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# Preface

Preface_wo_10_01_2020

***<u>Delete all but the first paragraph and add the following:</u>***

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_11_9_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_11_9_2016

***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 |

101.04_National_1_22_2020

***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.

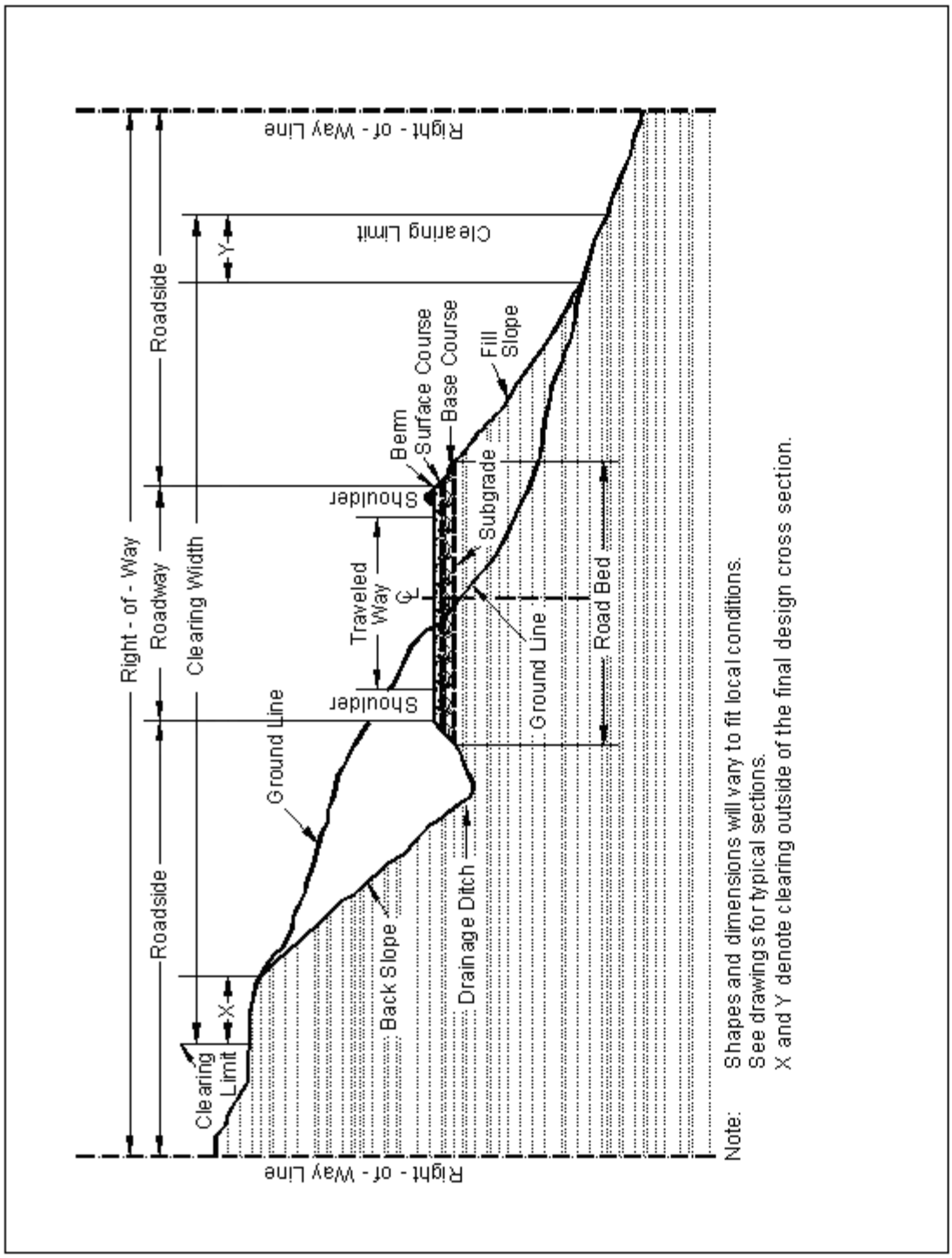
**Shop Drawings** — (Timber and Stewardship Contracts) Referred to as "Drawings" in FP-14, include drawings, diagrams, layouts, schematics, descriptive literature, illustrations, lists or tables, performance and test data, and similar materials furnished by Purchaser to explain in detail specific portions 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_11_9_2016

***<u>Delete Section 102 in its entirety.</u>***

Delete Section 102.

# 103 - Scope of Work

103.00_National_11_9_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_11_9_2016

***Delete Subsections 104.01, 104.02, and 104.04.***

## Delete Subsections 104.01, 104.02, 104.04.

104.06_National_11_9_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_11_9_2016

***<u>Delete Subsection 106.02 and replace with the following:</u>***

## 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.

# 107 - Legal Relations and Responsibility to the Public

107.02_National_11_1_2016

Add the following to Subsection 107.02:

## 107.02 Protection and Restoration of Property and Landscape.

The contractor shall perform all in-stream work between June 1st and September 15th.

Trees shall be cut between November 15th and March 31st.

107.05_National_7_18_2017

***Delete Subsection 107.05.***

## Delete Subsection 107.05.

# 108 - Prosecution and Progress

108.00_National_11_9_2016

***Delete Section 108 in its entirety.***

Delete Section 108.

# 109 - Measurement and Payment

109.00_National_11_9_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 |

***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



Add the following to Subsection 152.04(c):

## 152.04 General.

**(c) Material.**

Use required stake dimensions and materials. Pre-paint the top 2 inches of all stakes and lath, or mark them with plastic flagging. Use designated colors for paint or flagging. Mark all stakes with a stake pencil that leaves a legible imprint, or with waterproof ink.

Do not use aerosol spray paints.

Use moisture-resistant paper for survey notes. Keep notes in books with covers that will protect the contents and retain the pages in numerical sequence.

Make the following changes to Subsection 152.05:

## 152.05 Survey and Staking Requirements.

Delete Subsection 152.05(d)(2) and replace with the following:

**(d) Slope and reference stakes.**

**(2) Conventional survey methods.** When required, locate slope stakes on designated portions of the road. Locate the slope stake catch points 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, and the slope ratios.

Place slope reference stakes at least 10 feet outside the clearing limit and mark with the offset distance to the slope stake. Place sight stakes when required.

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.

Add the following to Subsection 152.05(e):

**(e) Clearing and grubbing limits.**

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.

After establishing clearing limits, move the location line stake outside the clearing limits for station identification purposes, and mark it with horizontal distance to location line.

Replace Table 152-1 with the following:

## Table 152-1 Construction Survey and Staking Tolerances

**Table 152-1**
**Construction Survey and Staking Tolerances [1]**

| Staking Phase | Horizontal | Vertical |
|---|---|---|
| Control points set from existing Government control points- Tolerance Class A | ±0.03 feet (±10 millimeters) | ±0.01 feet × $\sqrt{N}$ (±3 millimeters × $\sqrt{N}$ )[2] |
| Mapping, topography, and cross-section Points- Tolerance Class A | ±0.16 feet (±50 millimeters) | ±0.16 feet (±50 millimeters) |
| Centerline points [3] including (PC), (PT), (POT),(POC), and references- Tolerance Class A | ±0.06 feet (±20 millimeters) | ±0.06 feet (±20 millimeters) |
| Slope-stake and slope-stake references- Tolerance Class A [4] | ±0.16 feet (±50 millimeters) | ±0.16 feet ±50 millimeters) |
| Culverts, ditches, and minor drainage structures stakes- Tolerance Class A | ±0.16 feet (±50 millimeters) | ±0.06 feet (±20 millimeters) |
| Retaining walls stakes | ±0.06 feet (±20 millimeters) | ±0.03 feet (±10 millimeters) |
| Curb and gutter stakes | ±0.06 feet (±20 millimeters) | ±0.03 feet (±10 millimeters) |
| Bridge substructures stakes | ±0.03 feet (±10 millimeters)[5] | ±0.03 feet (±10 millimeters) |
| Bridge superstructures stakes | ±0.03 feet (±10 millimeters)[5] | ±0.03 feet (±10 millimeters) |
| Clearing and grubbing limit stakes- Tolerance Class A | ±1.00 feet (±300 millimeters) | – |
| Roadway subgrade finish stakes- Tolerance Class A [6] | ±0.16 feet (±50 millimeters) | ±0.03 feet (±10 millimeters) |
| Roadway finish grade stakes [6] | ±0.16 feet (±50 millimeters) | ±0.03 feet (±10 millimeters) |
| | | |
| | | |

**Table 152-1**
**Construction Survey and Staking Tolerances (continued) [1]**

| Staking Phase | Horizontal | Vertical |
|---|---|---|

| | | |
|---|---|---|
| Control points set from existing Government control points –Tolerance Class B (7) | ±0.16 feet<br>(±20 millimeters) | ±0.16 feet × $\sqrt{N}$<br>(±20 millimeters × $\sqrt{N}$ )(2) |
| Mapping, topography, and cross-section points–Tolerance Class B (7) | ±1.00 feet<br>(±300 millimeters) | ±0.50 feet<br>(±150 millimeters) |
| Centerline points including (PC), (PT), (POT),(POC), and references–Tolerance Class B (7) | ±0.16 feet<br>(±20 millimeters) | ±0.16 feet<br>(±20 millimeters) |
| Slope-stake and slope-stake references–Tolerance Class B (7) | ±0.50 feet<br>(±50 millimeters) | ±0.16 feet<br>±50 millimeters) |
| Culverts, ditches, and minor drainage structures stakes–Tolerance Class B (7) | ±0.50 feet<br>(±150 millimeters) | ±0.16 feet<br>(±20 millimeters) |
| Clearing and grubbing limit stakes–Tolerance Class B (7) | ±2.00 feet<br>(±600 millimeters) | — |
| Roadway subgrade finish stakes–Tolerance Class B (7) | ±0.50 feet<br>(±50 millimeters) | ±0.16 feet<br>(±10 millimeters) |
| Roadway finish grade stakes–Tolerance Class B (7) | ±0.50 feet<br>(±50 millimeters) | ±0.16 feet<br>(±10 millimeters) |
| | | |

(1) At statistical 95 percent confidence level. Tolerances are relative to existing Government control points.

(2) N is the number of instrument setups.

(3) Centerline points: PC - point of curve, PT - point of tangent, POT - point on tangent, POC - point on curve.

(4) Take the cross-sections normal to the centerline ±1 degree.

(5) Bridge control is established as a local network and the tolerances are relative to that network.

(6) Includes paved ditches.

(7) Tolerance Class B for Very Low Volume Roads with an aggregate or native finished surface.

152.02_Forest_11_21_2019

*Add the following to Subsection 152.04:*

**152.04 General.**

For projects surveyed and staked using preliminary survey line (P-line) method, the government shall provide P-line traverse data and construction staking data showing the projected location of catch points.

*Add the following to Subsection 152.05:*

**152.05 Survey and Staking Requirements.**

**(b) Centerline establishment.** For P-line survey and staking method, establish the centerline (L-line) by measuring right or left from the preliminary survey line (P-line) on a bisector bearing the distance shown in the Government-provided staking notes. Ensure that the station of the centerline point is that listed in the Government-provided staking notes.

**(1) P-line establishment.** A preliminary survey line has been established on the ground for this project, with initial and succeeding survey points referenced. Reestablish missing P-line points as necessary to control subsequent construction staking operations to the precision designated in table 152-1.

Set additional intermediate P-line stakes at locations shown on the plans and listed in the construction staking notes, as needed to establish control for additional design features. Examples include but are not limited to: beginning and ending of extra widening and turnout tapers; horizontal curves; and turnarounds.

**(d) Slope and references stakes**

**(3) P-line staking method.** Establish slope stakes, clearing limits, and reference stakes at right angles to each centerline station listed in the construction staking notes. Slope stakes and references shall be set on the cut side only, except through cuts or through fills where both sides are staked and referenced. Establish clearing limits on both sides of centerline.

Mark slope stakes with the station, the amount of cut or fill, the horizontal distance to centerline, and the slope ratios.

Place slope reference stakes at least 10 feet outside the clearing limit, mark with the offset distance to the slope stake, and duplicate the information on the slope stake.

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 152-1.

**Method II** – Projected Catchpoint L-line reference. Stake information such as amount of cut or fill shall be provided in the government-provided staking notes. Slope stake catchpoints shall be located by measuring distances from the established centerline (L-line) location. Measurements and stake locations shall be along the cross section line perpendicular to the centerline (L-line) alignment. If field conditions do not match staking data stake according to method I.

**Method III**— Projected Catchpoint P-line reference. Stake information such as amount of cut or fill shall be provided in the government-provided staking notes. Slope stake catchpoints shall be located by measuring

slope distances from the P-line as shown in the Government provided data. Measurements and stake locations shall be along the cross section line bisecting the preliminary survey line (P-line).

For stations within horizontal curves having a deflection angle greater than 20 degrees stake according to method II.

If field conditions do not match staking data stake according to method I.

**Table 152-1**

**Construction Survey and Staking Tolerances [1]**

| **For P-line Survey and Staking method** | | |
|---|---|---|
| **Staking Phase** | **Horizontal** | **Vertical** |
| P-line Accuracy requirements for reestablishing P-Line | 1:100 closure with a max<br>foresight and backsight rejection limit of 30 minutes | 1:400 closure with a max foresight and backsight rejection limit of 0.50%. |
| Distance from P-line stake to centerline stake, slope stake, or reference stake. | ±0.2 feet | ±0.2 feet if staking with method I |
| Distance from slope stake to clear flag/stake | ±1.0 feet | NA |

# 153 - Contractor Quality Control

153.02_National_11_1_2016

Delete Subsection 153.02 and replace with the following:

## 153.02 Qualifications.

Submit the following for approval with the quality control plan:

**(a) Quality control manager (QCM).** Furnish a QCM who has at least 2 years' experience in construction, inspector, quality control and material testing on construction projects of similar type and scope.

**(b) Testers.** Provide testers with at least one year experience in the type of sampling and testing required, and with one of the following for the type of sampling and testing performed:

(1) NICET Level II certification in highway material or equivalent state or industry certification;

(2) Certification by a regional certification program (such as Western Alliance for Quality Transportation Construction (WAQTC), Northeast Transportation Technician Certification Program (NETTCP), Southeast Task Force for Technician Training and Qualification (STFTTQ), or Multi Regional Training and Certification (M-TRAC)); or

(3) At least one year employment by an AASHTO accredited laboratory performing equivalent sampling and testing.

153.03_National_11_1_2016

Add the following paragraph to the end of Subsection 153.03(b):

## 153.03 Quality Control Plan.

**(b) Quality Control Procedures.**

Submit written proposals for approval of alternate AASHTO or State approved test methods. Alternate methods may be allowed based on documented equivalence to the specified method.

153.07_National_11_1_2016

Delete Subsection 153.07 and replace with the following:

## 153.07 Records and control charts.

Maintain complete testing and inspection records by pay item number and make them accessible to the CO.

# 155 - Schedules for Construction Contracts

155.00_National_11_9_2016

***Delete Section 155 in its entirety.***

Delete Section 155.

# 156 - Public Traffic



Delete Section 156 in its entirety and replace with the following:

## Section 156. – PUBLIC TRAFFIC

**Description**

**156.01** This work consists of controlling and protecting public traffic adjacent to and within the project.

**Material**

**156.02** Conform to the MUTCD and the following Sections and Subsections:

| | |
|---|---|
| Permanent Traffic Control | 633 |
| Traffic Signing and Marking Material | 718 |
| Concrete Barriers and Precast Guardwalls | 618 |
| Temporary plastic fence | 710.11 |

**Construction Requirements**

**156.03 General.** Accommodate traffic according to MUTCD, approved traffic control plan and this section. Perform work in a manner that ensures safety and convenience of the public. Unless otherwise provided for in Table 156-1, keep existing roads open to all traffic during road improvement work, and maintain them in a condition that will adequately accommodate traffic. Delays may not exceed **120** minutes at any one time followed by an open period of no less than **60** minutes. Accommodate public traffic on roads adjacent to and within the project until the project is accepted according to Subsection 106.07(b).

Submit traffic control plan at least 30 days prior to intended use. Perform no work that interferes or conflicts with traffic or existing access to the roadway surface until a traffic control plan has been approved.

Post construction signs and traffic control devices in conformance with MUTCD and Forest Service EM 7100-15. All required signs will be in place and approved prior to beginning work on project.

If the Contractor agrees in writing to allow public traffic to use a new road being constructed prior to completion, it will be considered an existing road for traffic control purposes.

**156.04 Temporary Traffic Control.** Install and maintain temporary traffic control devices adjacent to and within the project as required by the approved traffic control plan and the MUTCD. Install and maintain traffic control devices as follows:

**(a)** Furnish and install traffic control devices before the start of construction operations.

**(b)** All detours outside of clearing limits will be approved in writing by the Contracting Officer as part of the traffic control plan.

**(c)** Install only those traffic control devices needed for each stage or phase.

**(d)** Relocate temporary traffic control devices as necessary.

**(e)** Remove devices that no longer apply to the existing conditions.

**(f)** Immediately replace any device that is lost, stolen, destroyed, or inoperative.

**(g)** Keep temporary traffic control devices clean.

**(h)** Remove all temporary traffic control devices upon contract completion or when approved.

**(i)** When required, use flaggers certified by the American Traffic Safety Services Association, the National Safety Council, the International Municipal Signal Association, a state agency, or other acceptable organization. Perform the work described under MUTCD Part 6. Use type III, VII, VIII, or IX retroreflective sheeting on flagger paddles. Do not use flags. Flaggers must wear high visibility safety apparel as required by MUTCD 6E.02.

**156.05 Temporary Closures.** Road segments may be closed as shown in Table 156-1. The maximum consecutive days of closure shall be followed by a minimum number of consecutive days open to traffic as shown. Maintain traffic control devices during closure period(s). Appropriate barricades and signs will be erected and maintained as shown in the traffic control plan or as otherwise designated.

Prior to closing roads during construction, give written notice to the Contracting Officer at least 10 days in advance.

**Table 156-1**
**Temporary Road Closures**

| Road Number | From Terminus | To Terminus | Maximum Consecutive Days of Closure | Minimum Consecutive Days Open |
|---|---|---|---|---|
| **FR 35-MP0.1** | **STA 6+00** | **STA 12+00** | **90** | **20** |
| | | | | |
| | | | | |
| | | | | |

**156.06 Acceptance.** Public traffic work will be evaluated under Subsection 106.02.

**Measurement and Payment**

**156.07** Do not measure Public Traffic for payment. Payment for contract work is provided indirectly. See Subsection 109.05.

# 157 - Soil Erosion and Sediment Control

157.04_Forest_6_13_2019

Delete Subsection 157.04 and replace with the following:

## 157.04 General.

Thirty (30) days prior to the start of construction, submit a written plan according to subsection 104.03 with all necessary permits 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 without approval.

When erosion control measures are not functioning as intended, take corrective action to eliminate or minimize pollutants in storm water discharges from the project.

Excavation sequencing: The contractor shall plan and discuss in-stream excavation sequencing with the COR. The primary objectives shall be minimizing the discharge of fine and coarse sediment into waterways and maintaining a relatively dry work zone to aid in maintaining gradation and attaining adequate compaction of granular materials. Excavation shall be conducted in a manner that strictly minimizes both excavation and fill in the presence of flowing water. General principals to be adhered to in excavation sequencing include: construction of berms comprised of sandbags and/or relatively coarse rock and gravel that is sufficiently resistant to erosion for establishment of stream diversions and temporary bypass channels; completing excavations from downstream to upstream to limit the potential for flowing water to enter the excavated area until earthwork in the channel is nearly completed; placement of temporary grade controls, as needed, to limit erosion within temporary bypass channels. Accumulations of highly turbid water shall be pumped from the work zone and discharged onto the forest floor in a manner that limits the discharge of the turbid water back into the stream.

# 201 - Clearing and Grubbing

201.01_Forest_1_22_2020

Delete and replace Subsection 201.04(d) and replace with the following:

## 201.04(d) Clearing.

**(d)** Trim tree branches that extend over the road surface and shoulders to attain a clear height of **15** feet. Trim tree limbs as near flush with the trunk as practicable.

# 203 - Removal of Structures and Obstructions



Delete Section 203 in its entirety and replace with the following.

## Section 203. — REMOVAL OF STRUCTURES AND OBSTRUCTIONS

**Description**

**203.01** This work consists of salvaging, removing, and disposing of bridges, structures, culverts, and other obstructions.

**Material**

**203.02** Conform to the following Subsection:

| | |
|---|---|
| Backfill material | 704.03 |

**Construction Requirements**

**203.03 Salvaging Material.** Salvage with reasonable care material designated to be salvaged. Salvage in readily transportable sections or pieces. Replace or repair members, pins, nuts, plates, and related hardware damaged, lost, or destroyed during the salvage operation. Securely attach parts to adjacent members or pack them in sturdy boxes with the contents clearly marked.

Match mark members of salvaged structures. Submit one set of drawings according to Section 104 identifying the members and their respective match marks.

Stockpile salvaged material at a designated area on the project.

**203.04 Removing Material.**

**(a) Submittals.** Submit a bridge removal plan at least 7 days before beginning bridge removal for approval. Include the following:

(1) Methods and equipment to be used;

(2) Measures to be used for protecting the environment, public, adjacent property, and workers;

(3) Methods to keep debris out of stream and streambed.

**(b) General.** Saw cut sidewalks, curbs, pavements, and structures when partial removal is required.

Construct structurally adequate debris shields to contain debris within the construction limits. Do not allow debris to enter waterways, travel lanes open to public traffic, or areas designated not to be disturbed.

Handle material with lead paint contamination according to Subsection 563.05.

Raze and remove foundations, pavements, culverts, sidewalks, curbs, structures, and other obstructions interfering with the work and not designated to remain.

Remove structures and obstructions in the roadbed to 12 inches below subgrade elevation. Remove structures and obstructions outside the roadbed to 12 inches below finished ground or to the natural stream bottom.

Except in excavation areas, backfill and compact cavities left by structure removal with backfill material to the lines and grades of the finished ground. Backfill excavated areas according to Subsection 209.09. Compact backfill according to Subsection 209.10.

**(c) Concrete removal in repair areas.** Saw cut ¾ inch deep along boundaries of repair areas. Use power driven hand tools to remove existing concrete. Do not damage concrete designated to remain in place.

Where the bond between existing concrete and reinforcing steel is destroyed, remove concrete adjacent to bond to the reinforcing steel to provide at least a ¾ inch clearance for the new concrete to bond to the reinforcing steel. Use care to prevent damage to remaining concrete when achieving the final surface.

Clean exposed concrete surfaces that will be in contact with repair material. Provide a residue free surface.

**(d) Reinforcing steel.** Do not cut ro damage reinforcing steel designated to remain in place. Repair or replace damaged bars. Replace deteriorated bars as directed by the CO.

Clean exposed reinforcing steel of coatings or residue that inhibits bonding with the new concrete.

Protect the steel from corrosion and contamination. If the steel becomes corroded or contaminated, reclean the steel before placing concrete.

**203.05 Disposing of Material.** Dispose of debris, unsuitable material, and excess material as follows:

**(a) Remove from project.** Recycle or dispose of material legally off the project;

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

**(c) 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;

**(d) Decking.** 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;

**(e) Removal to designated locations.** Remove construction slash and debris to designated locations; and

**(f) Piling.** Pile construction slash in designated areas.

**203.06 Acceptance.** Removal of structures and obstructions will be evaluated under Subsection 106.02.

Backfilling and compacting of cavities left by structures will be evaluated under Section 209.

**Measurement**

**203.07** Measure the Section 203 pay items listed in the bid schedule according to Subsection 109.02.

**Payment**

**203.08** The accepted quantities will be paid at the contract price per unit of measurement for the Section 203 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

# 204 - Excavation and Embankment

204.00_National_11_4_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 |
| Water | 725.01(c) |

## 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.

**204.07 Subexcavation.** Excavate material to the required limits. Dispose of unsuitable material according to 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 1⅓V: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 |
| **Production (continued)** | | | | | | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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

209.07_Forest_10_31_2017

## 209.07 Dewatering.

Add the following:

Do not pump water from foundation excavations directly into live streams or marine waters. Pump water into settling areas as specified in the contract.

209.10_Forest_5_22_2019

*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 sieve. Compact as follows:

**(1) More than 80 percent retained on a No. 4 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 per second and vibratory rollers at speeds less than 3 feet 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 impact per vibration and a minimum frequency of 1000 vibrations per minute;

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

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

Increase the compactive effort for layers deeper than 12 inches as follows:

- For each additional 6 inches 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 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 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 sieve. Multiply this number by the percentage of material passing a No. 4 sieve, and add 2 percent to determine the optimum moisture content of the material.

Use nonvibratory rollers at speeds less than 6 feet per second and vibratory rollers at speeds less than 3 feet 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 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 per second and vibratory rollers at speeds less than 3 feet 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 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 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.

**(4)** Sheepsfoot, tamping, or grid rollers capable of exerting a force of 250 pounds per inch 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 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.

# 210 – Temporary Construction Pad

## Description

**210.01** This work consists of furnishing all labor, equipment and materials necessary to construct, maintain, remove and dispose of the temporary construction pad for access to the west abutment. All work must be conducted as directed by the Contracting Officer and in accordance with any permit requirements.

## Material

**210.03** The materials must meet the requirements specified in the standard specifications.

## Construction Requirements

**210.04** Construct the temporary pad with large stone, temporary platforms, or a combination of methods. These temporary access method(s) must allow for adequate stream flow. The Contractor is responsible for removal of the material that was placed within the stream.

## Measurement and Payment

**210.16** The completed work, as described, will be measured and paid for by the contract Lump Sum price. **Temporary Construction Pad** includes furnishing all labor, equipment and materials necessary to construct, maintain, remove and dispose of the temporary construction pad.

# 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 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.

301.08_Forest_1_23_2020

## 301.08 Acceptance.

Delete 301.08 (b).

# 403 – Asphalt Concrete

403.02_National_11_4_2016

Delete Subsection 403.02 (a) and replace with the following:

## 403.02 Composition of Mix.

**(a) TBD**.

403.06_National_11_4_2016

Add the following to Subsection 403.06 Weather Limitations:

## 403.06 Weather Limitations.

**HMA Seasonal Limitations.** Unless otherwise approved by the Engineer in writing, place HMA in accordance with the following seasonal limitations.

a. TBD.

# 411 - Asphalt Prime Coat

411.05_National_7_17_2017

Delete Subsection 411.05(d) and replace with the following:

## 411.05 Weather Limitations.

**(d)** Weather is not forecasted to be foggy or rainy 24 hours following application.

411.08_National_11_4_2016

Delete the second paragraph of Subsection 411.08 and replace with the following:

## 411.08 Maintenance.

Spread additional blotter to cover unabsorbed cut-back asphalt. Spread additional choker aggregate to cover unabsorbed emulsified asphalt. Remove excess blotter or choker aggregate after the asphalt is absorbed.

411.09_National_11_4_2016

Delete the second sentence of Subsection 411.09 and replace with the following:

## 411.09 Acceptance.

Crushed aggregate, blotter, and choker aggregate will be evaluated under Subsection 106.03.

# 412 - Asphalt Tack Coat

412.05_National_11_4_2016

Delete Subsection 412.05(b) and replace with the following:

## 412.05 Weather Limitations.

**(b)** Ambient air temperature is above 40 °F (5 °C) and rising; and

# 552 - Structural Concrete

552.00_Regional_4_18_2019

## 552.01 Description.

*Delete the first paragraph of Subsection 552.01 and replace with the following:*

This work consists of furnishing, placing, finishing, and curing concrete to be cast-in-place in bridges, culverts, and other structures; furnishing precast concrete elements by forming, placing reinforcing steel, placing and finishing concrete, curing, and transporting members; and materials testing and implementing quality control procedures. When specified, work also includes installation of furnished precast concrete elements, including performing all necessary grouting, welding or other connections; and repairs or finishing associated with transport and the removal of lifting devices.

## 552.02 Material.

Add the following references to Subsection 552.02:

| | |
|---|---|
| Dowel bars | 709.01(f) |
| Falsework and forms | 562 |
| Hook bolts | 709.01(e) |
| Mortar cement | 701.02(b) |
| Reinforcing steel | 554 |
| Structural steel | 717.01 |

## 552.03 Construction Requirements.

*Delete Table 552-1 and its footnotes and replace with the following table and footnotes:*

**Table 552-1**

**Composition of Concrete**

| Class of Concrete | Minimum Compressive Strength @ 28-Days, f'c, psi (MPa) | Maximum Water/ Cementitious Material Ratio | Coarse Aggregate Size Number AASHTO M 43 [1] |
|---|---|---|---|
| A | 4500 (31.0) | 0.45 | 5, 56, 57 |
| A(AE) [5] | 4500 (31.0) | 0.45 | 5, 56, 57 |
| C | 4500 (31.0) | 0.45 | 7, 78 |
| C(AE) | 4500 (31.0) | 0.45 | 7, 78 |
| D(AE) [2] | 5000 (34.5) | 0.40 | 5, 56, 57 |
| P (Precast, Prestressed) [3] [4] [5] | See plans | – | 6,7,67,68,78 |
| P(AE) [3] [4] [5] | See plans | – | 6,7,67,68,78 |
| S (Seal) | – | 0.54 | 5, 56, 57 |

[1] Meet the processing requirements of AASHTO M 43, Table 1 – Standard Sizes of Processed Aggregate.

[2] The maximum water-soluble chloride ion (Cl-) content is 0.15 percent by mass of cement. Determine the water-soluble chloride ion content of concrete made with mix ingredients at an age between 28 and 48 days according to ASTM C1218. Submit test results with the concrete mix design for approval.

[3] The maximum water-soluble chloride ion (Cl-) content is 0.06 percent by mass of cement. Determine the water-soluble chloride ion content of concrete made with mix ingredients at an age between 28 and 48 days according to ASTM C1218. Submit test results with the concrete mix design for approval.

[4] Use Class P (AE) concrete in the entire depth of the top flange of all multi-beam bridge girders. In lieu of this, Class P (AE) concrete may be used for fabrication of the entire girder and throughout the entire depth of prestressed slabs. In all cases, furnish concrete meeting the 28 day specified minimum concrete strength requirements for the prestressed members as shown on the plans, unless otherwise specified.

[5] Use Class A (AE) or Class P (AE) concrete for precast elements to be used as substructure elements, such as footings or foundations. Use Class P (AE) concrete for fabrication of precast elements to be used in a precast (non-prestressed) superstructure element, including slabs, girders, and box culverts where traffic will be in contact with the horizontal top surface. In all cases, furnish concrete meeting the 28 day specified minimum concrete strength requirements for the precast or prestressed members as shown on the plans, unless otherwise specified.

*Delete the second and third paragraph of Subsection 552.03 and replace with the following:*

Submit written concrete mix designs on FHWA Form 1608, 552 *Structural Concrete Mix Design Submittal*, or other format that is professional in appearance and provides all of the required information in subsections (a) through (z) of this section, 552.03. Allow at least 30 calendar days for approval before production.

Add the following Subsection 552.03 under the list of items to be included in the mix design submittal:

**(z)** Evaluation of potential aggregate reactivity

## 552.08 Delivery.

*Delete the last sentence of the first paragraph of Subsection 552.08(a) with the following:*

Do not exceed 130 total revolutions at mixing speed, including both initial mixing and remixing. Do not exceed 300 total revolutions, including both mixing and agitating speed.

*Delete table 552-4 and its footnotes and replace with the following table and footnotes:*

**Table 552-4**
**Concrete Remixing and Discharge Time Limits**

| **Cement Type** [1] | **Admixtures** | **Remixing Time Limit (hour)** | **Discharge Time Limit (hour)** |
|---|---|---|---|
| Type I, IA, II, IIA, V, or approved blended hydraulic cement | None | 0.75 | 1.00 |
| Type I, IA, II, IIA, V, or approved blended hydraulic cement | ASTM C494, Type B, D, or G[2] | 1.25 | 1.50 |
| Type I, IA, II, IIA, V, or approved blended hydraulic cement | Hydration stabilizer | 3.00 | Approved design discharge time limit, 3.50 maximum |
| Type III | None | 0.50 | 0.75 |
| Type III | ASTM C494, Type B, D, or G[2] | 1.00 | 1.25 |

[1] AASHTO M 85 or AASHTO M 240 as applicable.

[2] ASTM C494 defines Type B as a retarding admixture, Type D as a Water-reducing and retarding admixture, and Type G as a Water-reducing, high range, and retarding admixture.

## 552.18 Loads on New Concrete Structures.

Add the following paragraph to Subsection 552.18:

Do not allow public traffic on the bridge until approaches, curbs, and bridge rail are completed and in-place. Erect barricades at each end of bridge spans when road approaches allow vehicles to drive directly onto the structure.

***Delete* Subsections 552.20, 552.21, and 552.22 and replace with the following:**

**552.20 Precast Elements.** Precast concrete elements and members considered structural in nature shall meet the following specifications of this section.

**(a) Certification and/or Quality Assurance of Precast Manufacturing Plant.** Furnish precast concrete members using a plant with one of the following certifications, appropriate to the type of member being fabricated:

(1) Precast/Prestressed Concrete Institute (PCI)
   (a) Bridge 1, Precast Bridge Products (no prestressed reinforcing).
   (b) Commercial 1, Precast Concrete Products (no prestressed reinforcing).
(2) National Precast Concrete Association (NPCA)
(3) American Concrete Pipe Association (ACPA)

When available, submit a copy of the transmittal letter of the latest PCI, NPCA, or ACPA inspection and certification with the shop drawings.

In lieu of the above certification, the Contractor shall retain a professional engineer to provide quality assurance for the work by inspecting and certifying in writing the concrete members are constructed in accordance with the contract specifications and FSSS Section 552 and shall include information including but not limited to the following:

**(a)** Shop drawings review.
**(b)** Concrete member dimensions.
**(c)** Concrete mix design.
**(d)** Aggregate sources, moisture contents, test results.
**(e)** Steel reinforcing placement.
**(f)** Concrete curing and strength test results.
**(g)** Concrete material certifications.
**(h)** Placement mixing, delivery and sampling.
**(i)** Properly calibrated production and test equipment
**(j)** Proper records keeping including; personnel qualifications and training records, material sources, quality control testing results for the aggregate and concrete, pre-

pour and post-pour inspection reports, batching records, disposition of failing products, and shipping.

Material sources shall be on the State's approved supplier list or approved in writing by the CO.

Furnish the certification or supplemental information above to the CO prior to shipment of materials and installation at the job site.

Perform all sampling, testing, and inspection necessary to ensure quality control of the component materials and the concrete. Sample and test for quality control and acceptance testing in accordance with the AASHTO or ASTM test methods prescribed in Section 552.

Maintain adequate records of all inspections and tests. Keep records that indicate the nature and number of observations made, the number and type of deficiencies found, the quantities approved and rejected, and the nature of any corrective action taken.

**(b) Precast Manufacturing Plant (i.e. Casting Yard).** The precasting of concrete structural members may be done at a casting yard of an industry-certified plant or a casting yard of the Contractor's choice with the appropriate certifications discussed above.

**(c) Tolerances.** Place and consolidate concrete so that shrinkage cracks are not produced in the member.

Verify that the prefabricated elements will fit-up and align properly before shipping from the precast facility. Assembling each superstructure and substructure composed of prefabricated elements in the yard prior to shipping the elements to the project site is a suitable way to perform such verification. If assembled in the yard, use blocking to simulate the support of the elements and the spacing between the elements. Verify all elements are constructed in compliance with all plan requirements. Dry fit all connections in the fabrication yard prior to installation of the elements at the bridge site.

Fabricate precast concrete foundation units straight and true size and shape with exposed edges and corners precise and true so each finished unit complies with the following dimension tolerances as well as position tolerances for cast in items:

(1) Length shall not vary by more than ¾ inch.
(2) Height/Width shall not vary from that shown in the design by more than ¼ inch.
(3) Local smoothness shall be no more than ¼ inch in 10 feet for any surface, except when finishing or form liners are called out or accepted as part of the submittal
(4) Position of inserts for structural connections shall not vary from that shown in the shop drawings by more than ½ inch.
(5) Placement of non-prestressed reinforcement shall comply with Section 554 Reinforcing Steel.

**(d) Submittals.** Submit four (4) sets of shop drawings to the CO for approval according to subsection 104.03, a minimum of 21 days before fabrication of the precast member(s). In lieu of

hard copy shop drawing submittals, electronic submittals are acceptable. Show all details necessary for fabrication, including the following:

(1) Details and location of all lifting holes, inserts, hardware, devices, and any additional reinforcing required for lifting. Include supporting calculations and lifting procedures.
(2) Describe the method of curing, handling, storing, and transporting the elements.
(3) Concrete mix design for all precast elements.

**(e) Quality Assurance.**

(1) Permanently mark each element with date of fabrication, supplier identification and module identification. Stamp markings in fresh concrete.
(2) Prevent cracking or damage of precast components during handling and storage.
(3) Replace or repair defective or broken precast concrete deck and concrete deck overhang elements according to section 106. Requests to repair defective or broken elements are subject to the following;
    (a) Obtain approval before performing concrete repairs.
    (b) Concrete repair work must re-establish the module's structural integrity, durability, and aesthetics to the satisfaction of the CO.
    (c) Describe the cause of damage and the corrective action taken to eliminate future damage.
    (d) An updated CPM schedule showing the effects of repair work on project completion must be submitted.
(4) Elements will be rejected if they do not conform to the contract documents, and for the following reasons:
    (a) Full-depth cracking of concrete and concrete breakage that is not repairable.
    (b) Cracks that extend to the nearest reinforcement plane, or fine surface cracks that do not extend to the nearest reinforcement plane but are numerous or extensive.
    (c) Camber that does not meet the requirements of the plans or fabrication drawings.
    (d) Honeycombed texture.
    (e) Dimensions exceeding the allowable tolerances.
    (f) Damage during fabrication, transportation, erection, or construction.
(5) Document all test results for structural concrete. Show in the quality control files at least the following information:
    (a) Element identification.
    (b) Date and time of fabrication concrete pour.
    (c) Concrete cylinder test results.
    (d) Concrete mix design and the batch print out.
    (e) Form-stripping date.
    (f) Location and number of blockouts and lifting inserts.
    (g) Temperature, moisture, and duration of curing period.

(h) Approved repair procedures.

**(f) Handling, storing, and transporting.**

(1) *Damage/Cracking.* Prevent cracking or damage of prefabricated elements and modules during handling, storing, and transporting.

(2) *Precast Element Sizes.* Finalize the size of precast elements with consideration for shipping restrictions, equipment availability, and site constraints. Show the final element sizes on the assembly plan.

(3) *Lifting Devices.* The design and detail of the lifting devices is the responsibility of the contractor. Use lifting devices in a manner that does not cause damage, cracking, or torsional forces. Place the lifting devices in locations that are not visible once the prefabricated element is placed, or within recessed pockets that can be patched after installation.

(4) *Safety.* The Contractor is responsible for the safety and stability of prefabricated elements during all stages of handling, transportation, and construction.

(5) *Handling and Storing.* Store the precast units in a horizontal and upright position, supported at their designated bearing points. Follow Chapter 5 of the PCI Design Handbook for handling and erection bracing requirements.

Lift the precast elements so that the angle between the top surface of the precast element and the lifting line is not less than 60 degrees when measured from the top surface of the precast elements to the lifting line. If two cranes are used, then the lifting lines shall be vertical. Lift the modules at the designated points. The Contractor is responsible for handling stresses in the modules. Choose the locations of the lifting points so that the anticipated flexural tensile stress induced in the top of the structural concrete for the assumed support locations is not greater than the allowable stress.

Select smooth and well compacted storage areas to prevent damage due to differential settlement. Support precast elements during storage to prevent cracking or creep induced deformation (sagging). Check precast elements at least once per month to ensure that creep-induced deformation does not occur.

Protect the elements from freezing temperatures for 5 days after casting or until precast concrete attains design compressive strength. Do not remove thermal protection for any length of time before the units attain the specified compressive strength when the surrounding air temperature is below 20 °F (-6 °C).
Before transporting precast concrete members, provide written certification that the members were fabricated and visually inspected in conformance with 552 and meet minimum quality requirements.

(6) *Additional Reinforcement.* Provide additional reinforcement, as needed, to meet the requirements of handling, transporting, and erecting precast members.

(7) *Requirements Prior to Shipping.* Do not ship precast concrete members until concrete cylinder tests, manufactured from the same concrete and cured under the same conditions as the members, indicate that the concrete in each member has attained the minimum required design strength and is at least 7 days old.

**(g) Installation.**

(1) Install members without damage to structural capacity, shape, or finish. Replace or repair damaged members.

(2) Install members level and plumb without exceeding the following allowable tolerances:

(a) Plan Location from Design Datum: Plus or Minus ½ in. (±13mm).

(b) Top Elevation from Nominal Top Elevation: Plus or Minus 3/8 in. (±6mm).

(c) Maximum Plumb Variation over the Lesser of Height of Structure or 100 ft (30m): 1 in. (25 mm).

(d) Plumb in Any 10 ft (3 m) of Element Height: ¼ in. (6mm).

(e) Maximum Jog in Alignment of Matching Edges: ¼ in. (6mm).

**552.21 Acceptance.**

See Table 552-9 for sampling, testing, and acceptance requirements and the quality characteristic category.

Reinforcing steel, anchor devices, elastomeric bearings, and material for concrete and grout will be evaluated under Subsection 106.03. Furnish production certifications for hydraulic cement, reinforcing steel, and any other cementitious materials.

Cast in place concrete mixture's slump, air content, density, and temperature will be evaluated under Subsections 106.02 and 106.04.

Concrete compressive strength will be evaluated under Subsection 106.05. The lower specification limit is the minimum required compressive strength at 28 days ($f'_c$) specified in the contract. Remove and replace concrete represented by cylinders having a compressive strength less than 90 percent of the minimum 28-day strength ($f'_c$).

Concrete for precast concrete members will be evaluated under Subsections 106.02, 106.03, and 106.04.

Construction of all precast concrete members and concrete structures (including batching, placing, finishing, and curing concrete) will be evaluated under Subsections 106.02 and 106.04.

Reinforcing steel will be evaluated under Section 554.

Falsework and forms will be evaluated under Section 562.

**Measurement**

**552.22** Measure the Section 552 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

When measuring structural concrete by the cubic yard (cubic meter), measure in the structure.

Do not measure reinforcing steel, concrete, anchorages, plates, nuts, and other material contained within or attached to the unit for precast concrete structural members.

## Payment

**552.23** The accepted quantities will be paid at the contract price per unit of measurement for the Section 552 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05

# 555 – Steel Structures

## 555.21 Payment.

*Add the following to subsection 555.21:*

Payment for 55501.1 Structural Steel Stringers, Erected, includes picking up the W36x160 steel beams from the owner specified location of (XXXXXXXXXX, -XXXXXXXXXX), delivery to the project site, and installation.

# 567 - Micropiles

Add the following note to subsection 567.04:

**567.04 Submittals**

**(o)** Stamped engineering calculations and details for micropile design that meets the specified capacity and minimum embedment requirements.

# 625 - Turf Establishment

625.00_National_7_18_2017

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:

| | |
|---|---|
| Agricultural limestone | 713.02 |
| Fertilizer | 713.03 |
| Mulch | 713.05 |
| Seed | 713.04 |
| Tackifiers | 713.11 |

**Construction Requirements**

**625.03 General.** Apply turf establishment to prepared ground or any disturbed area between **April 15th** and **September 15th.** Apply turf establishment to the areas shown on the plans or worklists within **3** 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 Watering.** Maintain moisture as follows:

**Watering is not required.**

**625.06 Fertilizing.**

**Fertilizing is not required.**

**625.07 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

**(b) Hydraulic Method.** Use hydraulic-type equipment capable of providing a uniform application using water as the carrying agent. Add a tracer material consisting of either wood or grass cellulose

fiber mulch to the water. Apply the tracer material at a rate of 400 pounds per acre to provide visible evidence of uniform application. Add the seed to the water slurry no more than 30 minutes before application. Seed by hand areas inaccessible to seeding equipment.

Furnish and apply the following kinds and amounts of pure live seed:

| Type of Seed | | Quantity of Pure Live Seed (Lbs/Acre) |
|---|---|---|
| 1. | Perennial Ryegrass (Lolium perenne) | 25 |
| 2. | Annual Ryegrass (Lolium multiflorum) | 25 |
| | Total | 50 |

*If Boreal Red Fescue or Arctared Fescue is unavailable, Fawn Tall Fescue may be substituted in the same proportion.

For watershed restoration activities or erosion control measures where native plant materials are desired, use the following turf mixture.

Furnish and apply the following kinds and amounts of pure live seed (Native mix):

| Type of Seed | | Quantity of Pure Live Seed (Lbs/Acre) |
|---|---|---|
| 1. | Perennial Ryegrass (Lolium perenne) | 25 |
| 2. | Annual Ryegrass (Lolium multiflorum) | 25 |
| | Total | 50 |

**625.08 Mulching.** Apply Mulch within **48** hours after seeding by the following methods.

**(a) Dry Method.** Mulch is not required when using the Dry Method.

**(b) Hydraulic Method.** Apply mulch in a separate application from the seed using hydraulic-type equipment according to Subsection 625.07(b).

Apply bonded fiber matrix hydraulic mulch at a minimum rate of **1,205** pounds per acre.

Apply so no hole in the matrix is greater than 0.04 inches. Apply so that no gaps exist between the matrix and the soil.

Apply mulch uniformly over the entire disturbed area. Mulch by hand areas inaccessible to mulching equipment.

**625.09 Protecting and Caring for Seeded Areas.** Repair or apply supplemental applications of seed, mulch, fertilizer, and water as many times as needed until turf is established or final acceptance.

**625.10 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**

**625.11** 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, measure on the ground surface.

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

**Payment**

**625.12** 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.

# 703 - Aggregate

703.05_National_1_23_2020

**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 703-16 |
| **(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 | |
| 3/4 inch | | | 64 – 94 (6) | 86 – 100 (6) | 100 |
| 1/2 inch | 45 – 59 (7) | | | | |
| 3/8 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 (±) 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 | |