

**STANDARD MODIFICATION  
HSM18-4**

**02/06/2019**

**DIVISION 100—GENERAL PROVISIONS**

**SECTION 101  
DEFINITIONS AND TERMS**

**101-1.01 GENERAL**

*ADD the following paragraph after the sixth paragraph:*

Delete “Standard Drawing” throughout the Alaska Standard Specifications for Highway Construction and throughout the Alaska Traffic Manual Supplement and replace in both documents with, “Alaska Standard Plan”.

**101-1.03 DEFINITIONS**

*ADD the following definition:*

**ALASKA STANDARD PLAN.** Detail Drawing adopted by the Department for repetitive use, showing details to be used where appropriate.

*DELETE the following definition:*

**STANDARD DRAWING.**

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**STANDARD MODIFICATION  
HSM18-1**

**07/01/2018**

**DIVISION 100—GENERAL PROVISIONS**

**SECTION 101  
DEFINITIONS AND TERMS**

*DELETE the definition for BID and REPLACE with the following:*

**BID (OR PROPOSAL).** The bidder’s offer, on the prescribed forms, to perform the specified work at the prices quoted.

*ADD The following five definitions:*

**BID FORMS.** Department-furnished forms that a bidder must complete and submit when making a bid in response to an advertised project. Bid forms may include a bid schedule, certification forms, acknowledgment forms, and other documents.

**DIGITAL SIGNATURE.** An electronic signature that conforms to the Uniform Electronic Transactions Act, AS 09.80.010 et seq.

**ELECTRONIC BID.** A bid that a bidder (i) prepares on the Department’s bid forms accessed through the Department’s approved online bidding service and (ii) submits to the Department through use of that bidding service’s online submittal process.

**ELECTRONIC MAIL (EMAIL).** A system for sending messages from one person to another via telecommunications links between computers or terminals using dedicated software.

**MANUAL BID.** A bid that a bidder (i) prepares on the Department's bid forms accessed either through the Department's approved online bidding service or obtained from the Department's Regional Contracts Office and (ii) submits to the Department in physical paper form by hand delivery, U.S. Mail, or courier service.

## **SECTION 102 BIDDING REQUIREMENTS AND CONDITIONS**

**102-1.05 PREPARATION OF BID.** DELETE the subsection in its entirety and replace with the following: A bidder shall prepare its bid using either the Department approved bid preparation software or the Department provided bid forms or legible copies of the Department's forms. All entries shall be legible and in ink or type.

Bidders shall:

1. Enter all prices required on the Bid Schedule, in figures;
2. Enter a unit price for each contract item for which a quantity is given;
3. Enter the products of the respective unit prices and quantities in the column provided;
4. Enter lump sum prices for lump sum contract items in the column(s) provided; and
5. Enter the total amount of all contract items for the basic bid and, when specified, any alternates.

When a bid item contains a choice to be made by the bidder, the bidder shall indicate a choice according to the Specifications for that item. No further choice is permitted.

The bid must be signed in ink or by a digital signature by the person or persons authorized to sign the Contract for the bidder. If a bidder is a corporation, the bid must be signed by a corporate officer or agent with authority to bind the corporation. If a bidder is a partnership, a partner must sign. If the bidder is a joint venture, each principal member must sign. If a bidder is a sole proprietorship, the owner must sign. Each person signing the bid must initial any changes made to entries on the bid forms.

A bidder submitting an electronic bid agrees that its digital signature constitutes a binding signature.

The bidder shall make no claim against the Department in the event it is unable to submit its bid through approved online bidding service and/or approved online bidding service is unable to submit the bid(s) to the Department. The Department reserves the right to postpone the public bid opening in the event of technical problems.

For multiple-project bid openings, the bidder may limit the total dollar amount or number of projects to be accepted by completing and attaching the following statement with its bid for at least one of the projects. The Department will then determine which of the low bids it will accept, up to the total indicated.

*"We wish to disqualify all of our successful bids at this bid opening which exceed the total of \$\_\_\_\_\_ or \_\_\_\_\_ contracts and hereby authorize the Department to determine which bids to disqualify, based on this limit."*

**102-1.06 NONRESPONSIVE BIDS.** DELETE the subsection in its entirety and replace with the following:

1. A bid shall be rejected as nonresponsive if it:
  - a. Is not properly signed by an authorized representative of the bidder and in a legally binding manner;
  - b. Contains unauthorized additions, conditional or alternative bids, or other irregularities that make the bid incomplete, indefinite, or ambiguous;

- c. Includes a reservation of the right to accept or reject any award, or to enter into a contract pursuant to an award, except for an award limitation under Subsection 102-1.05;
  - d. Fails to include an acceptable bid guaranty with the bid;
  - e. Is materially unbalanced; or
  - f. Fails to meet any other material requirement of the Invitation To Bid.
2. A bid may be rejected as nonresponsive, in the Department's discretion, if it:
- a. Is not typed or completed in ink;
  - b. Fails to include an acknowledgement of receipt of each addendum by assigned number and date of issue; or
  - c. Is missing a bid price for any pay item, except when alternate pay items are authorized.

**102-1.07 BID GUARANTY.** *DELETE the subsection in its entirety and replace with the following:* Bids shall be accompanied by a bid guaranty in the amount specified on the Invitation To Bid. The guaranty shall be unconditionally payable to the State of Alaska and shall be in the form of an acceptable paper Bid Bond (Form 25D-14), an electronic bid bond acceptable to the Department and verified through its online bidding service, a certified check, a cashier's check, or a money order.

The surety of a Bid Bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. A legible power of attorney shall be included with each paper Bid Bond (Form 25D-14).

An individual surety will not be accepted as a bid guaranty.

**102-1.08 DELIVERY OF BIDS.** *DELETE the subsection in its entirety and replace with the following:* Bids shall be submitted electronically through the online bidding service, or shall be submitted in a sealed envelope. When bids are submitted in a sealed envelope, the envelope shall clearly indicate its contents and the designated address, as specified on the Invitation to Bid. Bids for other work may not be included in the envelope. In the event of a bid delay, electronic bidders that have already submitted their bid prior to the bid delay must resubmit their bid utilizing all Bid Forms EBSX Files or their bid will not be received.

The Department will not accept a bid submitted by email or fax unless specifically called for in the Invitation to Bid.

**102-1.09 WITHDRAWAL OR REVISION OF BIDS.** *DELETE the subsection in its entirety and replace with the following:* Manual Bids may be withdrawn or revised in writing delivered by mail, fax, or email, provided that the designated office receives the withdrawal or revision before the deadline stated in the Invitation To Bid. Withdraw requests must be signed and submitted by the bidder's duly appointed representative who is legally authorized to bind the bidder. Revisions shall include both the modification of the unit bid price and the total modification of each item modified but shall not reveal the amount of the total original or revised bids.

Electronic Bids may be withdrawn or resubmitted through the online bidding service. Revisions to electronic bids delivered by mail, fax, or email will not be permitted. If electronic bid withdrawal is unsuccessful, electronic bids may be withdrawn in writing delivered by mail, fax, or email provided that the designated office receives the withdrawal before the deadline stated in the Invitation To Bid. Written withdrawal requests must be signed and submitted by the bidder's duly appointed representative who is legally authorized to bind the bidder.

**102-1.11 ADDENDA REQUIREMENTS.** *DELETE the subsection in its entirety and replace with the following:* The Department will issue addenda if it determines, in its discretion, that clarifications or changes to the Contract documents or bid opening date are needed. The Department may send addenda by any reasonable method such as fax, email, or may post the addenda on its website or online bidding service. Unless picked up in person or included with the bid documents, addenda or notice that an addendum has been issued will be addressed to the individual or company to whom bidding documents were issued and sent to the email address or fax number on the plan holders' list. Notwithstanding the Department's efforts to distribute addenda, bidders are responsible for ensuring that they have received all addenda affecting the Invitation To Bid. Bidders must acknowledge all addenda on the Bid Forms, by fax, or by email before the deadline stated in the Invitation to Bid.

**102-1.12 RECEIPT AND OPENING OF BIDS.** *DELETE the subsection in its entirety and replace with the following:* The Department will only consider bids, revisions, and withdrawals received before the deadline stated in the Invitation to Bid.

The Department will assemble, open, and publicly announce bids at the time and place indicated in the Invitation to Bid, or as soon thereafter as practicable. The Department is not responsible for prematurely opening or failing to open bids that are improperly addressed or identified.

*ADD the following subsection:*

#### **102-1.14 ELECTRONIC MAIL**

Within its submitted bid, a bidder must include a current electronic mail (email) address of bidder's representative who possesses authority to receive, process, and respond to Department emails regarding the advertised project.

The Department may send notices and information to a bidder by using the furnished email address of the bidder's authorized representative.

A bidder shall notify the Department if the bidder requests the Department to send email notices or information to an address different from the email address initially provided in its bid forms. The bidder shall notify the Department of such change by sending a request in writing to the Contract's point of contact identified on the Invitation to Bid that is signed by a representative who is authorized and empowered to legally bind the bidder.

Delivery of an email sent by the Department is complete upon receipt in the addressee's email account. An email sent after 4:30 pm shall be deemed to have occurred at the opening of business on the next working day.

If needed, the Department may demonstrate proof of email delivery by affidavit or certification that includes the following:

1. The date and time that the Department sent the email message;
2. The email address from which the Department sent the message;
3. The name and email address to which the Department sent the message;
4. A statement that the Department sent the email message and that the person signing the affidavit or certification believes the transmission to have been complete and without error; and
5. An attached copy of the subject email.

### **SECTION 103 AWARD AND EXECUTION OF CONTRACT**

**103-1.01 CONSIDERATION OF BIDS.** *DELETE the subsection in its entirety and replace with the following:* After the bids are opened and read, the bids will be mathematically checked and compared on the basis of the sum of the products of the bid schedule quantities and the unit bid prices. The unit bid prices govern if there is an error in extending the unit bid prices, or in totaling the extensions, or if an extension is missing. The results of the bid comparisons will be made available to the public as soon as practicable.

Until the Award, the Department may reject any or all bids, waive minor informalities or advertise for new bids without liability to any bidder if the Department, in its discretion, determines that to do so is in the best interests of the State.

A bidder may request withdrawal of a bid after opening and before the Award only in accordance with AS 36.30.160(b) and State procurement regulations. Submit the request to the Contracting Officer.

An interested party, as defined in AS 36.30.699, may protest a proposed Award of contract as per AS 36.30.560 and AS 36.30.565. Submit the protest to the Contracting Officer.

**WHOLLY STATE-FUNDED PROJECTS.** On wholly state-funded projects, determination of the low bidder will include bidder preferences as required under AS 36.30.321, according to subsections 1-3 below. Alaska Bidder Preference, Alaska Veteran Preference, and Alaska Product Preference are not applicable on projects with federal funding.

1. Alaska Bidder Preference: A bidder claiming this preference shall provide with their bid an Alaska Bidder Preference Certification, certifying they qualify as an Alaska bidder eligible for Alaska Bidder Preference according to AS 36.30.

If the bidder qualifies as an Alaska bidder, a five percent (5%) preference will be applied to the price of the bid. "Alaska bidder" means a person who:

- a. holds a current Alaska business license;
  - b. submits a bid for goods, services, or construction under the name as appearing on the person's current Alaska business license;
  - c. has maintained a place of business within the state staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the bid;
  - d. is incorporated or qualified to do business under the laws of the state, is a sole proprietorship and the proprietor is a resident of the state, is a limited liability company organized under AS 10.50 and all members are residents of the state, or is a partnership under former AS 32.05, AS 32.06, or AS 32.11 and all partners are residents of the state; and
  - e. If a joint venture, is composed entirely of ventures that qualify under (a) through (d), above.
2. Alaska Veteran Preference: A bidder claiming this preference shall provide an Alaska Veteran Preference Certification, certifying they qualify as an Alaska bidder eligible for Alaska Veteran preference according to AS 36.30.

If a bidder qualifies as an Alaska bidder and is a qualifying entity, an Alaska Veteran Preference of 5 percent shall be applied to the bid price. The preference may not exceed \$5,000 (AS 36.30.321). A "qualifying entity" means a:

- a. sole proprietorship owned by an Alaska veteran;
- b. partnership under AS 32.06 or AS 32.11 if a majority of the partners are Alaska veterans;
- c. limited liability company organized under AS 10.50 if a majority of the members are Alaska veterans; or

- d. corporation that is wholly owned by individuals, and a majority of the individuals are Alaska veterans.

A preference under this section is in addition to any other preference for which the bidder qualifies.

To qualify for this preference, the bidder must add value by the bidder itself actually performing, controlling, managing and supervising a significant part of the services provided or the bidder must have sold supplies of the general nature solicited to other state agencies, governments, or the general public.

An Alaska veteran is a resident of Alaska who:

- (1) served in the Armed forces of the United States, including a reserve unit of the United States armed forces; or the Alaska Territorial Guard, the Alaska Army National Guard, the Alaska Air National Guard, or the Alaska Naval Militia; and
  - (2) was separated from service under a condition that was not dishonorable.
3. Alaska Product Preference: A bidder claiming this preference shall complete and sign the Alaska Product Preference Worksheet, according to the worksheet instructions, and submit the completed worksheet with their bid.

Except for timber, lumber and manufactured lumber products used in the construction project under AS 36.30.322(b), an Alaska products preference will be given as required under AS 36.30.326 - 36.30.332 when the bidder designates the use of Alaska products.

If the successful bidder/contractor proposes to use an Alaska product and does not do so, a penalty will be assessed against the successful bidder/contractor according to AS 36.30.330(a).

Each Alaska product declared on the Alaska Product Preference Worksheet must have an "Approval" date on the Alaska Product Preference Program List, that is on or before the bid opening date for this contract, and that does not expire before the bid opening date for this contract.

**103-1.03 AWARD OF CONTRACT.** *DELETE the subsection in its entirety and replace with the following:*

The Department will award the Contract to the lowest responsible and responsive bidder unless it rejects all bids. The Department will notify all bidders in writing via email, fax, or U.S. Mail of its intent to award.

The Department will notify the successful bidder in writing of its intent to award the Contract and request that certain required documents, including the Contract Form, bonds, and insurance be submitted within the time specified. The successful bidder's refusal to sign the Contract and provide the requested documents within the time specified may result in cancellation of the notice of intent to award and forfeiture of the bid security.

If an award is made, it will be made as soon as practicable and usually within 40 days after bid opening. Award may be delayed due to bid irregularities or a bid protest, or if the award date is extended by mutual consent. Bids shall be valid for 120 days after bid opening, and may be extended by mutual consent.

**SECTION 109  
MEASUREMENT AND PAYMENT**

**109-1.01 GENERAL.** *Insert the following after the second paragraph:* Pay item numbers in the Bid Schedule are cross-referenced to the pay item numbers in all other contract documents. The cross-reference for pay item numbers is included in the Estimate of Quantities table on the plans.

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**STANDARD MODIFICATION  
SM-3**

12/22/2017

**SECTION 120  
DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM****120-1.01 DESCRIPTION**

DELETE the second paragraph of Subsection 120-1.01 and REPLACE with the following:

The Department, in coordination with the Federal Highway Administration (FHWA), adopted a Race-Neutral DBE Program with an overall DBE Utilization Goal of 8.83 percent for Alaska's FHWA Federal-Aid program. Although the Race-Neutral program does not establish or require individual project DBE Utilization Goals, 49 CFR establishes the Bidder is responsible to make a portion of the work available to DBEs and to select those portions of the work or material needs consistent with the available DBEs to facilitate DBE participation.

**STANDARD MODIFICATION  
SM-4**

12/22/2017

DELETE Section 606 in its entirety and REPLACE with the following:

**SECTION 606  
GUARDRAIL**

**606-1.01 DESCRIPTION.** Construct new guardrail, terminal sections, and transition rail of the kind and type specified.

Remove and reconstruct or remove and dispose of existing guardrail, terminal sections, and transition rail.

**606-2.01 MATERIALS.** Use materials that conform to the following:

Concrete	Section 501, Class A
Flexible Delineator Posts	Section 730-2.05
Guardrail Connection Plate	Section 722
Guardrail Hardware	Subsection 710-2.07
Guardrail Posts and Blockouts	Subsection 710-2.06
High Strength Bolts	Section 722
Metal Beam Rail	Subsection 710-2.04
Terminals	Subsection 710-2.11
Wire Cable	Subsection 709-2.02

Terminal Markers. Single piece marker, meeting the requirements of Section 730-2.05 Flexible Delineator Posts.

Post-mounted flexible delineators. Single piece marker, meeting the requirements of Section 730-2.05 Flexible Delineator Posts.

Furnish terminal markers, color as shown on the plans, nominally 0.125 by 3.75 inches by 66 inches long or as shown on the plans, with a 3 inch by 12 inch retroreflective sheeting matching the color of the adjacent lane line, or as shown on the plans.

Furnish post-mounted flexible delineators, color and dimensions as shown on the plans, with a 3 inch by 12 inch retroreflective sheeting matching the color of the adjacent lane line, or as shown on the plans.

Fabricate side-mounted guardrail reflector assembly brackets from aluminum alloy.

Retroreflective sheeting for terminal markers, post-mounted flexible delineators, and side-mounted guardrail reflectors shall meet ASTM D4956 requirements for Type VIII, IX, or XI.)

**CONSTRUCTION REQUIREMENTS**

**606-3.01 GENERAL.** Install guardrail and terminals at the locations shown on the Plans. Conform with the Standard Drawings and these Specifications.

At locations where public traffic is adjacent to guardrail work, have all materials on site, including crashworthy terminals, that are required to completely install a segment of guardrail before beginning work on that segment.

Start guardrail installation at the "upstream" end (the end adjacent traffic will encounter first) by either installing a crashworthy terminal or connecting to an existing barrier. Continue installation in the direction of traffic. Exception: if the guardrail run will connect to existing barrier, buried in the backslope, or guardrail, existing or new bridge railing, or other existing structure at the "downstream" end, guardrail installation may be started at the point of connection.

Do not leave posts installed for guardrail within the clear zone for more than 48 hours before installing the rail. At the end of each work shift, install drums or Type II barricades with flashing warning lights to delineate incomplete sections of guardrail and terminal sections.

If guardrail runs are not completed within 10 calendar days after beginning installation, install temporary crash cushions meeting NCHRP 350 or MASH test level 3 at all non-crashworthy guardrail ends within the clear zone. Apply Traffic Price Adjustment if the Contractor does not comply with the crash cushion requirement.

Where necessary, adjust the height of existing guardrail to provide a smooth transition to new guardrail. Use 25 linear feet of guardrail or two 12' 6" pieces of guardrail to transition to match the existing or new guardrail elements and/or end treatments.

After shaping the slopes and staking proposed guardrail terminal section locations, request the Engineer to field verify their locations. Receive approval of the staked locations before installing terminal sections.

Treat field cuts to timber posts and blockouts according to AWPA standard M 4.

Install blockouts according to manufacturer's recommendations and as shown on the plans.

Install side-mounted guardrail reflectors and post-mounted flexible delineators as follows:

1. At intervals noted on the plans or Standard Drawings, starting with the first guardrail post beyond terminal sections
2. With the retroreflective sheeting facing approaching traffic
3. With retroreflective sheeting on both sides, on two-way roadways
4. Not on the terminal sections, except as shown on the plans

Attach terminal markers, in a vertical position, to the P.T. post of Short Radius Guardrail sections and to the post where the flare begins for parallel guardrail terminals. Coordinate terminal marker locations with the Engineer.

At the end of each work shift, install drums or Type II barricades with flashing warning lights to delineate incomplete sections of guardrail and terminal sections.

**606-3.02 POSTS.** Set posts to accommodate the line, grade, and curvature shown on the Plans.

Use either wood or steel posts when allowed by the type of guardrail specified, subject to the following:

1. Use one type of post material on the project unless extending an existing run of guardrail.
2. Match existing post material to extend an existing run of guardrail.

Set posts as follows:

1. Set posts plumb, in the location and to the depth shown on the Plans or Standard Drawings.



2. Choose an installation method that does not damage the post, adjacent pavement, structures, utility conduits, and final slopes. Repair all damage to the satisfaction of the Engineer, or replace the damaged item, as per subsection 105-1.11.
3. Set wood or steel posts in dug, drilled, or pre-punched holes. Steel posts may also be set by ramming or driving if:
  - a. The underlying material is no larger than six inch; and
  - b. The posts are not damaged during installation.
4. For placement in solid rock or broken rock embankment greater than six inch, set wood or steel posts in pre-dug, pre-drilled, or pre-punched holes.
5. Backfill and compact around posts with material as specified in the typical section to firmly support the post laterally and vertically. Compact under and around posts to the Engineer's satisfaction.

**606-3.03 BEAM RAIL.** Fabricate metal work in the fabricator's shop. Bend curved guardrail elements with radii less than or equal to 100 feet in the fabricator's shop or with an approved bending apparatus.

Receive approval before field punching, cutting, or welding. Repair damaged spelter coat areas on galvanized rail elements according to AASHTO M 36.

Lap rail elements so that the exposed ends face away from approaching traffic in the adjacent lane.

Use bolts long enough to extend at least 1/4 inch beyond the nuts. Except where required for adjustments, do not extend bolts more than 1 inch beyond the nuts.

Locate bolts at expansion joints at the center of the slotted holes.

Tighten bolts at expansion joints to snug-tight. Make all other bolts fully-tight.

**606-3.04 CABLE RAIL.** Install cable guardrail according to the Plans and Specifications. Install at the locations shown on the Plans.

**606-3.05 TERMINAL SECTIONS.**

1. Parallel Terminals. Install terminal sections according to the manufacturer's recommendations for the entire length of the terminal then, if required, transition rail height over 25' to match guardrail height and splice location. Install where shown on the Plans.

Follow Section 203 for excavation and embankment requirements.

Install ASTM D4956 Type III, IV, or V retroreflective sheeting on the end section of parallel terminals consisting of yellow and black bars sloping 45 degrees downward toward the traffic side of the terminal according to guidance for Object Markers for Obstructions Adjacent to the Roadway in Chapter 2C of the ATM.

2. Buried-in-Backslope Terminals. Install buried-in-backslope terminals where shown on the plans. If required, transition rail height over 25' to match guardrail height and splice location.

Attach terminal markers, in a vertical position, to the first post of each parallel guardrail terminal, and to the post where the flare begins for parallel guardrail terminals and buried-in-backslope terminals. Orient terminal markers to face traffic approaching in the near lane. Coordinate terminal marker locations with the Engineer.

**606-3.06 REMOVAL AND RECONSTRUCTION OF GUARDRAIL.** Remove and reconstruct guardrail as specified. Replace lost or damaged materials without extra compensation.

**606-3.07 REMOVAL AND DISPOSAL OF EXISTING GUARDRAIL.** Remove the existing guardrail shown on the Plans, including the rail, cable elements, terminal sections, hardware, posts, concrete bases, and

steel tubes. Backfill resulting holes with material in 6-inch layers that is similar to the existing embankment and compact to the same approximate density. Removed items become your property.

**606-3.08 ADJUST EXISTING GUARDRAIL.** When called for on the Plans, reset existing guardrail to the height shown on the applicable Standard Drawing, measured from the top of the rail to the finished shoulder surface below the rail. Raise and lower the posts several times to prevent settlement and then re-drive them to the height shown on the Plans. Use other methods if approved.

**606-3.09 INSTALL NEW GUARDRAIL.** Install guardrail as shown on the applicable Standard Drawings, measured from the top of the rail to the finished shoulder surface below the rail.

Install MASH Test Level 3-compliant W31 guardrail as shown on the plans. Install new guardrail in conformance with tolerances shown on the plans.

**606-4.01 METHOD OF MEASUREMENT.** Section 109 and as follows:

1. Guardrail. Measured along the face of the rail or cable, from the center of the end posts.

Short Radius Guardrail. Per each, installed in place.

When the guardrail is connected to a terminal section, the pay limit for the rail ends where the specified terminal section begins.

2. Terminals. Per each, installed in place.
3. Transition Rail (Bridge Rail Thrie Beam Transition or Bridge Rail W-Beam Transition). Per each accepted connection.

**606-5.01 BASIS OF PAYMENT.**

Payment for temporary crash cushions installed to protect motorists from guardrail installations that have not been completed within 10 calendar days of beginning installation is subsidiary to other items.

1. Guardrail. Side-mounted guardrail reflectors, post-mounted flexible delineators, terminal markers, guardrail beam, posts, blockouts, and associated hardware are subsidiary. Installation of downstream anchors, transitions for rail height and splice locations, long span guardrail sections, and guardrail stiffening sections are subsidiary to guardrail installation.
2. Short radius guardrail sections. The contract price includes all materials from the terminal anchor to and including the first wood or steel post of standard guardrail or guardrail end terminal, and including the terminal anchor assembly, in-line anchor, terminal posts, CRT posts, rail elements, terminal markers, and associated hardware required for a complete installation.
3. Terminal Sections.
  - a. Parallel Guardrail Terminal. The contract price includes rail elements, posts, blockouts, pipe sleeves, cable assemblies, guardrail extruders, terminal markers, and all associated hardware required for a complete installation.
  - b. Buried in Backslope Guardrail Terminal. The contract price includes rail elements, posts, blockouts, concrete, rebar, anchors, and all associated hardware required for a complete installation.
4. Transition Rail. The contract price includes all brackets, beam sections, transition pieces, and all posts and associated hardware required for a complete connection of the guardrail section to a bridge rail or barrier.

All material required for embankment widening for guardrail and terminal sections is paid for under the appropriate pay items shown in the bid schedule.

Payment will be made under:

Pay Item	Pay Unit
606(1) W-Beam Guardrail	Linear Foot
606(2) Thrie Beam Guardrail	Linear Foot
606(3) Box Beam Guardrail	Linear Foot
606(4) Cable Guardrail	Linear Foot
606(5) Removing and Reconstructing Guardrail	Linear Foot
606(6) Removing and Disposing of Guardrail	Linear Foot
606(7) Raising Existing Guardrail (Retired)	Linear Foot
606(8) Double-faced, W-Beam Guardrail	Linear Foot
606(9) Short Radius Guardrail	Each
606(10) Slotted Rail Terminal (SRT-350) (Retired)	Each
606(11) Extruder Terminal (ET-2000) (Retired)	Each
606(12) Guardrail/Bridge Rail Connection (Retired)	Each
606(13) Parallel Guardrail Terminal	Each
606(14) Buried in Backslope Guardrail Terminal	Each
606(15) Adjust Existing Guardrail	Linear Foot
606(16) Transition Rail	Each

**STANDARD MODIFICATION  
HSM18-3**

**10/12/2018**

*Delete Section 630 in its entirety and substitute the following:*

**SECTION 630  
GEOTEXTILE FOR EMBANKMENT AND ROADWAY  
SEPARATION, STABILIZATION AND REINFORCEMENT**

**630-1.01 DESCRIPTION.** Prepare ground surface, and furnish and place geotextiles for separation, stabilization, and/or reinforcement as shown on the Plans.

**630-2.01 MATERIALS.** Use materials that conform to the following:

Geotextiles and Sewn Seam Strength                      Subsection 729-2.01

Sewing Thread. Use high strength polypropylene, or polyester. Do not use nylon thread. Use thread of contrasting color to that of the geotextile itself.

**630-3.01 CONSTRUCTION.**

1. Surface Preparation. Prepare ground surface by removing stumps, brush, boulders, and sharp objects. Fill holes and ruts over 3 inches deep, with material shown on the Plans or as approved by the Engineer.
2. Geotextile Placement. Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases, folds or wrinkles. Do not drag the geotextile through mud or over sharp objects that could damage the geotextile. Do not expose geotextiles to sunlight for longer than 14 days after removal of protective covering. Do not allow geotextiles to get wet prior to installation.
  - a. Separation and Stabilization. Lay geotextile for embankment separation and stabilization parallel to roadway centerline. On horizontal curves, place in segment lengths not exceeding those listed in Table 630-1, with butt ends cut to match and sewn or overlapped. On tangents, straighten the geotextile and sew or overlap butt ends. Shingle overlaps in the same direction as fill placement. Prevent overlapped edges from lifting during construction.

- b. **Reinforcement.** Lay the machine direction of the geotextile for embankment reinforcement perpendicular to the roadway centerline or as shown on the Plans. Join segments by sewing or an approved bonding or attachment process. Shingle overlaps in the same direction as fill placement if seams are not sewn. Prevent overlapped edges from lifting during construction.

**TABLE 630-1  
GEOTEXTILE PLACEMENT ON CURVES**

Degree of Curve	Maximum Segment Length (ft.)
1	125
2	90
3	75
4	65
5	55
6	50

3. **Joining.** Join adjacent geotextiles for separation or stabilization by overlapping or sewing. Join adjacent geotextiles for reinforcement by sewing or as shown on the Plans.
- a. Sew seams with a Butterfly or J-Seam using a double-thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates four layers of geotextile for the full seam length. Make the stitching line 1-1/4 inches ( $\pm 1/4$  inch) from the folded edge of the seam and at least 1/2 inch from the free edge of the geotextile. Sew seams so that they face upward and can be easily inspected by the Engineer. Illustrations showing correct stitch formation and seam configurations are provided in Figure 1-2 (page 1-28) of the FHWA publication, *Geosynthetic Design & Construction Guidelines*, FHWA-NHI-07-092, August 2008.
- b. Overlap geotextile sections by a minimum of 3 feet at all longitudinal and transverse joints. Place the beginning of each new roll beneath the end of the previous roll to prevent the advancing fill from lifting the geotextile. Shingle in the direction of construction.
4. **Material Placing and Spreading.** During placing and spreading of material, maintain a minimum depth of 12 inches of cover material; or a minimum depth equal to the separation distance between multiple layers of geotextile as shown on the Plans when this separation distance is less than 12 inches; at all times between the geotextile and the wheels or tracks of the construction equipment. Limit the size and weight of construction equipment to reduce rutting in the initial lift above the geotextile to not greater than 3 inches deep to prevent overstressing the geotextile.

Spread the material in the direction of the upper overlapped geotextile. Maintain proper overlap and geotextile continuity. If sewn or bonded seams are used, place the cover material and spread in only one direction for the entire length of the geotextile. On weak subgrades limit height of dumped cover material to prevent localized subgrade and/or geotextile failure. Do not drop stones or frozen material larger than 1 foot in diameter directly onto the geotextile from a height of more than 1 foot.

Compact using a smooth drum roller. Do not allow construction equipment to make sudden stops, starts, or turns on the cover material. Do not allow turning of vehicles on the initial lift of cover material above the geotextile. Fill any ruts over 3 inches deep occurring during construction with material shown on the Plans; do not grade adjacent material into rut; and compact to the specified density.

5. **Geotextile Repair.** Repair and replace damaged geotextile (torn, punctured, or disturbed at the overlaps or sewn joints). For damage evidenced by visible geotextile damage, subgrade pumping, intrusion, or embankment distortion, remove the backfill around and under the damaged or

displaced area, and repair with material matching the damaged material. Make patches overlap or sew patches to the existing geotextile..

- a. Separation and Stabilization. Overlay torn area with geotextile with a minimum 3 foot overlap around the edges of the torn or damaged area or sew and bond according to Subsection 630-3.01.3.a. Ensure the patch remains in place when cover material is placed over the affected area.
- b. Reinforcement. Sew according to Subsection 630-3.01.3.a unless joining by overlap is shown on the Plans. Ensure the patch remains in place when cover material is placed over the affected area.

**630-4.01 METHOD OF MEASUREMENT.** By multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for overlap, whether at joints or patches.

**630-5.01 BASIS OF PAYMENT.** Payment will be made at the contract unit price per square yard. Material used to fill ruts and holes will be paid for under separate materials pay items.

Pay Item	Pay Unit
630(1) Geotextile, Separation, Class 3	Square Yard
630(2) Geotextile, Stabilization, Class 1	Square Yard
630(3A) Geotextile, Reinforcement – Type 1	Square Yard
630(3B) Geotextile, Reinforcement – Type 2	Square Yard

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*Delete Section 631 in its entirety and substitute the following:*

**SECTION 631  
GEOTEXTILE FOR SUBSURFACE  
DRAINAGE AND EROSION CONTROL**

**631-1.01 DESCRIPTION.** Prepare ground surface, and furnish and place geotextiles for subsurface drainage and erosion control, as shown on the Plans.

**631-2.01 MATERIALS.** Use materials that conform to the following for the class specified in the bid schedule:

Geotextiles and Sewn Seam Strength Subsection 729-2.01

Sewing Thread. Use high strength polypropylene, or polyester. Do not use nylon thread. Use thread of contrasting color to that of the geotextile itself.

**631-3.01 CONSTRUCTION.**

1. Surface Preparation. Prepare ground surface by removing stumps, brush, boulders, and sharp objects. Fill holes and ruts over 3 inches deep, with material shown on the Plans or as approved by the Engineer. Construct smooth and stable trench walls.
2. Geotextile Placement. Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases, folds or wrinkles. Place geotextile in a manner which will ensure intimate contact between the trench wall and the geotextile (i.e., no voids, folds, or wrinkles). The geotextile may be held in place with securing pins at 3-foot spacing along all edges (but not closer than 2 inches

from the edge) to prevent movement during construction. Do not expose geotextiles to sunlight for longer than 14 days after removal of protective covering. Do not allow geotextile rolls to get wet prior to installation.

- a. Subsurface Drainage. In trenches, after placing the geotextile and material shown on the Plans, fold the geotextile over the top of the material shown on the Plans to produce a minimum overlap of 12 inches, for trenches greater than 12 inches wide. In trenches less than 12 inches wide, make the overlap equal to the width of the trench. Then cover the geotextile with the subsequent course of material.
  - b. Erosion Control. Place and anchor geotextile on the approved surface so it will not be torn or excessively stretched by placement of the overlying materials. Secure the geotextile to the slope but secure it loosely enough so that the geotextile will not tear when riprap or other cover material is placed on the geotextile. The geotextile shall not be keyed at the top of the slope until the riprap or other cover material is in place at the top of the slope. Anchor the terminal ends of the geotextile using key trenches or aprons with a minimum of 24 inches depth into the soil substrate at the crest and toe of slope, or as shown on the Plans. Place geotextile with the machine direction parallel to the direction of water flow (normally parallel to the slope for erosion control runoff and wave action, and parallel to the stream or channel).
3. Joining. Join geotextile by sewing or overlapping.
- a. Sew seams with a Butterfly or J-Seam using a double thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates four layers of geotextile for the full seam length. Make the stitching line 1-1/4 inches ( $\pm 1/4$  inch) from the folded edge of the seam and at least 1/2 inch from the free edge of the geotextile. Sew seams so that they can be easily inspected by the Engineer or representative. Illustrations showing correct stitch formation and seam configurations are provided in Figure 1-2 (page 1-28) of the FHWA publication, *Geosynthetic Design & Construction Guidelines*, FHWA-NHI-07-092, August 2008. Conform both factory and field sewn seams to the strength requirements of Table 1 as outlined in the AASHTO M288 for subsurface drainage and erosion control applications.
  - b. Overlap geotextile sections by a minimum of 3 feet at all longitudinal and transverse joints. Overlap successive geotextile sheets in the direction of flow so that the upstream sheet is placed over the downstream sheet and/or upslope over downslope. In trenches, where overlapped seams are constructed in the longitudinal trench direction, make the overlap equal to the width of the trench.
4. Placement of Cover Material. Following placement of the geotextile on the prepared surface, place cover material of the type shown on the Plans. Place the cover material and armor from the bottom to the top of the slope using methods which minimize tearing and/or excessive stretching of the geotextile. In underwater applications, place the geotextile and the required thickness of cover material in the same day. Maintain proper overlap and geotextile continuity. Do not exceed the allowable drop heights for cover material shown in Table 631-1. Do not allow stones with a weight of more than 100 pounds to roll down the slope on the geotextile. Do not grade the slope in a way that will disturb the cover material or armor stone once it has been placed. Backfill all voids in the riprap or other cover material, which allows the geotextile to be visible, with material shown on the Plans, so that the geotextile is completely covered.

**TABLE 631-1 ALLOWABLE DROP HEIGHT FOR GEOTEXTILE**

INDIVIDUAL STONE Max. Weight (lbs)	ALLOWABLE DROP HEIGHT (ft)	
	UNPROTECTED GEOTEXTILE	PROTECTED GEOTEXTILE*

< 5	3	3
5-250	0	3
> 250	0	0**

\* Protected geotextile is defined as having a gravelly covering (cushion layer) at least 6 inches thick.

\*\* If stones greater than 250 pounds must be dropped or if a height of drop greater than 3 feet is required, then perform field trials to determine the minimum cushion thickness and/or maximum height of safe drop without damaging the geotextile.

Maintain a minimum depth of 12 inches of cover material between the geotextile and the wheels or tracks of the construction equipment.

5. **Geotextile Repair.** Should the geotextile be torn, punctured, or the overlaps or sewn joints disturbed – as evidenced by visible geotextile damage – remove the backfill around the damaged area and repair or replace the damaged area at no additional expense to the State. Make repairs to the damaged area with a patch of the same type of geotextile originally placed. Overlay torn area with geotextile with a minimum 3 foot overlap around the edges of the torn area. Ensure that the patch remains in place when material is placed over the affected area.

**631-4.01 METHOD OF MEASUREMENT.** By multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for geotextile in key trenches or for overlap, whether at joints or patches.

**631-5.01 BASIS OF PAYMENT.** Payment will be made at the contract unit price per square yard. Material used to fill ruts and holes will be paid for under separate materials pay items at the unit price for the type of material used.

Pay Item	Pay Unit
631(1) Geotextile, Drainage, Class <u>2</u>	Square Yard
631(2) Geotextile, Erosion Control, Class <u>1</u>	Square Yard

*Delete Section 632 in its entirety and substitute the following:*

## SECTION 632

### PAVING FABRIC

**632-1.01 DESCRIPTION.** Furnish and install geotextile paving fabric where shown on the Plans.

**632-2.01 MATERIALS.** Use materials that conform to the following:

Paving Fabric                      Subsection 729-2.03  
Asphalt Binder                      Subsection 702-2.01 (for grade of asphalt used in the overlay)  
Emulsified Asphalt                      Subsection 702-2.03

**632-3.01 CONSTRUCTION.**

1. **Surface Preparation.** Prepare the surface on which the fabric is to be placed as follows:
  - a. Remove excess asphalt material, loose aggregate, and other foreign materials from the surface.
  - b. Fill all potholes and cracks wider than 1/4 inch with emulsified asphalt (CSS-1) sand slurry.
2. **Application of Sealant.** Apply asphalt sealant by distributor meeting all requirements set forth under Subsection 402-3.02. Apply asphalt sealant (tack coat) uniformly at 0.20 to 0.30 gallons per square yard and at a temperature between 295°F and 320°F in the distributor tank, or as recommended by the Paving Fabric manufacturer. Do not apply asphalt material on a wet surface or when the ambient air temperature is below 45 °F or when other conditions would prevent proper application.

3. **Fabric Laydown Equipment.** Use approved mechanical laydown equipment to place fabric.
4. **Fabric Placement.** Place fabric directly on top of the asphalt sealant (tack coat) before the sealant has cooled and lost its tackiness. Lay fabric in full rolls without wrinkles and/or folds. Place the fabric per the manufacturer's recommendations. Overlap geotextile joints to ensure full closure of the joint, but do not exceed 6 inches of overlap. Overlap transverse joints in the direction of paving. Apply 0.20 gallons per square yard of additional asphalt sealant beneath all fabric joints. Remove and replace damaged geotextiles. Removal and replacement of damaged geotextiles is subsidiary to Section 632 Pay Items.
5. **Bituminous Surface Course Overlay.** Place the bituminous surface course closely following the fabric laydown to avoid exposure of uncovered fabric overnight or to traffic or inclement weather. Do not allow the temperature of the hot-mix asphalt to exceed manufacturer's recommendations. If asphalt sealant bleeds through the fabric before the placement of the overlay, apply sand or bituminous surface course evenly over the affected area to prevent fabric pick-up by construction equipment. Prevent paver or other construction equipment from turning and/or pivoting on the fabric.

**632-4.01 METHOD OF MEASUREMENT.** By multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for overlap, whether at joints or patches.

**632-5.01 BASIS OF PAYMENT.**

Pay Item	Pay Unit
632(1) Paving Fabric	Square Yard

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*Delete Section 633 in its entirety and substitute the following:*

**SECTION 633  
SILT FENCE**

**633-1.01 DESCRIPTION.** Furnish, install, maintain, and remove temporary silt fence as shown on the Plans or as directed.

**633-2.01 MATERIALS.** Use materials that conform to the following:

Geotextile	Subsection 729-2.01
Silt Fence	Subsection 729-2.04
Posts	Wood 1.5-inch x 1.5-inch x 36-inch min., steel, or approved synthetic material.
Prefabricated Silt Fence Attachment Devices	Meet the Plans and Section 633 requirements. Staples; wire; self-locking nylon, plastic, wire ties; or other approved means to attach fabric to posts.
Support Mesh between Posts	14-gage welded wire fencing, metal chain-link fabric, or geosynthetic mesh with equivalent strength. Use maximum mesh spacing of 6 inches. Use height shown on the Plans, or specified in the Bid Schedule.

**633-3.01 CONSTRUCTION.** Install silt fence according to Plans. Use Trenchless Detail when installing silt fence over permanently frozen ground. Drill holes for support posts, if required.

When joining to another roll, place both end posts together and wrap them with silt fence by turning them one full rotation. Drive the wrapped posts.

**633-3.02 MAINTENANCE.** Maintain the integrity of the fence to contain sediment in runoff until final



stabilization.

**633-3.03 REMOVAL.** After disturbed area has been accepted as permanently stabilized or when sediment protection is no longer needed, remove silt fence.

**633-4.01 METHOD OF MEASUREMENT.** Section 109. Measure silt fence by the length of fence installed. No allowance will be made for overlap, whether at joints or patches.

**633-5.01 BASIS OF PAYMENT.** The contract price includes installation, maintenance, removal and disposal of the silt fence.

Pay Item		Pay Unit
633(1)	Silt Fence	Linear Foot
633(2)	Support Mesh Reinforced Silt Fence	Linear Foot

*Delete Section 634 in its entirety and substitute the following:*

#### SECTION 634

#### GEOGRID FOR EMBANKMENT AND ROADWAY STABILIZATION AND REINFORCEMENT

**634-1.01 DESCRIPTION.** Furnish and install geogrid material as shown on the Plans.

**634-2.01 MATERIALS.** Use materials that conform to the following:

Geogrid            Subsection 729-2.04

#### 634-3.01 CONSTRUCTION

1. Surface Preparation.
  - a. Soft Ground (CBR  $\leq$ 3). Prepare surface by removal of stumps, brush, boulders, and sharp objects. Fill holes and ruts over 3 inches deep, with material shown on the Plans or as approved by the Engineer.
  - b. Firm Ground (CBR  $>$ 3). Compact and finish subgrade or subbase prior to placement of the geogrid.
2. Geogrid Placement. Unroll geogrid directly onto the prepared ground surface in the direction of advancing construction, parallel to the centerline of the roadway or according to the Plans. Do not drag the geogrid across the subgrade. Install the geogrid in the longest continuous practical length, free from folds, creases or wrinkles. Hold the geogrid in place with pins, staples, sandbags or piles of granular material. Do not expose geogrids to sunlight for longer than 14 days after removal of protective covering.
  - a. Soft Ground (CBR  $\leq$ 3). Overlap geogrid panels a minimum of 24 inches at all joints with the upper geogrid in the direction that fill will be placed. Tie panels together securely with cable ties or hog rings at 20 foot intervals, or according to the manufacturer's recommendations.
  - b. Firm Ground (CBR  $>$ 3). Overlap geogrid panels a minimum of 12 inches at all joints in the direction that fill will be placed. Tie panels together securely with cable ties or hog rings at 20 foot intervals and hand-tension geogrid and stake to the ground at the edges, overlaps, and in the center of each roll, at 30 foot intervals or as shown on the Plans.

Place the beginning of each new roll beneath the end of the previous roll to prevent the advancing fill from lifting the geogrid. Stagger end overlaps at least 10 feet from other end overlaps in adjacent rolls.

3. **Placement of Cover Material.** Do not operate equipment directly on the unprotected geogrid. Spread fill material in the direction of the fabric overlap. Compact using a smooth drum roller. Do not allow construction equipment to make sudden stops, starts, or turns on the cover material.
  - a. **Very Soft Ground (CBR < 1).** End-dump material onto previously placed material and spread over the geogrid with a low ground pressure dozer to the depth permitted. Maintain a minimum depth of 12 inches of cover material at all times between the geogrid and the wheels or tracks of the construction equipment unless otherwise shown on the Plans. Do not dump material directly onto the geogrid. To prevent a mud wave, end-dump fill along the edges of the geogrid to form toe berms or access roads that extend one to two panel widths ahead of the remainder of the embankment fill placement. After constructing the two berms, spread fill in the area between the toe berms by placing material parallel to the alignment and symmetrical from the toe berms inward toward the center to maintain a U-shaped leading edge (i.e., concave outward) to contain the mud wave. Limit height of dumped piles above the geogrid to avoid local bearing failure. Traffic on the first lift should be parallel to the embankment alignment. Do not allow construction equipment to turn on the first lift. Compact first lift by tracking in place with dozers or end-loaders. Compact with specified compaction equipment once embankment is at least 2 feet above the geogrid.
  - b. **Soft Ground ( $1 \leq \text{CBR} \leq 3$ ).** End-dump material onto previously placed material and spread over the geogrid with a low ground pressure dozer to the depth permitted. Maintain a minimum depth of 6 inches of cover material at all times between the geogrid and the wheels or tracks of the construction equipment unless otherwise shown on the Plans. Place the end-dumped material along the roadway centerline and spread it outward to the roadway edges to prevent the development of wrinkles or movement of the geogrid during construction. Fill in any ruts that form during construction with material shown on the Plans. Do not cut down the fill adjacent to the ruts.
  - c. **Firm Ground (CBR > 3).** Maintain a minimum depth of 6 inches of cover material at all times between the geogrid and the wheels or tracks of the construction equipment.
4. **Geogrid Repair.** Should the geogrid be torn, punctured, or the overlaps disturbed – as evidenced by visible geogrid damage – remove the backfill around the damaged area and repair or replace the damaged area at no additional expense to the State. Make repairs to the damaged area with a patch of the same type of geogrid originally placed. Overlay torn area with geogrid with a minimum 3 foot overlap around the edges of the torn area and secure as recommended by the geogrid manufacturer.

**634-4.01 METHOD OF MEASUREMENT.** By multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for overlap, whether at joints or patches.

**634-5.01 BASIS OF PAYMENT.** Payment will be made at the contract unit price per square yard. Material used to fill ruts and holes will be paid for at the unit price for the type of material used.

Pay Item	Pay Unit
634(1) Geogrid, Stabilization, Class _____	Square Yard
634 (2) Geogrid, Reinforcement, Class _____	Square Yard

**STANDARD MODIFICATION  
SM-2**

4/30/2017

**SECTION 641  
EROSION, SEDIMENT, AND POLLUTION CONTROL****641-3.03 SWPPP INSPECTIONS, AMENDMENTS, REPORTS, AND LOGS.**

DELETE subparagraph 3.03.5. Stabilization before Seasonal Thaw and REPLACE with the following:

5. Stabilization before Fall Freeze up and Spring Thaw.

Construction Activities within the Project Zone must be stabilized with appropriate BMPs prior to the anticipated date of fall freeze up, in accordance with the CGP, Section 4.12.

Exceptions to stabilization prior to anticipated date of fall freeze up include:

- a. When stabilization activities are precluded by snow cover or frozen ground conditions prior to the anticipated date of fall freeze up, or
- b. When winter construction activity is authorized by the Engineer and conducted according to the contract.

Construction Activities within the Project Zone must be stabilized with appropriate BMPs prior to spring thaw, as defined in the CGP.

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**STANDARD MODIFICATION  
SM-5**

12/22/2017

**SECTION 710  
FENCE AND GUARDRAIL**

**710-2.04 METAL BEAM RAIL.** DELETE this subsection in its entirety and REPLACE with the following:

1. W-Beam and Thrie Beam Guardrail. Meet AASHTO M 180, Class A, Type II.
2. Box-Beam Guardrail. Meet:
  - a. ASTM A500 Grade B, or
  - b. ASTM A501.

Galvanize the rail per AASHTO M 111 after fabrication.

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**STANDARD MODIFICATION  
HSM18-2**

07/01/18

**710-2.11 GUARDRAIL TERMINALS.** DELETE this subsection in its entirety and REPLACE with the following:

W-beam shall meet requirements of AASHTO M 180, Class A, Type II. Galvanize after fabrication.

Components made from rolled pressed and forged shapes, castings, plates, bars, and strips shall meet the coating requirements of AASHTO M 111. Galvanize after fabrication.

All hardware or fasteners supplied shall meet the coating requirements of AASHTO M 232.

Provide one of the following terminal types, as shown on the plans, for single-rail W-beam guardrail. Design requirements: 31-inch top of rail height, 8-inch blockouts, W6 x 8.5 steel posts, 12ft-6in w-beam panels, and mid-span splice connection to run of rail.

1. Parallel Terminal.
  - a. Provide terminals meeting the following:
    - (1) Crashworthiness: MASH-compliant Test Level 3 terminals
    - (2) Length: 50 feet nominal effective length.
    - (3) End Offset: 0 to 2 feet (25:1 or flatter straight taper) Offset end as shown on the plans.
2. Buried in Backslope Terminal: Provide MASH-compliant Test Level 3 terminals.

**STANDARD MODIFICATION  
HSM18-3**

**10/12/2018**

*Delete Section 729 in its entirety and substitute the following:*

**SECTION 729  
GEOSYNTHETICS**

**729-2.01 GEOTEXTILE FOR SUBSURFACE DRAINAGE, SEPARATION, STABILIZATION, EROSION CONTROL AND EMBANKMENT REINFORCEMENT.**

1. Subsurface Drainage. Meet AASHTO M 288 for Subsurface Drainage, except provide a minimum permittivity of  $0.50 \text{ sec}^{-1}$ , and meet Class 2 Strength Property Requirements.
2. Separation. Meet AASHTO M 288 for Separation, except provide a minimum permittivity of  $0.50 \text{ sec}^{-1}$ , and meet Class 3 Strength Property Requirements.
3. Stabilization. Meet AASHTO M 288 for Stabilization, except provides a minimum permittivity of  $0.50 \text{ sec}^{-1}$ , and meet Class 1 Strength Property Requirements.
4. Erosion Control. Meet AASHTO M 288 for Permanent Erosion Control and meet Class 1 Strength Property Requirements.
5. Reinforcement. Meet the requirements in Table 729-1 for Type 1 or Type 2.

Package, label, handle and store geotextile materials according to ASTM D 4873.

**TABLE 729-1  
GEOTEXTILE REINFORCEMENT PROPERTIES**

Property	Test Method	Units	Requirement <sup>a</sup>	
			Type 1	Type 2
Grab Tensile	ASTM D4632	lb.	200/200	400/400
Grab Elongation	ASTM D4632	% (MD)	10	10
Wide Width Tensile	ASTM D4595	lb/in. (ultimate)	200/200	400/400
Wide Width Tensile	ASTM D4595	lb/in. (@ 5% strain)	100/100	200/200
Seam Breaking Strength	ASTM D4632	lb./in.	180	360
Puncture	ASTM D6241	lb.	500	1500
Trapezoidal Tear	ASTM D4533	lb.	100	150
AOS	ASTM D4751	U.S. sieve size	#30 <sup>b</sup>	#30 <sup>b</sup>
Permittivity	ASTM D4491	$\text{sec}^{-1}$	0.20	0.20
Flow Rate	ASTM D4491	gal./min./ft <sup>2</sup>	10	10

<sup>a</sup> Minimum Average Roll Values (MARV) in machine direction (MD) / cross-machine direction (XD) unless otherwise specified

<sup>b</sup> Maximum average roll value

**729-2.02 SILT FENCE.** Meet AASHTO M 288 for Temporary Silt Fence.

**729-2.03 PAVING FABRIC.** Meet AASHTO M 288 for Paving Fabric.

**729-2.04 GEOGRID FOR EMBANKMENT AND ROADWAY STABILIZATION AND REINFORCEMENT.** Provide geogrid consisting of a regular network of connected polymer tensile elements with aperture geometry sufficient to provide significant mechanical interlock with the surrounding material. Provide dimensionally stable geogrid that is able to retain its geometry during construction. Provide geogrid structure that resists ultraviolet degradation and all forms of chemical and biological degradation encountered in the material in which it is buried.

Package, label, handle, and store geogrid material according to ASTM D 4873.

1. Stabilization. Provide geogrid that meets the survivability requirements in Table 729-2 and meets the physical requirements in Table 729-3.
2. Reinforcement. Provide geogrid that meets the survivability requirements in Table 729-2 and as shown on the Plans.

**TABLE 729-2  
GEOGRID SURVIVABILITY REQUIREMENTS**

Property	Test Method	Units	Requirement	
			CLASS 1	CLASS 2
Ultimate Multi-Rib Tensile Strength <sup>a</sup>	ASTM D6637	lb./ft.	1230	820
Junction Strength <sup>a</sup>	ASTM D7737	lb.	25	25
Ultraviolet Stability (Retained Strength)	ASTM D4355	%	50% after 500 hours of exposure	

<sup>a</sup> Minimum Average Roll Value (MARV) in any rib direction.

**TABLE 729-3  
GEOGRID PHYSICAL REQUIREMENTS**

Property	Test Method	Units	Requirement
2% Tensile Strength <sup>a</sup>	ASTM D6637	lb./ft.	≥ 400
5% Tensile Strength <sup>a</sup>	ASTM D6637	lb./ft.	≥ 800
Percent Open Area	COE, CW-02215	%	50 – 80
Aperture Size <sup>b</sup>	Direct measure	in.	0.5 – 3.0

<sup>a</sup> Minimum Average Roll Value (MARV) in machine and cross-machine directions.

<sup>b</sup> measured as the spacing between parallel ribs.

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**STANDARD MODIFICATION  
SM-6**

**12/22/2017**

**SECTION 730  
SIGN MATERIALS**

**730-2.05 FLEXIBLE DELINEATOR POSTS.** *DELETE this subsection in its entirety and REPLACE with the following:*

Durable fiberglass composite, polymer, or plastic material meeting the dimensions and colors shown on the Plans. Resistant to ultraviolet light, ozone and hydrocarbon damage and remain flexible at a temperature of minus 40 °F. Provide posts with reflectors that are capable of self-erecting and remaining serviceable after 5 head-on impacts at 55 mph and 10 impacts at 35 mph with an automobile at an air temperature of plus 40 °F.