



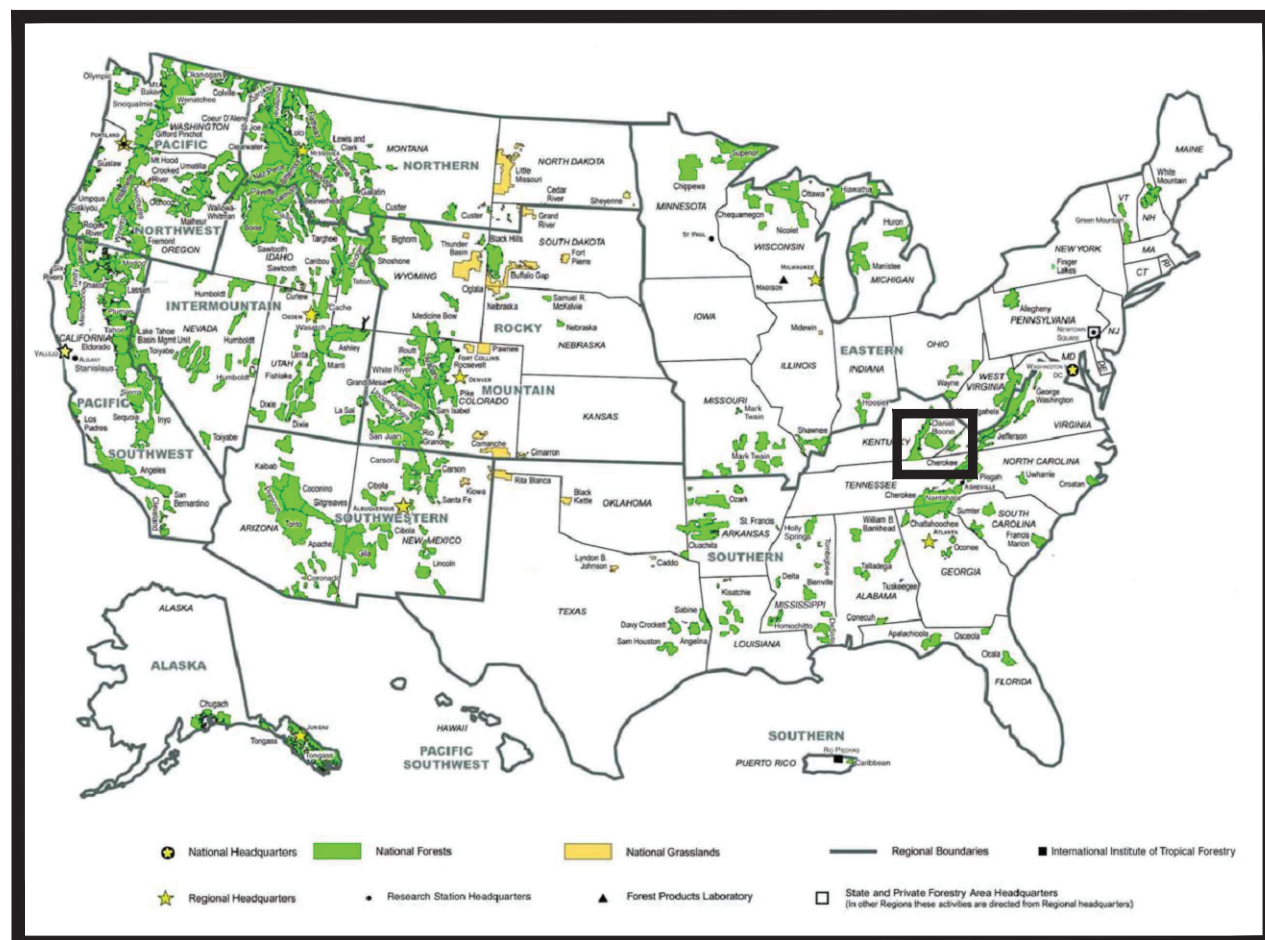
**United States Department of Agriculture
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KENTUCKY

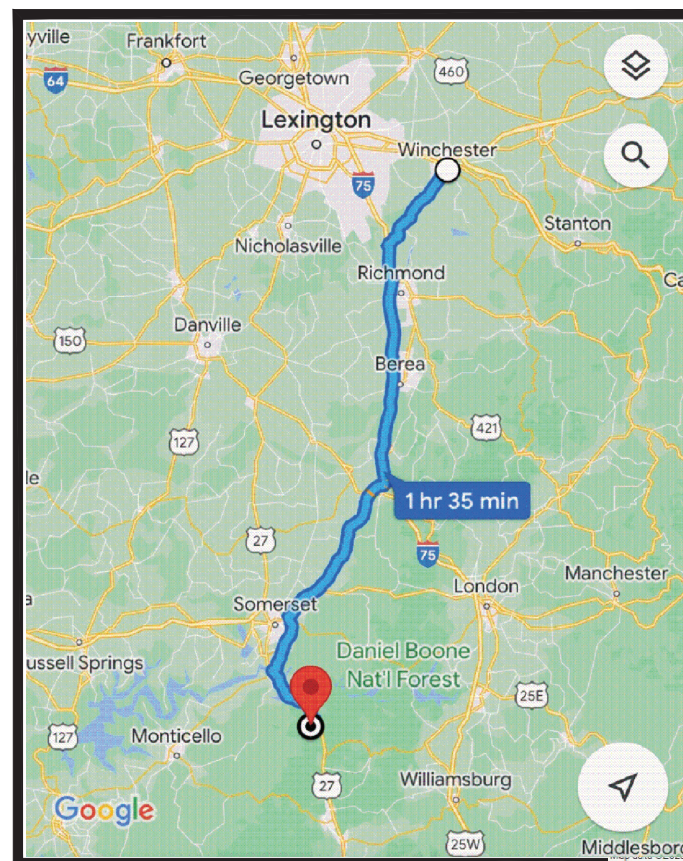
**R-8 SOUTHERN REGION
DANIEL BOONE
STEARNS DISTRICT**

Buck Knob

FOREST LOCATION



FOREST LOCATION



AREA MAP

TRAVEL DIRECTIONS:

FROM WINCHESTER: FROM BOONE AVE, TURN RIGHT ON I 75 S RAMP TO KNOXVILLE AND PROCEED FOR 32 MILES. TAKE EXIT 62 FOR US-25 S TOWARD KY-461/ MT VERNON AND PROCEED 0.4 MILES. TAKE A RIGHT AT THE FORK FOR MT VERNON, AND CONTINUE STRAIGHT FOR 0.7 MILES. STAY RIGHT AT FORK WITH KY 461 S/ LAKE CUMBERLAND ROAD AND CONTINUE FOR 24 MILES. TURN LEFT ON KY 1247 S, PROCEED FOR 4 MILES. TURN RIGHT ONTO US 27 S TOWARD WHITLEY CITY. PROCEED FOR 10 MILES. TURN RIGHT ONTO HWY 27, AND THEN TAKE A RIGHT ON TO BUCK KNOB TOWER ROAD. PROJECT IS ADJACENT TO BUCK KNOB TOWER ROAD.

INDEX OF SHEETS

SHEET	SHEET TITLE	DATE
1	Title Sheet	02/28/2023
2	Vicinity Map	02/28/2023
3	Estimated Quantities	02/28/2023
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6 – 7	Construction Staking	02/28/2023
8	NFSR #5104 Straightline	02/28/2023
9–11	NFSR #5104 Plan and Profile	02/28/2023

APPROVED BY:
SUNDAY STREET
FOREST ENGINEER

(Digitally signed)
Digitally signed by SUNDAY STREET
Date: 2023.07.10 14:38:56 -04'00'

DISTRICT RANGER

DATE

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R8
SOUTHERN REGION

STAMPS, LOGOS, AND SEALS

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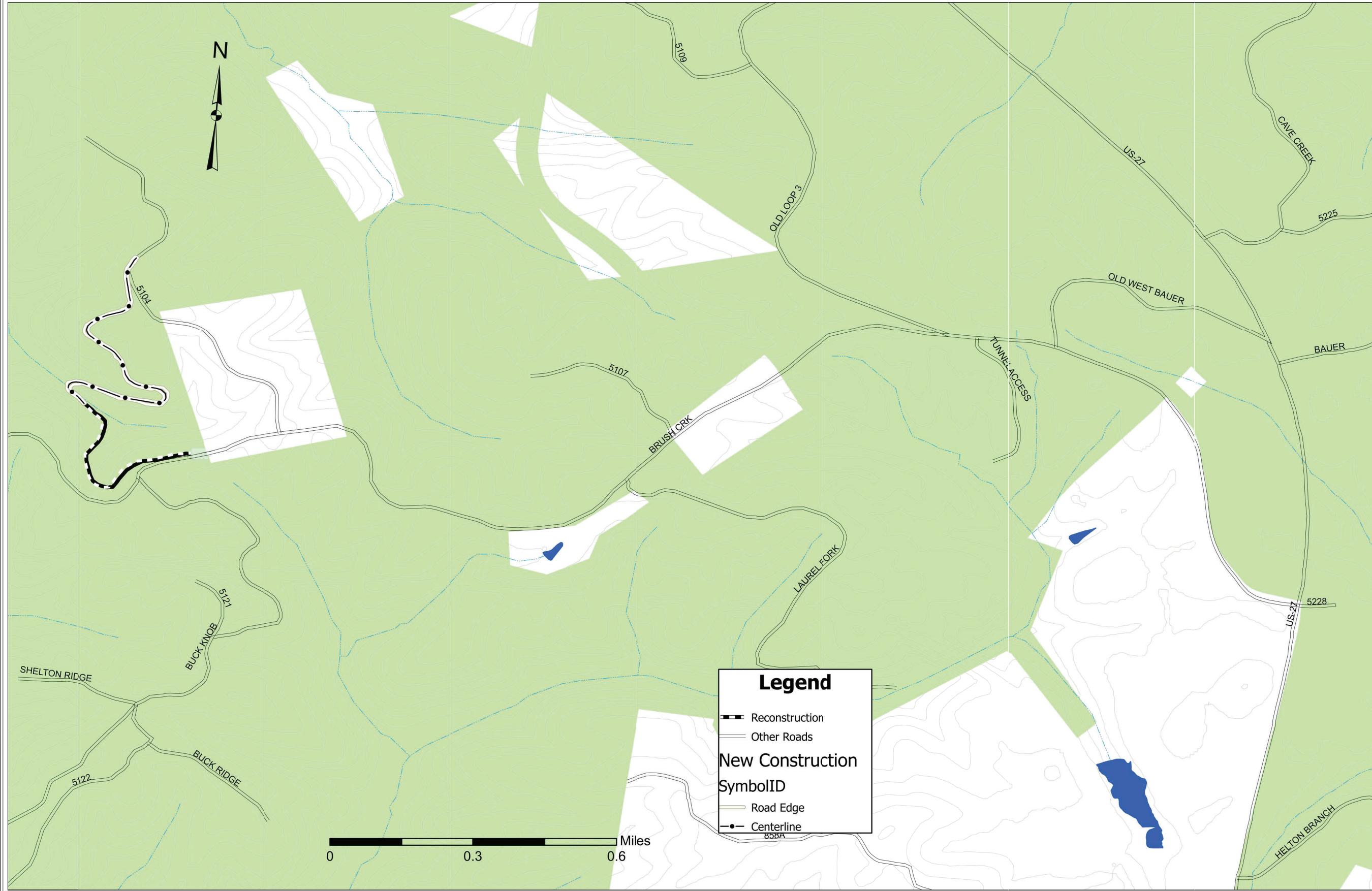
PROJECT NAME
BUCK KNOB

DANIEL BOONE NATIONAL FOREST

STEARNS DISTRICT

DRAWING TITLE
VICINITY MAP

DATE 11/30/2022	ARCHIVE NO. FS090523_R102013_L1-002.dwg
DESIGNER R. STONE	DRAWING SHEET NO. 2
DRAWN R. STONE	
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PROJECT NO.	SHEET 2 OF 11



Legend

- Reconstruction
- Other Roads

New Construction

SymbolID

- Road Edge
- Centerline

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PROJECT ESTIMATED QUANTITIES

STAMPS, LOGOS, AND SEALS

Road Number	Mobilization ...Lump Sum	Construction Survey and Staking, Method II, Tolerance E ... Mile	Clearing and Grubbing, Disposal Method(f) for Brush, Tops and Limbs, Logs and Stumps. Disposal Method(i) For Logs Meeting Utilization Standards ...Mile	Clearing and Grubbing, Disposal Method(f) for Brush, Tops and Limbs, Logs and Stumps. Disposal Method(i) For Logs Meeting Utilization Standards ...Acres	Roadway Excavation, Placement Method 3 ...Cubic Yard	Roadway Excavation, Placement Method 3 ...Mile	Construct Outsloped Grade Dip ...Each	Haul and Place Riprap, Class 3 (Commercial Source) ...Each	Hual and Place Crushed Aggregate Grading B, Compaction Method A (Commercial Source)Cubic Yard	Roadway Reconditioning, ...Mile	18 Inch Corrugated Steel Pipe, 0.064 Inch Thickness, Compaction Method 6 ...Linear Foot	24 Inch Corrugated Steel Pipe, 0.064 Inch Thickness, Compaction Method 6 ...Linear Foot	48 Inch Corrugated Steel Pipe, 0.064 Inch Thickness, Compaction Method 6 ...Linear Foot	Seeding, Dry Method with Mulch ...Acre	Furnish and Install Road Closure Device, Type 16' Steel Gate ...Each
	15101	15211	20103	20104	20401	20402	20426	25101	30102	30322	60256A	60256B	60256C	62556	65001
5104(R)	1.00		0.33			0.33			90	0.33	40	30			1.00
5104(C)		0.64		3.68	6240		1.00	20	150		64		54	0.61	
Totals	1.00	0.64	0.33	3.68	6240.00	0.33	1.00	20.00	240.00	0.33	104.00	30.00	54.00	0.61	1.00

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PROJECT NAME
BUCK KNOB

**DANIEL BOONE
NATIONAL FOREST**

STEARNS DISTRICT

DRAWING TITLE
ESTIMATED QUANTITIES

DATE 11/30/2022	ARCHIVE NO. FS090523_R102013_L1-002.dwg
DESIGNER R. STONE	DRAWING SHEET NO. 3
DRAWN R. STONE	
CHECKED S. STREET	
PROJECT NO.	SHEET 3 OF 11

CONSTRUCTION NOTES

SECTION 201 – CLEARING and GRUBBING: For existing roads to be reconstructed, see the clearing limits details on the Typical Sections to the right. The E.R. may designate individual trees that will remain within the clearing limits in sensitive areas adjacent to streams.

SECTION 204 – EXCAVATION and EMBANKMENT: This work includes: widening of the road subgrade to a minimum width of 14 feet, improving turning radii, curve widening and intersections to accommodate loaded log trucks, reshaping of the existing road template to facilitate proper drainage to ditch lines and culverts, and reconstructing all existing turnouts and turnarounds. Obtain cover material if needed for culvert installations from cut banks or roadbeds, as directed by the E.R. Remove all berms unless otherwise directed by the E.R.

Reconstruct ALL ditchlines to the dimensions shown in the typical sections unless the E.R. otherwise agrees.

SECTION 303 – ROAD RECONDITIONING: Clean ALL culvert inlets and outlets. Remove vegetation from the ends of the culverts and remove material down to the inverts. Clean culvert catchbasins.

SECTION 602 – CULVERTS and DRAINS: Payment for removal of log culverts encountered during new culvert installations is considered indirect to the corrugated metal pipe pay item. Dispose of log culverts as directed by the E.R.

SECTION 625 – TURF ESTABLISHMENT: Use certified weed free seed mix shown on this sheet. Use certified weed free straw bales for mulch. Application rate for mulch is 1 bale per 400 square feet (109 bales per acre). Seed and mulch after September 30 and before May 31. Seed and mulch all disturbed areas that are 1V:1H and flatter. Seed at a rate between 75-125 Pounds per Acre

Obtain and Mix seed with specifications listed below:

2 parts Winter Wheat

1 part Annual Rye

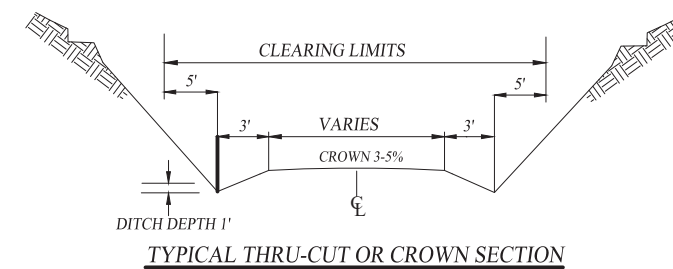
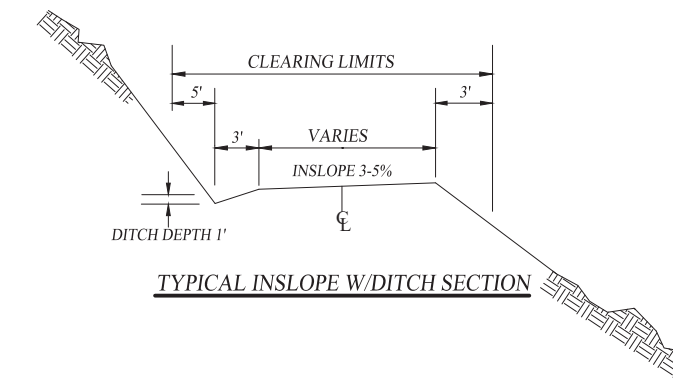
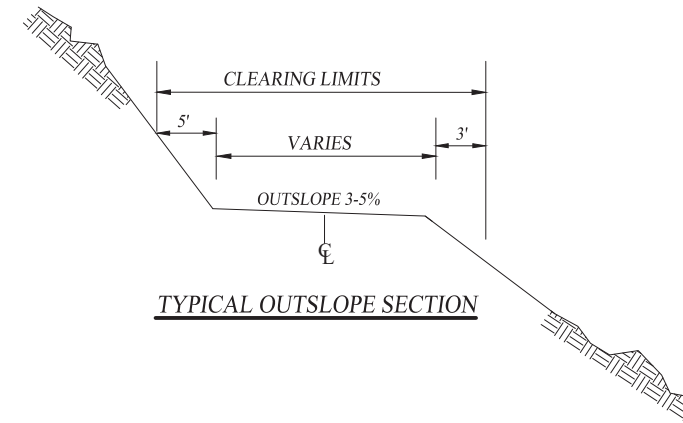
Mix can include oats and cereal rye

USFS May add native species to seeds for landing. To be determined by ER.

USE OF PUMPS: Portable pumps must be placed in a secondary containment vessel with sufficient volume to contain the contents of the fuel tank. All pumps used on the project must be outfitted with a suction screen that has a maximum opening size of 3/32". The only approved water sources will be designated by the E.R.

FUEL STORAGE AND REFUELING: Storage of fuel and other toxicants within Riparian Conservation Areas (RCA) is prohibited. Definition of RCA - an area within a slope distance of 300 feet of perennial streams or within a slope distance of 150 feet of intermittent streams. Refueling of equipment may be done within the RCA only at approved locations. Service trucks may not be parked overnight within RCA's, and must carry spill containment kits that are designed for the type of contaminants present and the potential spill volume. Before beginning any work, submit a hazardous spill plan in accordance with FSSS 107.10.

Road Templates with Clearing Limits for Reconstruction



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NATIONAL FOREST**

STEARNS DISTRICT

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CONSTRUCTION NOTES

DATE: 11/30/2022 ARCHIVE NO.: FS090523_R102013_L1-002.dwg

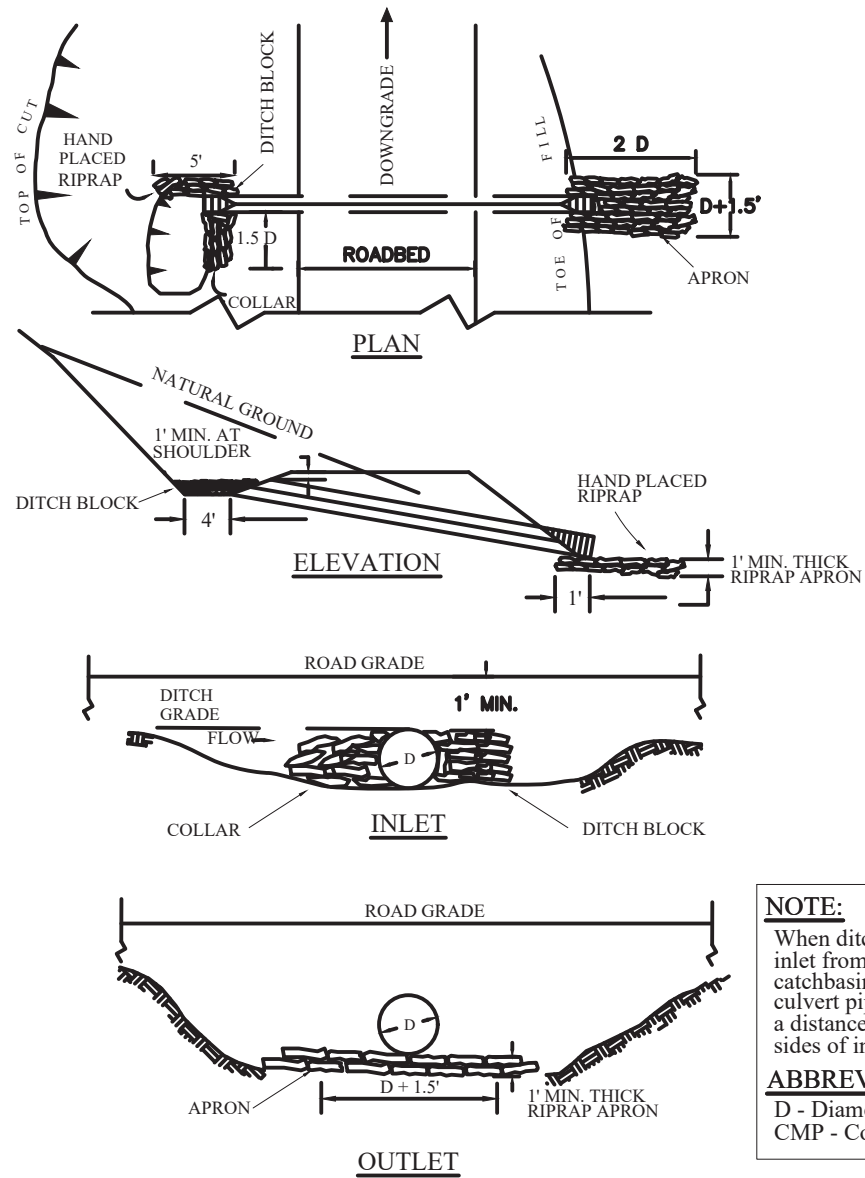
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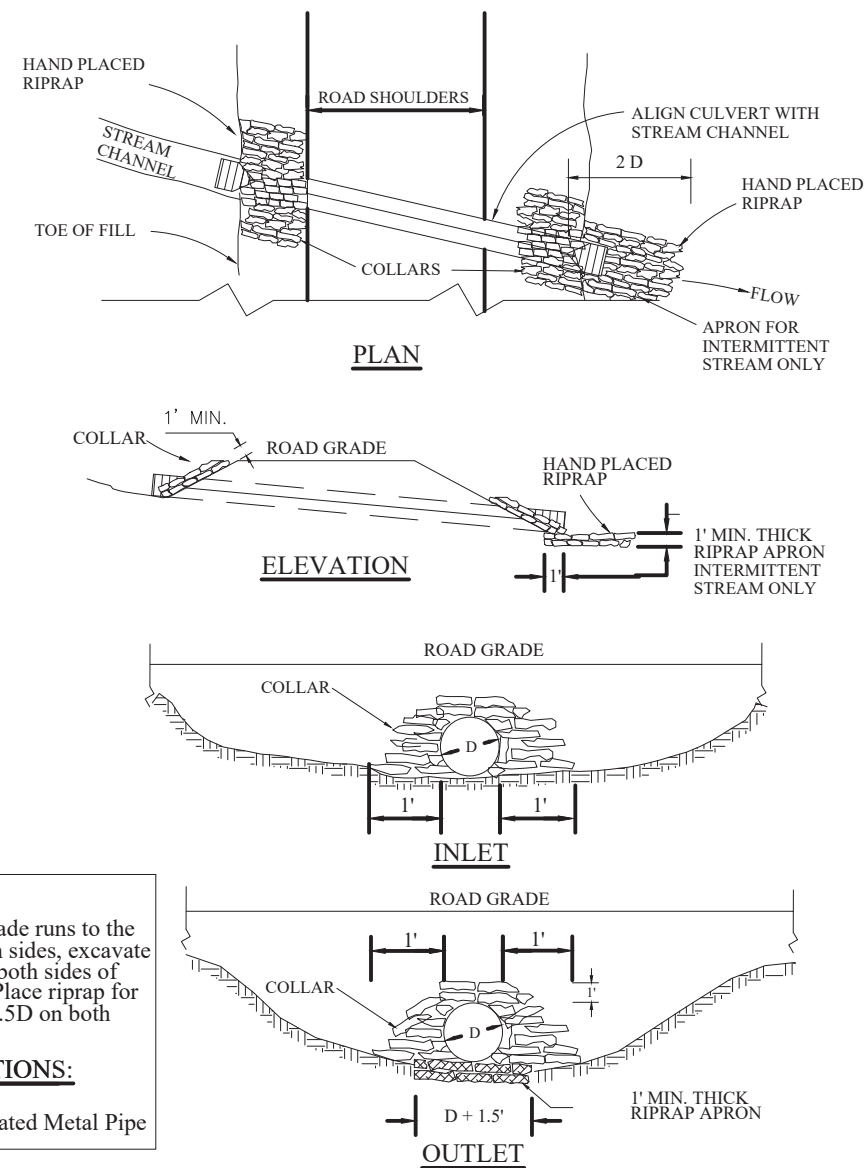
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PROJECT NO.: SHEET 4 OF 11

DITCH RELIEF CULVERT

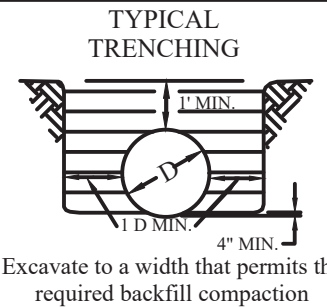


THROUGH FILL CULVERT



NOTE:
When ditch grade runs to the inlet from both sides, excavate catchbasin on both sides of culvert pipe. Place riprap for a distance of 1.5D on both sides of inlet.

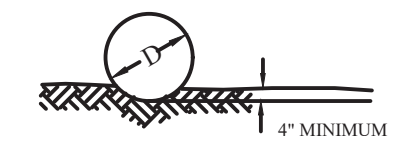
ABBREVIATIONS:
D - Diameter
CMP - Corrugated Metal Pipe



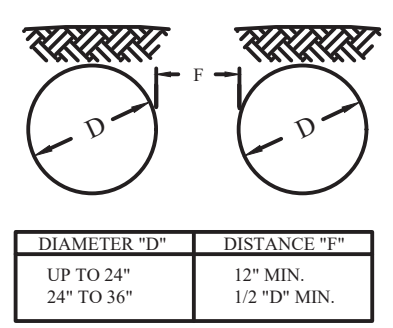
OUTLET DITCH NOTES

Construct V-shaped outlet ditch with 1V:3H side slopes. Round tops of slopes to blend with natural ground.

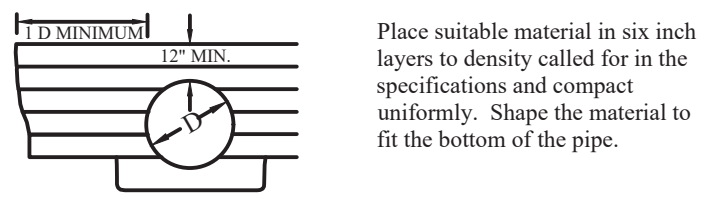
TYPICAL BEDDING DETAIL



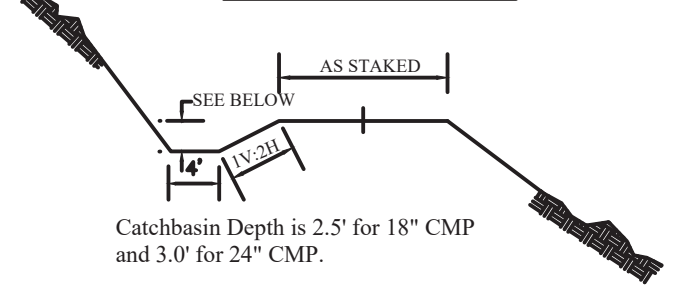
DUAL INSTALLATION



TYPICAL BACKFILL DETAIL



TYPICAL CATCH BASIN



These drawings and details are standard for corrugated metal pipe up to 48" diameter.

GENERAL NOTES

Indirect Work Items: Hand placed riprap, catchbasin construction, and pipe culvert excavation are considered indirect work items to corrugated metal pipe installations. The cost of indirect items will **not** be paid for separately.

Hand Placed Riprap: Construct riprap collars and aprons, as shown on the Drainage Summary Sheets, on all new culvert installations. Construct riprap collars to lay on the fill slope as shown in the elevation view. Riprap collars are **not** vertical walls. Furnish stone used for Hand Placed Riprap that is hard, durable, angular rock and is resistant to weathering and water action and free of organic or other unsuitable material. There is no gradation requirement for Hand Placed Riprap. Individual stones shall weigh approximately 20 to 50 pounds.

Flow Grade: Install pipe with a minimum flow grade of 2%. Preferred flow grade is 8% where possible.

Damaged Spelter: Remove the damaged or corroded ends of existing galvanized corrugated metal pipe to be extended. If the damaged end is flame cut, wire brush the burned spelter down to clean metal and paint the area with two coats of high zinc content paint.

Live Stream Culvert Installations: Prior to the start of construction, submit a written plan that provides permanent and temporary erosion control measures to minimize erosion and sedimentation during and after construction. Do not begin work until the necessary controls for that particular phase of work have been implemented. Do not modify the type, size, or location of any control. Submit an alternate erosion control plan with all necessary permits 30 days before intended use. Incorporate all permanent erosion control features into the project at the earliest practicable time, as outlined in the approved plan. When erosion control measures are not functioning as intended, immediately take corrective action. Use temporary channels, temporary culverts, earth berms, pumps, sandbags, or other methods to divert the flow of live streams. Use a minimum of 2 Sedimats or other approved products downstream of the installation to minimize sediment transport.

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BUCK KNOB

DANIEL BOONE NATIONAL FOREST

STEARNS DISTRICT

DRAWING TITLE

CONSTRUCTION NOTES

DATE	ARCHIVE NO.
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DRAWING TITLE
STAKING NOTES PG 1

DATE: 11/30/2022 ARCHIVE NO.: FS090523_R102013_L1-002.dwg

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PROJECT NO.	

NOTES:

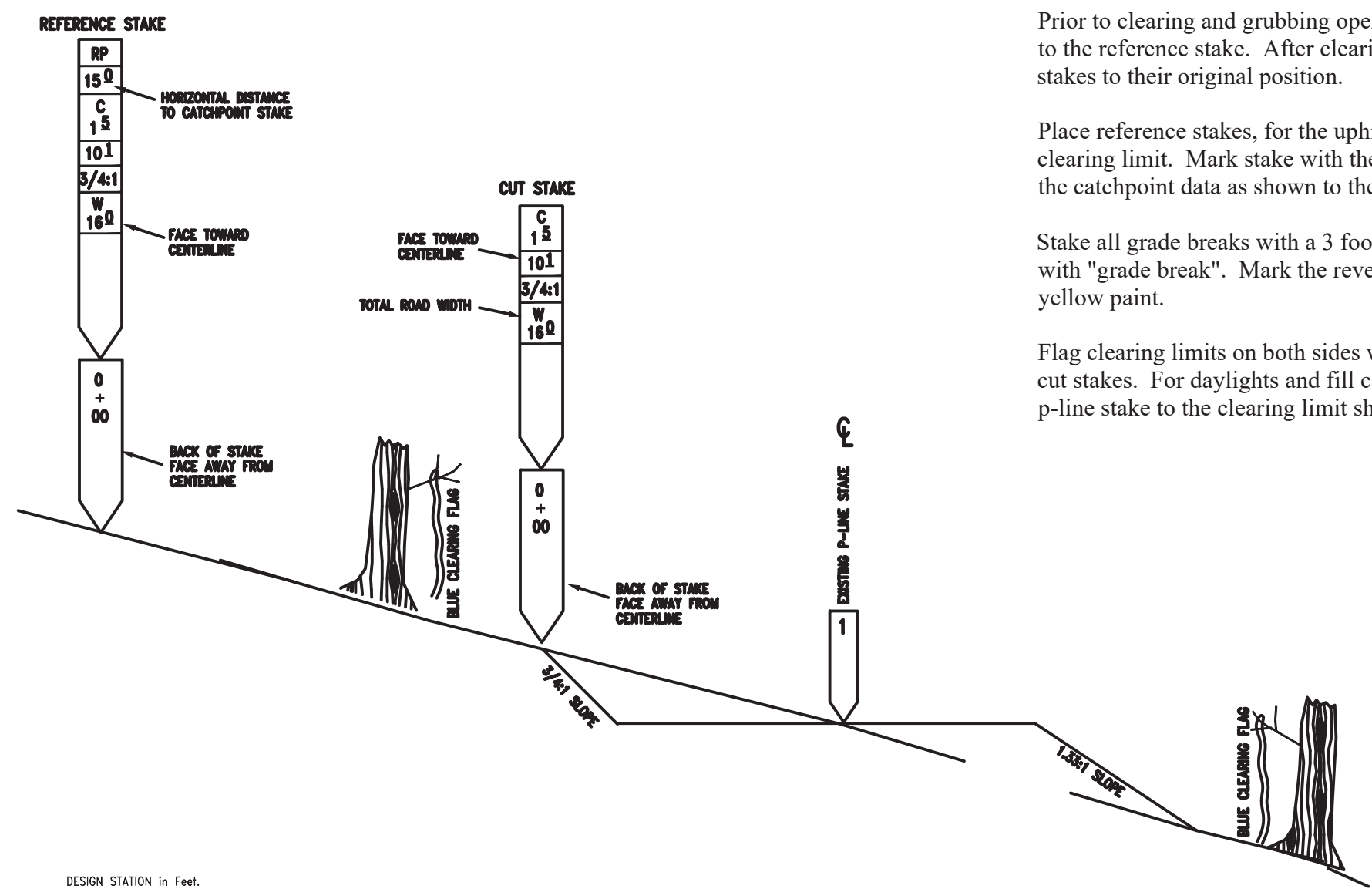
Establish slope stake catchpoints for uphill side only by using the theoretical slope distance from the p-line stake to the catchpoint shown in the slope stake notes. Paint all catchpoint slope stakes orange.

Prior to clearing and grubbing operations, move the slope stake outside the clearing limits to the reference stake. After clearing and grubbing and before excavation, reset the slope stakes to their original position.

Place reference stakes, for the uphill side only, a minimum of 10 feet outside the uphill clearing limit. Mark stake with the horizontal offset distance to the catchpoint stake and the catchpoint data as shown to the left. Paint all reference stakes with yellow paint.

Stake all grade breaks with a 3 foot lath. Mark the side of the lath that faces centerline with "grade break". Mark the reverse side with the design station and paint all with yellow paint.

Flag clearing limits on both sides with blue flagging. Clearing limits are 5 feet beyond all cut stakes. For daylight and fill catchpoints measure out the slope distance from the p-line stake to the clearing limit shown in the staking notes.



DESIGN STATION in Feet.
Convert to Stationing for
Labelling Stakes (i.e. for
1034, place 10+34 on Stakes)

THEORETICAL
CATCHPOINT DATA
(for Left side)

THEORETICAL
CATCHPOINT DATA
(for Right side)

P-LINE SECTION NO.

P-Line Section No.	L-Line Station	Slope Distance		Theoretical Catch Point Data -LEFT					Theoretical Catch Point Data -RIGHT					Slope Distance	
		To Clrg	To Catch Pt	Cut/Fill	Depth	Dist	Slope	Rd Width	Cut/Fill	Depth	Dist	Slope	Rd Width	To Catch pt	To Clrg
1	0	20.4	10.2	C	1.5	10.1	3/4:1	16	C	0	7	3/4:1	16	7	12.4
2	42	22.2	12	C	1.1	12	3/4:1	18	C	0.2	7.1	3/4:1	18	7.2	12.4
3	75	31.8	21.6	F	2.4	16.2	1.33:1	20	C	1.5	8.2	3/4:1	20	3.2	8.2

SAMPLE SLOPE STAKE NOTES PRINTOUT



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DRAWING TITLE
STAKING NOTES PG 2

DATE 11/30/2022	ARCHIVE NO. FS090523_R102013_L1-002.dwg
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PROJECT NO.	SHEET 7 OF 11

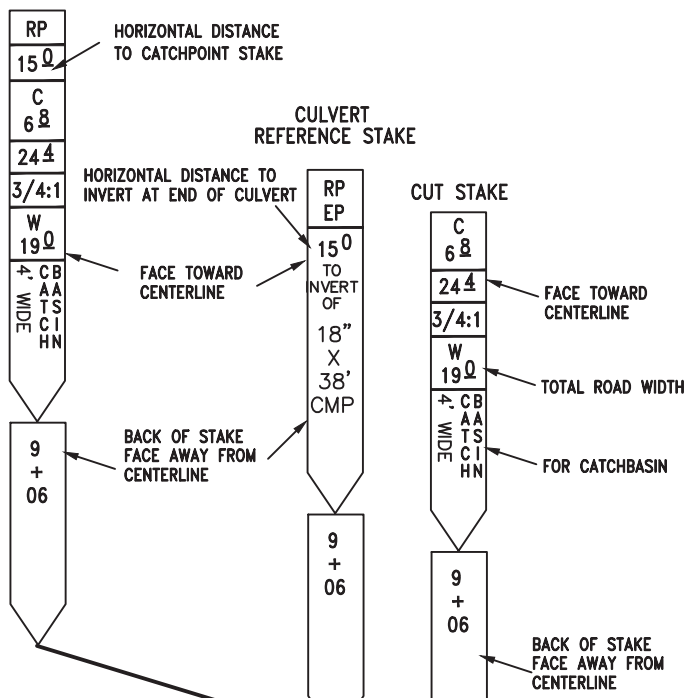
NOTES:

Staking Culverts: Determine the actual catch points for each side within the specified tolerance, using the theoretical catchpoint data provided as an initial starting point. Set culvert reference stakes at all culvert locations. Set a culvert reference stake on the flowline of the culvert 10 feet from each end or outside the clearing limits, whichever is greater. Record the following on these stakes:

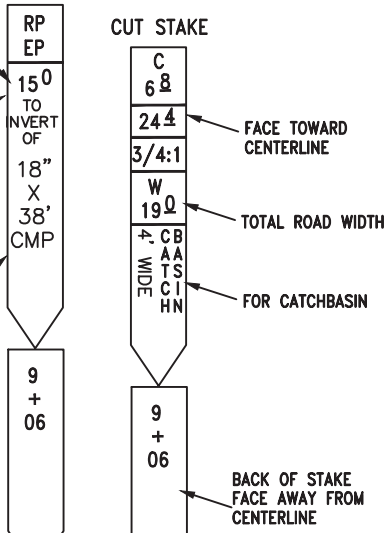
- (a) Horizontal distance from the reference stake to the invert at the ends of the culvert.
- (b) Diameter, length, and type of culvert.
- (c) Stationing of centerline point.

Paint culvert and slope reference stakes with yellow paint. Paint cut and fill slope stakes with orange paint.

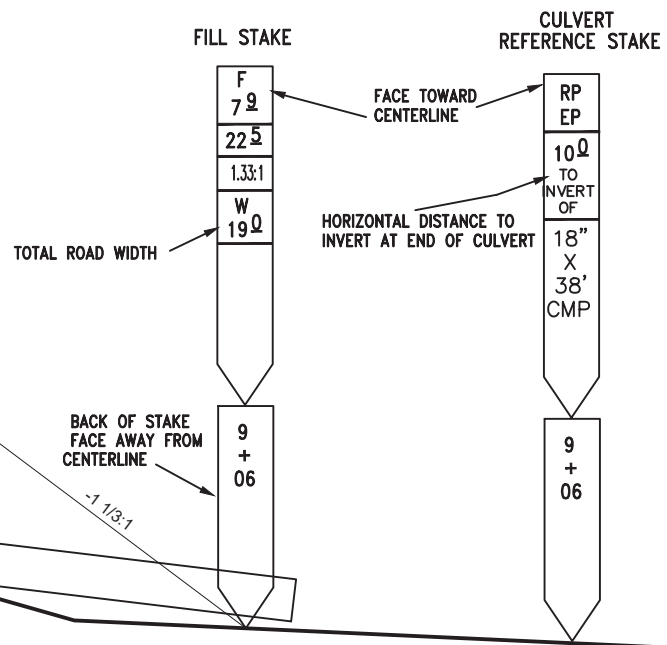
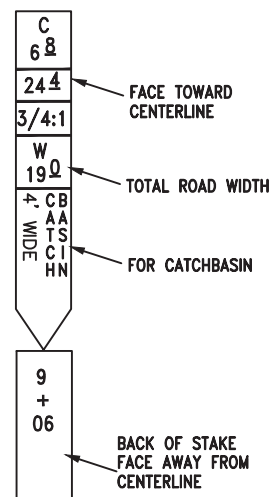
REFERENCE STAKE for CUT STAKE



CULVERT REFERENCE STAKE



CUT STAKE



Offset Distance from P-Line to L-Line

P-LINE SECTION NO.	Index: 32	H. Offset: 2.5 Right	Finished CL Elev: 5375.1	Cut Dp: -3.6			
L-Stn: 9+06		P Ground Elev: 5372.0	L-Gnd Elev: 5371.5	Cul Cmt: Install 18" x 38'			

DESIGN STATION in Feet.
Convert to Stationing for
Labelling Stakes (i.e. for
906, place 9+06 on Stakes)


THEORETICAL
CATCHPOINT DATA
(for Left side)

THEORETICAL
CATCHPOINT DATA
(for Right side)

P-Line Section No.	L-Line Station	Slope Distance		Theoretical Catch Point Data -LEFT				Theoretical Catch Point Data -RIGHT				Slope Distance			
		To Clrg	To Catch Pt	Cut/Fill	Depth	Dist	Slope	Rd Width	Cut/Fill	Depth	Dist	Slope	Rd Width	To Catch pt	To Clrg
32	906	29.3	24.1	C	6.8	24.4	3/4:1	19	F	7.9	22.5	1.33:1	19	25.5	35.4
33	916	12.7	7.4	C	2.8	9.1	3/4:1	19	F	8.1	22.3	1.33:1	19	25.8	36.2
34	954	20.1	14.6	C	8.4	13.3	3/4:1	16	F	5.5	16.6	1.33:1	16	18.3	29.4

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ROAD NO.	STATION	ITEM NO.	QUAN	UNIT	DESCRIPTION OF WORK	REMARKS
5104(R)	0+00 - 17+20	20103	0.33	Mile	Clearing and Grubbing, Disposal Method (f) for brush, tops, limbs, and stumps. Disposal Method (i) for logs meeting utilization standards.	See Typical Sections & Construction Notes
	0+00 - 17+20	20402	0.33	Mile	Roadway Excavation- Compaction Method 3	This work consists of excavating material and constructing embankments, removing berms, constructing new ditch lines, and reshaping existing road templates. Widen the road subgrade to a minimum of 14 feet, improve intersections, turning radii, and widen curves to accomodate loaded log trucks.
	0+00 - 17+20	30322	0.33	Mile	Road Reconditioning	Recondition all turnouts, grade dips, and ditch lines. Clean and recondition all culvert catch basins, outlets, lead out ditches, and cattle guards.
	0+00				Begin Road Reconstruction	Junction with MCC-55(County Jurisdiction Road)
	0+10	65001	1	Each	Furnish and Install Road Closure Device, Type 16' Stock Gate.	
	5+80	60256B	30	LF	Install 24" Corrugated Steel Pipe. 0.064 Inch Thickness, Compaction Method 6.	
	10+50	60256A	20	LF	Install 18" Corrugated Steel Pipe. 0.064 Inch Thickness, Compaction Method 6.	
	12+00	60256A	20	LF	Install 18" Corrugated Steel Pipe. 0.064 Inch Thickness, Compaction Method 6.	
	17+20				End Reconstruction	
	17+20				Begin New Construction	See Design Sheets pages 9-11 of the plans.



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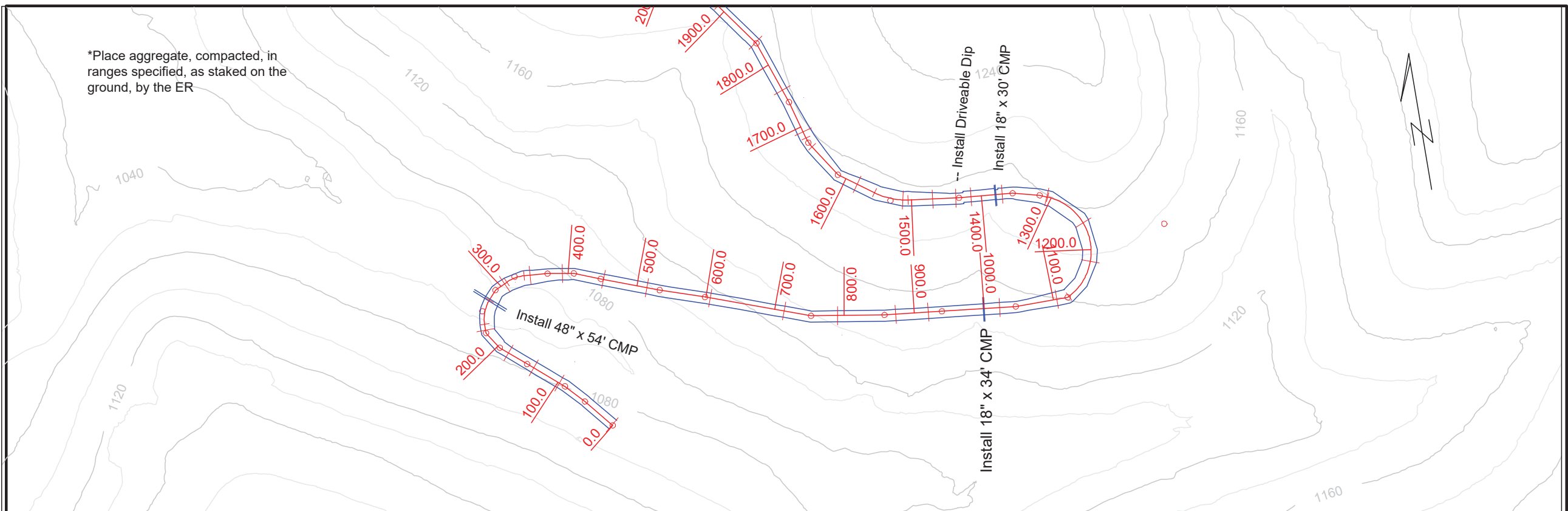
STEARNS DISTRICT

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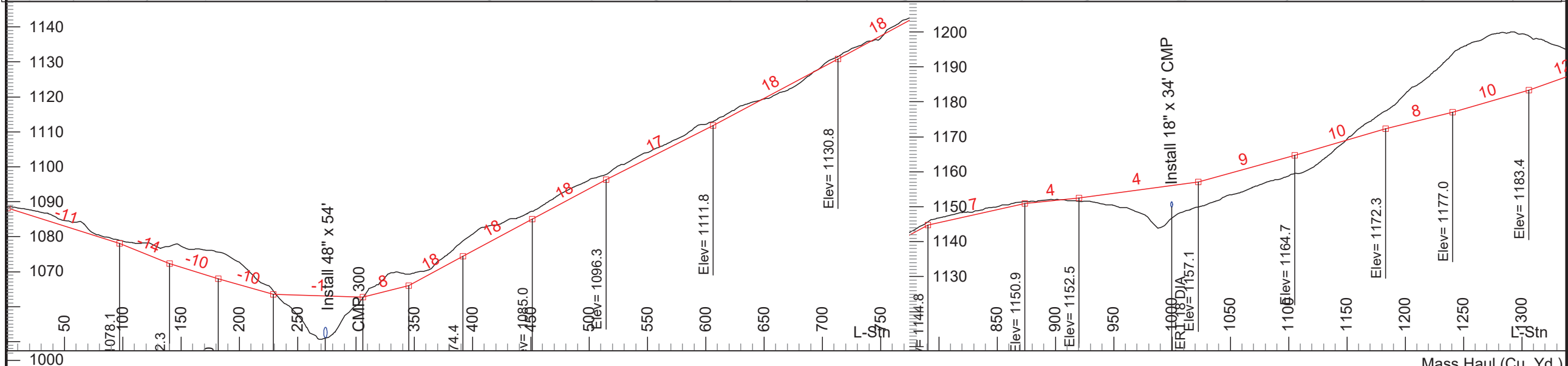
5104(R) Straightline

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DESIGNER R.STONE	DRAWING SHEET NO.
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PROJECT NO.	SHEET 8 OF 11

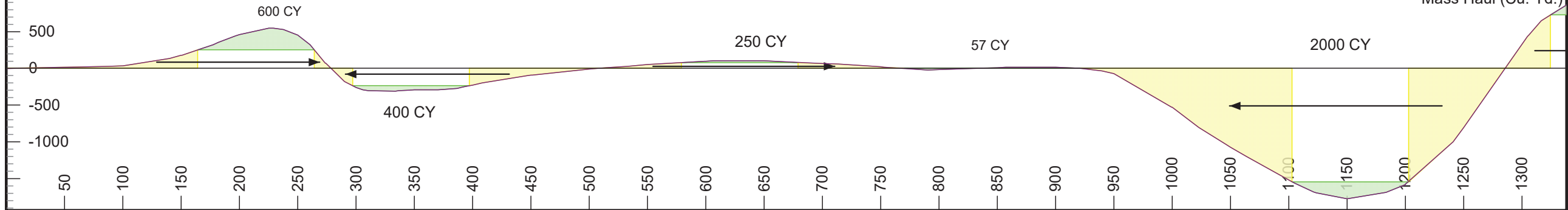
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Description	
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	Profile Topography
	Profile Subgrade
	Profile P-line Topography
	Profile Finished Grade
	Profile Slope Stakes
	Profile Road Edges
	Profile Layer 1
	Profile Layer 2
	Profile Culverts
	Profile Bridge Abutment



Plan Legend	
	Plan L-line Location
	Plan P-line Location
	Plan Slope Stakes
	Plan Road Edges
	Plan Clearing Limits
	Plan Horizontal Projection
	Plan Cross Section Lines
	Plan Reference Shots
	Plan Culverts
	Plan Bridge Abutment



Insert project details here



Station Range	
0.0	1338.6

Profile Vert Scale 1:400
Profile Horz Scale 1:1200

Buck Knob
NFSR 5104 Realignment
Stearns District
Daniel Boone
National Forest

Plan and Profile

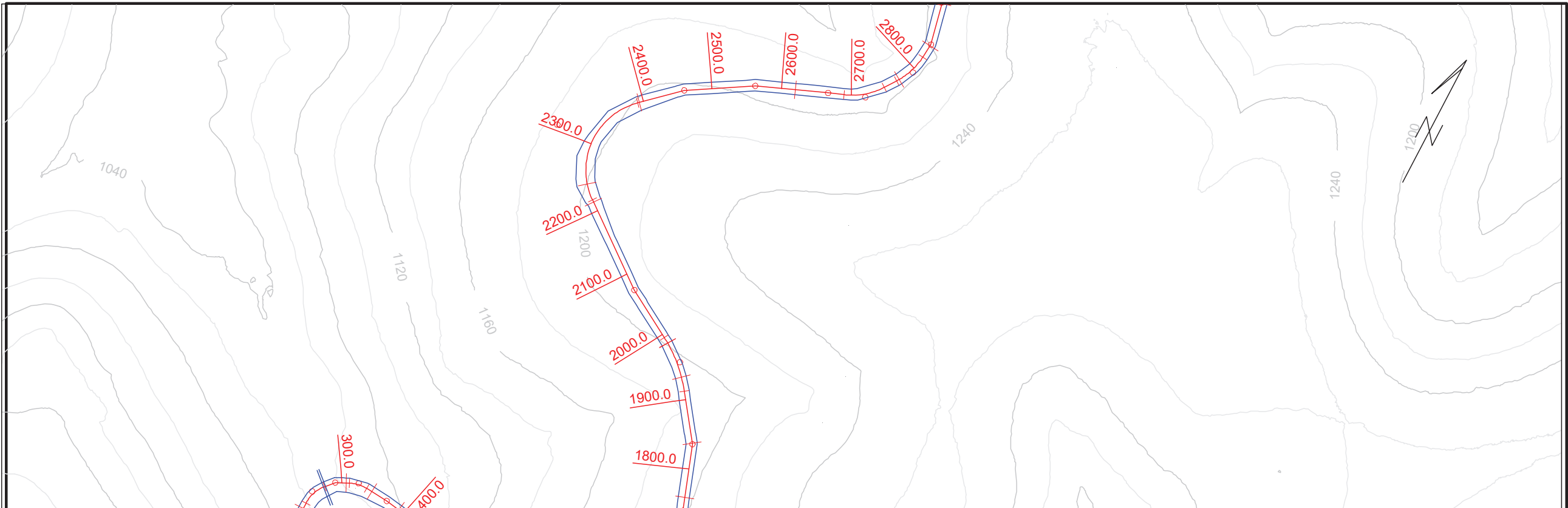
USFS

Designed By: R. Stone

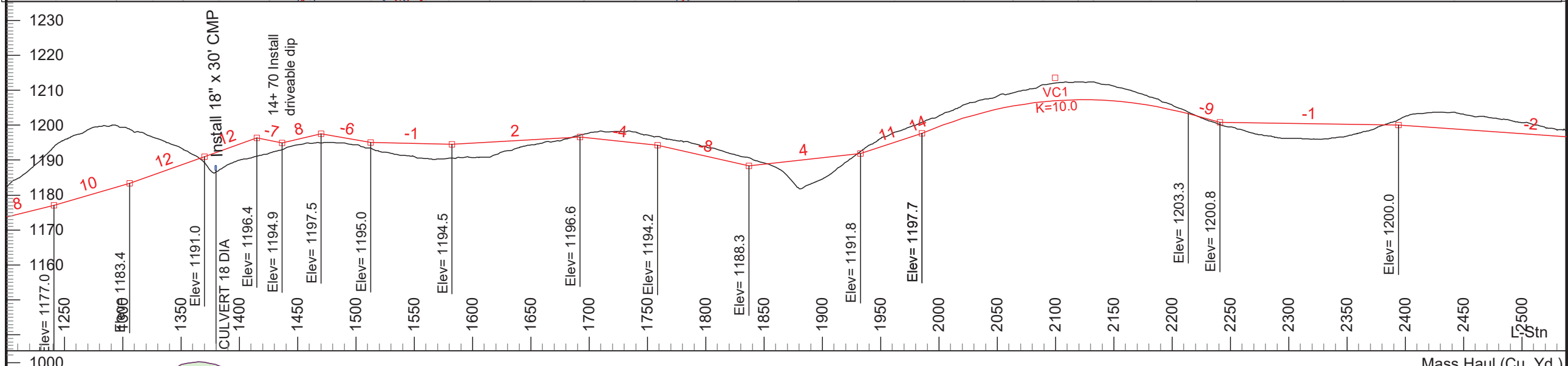
Sheet 9 of 11

23/03/06

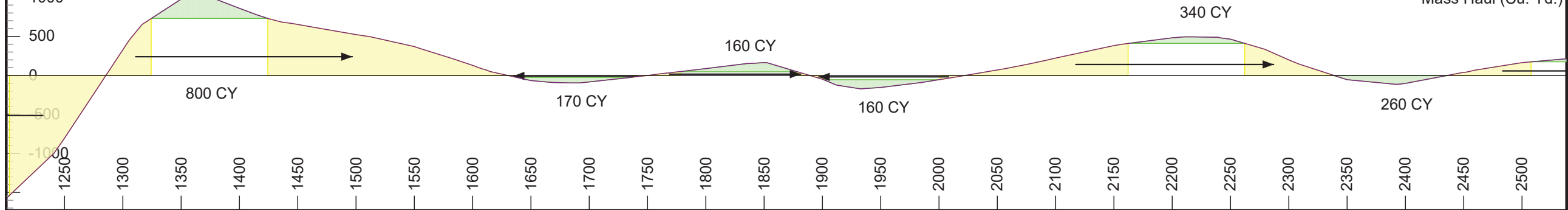
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Description	
Profile Legend	
	Profile Topography
	Profile Subgrade
	Profile P-line Topography
	Profile Finished Grade
	Profile Slope Stakes
	Profile Road Edges
	Profile Layer 1
	Profile Layer 2
	Profile Culverts
	Profile Bridge Abutment



Plan Legend	
	Plan L-line Location
	Plan P-line Location
	Plan Slope Stakes
	Plan Road Edges
	Plan Clearing Limits
	Plan Horizontal Projection
	Plan Cross Section Lines
	Plan Reference Shots
	Plan Culverts
	Plan Bridge Abutment



Insert project details here



Station Range	
1204.7	2543.3

Profile Vert Scale 1:400
Profile Horz Scale 1:1200

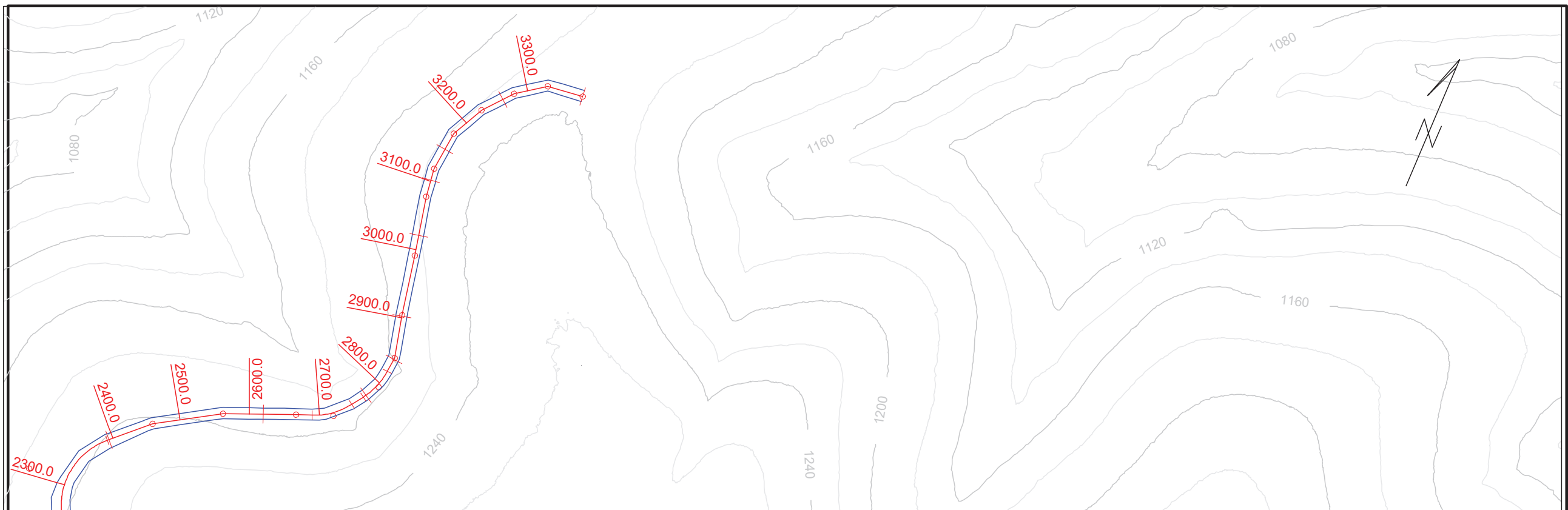
Buck Knob
NFSR 5104 Realignment
Stearns District
Daniel Boone
National Forest

Plan and Profile

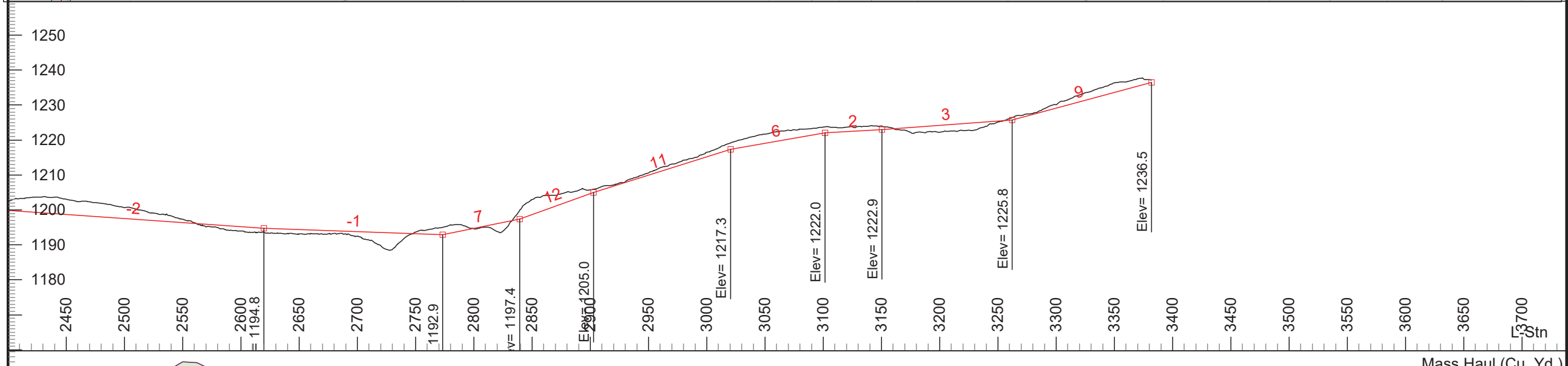
USFS

Designed By: R. Stone	
Sheet 10 of 11	23/03/06

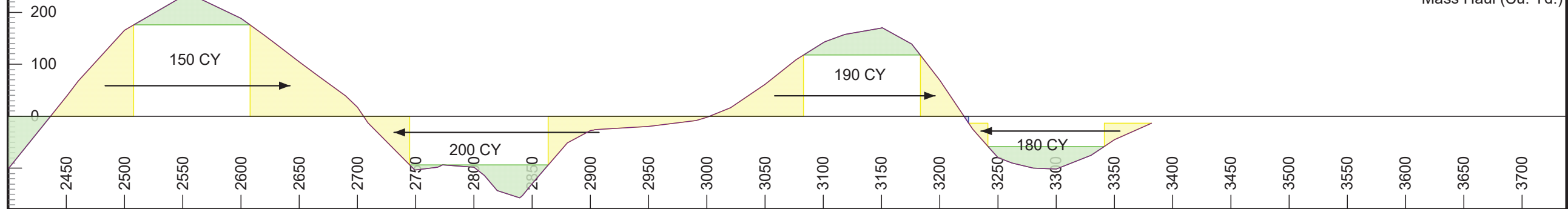
Project Name	
Description	
Profile Legend	
	Profile Topography
	Profile Subgrade
	Profile P-line Topography
	Profile Finished Grade
	Profile Slope Stakes
	Profile Road Edges
	Profile Layer 1
	Profile Layer 2
	Profile Culverts
	Profile Bridge Abutment



Plan Legend	
	Plan L-line Location
	Plan P-line Location
	Plan Slope Stakes
	Plan Road Edges
	Plan Clearing Limits
	Plan Horizontal Projection
	Plan Cross Section Lines
	Plan Reference Shots
	Plan Culverts
	Plan Bridge Abutment



Insert project details here



Station Range	
2409.4	3381.8

Profile Vert Scale 1:400
Profile Horz Scale 1:1200

Buck Knob
NFSR 5104 Realignment
Stearns District
Daniel Boone
National Forest

Plan and Profile

USFS

Designed By: R. Stone	
Sheet 11 of 11	23/03/06

(C and R) ROAD MAINTENANCE PLAN
Buck Knob Timber Sale

T-801 Slide and Slump Removal

The maximum volume of Purchaser responsibility for Slide and Slump repair shall be 50 cubic yards per 100 linear feet of roadway.

No slumps or slides are known to exist. If any occur, a suitable disposal location will be identified for unsuitable material.

T-803 Surface Blading

Designated water sources are shown on the Sale Area Map.

T-806 Dust Abatement

See T-803 for water source.

<u>Road</u>	<u>Type of Material</u>	<u>Application Rate</u>	<u>Frequency</u>
5104	Water	N/A	As Needed
5111	Water	N/A	As Needed

T-809 Waterbars

<u>Road</u>	<u>Number of Waterbars to Construct</u>	<u>Locations</u>
-------------	---	------------------

T-810 Barriers

<u>Road</u>	<u>Earthen Barrier</u>	<u>Location</u>
0+00	NA	

**Additional Road Maintenance Requirements FOR Reconstruction of FSR 5104
Design Criteria and assumptions regarding analysis should be included in the final decision
and implementation for this analysis to be valid.**

1. Road building, on identified plastic soils especially, should occur when the water table is not within 12 inches of the surface or when soil moisture exceeds the plastic limit. Soil moisture exceeds the plastic limit if the soil can be rolled to pencil size (approximately ¼ -inch diameter and 6 inches long) without breaking or crumbling.
2. Keep the first 428' of new road as dry as possible through construction techniques, as well as regular maintenance of gravel cover, ditches, and culverts.
3. Immediately address any rutting issues that occur in the first 428' of the new road. Not doing so could lead to a landslide.

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Preface

Preface_wo_07_17_2019

Delete all but the first paragraph and add the following:

The Forest Service, US Department of Agriculture has adopted FP-14 for construction of National Forest System Roads.

101 – Terms, Format, and Definitions

101.01_National_9_15_2016

Add the following paragraph to Subsection 101.01:

101.01 Meaning of Terms.

Delete all references to the FAR (Federal Acquisition Regulations) in the specifications when incorporating into 2400-6(T) Timber Sale or 2400-13(T) Stewardship contracts.

101.01_National_9_15_2016

Add the following paragraph to Subsection 101.01:

101.01 Meaning of Terms.

Delete all references to the TAR (Transportation Acquisition Regulations) in the specifications.

101.03_National_4_7_2015

Add the following to Subsection 101.03:

101.03 Abbreviations.

(a) Acronyms.

AGAR — Agriculture Acquisition Regulations
AFPA — American Forest and Paper Association
FSAR — Forest Service Acquisition Regulations
MSHA — Mine Safety and Health Administration
NESC — National Electrical Safety Code
WCLIB — West Coast Lumber Inspection Bureau

(f) Miscellaneous unit abbreviations.

MP	—	milepost	location
ppm	—	parts per million	volume
STA		station	location

Make the following changes to Subsection 101.04:

101.04 Definitions.

Delete these definitions and replace the following:

Bid Schedule — The Schedule of Items.

Bridge — A structure, including supports, erected over a depression or an obstruction such as water along a road, a trail, or a railway and having a deck for carrying traffic or other loads.

Contractor — The individual or legal entity contracting with the Government for performance of prescribed work. In a timber sale contract, the contractor is the “Purchaser”.

Culvert — Any structure with a bottom, regardless of fill depth, depth of invert burial, or presence of horizontal driving surface, or any bottomless (natural channel) structure with footings that will not have wheel loads in direct contact with the top of the structure.

Drawings — (Public Works Contracts) Design sheets or fabrication, erection, or construction details submitted to the CO by the Contractor according to FAR Clause 52.236-21 Specifications and Drawings for Construction. Also refers to submissions and submittals.

Notice to Proceed — (Public Works Contracts) Written notice to the Contractor to begin the contract work.

Right-of-Way — A general term denoting (1) the privilege to pass over land in some particular line (including easement, lease, permit, or license to occupy, use, or traverse public or private lands), or (2) Real property necessary for the project, including roadway, buffer areas, access, and drainage areas.

Solicitation—(Public Works Contracts) The complete assembly of documents (whether attached or incorporated by reference) furnished to prospective bidders.

Add the following definitions:

Adjustment in Contract Price — “Equitable adjustment,” as used in the Federal Acquisition Regulations, or “construction cost adjustment,” as used in the Timber Sale Contract, as applicable.

Change — “Change” means “change order” as used in the Federal Acquisition Regulations, or “design change” as used in the Timber Sale Contract.

Forest Service — The United States of America, acting through the Forest Service, U.S. Department of Agriculture.

Neat Line — A line defining the proposed or specified limits of an excavation or structure.

Pioneer Road — Temporary construction access built along the route of the project.

Purchaser — The individual, partnership, joint venture, or corporation contracting with the Government under the terms of a Timber Sale Contract and acting independently or through agents, employees, or subcontractors.

Protected Streamcourse — A drainage shown on the plans or timber sale area map that requires designated mitigation measures.

Road Order — An order affecting and controlling traffic on roads under Forest Service jurisdiction. Road Orders are issued by a designated Forest Officer under the authorities of 36 CFR, part 260.

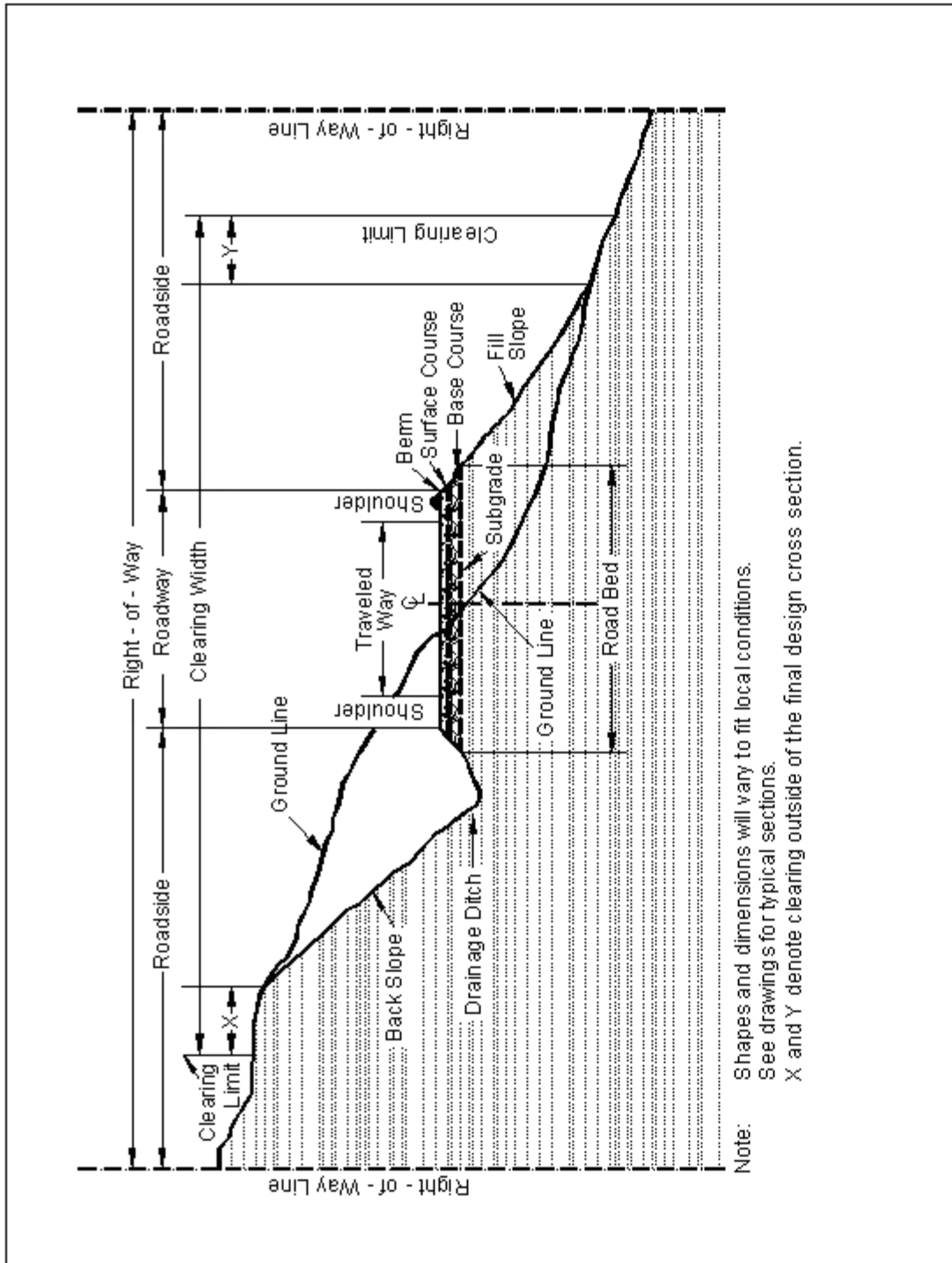
Shop Drawings — (Timber and Stewardship Contracts) Referred to as “Drawings” in FP-14, include drawings, diagrams, layouts, schematics, descriptive literature, illustrations, lists or tables, performance and test data, and similar materials furnished by Purchaser to explain in detail specific portions of the work required by the contract.

Utilization Standards —

The minimum size and percent soundness of trees described in Public Works contract specifications or Timber Sale and IRTC contract provisions to determine merchantable timber.

Add Figure 101-1—Illustration of road structure terms:

Figure 101-1—Illustration of road structure terms.



102 - Bid, Award, and Execution of Contract

102.00_National_9_15_2016

Delete Section 102 in its entirety.

Delete Section 102.

103 - Scope of Work

103.00_National_9_15_2016

Delete all of Section 103 except Subsection 103.01 Intent of Contract.

Delete Subsections 103.02, 103.03, 103.04, 103.05.

104 - Control of Work

104.00_National_9_15_2016

Delete Subsections 104.01, 104.02, and 104.04.

Delete Subsections 104.01, 104.02, 104.04.

104.03_National_10_23_2016

Delete Subsection 104.03 and replace with the following:

104.03 Specifications and Drawings.

Refer to B(T) 5.211 in the 2400-6(T)) or F(T).2.1.1 in the 2400-13(T) contracts for requirements under this subsection.

104.06_National_9_16_2016

Add the following to Subsection 104.06:

104.06 Use of Roads by Contractor.

The Contractor is authorized to use roads under the jurisdiction of the Forest Service for all activities necessary to complete this contract, subject to the limitations and authorizations designated in the Road Order(s) or described in the contract, when such use will not damage the roads or national forest resources, and when traffic can be accommodated safely.

106 - Acceptance of Work

106.01_National_7_18_2017

Delete Subsection 106.01 and replace with the following:

106.01 Conformity with Contract Requirements.

Follow the requirements of FAR Clause 52.246-12 Inspection of Construction.

References to standard test methods of AASHTO, ASTM, GSA, and other recognized standard authorities refer to the methods in effect on the date of solicitation for bids.

Perform all work to the lines, grades, cross-sections, dimensions, and processes or material requirements shown on the plans or specified in the contract.

Incorporate manufactured materials into the work according to the manufacturer's recommendations or to these specifications, whichever is more strict.

Plan dimensions and contract specification values are the values to be strived for and complied with as the design values from which any deviations are allowed. Perform work and provide material that is uniform in character and reasonably close to the prescribed value or within the specified tolerance range. The purpose of a tolerance range is to accommodate occasional minor variations from the median zone that are unavoidable for practical reasons.

When standard manufactured items are specified (such as fence, wire, plates, rolled shapes, pipe conduits, etc., that are identified by gauge, unit mass, section dimensions, etc.), the identification will be considered to be nominal masses or dimensions. Unless specific contract tolerances are noted, established manufacturing tolerances will be accepted.

The Government may inspect, sample, or test all work at any time before final acceptance of the project. When the Government tests work, copies of test reports are furnished to the Contractor upon request. Government tests may or may not be performed at the work site. If Contractor testing and inspection is verified by the Government, the Contractor's results may be used by the Government to evaluate work for acceptance. Do not rely on the availability of Government test results for process control.

Acceptable work conforming to the contract will be paid for at the contract unit bid price. Four methods of determining conformity and accepting work are described in Subsections 106.02 to 106.05 inclusive. The primary method of acceptance is specified in each Section of work. However, work may be rejected at any time it is found by any of the methods not to comply with the contract.

Remove, repair, or replace work that does not conform to the contract, or to prevailing industry standards where no specific contract requirements are noted. Removing, repairing, or replacing work; providing temporary traffic control; and any other related work to accomplish conformity will be at no cost to the Government.

(a) Disputing Government test results. If the accuracy of Government test results is disputed, promptly inform the CO. If the dispute is unresolved after reasonable steps are taken to resolve the dispute, further evaluation may be obtained by written request. Include a narrative describing the dispute and a proposed resolution protocol that addresses the following:

1. Sampling method;
2. Number of samples;
3. Sample transport;

4. Test procedures;
5. Testing laboratories;
6. Reporting;
7. Estimated time and costs; and
8. Validation process.

If the evaluation requires additional sampling or testing be performed, mutually agree with the Government on witnessing procedures and on sampling and testing by a third party laboratory. Use a third party laboratory accredited by the AASHTO accreditation program. Provide proof of the laboratory's accreditation for the test procedures to be used. Do not use the same laboratory that produced the disputed Government test results or that produced the test results used as a basis for the dispute.

The CO will review the proposed resolution protocol and may modify it before final approval and execution.

The Government will use the approved resolution protocol test results to determine the validity of the disputed testing. If the Government test results are validated, the Contractor will be responsible for all costs associated with developing and performing the resolution protocol. If the Government test results are not validated, the Government will be responsible for all costs associated with developing and performing the resolution protocol. If the validity of the Government test results cannot be determined, the Contractor and Government will equally share all costs associated with developing and carrying out the resolution protocol.

(b) Alternatives to removing and replacing non-conforming work. As an alternative to removal and replacement, the Contractor may submit a written request to:

1. Have the work accepted at a reduced price; or
2. Be given permission to perform corrective measures to bring the work into conformity.

The request must contain supporting rationale and documentation. Include references or data justifying the proposal based on an evaluation of test results, effect on service life, value of material or work, quality, aesthetics, and other tangible engineering basis. The CO will determine disposition of the nonconforming work.

106.02_National_10_23_2016

Delete Subsection 106.02 and replace with the following:

106.02 Visual Inspection.

Acceptance is based on visual inspection of the work for compliance with the specific contract requirements. Use prevailing industry standards in the absence of specific contract requirements or tolerances.

Delete Subsection 106.07.

106.07 Partial and Final Acceptance.

107 - Legal Relations and Responsibility to the Public

107.05_National_7_18_2017

Delete Subsection 107.05.

Delete Subsection 107.05.

107.08_National_10_23_2016

Delete Subsection 107.08 and replace with the following:

107.08 Sanitation, Health, and Safety.

Refer to specific provisions under B(T) 6.0 in the 2400-6(T) or G(T).0 in the 2400-13(T) contracts for requirements under this subsection.

108 - Prosecution and Progress

108.00_National_9_16_2016

Delete Section 108 in its entirety.

Delete Section 108.

109 - Measurement and Payment

109.00_National_9_16_2016

Delete Subsections 109.06, 109.07, 109.08, and 109.09:

Delete Subsections 109.06, 109.07, 109.08, 109.09.

109.01_National_2_22_2019

Delete the third paragraph and Table 109-1 of Subsection 109.01 and replace with the following:

109.01 Measurement of Work.

Take measurements as described in Subsection 109.02 unless otherwise modified by the Measurement Subsection of the section controlling the work being performed. Table 109-1 indicates the accuracy required for quantities of the various pay units used in the Schedule of Items. Use this guide to determine the decimal placement in the final payment.

Table 109-1

Decimal Accuracy of Quantities for Final Payment

Pay Item	Level of Precision
Linear Foot	1
Exception--Timber, Steel, and concrete Piles	0.1
Station	0.1
Mile	0.01
Square Foot	0.1
Square Yard	0.1
Each	1
Acre	0.01
Gallon	1
M-Gals.	0.1
Cubic Yard	1
Exception--Structure Excavation; Sheathing Materials; Bedding, Bed Course, and Backfill Materials; Gabions;	0.1
Exception--Concrete; Masonry	0.01
Pound	1
Ton	0.1
Exception--Calcium Chloride; Sodium Chloride; Hydrated Lime; Bituminous Materials; Pavements; Bed Course Materials	0.01
Hour	0.1
MFBM	0.01
Station Yard	1
Cubic Yard Mile	1

Ton Mile	1
----------	---

109.02_National_9_16_2016

Add the following sentence to Subsection 109.02(b):

109.02 Measurement Terms and Definitions.

(b) Contract quantity.

Contract quantities will be adjusted only when there are errors in the original design of 15% or more.

152 - Construction Survey and Staking

152.00_0402_us_12_21_2006

Delete Section 152 in its entirety and replace with the following.

Description

152.01 This work consists of furnishing qualified personnel and necessary equipment and material to construction stake and record data for the control of work.

Personnel, equipment, and material shall conform to the following:

(a) Personnel. Furnish technically qualified survey crews experienced in highway construction survey and staking. Provide personnel capable of performing in a timely and accurate manner. An acceptable crew supervisor shall be on the project whenever surveying/staking is in progress.

(b) Equipment. Furnish survey instruments and supporting equipment capable of achieving the specified tolerances.

(c) Material. Furnish acceptable tools, supplies, and stakes of the type and quality normally used in highway survey work and suitable for the intended use. Furnish wooden stakes of sufficient length to provide a solid set in the ground with sufficient surface area above ground for necessary legible markings. Furnish 36" lath for grade break and dip locations. Paint stakes and lath as SHOWN ON THE PLANS. Mark all stakes with a stake pencil that leaves a legible imprint, or with waterproof ink.

Keep notes in books with covers that will protect the contents and retain the pages in numerical sequence.

Construction Requirements

152.02 General. Include staking activities in the construction schedule. Include the dates and sequence of each staking activity. When indicated on the plans, a preliminary survey line has been established on the ground. Reestablish missing reference, control lines, or stakes as necessary to control subsequent construction staking operations. Data relating to horizontal and vertical alignment, theoretical slope stake catchpoints, and other design data will be furnished.

Provide immediate notification of apparent errors in the initial staking or in the furnished data.

Preserve all initial reference and control points. After beginning construction, replace all destroyed or disturbed initial reference or control points necessary for the quality control and quality assurance activities associated with the work.

Before surveying or staking, discuss and coordinate the following with the CO:

Surveying and staking methods;

Stake marking;
Grade control for courses of material;
Referencing;
Structure control; and
Any other procedures and controls necessary for the work.

Survey and establish controls within the tolerances shown in Table 152-1.

Prepare field notes in an approved format. Furnish all survey notes at least weekly. All field notes and supporting documentation become the property of the Government upon completion of the work.

Start work only after staking for the affected work is accepted.

The construction survey and staking work may be spot-checked for accuracy, and unacceptable portions of work may be rejected. Resurvey rejected work, and correct work that is not within the tolerances specified in Table 152-1. Acceptance of the construction staking does not relieve the Contractor of responsibility for correcting errors discovered during the work and for bearing all additional costs associated with the error.

152.03 Staking Requirements. Perform all staking, recording of data, and calculations as necessary to construct the project from the initial layout to final completion. Reset stakes as many times as necessary to construct the work.

(a) Control points. Relocate initial horizontal and vertical control points in conflict with construction to areas that will not be disturbed by construction operations. Furnish the coordinates and elevations for the relocated points before the initial points are disturbed.

(b) Slope stakes and references. When required, locate slope stakes on designated portions of the road, as shown on the plans. Locate the slope stake catchpoints and use them to establish clearing limits and slope stake references.

Mark slope stakes with the station, the amount of cut or fill, the horizontal distance to centerline, the slope ratios, and the width "W" from inside shoulder to outside shoulder.

Place slope reference stakes at least 10 feet outside the clearing limit and mark with the offset information to the slope stake as shown on the plans.

Prior to clearing and grubbing operations, move the slope stake outside the clearing limit to the slope reference stake. After clearing and grubbing and before excavation, reset the slope stakes in their original position.

Use the designated method to establish the slope stake catchpoint.

- **Method I—Computed Method.** Use the template information shown in the plans or other Government-provided data to calculate the actual location of the catchpoint. The slope stake “catchpoint distance” provided may be used as a trial location to initiate slope staking. Recatch slope stakes on any section that does not match the staking report within the tolerances established in Table 152-2.

- **Method II**—Catchpoint Measurement Method. Determine the location of slope stake catchpoints by measuring the catchpoint distances shown in the plans or other Government-provided data.

(c) Culverts. Stake all culverts by hand level method, or equivalent, as shown on the plans. Mark the stakes as shown on the plans.

(d) Clearing and grubbing limits. Establish clearing limits on each side of the location line by measuring the required horizontal or slope distances shown in the stake notes. Mark the clearing limits with flagging or tags on trees to be left standing, or on lath. Make markings intervisible, and no more than 90 feet apart.

(d) Grade breaks and drain dips. Mark the locations of grade breaks and drain dips shown in the plans on the plan and profile sheets with a 36" lath, placed next to the slope stake reference. Mark as shown on the plans.

152.04 Acceptance. Construction staking will be evaluated under Subsection 106.02 and 106.04.

Measurement

152.05 Measure the Section 152 items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

Do not measure resetting stakes.

Payment

152.06 The accepted quantities, as provided above, will be paid at the contract price per unit of measurement for the Section 152 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Table 152-1 Slope stake tolerances.

Item	Tolerances				
	A	B	C	D	E
Allowable deviation of cross-section line projection from a true perpendicular to tangents, a true bisector of angle points, or a true radius of curves	(±)2°	(±)3°	(±)3°	(±)5°	(±)5°
Slope distance accuracy for slope stake, in feet or percentage of slope distance measured from preliminary stake, whichever is greater.	0.1 ft or 0.4%	0.15 ft or 0.6%	0.2 ft or 1.0%	0.2 ft or 1.0%	0.5 ft or 2.0%

Slope reference stakes from slope stakes.	0.1 ft or 0.4%	0.15 ft or 0.6%	0.2 ft or 1.0%	0.2 ft or 1.0%	0.3 ft or 1.0%
Clearing limits from slope stakes.	1.0 ft	1.0 ft	1.0 ft	1.0 ft	1.0 ft

155 - Schedules for Construction Contracts

155.00_National_9_14_2016

Delete Section 155 in its entirety.

Delete Section 155.

201 - Clearing and Grubbing

201.00_nat_us_08_05_2009

201.02 Material:

Delete Tree wound dressing material reference.

Delete the first sentence of this Subsection 201.06 and replace the following:

201.06 Disposal.

Dispose of merchantable timber designated for removal according to the provisions of the timber sale contract.

Merchantable timber is Government property.

203 – Removal of Structures and Obstructions

203.05_National_10_7_2016

Add the following to Subsection 203.05:

203.05 Disposing of Material.

(e) Windrowing Construction Slash. Place construction slash outside the roadway in neat, compacted windrows approximately parallel to and along the toe line of embankment slopes. Do not permit the top of the windrows to extend above subgrade. Use construction equipment to matt down all material in a windrow to form a compact and uniform pile. Construct breaks of at least 15 feet at least every 200 feet in a windrow. Do not place windrows against trees.

(f) Scattering. Scatter construction slash in designated areas without damaging trees. Limb all logs. Place logs and stumps away from trees, positioned so they will not roll, and are not on top of one another. Limb and scatter other construction slash to reduce slash concentrations. When scattering for erosion control, place construction slash as flat as practicable on the completed slope.

(g) Chipping. Use an approved chipping machine to chip slash longer than 3 feet. Deposit chips on embankment slopes or outside the roadway to a loose depth less than 6 inches. Minor amounts of chips or ground woody material may be permitted within the roadway if they are thoroughly mixed with soil and do not form a layer.

(h) Debris Mat. Use tree limbs, tops, cull logs, split stumps, wood chunks, and other debris to form a mat upon which construction equipment is operated. Place stumps upside down and blend stumps into the mat.

(i) Decking. Remove brush from designated log deck areas. Limb and top logs.

Logs not meeting the Utilization Standards described in Subsection 201.04(c) shall be cut to lengths less than <number> feet and decked in designated log deck location.

Merchantable timber not associated with an existing timber sale shall be cut to length meeting the Utilization Standards described in Subsection 201.04(c).

Deck logs so that logs are piled parallel to one another; can be removed by standard log loading equipment; will not damage standing trees; will not interfere with drainage, and will not roll. Keep logs in log decks free of brush and soil.

(j) Removal to designated locations. Remove construction slash to designated locations.

(k) Piling. Pile construction slash in designated areas. Place and construct piles so that if the piles are burned, the burning will not damage remaining trees. Keep piles free of dirt from stumps.

204 - Excavation and Embankment

204.00_National_9_16_2016

Delete Section 204 in its entirety and replace with the following.

Section 204. — EXCAVATION AND EMBANKMENT

Description

204.01 This work consists of excavating material and constructing embankments. This work also includes furnishing, hauling, stockpiling, placing, disposing, sloping, shaping, compacting, and finishing earthen and rocky material.

204.02 Definitions.

(a) Excavation. Excavation consists of the following:

(1) Roadway excavation. Material excavated from within the right-of-way or easement areas, except subexcavation covered in Subsection 204.02(a)(2) and structure excavation covered in Sections 208 and 209. Roadway excavation includes all material encountered regardless of its nature or characteristics.

(2) Subexcavation. Material excavated from below subgrade elevation in cut sections or from below the original ground-line in embankment sections. Subexcavation excludes the work required by Subsection 204.05 or 204.06.

(3) Borrow excavation. Material used for embankment construction that is obtained from outside the roadway prism. Borrow excavation includes unclassified borrow, and topping.

(b) Embankment construction. Embankment construction consists of placing and compacting roadway or borrow excavation. This work includes:

- (1)** Preparing foundation for embankment;
- (2)** Constructing roadway embankments;
- (3)** Benching for side-hill embankments;
- (4)** Constructing dikes, ramps, mounds, and berms; and
- (5)** Backfilling subexcavated areas, holes, pits, and other depressions.

(c) Conserved topsoil. Excavated material conserved from the roadway excavation and embankment foundation areas that is suitable for growth of grass, cover crops, or native vegetation.

(d) Waste. Excess and unsuitable roadway excavation and subexcavation that cannot be used.

Material

204.03 Conform to the following Subsections:

Topping	704.05
Unclassified borrow	704.06

Construction Requirements

204.04 Preparation for Roadway Excavation and Embankment Construction. Clear the area of vegetation and obstructions according to Sections 201 and 203.

Road pioneering, slash disposal, and grubbing of stumps may proceed concurrently with excavation and embankment. Maintain drainage during pioneering operations.

204.05 Conserved Topsoil. When designated, conserve topsoil from roadway excavation and embankment foundation areas. Stockpile conserved topsoil in low windrows immediately beyond the rounding limits of cut and embankment slopes or in other approved locations. Separate conserved topsoil from other excavated material. When designated, place conserved topsoil on completed slopes according to Section 624.

204.06 Roadway Excavation. Excavate as follows:

(a) Rock cuts. Blast rock according to Section 205. Excavate rock cuts to 6 inches (150 millimeters) below subgrade within the roadbed limits. Backfill to subgrade with topping or other suitable material. Compact the material according to Subsection 204.11.

(b) Earth cuts. Scarify earth cuts to 6 inches (150 millimeters) below subgrade within the roadbed limits. Compact the scarified material according to Subsection 204.11.

(c) Pioneer Roads. Conduct excavation and placement operations so material to be treated under Section 201 will not be incorporated into the roadway unless specified in the slash treatment method. Maintain drainage during pioneering operations.

Remove snow and ice in advance of the work and deposit beyond the roadway limits in a manner that will not waste material or generate sediment. Do not incorporate snow and ice into embankments. Place snow or ice in a manner to prevent resource damage.

(d) Drainage Feature. Drainage feature includes construction of all ditches, minor channel changes, drainage dips, catch basins, surface water deflectors, and other minor drainage structures. Compact the material according to Subsection 204.11. Excavate on a uniform grade between control points.

Do not disturb material and vegetation outside the construction limits. Retrieve material deposited outside the construction limits. Dispose of unsuitable or excess excavation material according to Subsection 204.14. Replace shortage of suitable material caused by premature disposal of roadway excavation.

Shape to drain and compact the work area to a uniform cross-section at the end of each day's operations.

Subsection 204.14. Take cross-sections according to Section 152. Backfill subexcavated area with suitable material in horizontal layers not exceeding 12 inches (300 millimeters) in compacted thickness and compact according to Subsection 204.11. Prevent unsuitable material from mixing with suitable backfill material.

204.08 Borrow Excavation. Use suitable roadway excavation in embankment construction. Do not use borrow excavation when it results in excess roadway excavation. Deduct excess borrow excavation from the total borrow excavation quantity.

Obtain borrow source approval according to Subsection 105.02. Develop and restore borrow sources according to Subsections 105.03 and 105.06. Do not excavate beyond the established limits. When applicable, shape the borrow source to permit accurate measurements when excavation is complete.

204.09 Preparing Foundation for Embankment Construction. Prepare foundation for embankment construction as follows:

(a) Embankment over natural ground. Remove topsoil and break up the ground surface to a minimum depth of 6 inches (150 millimeters) by plowing or scarifying. Compact the ground surface according to Subsection 204.11.

(b) Embankments over an existing asphalt, concrete, or gravel road surface. Scarify gravel roads to a minimum depth of 6 inches (150 millimeters). Scarify or pulverize asphalt and concrete roads to 6 inches (150 millimeters) below the pavement. Reduce particles to a maximum size of 6 inches (150 millimeters) and produce a uniform material. Compact the surface according to Subsection 204.11.

(c) Embankment across ground not capable of supporting equipment. Dump successive loads of embankment material in a uniformly distributed layer to construct the lower portion of the embankment. Limit the layer thickness to the minimum depth necessary to support the equipment.

(d) Embankment on an existing slope steeper than 1V:3H. Cut horizontal steps in the existing slope to a sufficient width to accommodate placement and compaction operations and equipment. Step the slope as the embankment is placed and compacted in layers. Begin each step at the intersection of the original ground and the vertical cut of the previous step.

204.10 Embankment Construction. Incorporate only suitable roadway excavation material into the embankment. When the supply of suitable roadway excavation is exhausted, furnish unclassified borrow to complete the embankment. Obtain written approval before beginning construction of embankments over 6 feet (2 meters) high at subgrade centerline. Construct embankments as follows:

(a) General. At the end of each day's operations, shape to drain and compact the embankment surface to a uniform cross-section. Eliminate ruts and low spots that could hold water.

During all stages of construction, route and distribute hauling and leveling equipment over the width and length of each layer of material.

Compact embankment side slopes with a tamping foot roller, by walking with a dozer, or by over-building the fill and then removing excess material to the final slope line. For slopes 1V:1¾H or steeper, compact the slopes as embankment construction progresses.

(b) Embankment within the roadway prism. Place embankment material in horizontal layers not exceeding 12 inches (300 millimeters) in compacted thickness. Incorporate oversize boulders or rock fragments into the 12-inch (300-millimeter) layers by reducing them in size or placing them individually as required below. Compact each layer according to Subsection 204.11 before placing the next layer.

Material composed predominately of boulders or rock fragments too large for 12-inch (300-millimeter) layers may be placed in layers up to 24 inches (600 millimeters) thick. Incorporate oversize boulders or rock fragments into the 24-inch (600-millimeter) layer by reducing them in size or placing individual rock fragments and boulders greater than 24 inches (600 millimeters) in diameter as follows:

(1) Reduce rock to less than 48 inches (1200 millimeters) in the largest dimension;

(2) Distribute rock within the embankment to prevent nesting;

(3) Place layers of embankment material around each rock to a depth not greater than that permitted above. Fill voids between rocks; and

(4) Compact each layer according to Subsection 204.11(a) before placing the next layer.

(c) Embankment outside of roadway prism. When placing embankment outside the staked roadway prism, place material in horizontal layers not exceeding 24 inches (600 millimeters) in compacted thickness. Compact each layer according to Subsection 204.11.

204.11 Compaction. Compact the embankment using one of the following methods as specified.

(a) Placement Method 1. Use AASHTO T 27 to determine the quantity of material retained on a No. 4 (4.75-millimeter) sieve. Compact as follows:

(1) More than 80 percent retained on a No. 4 (4.75-millimeter) sieve. Adjust the moisture content to a level suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Compact each layer of material full width with one of the following and until there is no visible evidence of further consolidation:

(a) Four roller passes of a vibratory roller having a minimum dynamic force of 40,000 pounds (180 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute;

(b) Eight roller passes of a 20-ton (20-metric ton) compression-type roller; or

(c) Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches (300 millimeters) as follows:

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 204.11(a)(1)(a), by four passes; or

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 204.11(a)(1)(b) and (c), by eight passes.

(2) 50 to 80 percent retained on a No. 4 (4.75-millimeter) sieve. Classify the material according to AASHTO M 145. Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content. Use AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 (4.75-millimeter) sieve. Multiply this number by the percentage of material passing a No. 4 (4.75-millimeter) sieve, and add 2 percent to determine the optimum moisture content of the material.

Use nonvibratory rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Compact each layer of material full width according to Subsection 204.11(a)(1).

(3) Less than 50 percent retained on a No. 4 (4.75-millimeter) sieve. Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the maximum density according to AASHTO T 99, Method C.

Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type or vibratory rollers. Compact each layer of material full width to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures. When required, use AASHTO T 224 to correct for coarse particles.

(b) Placement Method 2. 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. Operate roller compaction equipment over the full width of each layer until there is no visible evidence of further consolidation or, if when a sheepsfoot roller is used, the roller “walks out” of the layer. Make at least three complete passes. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Ensure rollers meet the following requirements:

(1) Steel wheeled rollers, other than vibratory, capable of exerting a force of not less than 250 pounds per inch (4.5 kilogram/millimeter) of width of the compression roll or rolls.

(2) Vibratory steel wheeled rollers equipped with amplitude and frequency controls with a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration, specifically designed to compact the material on which it is used.

(3) Pneumatic-tired rollers with smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi (550 Kilopascals).

(4) Sheepsfoot, tamping, or grid rollers capable of exerting a force of 250 pounds per inch (4.5 kilogram/millimeter) of width of roller drum.

(c) Placement Method 3. 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. Operate hauling and spreading equipment uniformly over the full width of each layer until there is no visible evidence of further consolidation. Make at least three complete passes.

(d) Placement Method 4. 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. Operate hauling and spreading equipment uniformly over the full width of each layer.

(e) Placement Method 5. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact the complete surface with a bucket of an excavator larger than 39,000 pounds (18 metric ton) Gross Vehicle Weight using a minimum of three blows. Overlap compaction by ½ width of bucket.

(f) Placement Method 6. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact using an approved mechanical tamper for a minimum of three complete passes.

When compacting with rollers or hauling and spreading equipment is not practical, use approved mechanical tampers for a minimum of three complete passes.

204.12 Drainage Features. Slope, grade, and shape all drainage features. Remove projecting roots, stumps, rock, or similar matter. Maintain all drainage features in an open condition and without sticks, and other debris.

Form furrow ditches by plowing or using other acceptable methods to produce a continuous furrow. Place excavated material on the downhill side so the bottom of the ditch is approximately 18 inches (450 millimeters) below the crest of the loose material. Clean the ditch using a hand shovel or other suitable method. Shape to provide drainage without overflow.

204.13 Sloping, Shaping, and Finishing. Complete subgrade, slopes, drainage features, culverts, riprap, and other underground minor structures before placing aggregate courses. Slope, shape, and finish to the designated tolerance class as defined in Table 204-2 as follows:

(a) Sloping. Leave earth slopes with uniform roughened surfaces, except as described in Subsection 204.13(b), with no noticeable break as viewed from the road. Except in solid rock, round tops and bottoms of slopes including the slopes of drainage ditches. Round material overlaying solid rock to the extent practical. Scale rock slopes. Slope rounding is not required on tolerance class D through M roads.

If a slide or slipout occurs on a cut or embankment slope, remove or replace the material and repair or restore damage to the work. Bench or key the slope to stabilize the slide. Reshape the cut or embankment slope to an acceptable condition.

(b) Stepped slopes. Where required, construct steps on slopes of 1½V:1H to 1V:2H. Construct the steps approximately 18 inches (450 millimeters) high. Blend the steps into natural ground at the end of the cut. If the slope contains non-rippable rock outcrops, blend steps into the rock. Remove loose material found in transitional area. Except for removing large rocks that may fall, scaling stepped slopes is not required.

(c) Shaping. Shape the subgrade to a smooth surface and to the cross-section required. Shape slopes to gradually transition into slope adjustments without noticeable breaks. At the ends of cuts and at intersections of cuts and embankments, adjust slopes in the horizontal and vertical planes to blend into each other or into the natural ground.

(d) Finishing. Ensure that the subgrade is visibly moist during shaping and dressing; smooth and uniform, and shaped to conform to the typical sections. Remove material larger than 6 inches (150 millimeters) from the top 6 inches (150 millimeters) of the roadbed. Remove unsuitable material from the roadbed, and replace it with suitable material. Scarify to 6 inches (150 millimeters) below the bottom of low sections, holes, cracks, or depressions and bring back to grade with suitable material.

Maintain proper ditch drainage.

204.14 Disposal of Unsuitable or Excess Material. Dispose of unsuitable or excess material at designated sites or according to Subsection 203.05(a)

When there is a pay item for waste, shape and compact the waste material in its final location. Do not mix clearing or other material not subject to payment with the waste material.

204.15 Acceptance. See Table 204-1 for sampling, testing, and acceptance requirements.

Material for embankment and conserved topsoil will be evaluated under Subsections 106.02 and 106.04.

Excavation and embankment construction will be evaluated under Subsections 106.02 and 106.04.

Subexcavation will be evaluated under Subsections 106.02 and 106.04.

Measurement

204.16 Measure the Section 204 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable:

(a) Roadway excavation. Measure roadway excavation in its original position as follows:

(1) Include the following volumes in roadway excavation:

- (a)* Roadway prism excavation;
- (b)* Rock material excavated and removed from below subgrade in cut sections;
- (c)* Unsuitable material below subgrade and unsuitable material beneath embankment areas when a pay item for subexcavation is not listed in the bid schedule;
- (d)* Ditches, except furrow ditches measured under a separate pay item;
- (e)* Conserved topsoil;
- (f)* Borrow material used in the work when a pay item for borrow is not listed in the bid schedule;
- (g)* Loose scattered rocks removed and placed as required within the roadway;
- (h)* Conserved material taken from pre-existing stockpiles and used in Section 204 work, except topsoil measured under 624; and
- (i)* Slide and slipout material not attributable to the Contractor's method of operation.

(2) Do not include the following in roadway excavation:

- (a)* Overburden and other spoil material from borrow sources;
- (b)* Overbreakage from the backslope in rock excavation;
- (c)* Water or other liquid material;
- (d)* Material used for purposes other than required;
- (e)* Roadbed material scarified in place and not removed;
- (f)* Material excavated when stepping cut slopes;
- (g)* Material excavated when rounding cut slopes;
- (h)* Preparing foundations for embankment construction;
- (i)* Material excavated when benching for embankments;
- (j)* Slide or slipout material attributable to the Contractor's method of operation;
- (k)* Conserved material taken from stockpiles constructed at the option of the Contractor;
- (l)* Material excavated outside the established slope limits; and
- (m)* Road pioneering for the convenience of the Contractor.

(3) When both roadway excavation and embankment construction pay items are listed in the bid schedule, measure roadway excavation only for the following:

- (a)* Unsuitable material below subgrade in cuts and unsuitable material beneath embankment areas when a pay item for subexcavation is not listed in the bid schedule;
- (b)* Slide and slipout material not attributable to the Contractor's method of operations; and
- (c)* Drainage ditches, channel changes, and diversion ditches.

(b) Unclassified borrow, and topping. When measuring by the cubic yard (cubic meter) measure in its original position. If borrow excavation is measured by the cubic yard (cubic meter) in-place, take initial cross-sections of the ground surface after stripping overburden. Upon completion of excavation and after the borrow source waste material is returned to the source, retake cross-sections before replacing the overburden. Do not measure borrow excavation until suitable roadway excavation is depleted.

(c) Embankment construction. Measure embankment construction in its final position. Do not make deductions from the embankment construction quantity for the volume of minor structures.

(1) Include the following volumes in embankment construction:

- (a)* Roadway embankments;
- (b)* Material used to backfill subexcavated areas, holes, pits, and other depressions;
- (c)* Material used to restore obliterated roadbeds to original contours; and
- (d)* Material used for dikes, ramps, mounds, and berms.

(2) Do not include the following in embankment construction:

- (a)* Preparing foundations for embankment construction;
- (b)* Adjustments for subsidence or settlement of the embankment or of the foundation on which the embankment is placed; and
- (c)* Material used to round fill slopes.

(d) Rounding cut slopes. If a pay item for slope rounding is included in the bid schedule measure rounding cut slopes horizontally along the centerline of the roadway. If a pay item is not included for slope rounding is not included in the bid schedule payment will be considered indirect to roadway excavation.

(e) Waste. Measure waste by the cubic yard (cubic meter) in its final position. Take initial cross-sections of the ground surface after stripping over-burden. Upon completion of the waste placement, retake cross-sections before replacing overburden.

(f) Slope scaling. Measure slope scaling by the cubic yard (cubic meter) in the hauling vehicle.

(g) Subexcavation. Measure subexcavation by the cubic yard (cubic meter) in its original position.

(h) Drainage features. Measurement includes all excavation, embankment, shaping, and grading necessary for a completed drainage feature.

Payment

204.17 The accepted quantities will be paid at the contract price per unit of measurement for the Section 204 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

**Table 204-1
Sampling, Testing, and Acceptance Requirements**

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Source								
Topping (704.05)	Measured and tested for conformance (106.04 & 105)	Classification ⁽¹⁾	–	AASHTO M 145	1 per soil type and source of material	Processed material	Yes	Before using in work
Unclassified borrow (704.06)	"	"	–	"	"	"	"	"
Production								
Topping (704.05) and (204.11(a))	Measured and tested for conformance (106.04)	Moisture-density	–	T 99, Method C ⁽²⁾	1 per soil type, but not less than 1 per each 13,000 yd ³ (10,000 m ³)	Processed material	Yes	Before using in work
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd ² (3000 m ²), but not less than 3 per layer	In-place	No	Before placement of next layer
Unclassified borrow (704.06) and (204.11(a))	"	Moisture-density	–	T 99, Method C ⁽²⁾	1 per soil type, but not less than 1 per each 13,000 yd ³ (10,000 m ³)	Processed material	Yes	Before using in work
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd ² (3000 m ²), but not less than 3 per layer	In-place	No	Before placement of next layer

**Table 204-1
Sampling, Testing, and Acceptance Requirements**

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Production (continued)								
Earth embankment (204.11(a))	Measured and tested for conformance (106.04)	Classification	–	AASHTO M 145	1 per soil type	Source of material	Yes	Before using in work
		Moisture-density	–	T 99, Method C ⁽²⁾	1 per soil type, but not less than 1 per each 13,000 yd ³ (10,000 m ³)	"	"	"
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd ² (3000 m ²), but not less than 3 per layer	In-place	No	Before placement of next layer
Top of subgrade (204.11(a))	"	Density	–	AASHTO T 310 or other approved procedures	1 per 2500 yd ² (2000 m ²), but not less than 3 per layer	In-place	No	Before placement of next layer
Finished Product								
Roadbed (204.13)	Measured and tested for conformance (106.04)	Final line & grade	–	Field measured	Determined by the CO	Determined by the CO	No	Before placement of next layer

(1) Not required when using Government-provided source.

(2) Minimum 5 points per proctor.

**Table 204-2
Construction Tolerances**

Location Description	Tolerance Class (a)												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Roadbed width (ft)	+0.5	+0.5	+1.0	+1.0	+1.0	+1.0	+1.5	+1.0	+2.0	+2.0	+2.0	+2.0	+2.0
Subgrade elevation (ft)	±0.1	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±2.0	±3.0	±2.0	±3.0	(c)
Centerline alignment (ft)	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±1.5	±2.0	±3.0	±3.0	±5.0	(c)
Slopes, excavation, and embankment (% slope ^(b))	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10	±20	±20	±20

(a) Maximum allowable deviation from construction stakes and drawings.

(b) Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

(c) Unless otherwise shown the centerline alignment and subgrade elevation, as built, have no horizontal curves with a radius of less than 80 feet, and no vertical curves with a curve length of less than 80 feet when the algebraic difference in the grade change is less than 10 percent, or a curve length of less than 100 feet when the algebraic difference of the grade change is greater than or equal to 10 percent. The centerline grade is not to exceed 20 percent in 100 feet of length.

209 - Structure Excavation and Backfill

209.10_National_7_17_2017

Delete Subsection 209.10 and replace with the following:

209.10 Compacting.

Compact the embankment using one of the following methods as specified.

(a) Compaction Method 1. Use AASHTO T 27 to determine the quantity of material retained on a No. 4 (4.75-millimeter) sieve. Compact as follows:

(1) More than 80 percent retained on a No. 4 (4.75-millimeter) sieve. Adjust the moisture content to a level suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Compact each layer of material full width with one of the following and until there is no visible evidence of further consolidation:

- (a)** Four roller passes of a vibratory roller having a minimum dynamic force of 40,000 pounds (180 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute;
- (b)** Eight roller passes of a 20-ton (20-metric ton) compression-type roller; or
- (c)** Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches (300 millimeters) as follows:

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 209.10(a)(1)(a), by four passes; or
- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 209.10(a)(1)(b) and (c), by eight passes.

(2) 50 to 80 percent retained on a No. 4 (4.75-millimeter) sieve. Classify the material according to AASHTO M 145. Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content. Use AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 (4.75-millimeter) sieve. Multiply this number by the percentage of material passing a No. 4 (4.75-millimeter) sieve, and add 2 percent to determine the optimum moisture content of the material.

Use nonvibratory rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet(1 meter) per second. Compact each layer of material full width according to Subsection 209.10(a)(1).

(3) Less than 50 percent retained on a No. 4 (4.75-millimeter) sieve. Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the maximum density according to AASHTO T 99, Method C..

Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type or vibratory rollers. Compact each layer of material full width to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures. When required, use AASHTO T 224 to correct for coarse particles.

(b) Compaction Method 2. 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. Operate roller compaction equipment over the full width of each layer until there is no visible evidence of further consolidation or, if when a sheepsfoot roller is used, the roller “walks out” of the layer. Make at least three complete passes. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Ensure rollers meet the following requirements:

(1) Steel wheeled rollers, other than vibratory, capable of exerting a force of not less than 250 pounds per inch (4.5 kilogram/millimeter) of width of the compression roll or rolls.

(2) Vibratory steel wheeled rollers equipped with amplitude and frequency controls with a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration, specifically designed to compact the material on which it is used.

(3) Pneumatic-tired rollers with smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi (550 Kilopascals).

(4) Sheepsfoot, tamping, or grid rollers capable of exerting a force of 250 pounds per inch (4.5 kilogram/millimeter) of width of roller drum.

(c) Compaction Method 3. 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. Operate hauling and spreading equipment uniformly over the full width of each layer until there is no visible evidence of further consolidation. Make at least three complete passes.

(d) Compaction Method 4. 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. Operate hauling and spreading equipment uniformly over the full width of each layer.

(e) Compaction Method 5. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact the complete surface with a bucket of an excavator larger than 39,000 pounds (18 metric ton) Gross Vehicle Weight using a minimum of three blows. Overlap compaction by ½ width of bucket.

(f) Compaction Method 6. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact using an approved mechanical tamper for a minimum of three complete passes.

When compacting with rollers or hauling and spreading equipment is not practical, use approved mechanical tampers for a minimum of three complete passes.

301 - Untreated Aggregate Courses

301.03_National_7_17_2017

Add the following to Subsection 301.03:

301.03 General.

Written approval of the roadbed is required before placing aggregate.

For pit run or grid-rolled material, furnish material smaller than the maximum size, no gradation will be required otherwise. After processing on the road, remove all oversize material from the road and dispose as directed by the CO.

Provide additives or binder, if required, at the proportions specified.

Develop and use Government furnished sources according to Section 105.

If the aggregate is produced and stockpiled before placement, handle and stockpile according to Section 314.

301.05_National_7_17_2017

Delete Subsection 301.05 and replace with the following:

301.05 Compacting.

Compact each layer full width. Roll from the sides to the center, parallel to the centerline of the road. Along curbs, headers, walls, and all places not accessible to the roller, compact the material with approved tampers or compactors.

Compact the aggregate using one of the following methods as specified:

- (a) **Compaction A.** Operating spreading and hauling equipment over the full width of the travelway.
- (b) **Compaction B.** Operate rollers and compact as specified in Subsection 204.11(a)(1).
- (c) **Compaction C.** Moisten or dry the aggregate to a uniform moisture content between 5 and 7 percent based on total dry weight of the mixture. Operate rollers and compact as specified in Subsection 204.11(a)(1).
- (d) **Compaction D.** Compact to a density of at least 95 percent of the maximum density, as determined by AASHTO T 99, method C or D.
- (e) **Compaction E.** Compact to a density of at least 95 per-cent of the maximum density, as determined by AASHTO T 180, method C or D.

For all compaction methods, blade the surface of each layer during the compaction operations to remove irregularities and produce a smooth, even surface. When a density requirement is specified, determine the in place density and moisture content according to AASHTO T 310 or other approved test procedures.

303 - Road Reconditioning

Delete Subsection 303.05 and replace with the following:

303.07_National_7_17_2017

303.05 Roadbed Reconditioning.

Repair soft and unstable areas by excavating material to the required limits. Dispose of unsuitable or excess material at designated sites or according to Subsection 203.05(a) Backfill subexcavated area with suitable material in horizontal layers not exceeding 12 inches (300 millimeters) in compacted thickness. Compact by adjusting 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. Operate hauling and spreading equipment uniformly over the full width of each layer for compaction. Prevent unsuitable material from mixing with suitable backfill material. Maintain existing road template unless otherwise shown in the plans.

Add the following to Subsection 303.07:

303.05_BNF_7_03_2018

303.07 Roadway Reconditioning.

Remove cattleguard decks. Clean the deck and the area beneath the cattleguard of soil and other material to the bottom of the original foundation over the entire width of the installation. Dispose of waste at designated sites or according to Subsection 204.14. Reinstall the cattleguard deck.

602 - Culverts and Drains

602.05_National_10_6_2016

Add the following to Subsection 602.03.

602.03 General.

Ensure that the final installed alignment of all pipe allows no reverse grades, and does not permit horizontal and vertical alignments to vary from a straight line drawn from the center of the inlet to center of outlet by more than 2 percent of pipe center length of 1 foot, whichever is less.

Add the following to Subsection 602.05.

602.05 Laying Metal Pipe.

(c) Standard Connecting bands. Band corrugation shall match that of the pipe sections being joined or the annular rerolled ends of those pipe sections.

625 - Turf Establishment

625.00_National_10_6_2016

Delete Section 625 in its entirety and replace with the following:

Section 625. — TURF ESTABLISHMENT

Description

625.01 This work consists of soil preparation, watering, fertilizing, seeding, and mulching. Seeding and mulching methods are designated as dry or hydraulic.

Material

625.02 Conform to the following Subsections:

Mulch	713.05
Seed	713.04

Construction Requirements

625.03 General. Apply turf establishment to prepared ground or any disturbed area between **October 1** and **May 30**. Apply turf establishment to the areas shown on the plans or worklists within **90** days after completion of ground disturbing activities.

Seeded areas damaged by construction activities shall be reseeded within 10 days of the damage. Do not seed during windy weather or when the ground is excessively wet, frozen, or snow covered.

Assure that all seed and mulch used in the work conforms to the weed free requirements of Section 713.

625.04 Preparing Seedbed. Ensure that the surface soil is in a roughened condition favorable for germination and growth.

625.05 Seeding. Apply seed by the following methods:

(a) Dry Method. Apply the seed with approved power driven seeders, drills, or other mechanical equipment. Hand-operated seeding methods are satisfactory on areas inaccessible to mechanical equipment; or

Furnish and apply the kinds and amounts of pure live seed as shown on the plans.

Determine the pounds of seed to be furnished per acre by dividing the pounds of pure live seed required per acre by the product of the percent purity and percent germination.

625.06 Mulching. Apply Mulch within <12 > hours after seeding by the following methods.

(a) Dry Method. Apply mulch by spreading by hand, with a hand spreader, or a spreader utilizing forced air.

625.07 Acceptance. Material for turf establishment will be evaluated under Subsections 106.02 and 106.03.

Placing of turf establishment will be evaluated under Subsections 106.02 and 106.04.

Measurement

625.08 Measure the Section 625 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable:

When measuring turf establishment and supplemental applications by the acre (hectare), measure on the ground surface.

When measuring water by volume or mass, measure in the hauling vehicle or by metering.

Payment

625.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 625 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

650 - Road Closure Devices

650.00_nat_us_06_28_2007

Description

650.01 Work. Furnish and install, or install only, road closure devices using fabricated gates and accessories, combination post and rail barriers, concrete barriers, earth mound barriers, and other devices.

Materials

650.02 Requirements. Furnish materials to be used in fabricating gates and barriers. Ensure that all hardware is galvanized in accordance with AASHTO M 232 and meets the requirements of ASTM A 307. Furnish plain or cut washers that are American Standard Washers.

Furnish timber posts, rails, and lumber that meet the requirements of AASHTO M 168. Provide timber of the species and type, and rate of preservative treatment.

Furnish concrete that meets the requirements of Subsection 601.03, method B or C.

Construct earth mound barriers from excavated material adjacent to the barrier location, or from other designated locations.

Construction

650.03 Performance. Place road closure devices at designated locations. Construct all devices to the required dimensions. In assembling gates, perform required welding in accordance with the best modern practice and the applicable requirements of AWS D1.1.

After assembly, clean non-galvanized steel pipe gates and paint them with one coat of zinc-rich primer and two coats of exterior enamel of the required type and color.

Set all posts vertically and embed them to the required depth. Place concrete for embedment against undisturbed earth within an excavation sized to achieve the embedment dimensions. Compact the backfill in 6 inch layers to finished grade.

Furnish and install all signs and/or reflective warning markers accessory to the road closure device.

650.04 Acceptance. Construction of road closure devices will be evaluated under Subsections 106.02 and 106.04.

Measurement

650.05 Measure the items listed in the bid schedule according to Subsection 109.02.

Payment

650.06 The accepted quantities, measured as provided in Subsection 109.02 and above, will be paid at the contract price per unit of measurement for the Section 650 pay item listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

703 - Aggregate

703.05_National_12_15_2016

Delete 703.05 and replace with the following:

703.05 Subbase, Base, Surface Course, and Screened Aggregate.

(a) Subbase or base aggregate. Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-2
(2) Liquid limit, AASHTO T 89	25 max.
(3) Plastic limit, AASHTO T 90	Nonplastic
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	50% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

(b) Surface course aggregate. Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-3
(2) Liquid limit, AASHTO T 89	35 max.
(3) Plastic Index, AASHTO T 90	
a) If the percent passing the No. 200 sieve is less than 12%	2 to 9
b) If the percent passing the No. 200 sieve is greater than 12%	Less than 2
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	75% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Do not furnish material that contains asbestos fibers.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

(c) Screened aggregate – Furnish hard, durable particles or fragments of stone, slag, or gravel conforming the following:

(1) Gradation	Table 703-13
(2) Plastic Index, AASHTO T 90	Less than 9
(3) Los Angeles abrasion, AASHTO T 96	55% max.
(4) Free from organic matter and lumps or balls of clay.	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary.

Delete Table 703-2 and replace with the following:

**Table 703-2
Target Value Ranges for Subbase and Base Gradation**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)					
	Grading Designation					
	A (Subbase)	B (Subbase)	C (Base)	D (Base)	E (Base)	
2½ inch	100					
2 inch	97 – 100	100	100			
1½ inch		97 – 100				
1 inch	65 – 79 (6)		80 – 100 (6)	100		
¾ inch			64 – 94 (6)	86 – 100 (6)	100	
½ inch	45 – 59 (7)					
⅜ inch			40 – 69 (6)	51 – 82 (6)	62 – 90 (6)	
No. 4	28 – 42 (6)	40 – 60 (8)	31 – 54 (6)	36 – 64 (6)	36 – 74 (6)	
No. 40	9 – 17 (4)			12 – 26 (4)	12 – 26 (4)	
No. 200	4.0 – 8.0 (3)	4.0 – 12.0 (4)	4.0 – 7.0 (3)	4.0 – 7.0 (3)	4.0 – 7.0 (3)	

() The value in the parentheses is the allowable deviation (±) from the target values..

Delete Table 703-3 and replace with the following:

**Table 703-3
Target Value Ranges for Surface Gradation**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)										
	Grading Designation										
	F	G	H	S	T	U					
1 1/2 inch	100			100							
1 inch	97-100	100		72 - 92 (6)	100						
3/4 inch	76-89 (6)	97 - 100	97 - 100							100	
1/2 inch					71 - 91 (6)						
3/8 inch	56-68 (6)	70 - 80 (6)	80 - 92 (6)	51 - 71 (6)						71 - 90 (6)	
No. 4	43-53 (7)	51 - 63 (7)	58 - 70 (7)	36 - 53 (7)	43 - 60 (7)					50 - 68 (7)	
No. 8				26 - 40 (6)	30 - 46 (6)					34 - 51 (6)	
No. 16	23-32 (6)	28 - 39 (6)	28 - 40 (6)								
No. 40	15-23 (5)	19 - 27 (5)	16 - 26 (5)	14 - 25 (5)	16 - 28 (5)					19 - 30 (5)	
No. 200	10.0-16.0 (4)	10.0 - 16.0 (4)	9.0 - 14.0 (4)	8.0 - 15.0 (4)	8.0 - 15.0 (4)					8.0 - 15.0 (4)	

() The value in the parentheses is the allowable deviation (\pm) from the target values.
If the plasticity index (PI) is greater than 0, the TV range for the No. 200 sieve size is 8-12 (4).

Add Table 703-13:

**Table 703-13
Gradation Requirements for Screened Aggregate**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)						
	Grading Designation						
	L	M	N	O	P	Q	R
6 inch	100	100					
4 inch			100	100			
3 inch					100	100	
2 inch							100
No. 4		15-45		15-45		15-45	