APPENDIX C

C(T)5.31# – ROAD MAINTENANCE REQUIREMENTS. (9/04) Contractor shall maintain roads in accordance with the following Contract Road Maintenance Requirements Summary:

DURING AND POST HAUL											
ROAD	TERMINI		MILES	ROAD MAINTENACE T-SPECIFICATIONS							
	FROM	TO		T101	T103 WATER	T103 CHEM	T108	T113 AGG	T301	T310	T507
755	0	4	4	C	C						C
755	4	4.2	0.2	C	C						C
1018	0	0.62	0.62	C		C					C
1018	0.62	3.02	2.4	C							C
4736	0	1.3	1.3	C	C						C
4751	0	1.22	1.22	C							C
4752	0	1.08	1.08	C							C
4752A	0	0.83	0.83	C							C
4753	0	6.95	6.95	C		C		C	C	C	C
4753	6.625	6.955	0.33	C	C		C				C
4753H	0	2	2	C	C						C
4755	0.44	1.48	1.04	C		C					C
4756	0	2.926	2.926	C	C			C			C
4756	2.926	5.21	2.284	C							C
4756G	0	0.19	0.19	C			C				C
5033	0	0.28	0.28	C							C
5082	0	0.31	0.31	C			C				C
5083	0	0.41	0.41	C			C				C
4753N	0	1.45	1.45	C			C				C
5348	0	0.7	0.7	C			C				C
5348	0.7	1.79	1.09	C		C					C
14413	0	1.57	1.57	C			C				C
14415	0	0.79	0.79	C			C				C
14419	0	0.16	0.16	C			C				C
14421	0	0.17	0.17	C			C				C
99443B	0	0.58	0.58	C			C				C
5348EXT	1.79	2.01	0.22	C			C				C
4755A	0	1.22	1.22	C			C				C
14415EXT	0.79	1.71	0.92	C			C				C
1018EXT	3.02	3.75	0.73	C			C				C
1018A	0	1.72	1.72	C			C				C
99443AEXT	0.83	1.15	0.32	C			C				C
4753HEXT	2	2.97	0.97	C			C				C
4755RA	0	0.51	0.51	C			C				C
4857	0	1.517	1.517	C							C

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4857D	0	0.93	0.93	C			C				C
4872	0	6.9	6.9	C		C			C		C
4872	6.9	7.68	0.78	C		C					C
4872B	0.48	0.824	0.344	C							C
4873	0	3.51	3.51	C	C						C
4878	0	2.493	2.493	C			C				C
4879	0	2.08	2.08	C	C						C
8833	0.814	1.107	0.293	C			C				C
99443A	0	0.83	0.83	C							C
99444	0	0.65	0.65	C							C
228	0	4.11	4.11	C							C
4872B	0	0.48	0.48	C							C

Notes:
C = Contractor Performance Item
O = Optional Contract Line Item
NFSR = National Forest Service Road
CR = County Road
JCT = Junction
MP = Milepost
EOR = End of Road

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements

ROAD MAINTENANCE T-SPECIFICATIONS FOR STEWARDSHIP CONTRACTS

Contractor shall maintain roads in accordance with the following Contract Road Maintenance Requirements Summary:

Contractor will be responsible for doing all pre, during and post haul road maintenance with no compensation from the Forest Service.

T-SPECIFICATIONS	
T-SPEC NUMBER	**SPECIFICATION TITLE**
T-101	Surface Blading
T-103	Dust Abatement
T-108	Slide Removal and Slump Repair
T-113	Surfacing Repair
T-201	Shoulder Maintenance
T-301	Ditch Cleaning
T-310	Minor Drainage Structures
T-506	Clearing Roadway Vegetation
T-507	Cutting Roadside Vegetation
T-508	Seeding
T-618	Major Drainage Structures
T-619	Miscellaneous Structures
T-710	Traffic Services
T-841	Vegetation Establishment

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SPECIFICATION T-101 SURFACE BLADING

DESCRIPTION

1.1 Surface blading is keeping the native or aggregate surfaced road in a condition to facilitate traffic, minimize additional future maintenance, reduce erosion, and provide proper drainage. It includes maintaining the crown, inslope or outslope of the traveled way and shoulders, drainage dips, leadoff ditches, berms, turnouts, removal of minor slides and slumps, and other irregularities that prevent normal runoff from the road surface.

REQUIREMENTS

3.1 Surface blading shall be performed as often as necessary and to the standards required to facilitate traffic and proper drainage.

3.2 The blading shall be performed in such a manner as to preserve the existing cross section and to conserve surface materials. On gravel surfaced roads, the base must not be disturbed and no surface material may be bladed into the ditch or over the road shoulders. Blading of native surface roads shall be performed so no base material under four (4) inches in the greatest dimension is lost. All ruts, holes, etc., shall be removed by scarifying and/or cutting to the bottom of any surface irregularities. Oversize material brought to the surface in the scarification process shall be removed from the roadway. Surface material which has been displaced to the shoulders, turnouts, outside of curves, etc., shall be brought back so as to leave a uniform depth on the traveled way at completion of blading. Water shall be applied during blading if sufficient moisture is not present to prevent segregation.

3.3 Roadside cutslopes or berms shall not be undercut.

3.4 At intersections, the roadbeds of sideroads shall be graded for a reasonable distance to assure proper blending of the two riding surfaces.

3.5 Drainage dips and leadoff ditches shall be cleaned and continually maintained to conform reasonably to their original constructed lines, grade, and cross section.

3.6 Berms shall be repaired promptly by placing selected material as needed to restore the berm to its original condition.

3.7 Surface blading of native surface roads also includes ditch cleaning, which shall be done in accordance with T-301, Ditch Cleaning.

3.8 All blading operations shall be properly signed in accordance with **B(T)6.33#** and all applicable State Laws.

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements

SPECIFICATION T-103 DUST ABATEMENT

DESCRIPTION

1.1 Dust abatement consists of road surface preparation and application of materials.

MATERIALS

2.1 Water, bituminous products, lignin sulfonates, chloride products, and other materials may be used for dust abatement. Materials other than water will require approval of the Forest Service and shall meet specifications furnished by the Forest Service.

REQUIREMENTS

3.1 Dust abatement materials shall be applied to the road surface as necessary to control surface loss and provide that vehicles are always intervisible within their stopping sight distance. The average user speed on the road shall be used to determine stopping sight distance. Preparation shall be in accordance with Specification T-101, Surface Blading.

3.2 The rate of application shall be such that the selected material will not run off the surface and cause pollution or unnecessary waste.

3.3 When water is the selected material, it shall be applied as often as necessary to abate dust from all Contractor operations.

a. Dust abatement shall be maintained as needed throughout the duration of operations.

C5.314# – DUST ABATEMENT TREATMENT (2/02). When conditions are such that dusting would result in hazardous driving conditions or there would be an appreciable loss of road surface binder material, Purchaser shall control such dusting by application of a dust abatement treatment to the surface of roadways and other traveled areas according to referenced or attached specifications or other specifications agreed to in writing. This treatment will provide a surface which can be bladed and retreated when necessary. It is not intended to produce a permanent waterproof wearing surface or dust control for more than one year, even though some residual value may be retained. It is intended to be compatible with the physical characteristics of the road surface, such as parent material, percent fines, relative humidity, or possibly some residual dust abatement material.

Dust abatement treatment shall apply only to the roads listed below. The provisions of Specification T-103 of C5.31# shall apply to all other roads when required under C5.31#. T-103 of C5.31# may be used in lieu of C5.314# to perform dust abatement during hauling of timber cut within the clearing limits of roads constructed under this timber sale unless otherwise agreed.

Dust Abatement Specifications

Road Number	Road Name	Termini	Abatement Treatment	References or Attached
1018		0.00-0.62	CaCl Dry Pellet 90-94% Concentrate	C5.314# Attachment
4753		0.00-6.95	CaCl Dry Pellet 90-94% Concentrate	C5.314# Attachment

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4755		0.44-1.48	CaCl Dry Pellet 90-94% Concentrate	C5.314# Attachment
5348		0.70-1.79	CaCl Dry Pellet 90-94% Concentrate	C5.314# Attachment
4872		0.00-7.68	CaCl Dry Pellet 90-94% Concentrate	C5.314# Attachment

C5.314# Attachment (08/24)

SURFACE PREPARATION

Prior to application of chlorides, the roadway shall be prepared by T-101 Surface Blading, and watered as necessary to achieve adequate penetration of the chlorides without runoff. If flakes are used, water will be added after placing the flakes to facilitate penetration of the chlorides into the roadway.

APPLICATION

(a) The Distribution Equipment shall be so designed, equipped, maintained, and operated such that the dust abatement material may be applied uniformly on variable widths of surface.

For liquid products the following requirements shall apply: (1) The spray pattern from each nozzle on the spray bar shall be uniform across the spray bar; (2) Distribution equipment shall include accurate volume measuring devices or a calibrated tank, a thermometer for measuring temperatures of tank contents, and a hose and nozzle attachment for applying material to areas inaccessible to the spray bar.

Calcium Chloride Flake shall be spread with equipment that evenly distributes the material across the required road width. The relative weight of material placed shall be easily determined during application.

(b) Application Rate. Application rates will be as follows:

Application Rate Table

Road Number	Road Name	Termini	Application Type	Abatement Treatment	Application Rate	Width of Application (Feet)
ALL	ALL	-	ALL	CaCl Dry Pellet 90-94% Concentrate	1.3 lbs /sq yd	10

Unless otherwise specified, minimum concentration required is 1.29 – 1.33 Specific Gravity as per ASTM. The Forest Service may field test Chloride brines prior to application to make sure that the products meet the minimum concentrations. Acceptance of the material will be based on the concentration shown on the manufacturer's certificate, or on results of laboratory quality assurance tests done by the Forest Service on samples taken from distribution or hauling vehicles.

Uniform distribution shall be obtained at all points. For liquid products the spray pattern from each nozzle on the spray bar shall be uniform across the spray bar. For flake products, the coverage will be uniform on the road surface. Overlapping or skipping between spread sections shall be corrected. Accidental spillage and areas with excess dust palliative that are hazardous to traffic shall be covered with additional road surfacing material. The

surface of adjacent structures and trees shall be protected from spattering or marring. Dust palliative material shall be discharged only in approved areas, and shall not be allowed to flow into ditches or stream courses. All products may be placed in one application.

All spreading and hauling equipment shall comply with applicable State and Federal requirements including GVW limitations.

(c) Certification with Shipment. When each load of chloride material is delivered, the Purchaser shall furnish one copy of the Bill of Lading, and a fully executed Certificate of Compliance indicating, as a minimum, the following information: **Sale Name, Date of application, road segments where applied, application rate, application width, Material composition by weight of MgCL and CaCl applied, Net weight of shipment, Net gallons at 60 degrees F, Specific Gravity of brine at 60 degrees F, ambient air temperature at time of application.**

A separate Certificate of Compliance will not be required if the standard Bill of Lading contains the essential information required by the certificate.

(d) Sampling. Sampling of chloride material may be required to validate certifications furnished by the Purchaser. When sampling is directed by the Forest Service, the actual samples will be taken by the Purchaser in the presence of the Forest Service representative. All delivery and distribution equipment shall be constructed to permit sampling in conformance with AASHTO T-40 test procedure. Samples shall be obtained from hauling units just prior to application of the material.

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements
SPECIFICATION T-108 SLIDE REMOVAL AND SLUMP REPAIR

DESCRIPTION

1.1 Slide removal and slump repair consists of all work necessary to restore the road to its original cross section as necessary to facilitate use and provide drainage. This work is such that it cannot be handled by a grader during surface blading and ditch cleaning operations.

Slump repair is the filling with selected material of depressions or washouts in roadway which cannot be routinely filled by a motor grader.

Slide removal and slump repair includes excavation, loading, hauling, placing, and compacting of replacement material and the removal and disposal of waste material. This includes the development of disposal or borrow areas at locations approved by the Forest Service.

REQUIREMENTS

3.1 Contractor shall deposit slide material in an approved manner at designated locations.

Material shall not be disposed of on road fills unless otherwise agreed.

The slope which contributed the slide material shall be reshaped as practicable to reduce future sliding unless otherwise agreed.

3.2 When filling slumps and depressions, select material shall be used, placed in layers, and compacted to conform with or exceed the density of existing subgrade.

Existing aggregate surfacing shall be salvaged and relayed or replaced after slumps have been filled.

Damaged aggregate base, aggregate surfacing, and asphalt surfacing shall be repaired under Specification T-113, Surfacing Repair.

3.3 Following slide removal, roadway shall be shaped so as to reasonably conform to its original subgrade template.

3.4 Slump, waste, and borrow areas shall be seeded as required under T-508.

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements
SPECIFICATION T-113 SURFACING REPAIR

DESCRIPTION

1.1 Surfacing repair is patching potholes or small areas of broken asphalt or imported aggregate surfaces and asphalt dikes. It includes preparing the area to be patched and furnishing and placing all necessary materials, including base, and other work necessary to patch the surfacing, including paved shoulders. Sections requiring repair work shall be limited in area not to exceed **XXXXX** square feet for paved surfaces or **XXXXX** square feet for aggregate surfaces and not more than **XXXXX** areas per mile per year.

MATERIAL

2.1 Materials used for repair of aggregate surfacing shall conform to these specifications:

2.2 Materials used for asphalt patching shall conform to or exceed the requirements of these specifications:

REQUIREMENTS

3.1 Aggregate Surfacing Repair. Aggregate material shall be placed in accordance with the applicable specification used in paragraph 2.1 above. Work under this specification shall be performed in a timely manner to reduce further deterioration of the surface.

3.2 Asphalt Surfacing Repair.

A. Potholes (deep patch). Remove the surface course and base course as deep as necessary to reach firm support; extend horizontally at least six (6) inches into good asphalt surfacing surrounding the cracked area. Make the cut square or rectangular with faces straight and vertical. Prime the bottom and faces using MC70, MC250, MC800, or emulsified asphalt (penetration type). Backfill the hole with asphalt mix and compact. Use 2-inch layers if the hole is more than four (4) inches deep. Compact each layer thoroughly with mechanical tampers or rollers. Compaction shall not be done with equipment wheels without prior approval. The patch when completed and compacted shall be flush with surrounding surface.

B. Skin Patches. Minor depressions, light ravelling, or surface checking at scattered locations shall be treated by applying a skin patch. Carefully broom the surface of all loose material and apply a tack coat of MC70, MC250, or emulsified asphalt (penetration type) at the rate of 1/10-gallon per square yard. Place asphalt mix, distribute uniformly, and feather edges with asphalt rakes so the patch when compacted shall be flush with the adjoining surface. Roll thoroughly with a portable roller.

3.3 Asphalt Dikes. Asphalt material in the damaged length of dike shall be removed. Clean and repair asphalt foundation as necessary. Level exposed ends of existing dike. Prime all surfaces with bituminous material. Asphalt mix shall be placed and compacted to conform with the shape of the original dike.

3.4 All asphalt material removed from potholes, patches, and dikes shall be disposed of in designated area.

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Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements
SPECIFICATION T-301 DITCH CLEANING

DESCRIPTION

1.1 Ditch cleaning is removing and disposing of all slough material from roadside ditches to provide an unobstructed waterway conforming reasonably to previous line, grade, and cross section.

REQUIREMENTS

3.1 Slough Material.

A. Native Surfaced Roads. Slough material from ditch cleaning, if suitable, may be placed and blended into the existing road surface or shoulders or placed in a designed berm during surface blading.

B. Aggregate Surface Roads. Slough material from ditch cleaning shall not be mixed with aggregate surfacing or left on the road surface unless otherwise agreed. Material shall be disposed of in an agreed manner at designated locations.

C. Asphalt Surfaced Roads. Equipment, methods, and timing shall be agreed to before start of ditch cleaning operations so as to protect the asphalt pavement. Material shall be disposed of in an agreed manner at designated locations.

ds, gates, H-braces, fencing, guardrails, structure delineators, signs and other similar structures that have been previously installed to insure the safe and efficient operation of the road.

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements
SPECIFICATION T-310 MINOR DRAINAGE STRUCTURES

DESCRIPTION

1.1 Minor drainage structures are single passages with maximum waterway opening equivalent to a 78-inch round pipe (87- by 63-inch arch) or multiple passages with maximum, single waterway opening equivalent to a 60-inch round pipe (66- by 51-inch arch). They include overside drains. Maintenance is work performed on inlets, outlets, related channels, existing riprap, trash racks, and drop inlets.

MATERIALS

2.1 All materials used in the maintenance of minor drainage structures shall conform by type and specification to the material in the structure being maintained.

REQUIREMENTS

3.1 All minor drainage structures are to be maintained in accordance with these specifications in the spring following any significant runoff and prior to the beginning of winter storms.

3.2 Clear inlet and outlet channels, inlet trash racks, and drop inlets of loose material that could cause plugging or prevent the free flow of water. Debris shall be disposed of in agreed manner at designated locations.

3.3 If outlet riprap was originally placed to dissipate water energy, it shall be maintained in good condition including the replacement of riprap if necessary.

4.1 Make whatever minor repairs are necessary to ensure the proper functioning of the head walls, aprons, inlet assemblies, overside drains, riprap, trash racks, and other facilities related to the drainage structure.

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements
SPECIFICATION T-507 CUTTING ROADSIDE VEGETATION

DESCRIPTION

1.1 This work consists of cutting and disposing of all vegetative growth, including trees from within the roadway that reduce sight distance and operational capability of the road. Vegetation removal is required if the growth of the vegetation during the contract period causes unacceptable reduction of sight distance and operation capability.

REQUIREMENTS

3.1 Vegetative matter within the roadway which reduces sight distance, impedes vehicular travel, or interferes with road maintenance operations such as surface blading and ditch and culvert cleaning shall be removed. Downed timber meeting utilization standards shall be cut in appropriate lengths and decked along the roadside in locations where the traveled way or sight distance will not be impaired.

3.2 Low shrubs and brush which do not restrict sight distance, do not impede road maintenance, and reduce erosion shall not be removed. Vegetation removed shall be disposed of by scattering, chipping, hauling to designated disposal areas, or as otherwise agreed upon.

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements
LOGGING AND MAINTENANCE OPERATIONS SIGNING STANDARDS

All signs must be manufactured & installed as specified in the latest version of the FHWA "**Manual on Uniform Traffic Control Devices**" (MUTCD) and the FS publication "**Standards for Forest Service Signs & Posters**"(EM 7100-15).

SIGN STANDARDS

SHAPE & COLOR: Generally, signs for logging and maintenance operations are considered temporary traffic control (TTC) and are either diamond-shaped or rectangular. All signs shall have a black legend and border on an orange retroreflective background unless shown otherwise. Hand-painted, homemade signs are not legal. Fluorescent paint is not reflectorized.

SUBSTRATE: Sign substrate material may be High Density Overlay (HDO) Plywood, Aluminum, Fiberglass Reinforced Plastic, Corrugated Plastic or Roll-up Fabrics.

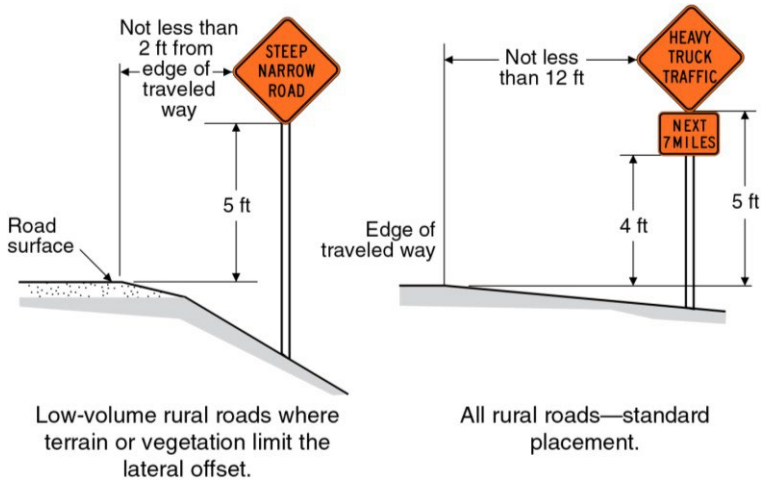
SIGN SIZE: Sign size is a factor of speed and MUTCD & FS standards. Where conditions of speed, volume, or special hazard require greater visibility or emphasis, larger signs should be used. Minimum sizes for the most common signs can be found in Figure 4: Table 4-1. Refer to the EM 7100-15 and MUTCD for additional sign sizes.

LEGEND: All lettering shall be minimum Series "C" alphabet, conforming to Standard Alphabets for Highway Signs. Letter size is also a function of speed - use letter size and word messages as specified in MUTCD and EM- 7100-15.

SIGN PLACEMENT

Signs are to be installed in locations as agreed to in the Traffic Control Plan. All signs are to be removed, covered, or folded when operations are not in progress or the sign message is not applicable. Signs should generally be located on the right-hand side of the roadway. When special emphasis is needed, signs may be placed on both the left and right sides of the road. Sign message shall be clearly visible to road users, mounted on posts or portable sign stands.

Figure 1: Lateral offset and mounting height for warning signs on rural roads.



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SIGN LOCATION

Signs must be located 100-500 feet prior to the temporary traffic control activity based on speed, (both ends of a through road) to warn traffic and allow for adequate perception and reaction time of the driver as listed in Figure 2: Table 4A.1 (EM7100-15). Minimum spacing will be agreed to in writing by the Contract Administrator or Engineering Representative.

Figure 2: Table 4A.1 Recommended Spacing of Advance Warning Signs

Table 4A.1—Recommended spacing of advance warning signs

Speed limit or prevailing approach speed (mph)	Distance from the TTC activity area to the first sign and between subsequent signs in a series (feet)
25 or less	100
30 to 45	350
45 to 50	500

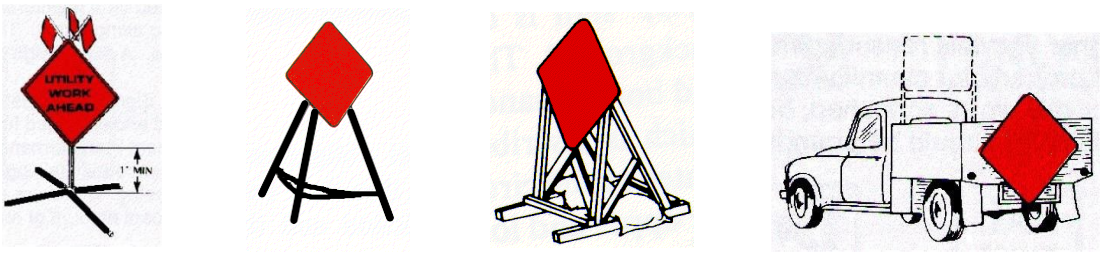
Refer to the MUTCD, chapter 6C for State and county highways and speeds greater than 50 mph.

SIGN SUPPORTS

POSTS: Signs are to be mounted on separate posts. Supplemental signs such as Speed Advisory plates are to be mounted on the same post as the primary sign. ***Do not mount signs on trees or other signs.*** Posts may be wood, metal, carsonite or similar material and must meet breakaway standards if within the clear zone. Wood posts that are 4 inches by 4 inches or have a cross-sectional area of 24 square inches or smaller are considered to meet breakaway standards when installed in normal soil conditions.

TEMPORARY/PORTABLE SUPPORTS: Portable supports may be used for short-term, short-duration, and mobile conditions. MUTCD defines this time period as one work shift, 12 hours or less. All portable supports must meet MUTCD standards, including breakaway. These must be a minimum of 1 foot above the road surface or more if visibility requires it.

Figure 3: Examples of Temporary/Portable Supports



SIGN SIZES

Sign sizes are dependent on speed of the road and road type as shown in Figure 4: Table 4-1 (EM7100-15) of which a portion of the table is shown below. Larger signs may be used whenever necessary for greater legibility or emphasis.

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Figure 4: Table 4-1 Temporary Traffic Control Sign Sizes

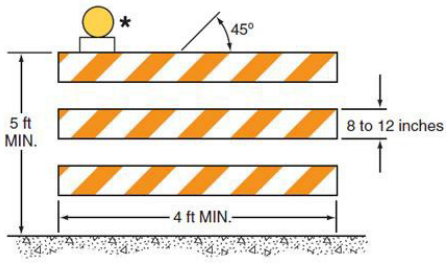
Table 4-1—Temporary Traffic Control sign sizes by road type

Message or Symbol	Sign code or series	Conventional road sign sizes (inches)	Low-volume roads	
			Typical sign sizes (inches) = or >35 mph	Minimum sign sizes (inches) <35 mph
REGULATORY				
TRAFFIC CONTROL POINT	EM-3	30 x 24	30 x 24	30 x 24
WARNING				
LOGGING OPERATIONS	FW11-10a	36 x 36	36 x 36	30 x 30
LOG TRUCKS	FW11-10b	36 x 36	36 x 36	30 x 30
LOG TRUCKS ENTERING ROAD	FW11-10c	36 x 36	36 x 36	30 x 30
HEAVY TRUCK TRAFFIC	FW11-10d	36 x 36	36 x 36	30 x 30

BARRICADES

Type 3 barricades are used to close or partially close roads for TTC activities. Type 3 barricades are a minimum length of 48 inches with 6 stripes. Traffic control signs may be installed on Type 3 barricades. Refer to the MUTCD, section 6F.03. Typical signs installed on these barricades include:

- ROAD CLOSED, AREA CLOSED
- ROAD CLOSED TO THRU TRAFFIC
- LOCAL TRAFFIC ONLY
- DETOUR
- ONE WAY



Type 3 Barricade
*warning light optional

Appendix C –Road Maintenance T-Specs & Traffic Safety Requirements

TYPICAL SIGNS

The signs below are not a complete listing of signs that may be needed The use of specific signs and their locations will be agreed to in writing by the Contract Administrator or Engineering Representative. Sign numbers are from MUTCD. An 'F' before the sign number indicates a Forest Service sign and the last number indicates sign size, generally in the horizontal direction. The sign sizes in the signs below are for low- volume roads with a speed of less than 35 mph. Larger signs may be used whenever necessary for greater legibility or emphasis.

Figure 5: Typical signs that meet the intent of Contract Provision B6.33, Safety

FW11-10a-30

FW11-10b-30

FW11-10d-30

FW11-10c-30

W22-1-36

W22-3-30

W20-1-30

W21-3-30

FR5-11-c 42

W7-3a-24*

W13-1P-18**

W16-2P-24*

* Specify Distance
** Specify Speed