway and moved periodically as work progresses.*

20 *Under high-volume conditions, consideration should be given to scheduling mobile operations work during off-peak hours.*

21 *If there are mobile operations on a high-speed travel lane of a multi-lane divided highway, arrow boards and/or Portable Changeable Message Signs should be used.*

Text layout—Warning sign (FW) (2-line)



FW11-10a FW11-10b

Dimensions (*inches*)

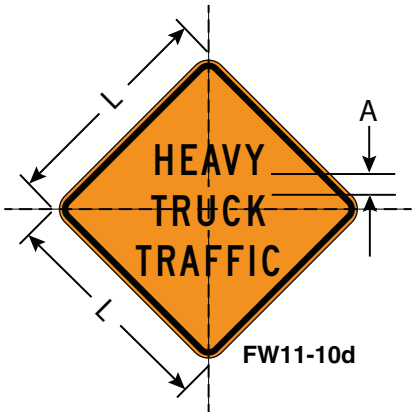
Sign Number	Message	L	A Spacing	Text (upper case)	Border	Border Inset
FW11-10a	LOGGING OPERATIONS	30	2 ½	4C	⅞	⅝
		36	3	5C	⅞	⅝
FW11-10b	LOG TRUCKS	30	2 ½	6D	⅞	⅝
		36	3	7D	⅞	⅝

Notes
Center text on vertical and horizontal centerlines.
Text—ASA Series as noted.
For larger sizes, refer to the “Standard Highway Signs” book.

Colors
Black legend and border.
Retroreflective orange background.

References
For sign guidelines, see chapter 4, section 4.6.2.
For manufacturing specifications, see chapters 14 and 14A.

Text layout—Warning sign (FW) (3-line)



Dimensions (*inches*)

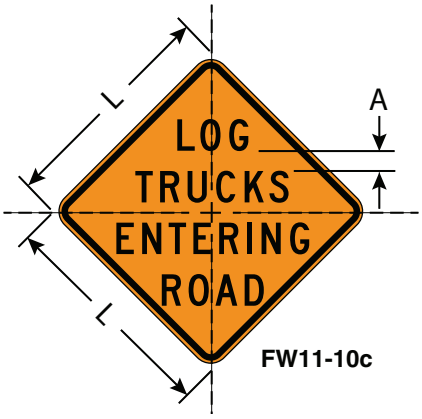
Sign Number	Message	L	A Spacing	Text (upper case)	Border	Border Inset
FW11-10d	HEAVY TRUCK TRAFFIC	30	2 ½	4C	⅞	⅝
		36	3	5C	⅞	⅝

Notes
Center text on vertical and horizontal centerlines.
Text—ASA Series as noted.
For larger sizes, refer to the “Standard Highway Signs” book.

Colors
Black legend and border.
Retroreflective orange background.

References
For sign guidelines, see chapter 4, section 4.6.3.
For manufacturing specifications, see chapters 14 and 14A.

Text layout—Warning sign (FW) (4-line)



FW11-10c

Dimensions (*inches*)

Sign Number	Message	L	A Spacing	Text (upper case)	Border	Border Inset
FW11-10c	LOG TRUCKS ENTERING ROAD	30	2 ½	4C	⅞	⅝
		36	3	5C	⅞	⅝

Notes
Center text on vertical and horizontal centerline.
Text—ASA Series as noted.
For larger sizes, refer to the “Standard Highway Signs” book.

Colors
Black legend and border.
Retroreflective orange background.

References
For sign guidelines, see chapter 4, section 4.6.2.
For manufacturing specifications, see chapters 14 and 14A.