MEMORANDUM

State of Alaska

Department of Transportation & Public Facilities
Design and Engineering Services – Central Region
Highway Design

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PIH Distribution

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SUBJECT: PIH Specifications Memo
AMATS: VFW: Eagle River Loop to Eagle River Road Pavement Preservation
CFHWY00732/001695

This memo was prepared to summarize the proposed project changes to the 2020 Standard Specifications for Highway Construction, the Standard Modifications, Statewide Specials, and Central Region Specials for the above listed project.

To see the Standard Specifications for Highway Construction 2020 edition please see the DOT&PF website:

http://dot.alaska.gov/stwddes/dcsspecs/index.shtml

To see the Standard Modifications, Statewide Specials, and CR Specials please see our ftp site for the latest edition.

http://www.dot.state.ak.us/creg/design/highways/specs/

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* No anticipated changes to the 2020 Standard Specifications for Highway Construction, Standard Modifications, Statewide Specials, or the current CR Specials.

Special Provision

SECTION 308
CRUSHED ASPHALT BASE COURSE

308-3.01 PULVERIZING AND MIXING. *Delete the first paragraph and substitute the following:* Crush or process the existing asphalt pavement so that 100% by weight passes the 2-inch sieve and 95-100% by weight passes the 1-inch sieve.

Add the following: The equipment must be capable of pulverizing a variety of asphalt surfacing and base courses. Patched and overlay areas may exist throughout the project. Surfacing and base thickness may vary from as-built thickness, and from the thickness indicated on the plans, if any are shown. Expect to find varying thicknesses and combinations of hot mix asphalt surfacing, high float surfacing, chip seal surfacing, asphalt treated base course, and aggregate base course throughout the project extents.

SECTION 501

CONCRETE FOR STRUCTURES

501-1.01 DESCRIPTION. *Add the following:* Crack inject cracks as located and directed by the Engineer. Repair spalled and deteriorated concrete areas as located and directed by the Engineer.

514-2.01 MATERIALS. *Add the following:*

Concrete Patch Material	Subsection 701-2.10

Replace 501-3.17 with the following:

501-3.17 CRACK EVALUATION. The Engineer will evaluate concrete that is cracked during and prior to execution of the Contract. Measure cracks at their widest point.

For concrete decks and approach slabs, allow the Engineer to inspect any surface cracking immediately after termination of concrete curing operations, before prestressing (if applicable), and before releasing falsework. If any 500 square foot portion of the concrete deck or approach slab has cracks, whose width exceeds 0.020 inches and combined lengths total more than 16 feet, treat the surface by performing low-viscosity resin crack repair.

For other concrete, cracks will be evaluated based on the crack width.

1. For concrete that is cracked during execution of the Contract; and crack widths equal to and greater than 0.060 inches, the concrete will be considered unacceptable. For concrete cracks that are identified prior to execution of the Contract; and crack widths equal to and greater than 0.060 inches, repair the crack by performing low-pressure crack repair according to Subsection 501-3.18.

2. For concrete that is cracked during or prior to execution of the Contract; and crack widths equal to and greater than 0.013 inches but less than 0.060 inches, repair the crack by performing low-pressure crack repair according to Subsection 501-3.18.

3. For concrete that is cracked during execution of the Contract; and cracks widths less than 0.013 inches wide, the crack will be considered acceptable with no additional evaluation or repairs required. For concrete cracks that are identified prior to execution of the Contract; and cracks widths less than 0.013 inches wide, the Engineer will evaluate the cracks to determine if additional evaluation or repairs are required.

Replace first paragraph of 501-3.18 with the following:

501-3.18 CRACK REPAIR. For concrete that is cracked during execution of the Contract, perform crack repairs and replace unacceptable concrete at no cost to the Department. No contract time extension will be given for repairing, removing, and replacing unacceptable material. For concrete cracks identified by the Engineer prior to Contract execution, inject cracks per Section 501-3.17 and Section 501-3.18.

Add the following:

501-3.20 SPALL REPAIR SURFACE PREPARATION. Determine the extent of concrete removal area according to the Engineer. Outline each area with a 1-inch deep cut perpendicular to the surface prior to removal of deteriorated concrete. The Engineer may require additional saw cut outlines and additional concrete removal.

Use any combination of mechanical methods, water-blast cleaning, and abrasive-blast cleaning to remove coarse or broken concrete until a dense, uniform surface of concrete exposing solid coarse aggregate is obtained. When using mechanical methods for removal of concrete, meet the following:

1. Use impact tools weighing less than 15 lbs.
2. Operate impact tools at an angle less than 45 degrees relative to the surface of the concrete being removed.
3. Use hand tools such as hammers and chisels or small air chisels, water blast cleaning, or abrasive blast cleaning to remove final particles of unsound concrete.

During the removal operation do not damage existing reinforcing steel, prestressing steel, or concrete to remain in place. Remove concrete ¾ inch below exposed reinforcing steel.

Before applying the repair material, clean the surface according to ASTM D 4258 and spray metallize exposed reinforcing steel according to 716-2.07.

501-3.21 CONCRETE SPALL REPAIR. Repair existing concrete surfaces that are located and specified by the Engineer with Rapid-Hardening Concrete. Use Epoxy Bonding Agent on the existing concrete bonding surface prior to placing Rapid-Hardening Concrete.

Finish the repair smooth and level with the surrounding existing concrete. Ensure the existing reinforcing cover as shown on the Plans is maintained in the repair areas.

501-5.01 BASIS OF PAYMENT. *Add the following:*

For concrete that is cracked during execution of the Contract payment for repair is subsidiary. For concrete cracks identified prior to Contract execution by the Engineer payment will be made under pay item 501.2002.0001.

Payment for concrete spall repair will be full compensation for all labor, equipment and materials required to complete the concrete spall repair in accordance with the Contract.

Payment will be made under:

Pay Item	Pay Unit
~~501.0001.0000 Class A Concrete~~	~~Lump Sum~~
501.2001.0001 Spall Repair	Contingent Sum
~~501.2002.0001 Crack Repair~~	~~Contingent Sum~~

SECTION 503
REINFORCING STEEL

503-3.01 PLACING DRAWINGS. *Replace the 1st paragraph with the following:*
Submit placing drawings, detailed according to ACI 315.

503-3.02 PROTECTION OF MATERIALS. *Replace the 2nd sentence of the 1st paragraph with the following*:
Before placing reinforcing steel in the work, ensure that the reinforcing steel is free of salt, rust, and foreign substances that may affect the performance of the reinforcing steel.

503-3.05 SPLICING. *Replace "c. Testing/Inspection" under Item 2. Electric Resistance Butt Welded Joints with the following:*

c. Testing/Inspection.

Perform job control tests using a testing laboratory with experience with ASTM A370 and California Test Method 670. A job control test consists of the fabrication, under the same conditions used to produce the splice, and the physical testing of 4 sample splices for each lot of splices. An authorized Department representative will designate when samples for job control tests are to be fabricated and will determine the limits of the lot represented by each job control test.

A lot of shop produced resistance welded butt joints is defined as no more than 150 splices of the same type of welds used for each combination of bar size and bar deformation pattern that is used in the work.

The Engineer or the Engineer's authorized representative shall witness the job control tests performed by the testing laboratory. Give the Engineer at least 7 working days' notice before beginning control tests.

Identify sample splices with tamper proof and weatherproof markings prior to shipment to the testing laboratory.

The sample shall consist of a resistance welded butt splice bar and a control bar that are identified and marked as a set. The same reinforcing bar (hoop) may be used to provide the test weld and control bar.

Test each sample to failure in accordance with ASTM A706, ASTM A370 and California Test Method 670. Determine the ultimate tensile strength for all control bars by testing the bars to failure.

The production lot will be rejected if:

(1) a sample fails within one bar diameter of the splice at less than 95 percent of the ultimate tensile strength of the associated control bar
(2) necking of the bar prior to rupture, as defined in California Test Method 670, is not observed
(3) a sample does not meet the mechanical requirements of ASTM A706 Grade 60

Replace "a. General" under Item 3. Welded Lap Splicing with the following:

a. General. Use direct lap joint welds conforming to the requirements of AWS D1.4 except as noted below.

Use the joint details and dimensions as shown in Figure 5.4(A), "Direct Lap Joint with Bars in Contact" of AWS D1.4.

Use electrodes classified as “Nickel-Steel” as referenced in AWS A5.5, A5.28, or A5.29.

Replace “c. Qualifications and Submittals.” and “d. Testing/Inspection.” under Item 4. Mechanical Butt Splices with the following:

c. Qualifications and Submittals. A splice will be considered qualified if the splice can develop a minimum tensile strength of 80000 psi, based on the nominal bar area, and the bars within the splice do not exceed a total slip shown in Table 503-3, when tested according to the relevant material ASTM, ASTM A370 and California Test Method 670.

TABLE 503-3
ALLOWABLE TOTAL SLIP LENGTH

Reinforcing Bar No.	Total Slip (inch)
4	0.020
5	0.020
6	0.020
7	0.028
8	0.028
9	0.028
10	0.036
11	0.036
14	0.048
18	0.060

Submit the following information:

(1) the manufacturer's name;

(2) the name of the product or assembly;

(3) the lot, heat, or batch number that identifies the splice;

(4) the bar grade and size number to be spliced by the material;

(5) a complete description of the splice and installation procedure; and,

(6) Tensile Test results including:

(a) bar nominal area;

(b) ultimate load at failure;

(c) ultimate tensile strength;

(d) necking results (either visually or through strain values); and,

(e) failure mechanism and location.

(7) Slip Test results including:

(f) initial length measurements;

(g) final length measurements; and,

(h) calculated slip.

d. Testing/Inspection. Perform job control tests consisting of the fabrication, under conditions used to produce the splice. For each lot of splices perform 6 slip tests and 6 tensile tests using different sample splices for each test. The Engineer will designate when samples for job control tests are to be fabricated and will determine the limits of the lot represented by each job control test.

A lot of mechanical butt joints is defined as no more than 150 splices of the same type of mechanical butt splice used for each combination of bar size and bar deformation pattern that is used in the work.

Make splice samples using the same splice materials, position, equipment, and following the same procedures as used to make splices in the work. Make splice samples at least 5 feet long with the splice at mid-length. Shorter sample splice bars may be used if approved by the Engineer.

Perform job control tests in the presence of the Engineer. Splices tested in the absence of the Engineer may be rejected. Notify the Engineer, in writing, at least 7 working days prior to performing testing.

Identify sample splices with weatherproof markings prior to shipment to the testing laboratory.

Test each sample according to the relevant material ASTM, ASTM A370 and California Test Method 670. Perform tensile testing until partial or total fracture of the parent bar material, mechanical splice material, or bar-to-splice connection.

The production lot will be rejected if:

(1) the minimum individual tensile strength of the sampled splices is less than 80000 psi based on the nominal bar area

(2) the maximum individual slip length of the sampled splices is greater than the limits in Table 503-3

Replace "b. Qualifications" and "c. Testing/Inspection." under Item 5. Mechanical Lap Splices. with the following:

b. Qualifications. A splice will be considered qualified if the splice can develop a minimum tensile strength of 75000 psi, based on the nominal bar area, when tested according to the relevant material ASTM, ASTM A370 and California Test Method 670.

Submit the following information:

(1) the manufacturer's name;

(2) the name of the product or assembly;

(3) the lot, heat, or batch number that identifies the splice;

(4) the bar grade and size number to be spliced by the material;

(5) a complete description of the splice and installation procedure; and,

(6) test results indicating the splice, used according to the manufacturer's procedures, complies with the minimum tensile strength requirements.

c. Testing/Inspection. Perform job control tests consisting of the fabrication, under conditions used to produce the splice, and tensile testing of 6 sample splices for each lot of splices. The Engineer will designate when samples for job control tests are to be fabricated and will determine the limits of the lot represented by each job control test.

A lot of mechanical butt joints is defined as no more than 150 splices of the same type of mechanical butt splice used for each combination of bar size and bar deformation pattern that is used in the work.

Make splice samples using the same splice materials, position, equipment, and following the same procedures as used to make splices in the work. Make splice samples at least 5 feet long with the splice at mid-length. Shorter sample splice bars may be used if approved by the Engineer.

Perform job control tests in the presence of the Engineer. Splices tested in the absence of the Engineer may be rejected. Notify the Engineer, in writing, at least 7 working days prior to performing testing.

Identify sample splices with weatherproof markings prior to shipment to the testing laboratory.

Test each sample according to the relevant material ASTM, ASTM A370 and California Test Method 670. Tensile test each sample until partial or total fracture of the parent bar material, mechanical splice material, or bar-to-splice connection.

All splices in the lot represented by a test will be considered to meet the tensile strength requirements when the minimum individual tensile strength of the sampled splices is not less than 75000 psi, based on the nominal bar area.

SECTION 504
STEEL STRUCTURES

504-3.01 FABRICATION. *Under Item 2 replace the 7th paragraph and sub requirements with the following*:

Surfaces of bearing and base plates and other steel surfaces that contact each other or concrete surfaces must be flat to within 1/32 inch in 12 inches and 1/16 inch overall.

Surfaces of bearing and base plates and other steel bearing surfaces that contract grout, preformed fabric pads, or elastomeric bearing pads must be flat to withing 1/8 inch in 12 inches and 3/16 inch overall.

Under Item 2 replace the 10th paragraph and subparagraphs after "Cold bend load-carrying rolled-steel plates as follows" with the following:

Cold bend at room temperature cross-frame or diaphragm connection plates up to 0.75 inches thick with minimum bending radii of 2.25 times the plate thickness in inches. Cold bend all other steel plates and bars with minimum bend radii of 5 times the plate thickness in inches measured to the concave face of the plate.

Before bending, round the edges of the plate to a radius of 1/16 inch throughout the portion of the plate to be bent.

SECTION 507
BRIDGE BARRIERS AND RAILING

507-1.01 DESCRIPTION. *Delete this Subsection and substitute the following:*
Remove and replace the existing steel bridge railing and existing concrete barrier. Construct concrete barrier, concrete median barrier, timber railing, steel bridge railing, pedestrian railing, and safety railing as shown on the Plans. Furnish and install bridge number plates as shown on the Plans.

507-2.01 MATERIALS. *Delete this Subsection and substitute the following:*

Steel Railing	Section 722
Cable Safety Railing	Section 722
Concrete	Section 501
Reinforcing Bars	Subsection 709-2.01
Epoxy-Coated Reinforcing Bars	Subsection 709-2.01
Grout	Subsection 701-2.03
Bronze Bridge Number Plate	Section 722
Anchor Adhesive	Subsection 712-2.23

507-3.01 CONSTRUCTION REQUIREMENTS.

1. General. *Add the following to the end of the first paragraph:* Set the grout underneath rail post base plates monolithically.

Add the following: Remove and dispose of existing railing elements. Remove existing rail hardware attached to the bridge girder. Cut embedded hardware, where necessary, flush to the girder surface and spray galvanize exposed hardware per section 716-2.07. Remove existing studs.

2. Steel. *Add the following:* Replace railing sections in their entirety.

Use a reinforcing steel locator at top deck surfaces to locate and map reinforcing steel prior to drilling for post-installed concrete anchors (J-bars). Adjust location of J-bars to clear existing top deck reinforcing, not to exceed 1 1/2 inch tolerance. Drill and bond J-bars according to Section 517.

Core and bond the post high strength bolts through the existing deck and existing rail hardware. Prepare each hole according to the manufacturer's instructions before placing the anchor adhesive and the high strength bolts. Fill the hole with anchor adhesive and install the high strength bolts according to the manufacturer's instructions. Completely fill cored holes with anchor adhesive using a method that will not trap air or create voids.

Submit shop drawings for final approval. Do not fabricate or install steel bridge railing until the Engineer approves the shop drawing submittal.

507-5.01 BASIS OF PAYMENT. *Delete this Subsection and substitute the following:*
The contract price includes all rail elements, rail posts, brackets, spacers, fastenings, and anchors required to attach the railing to the structure; concrete, grout, and associated reinforcing steel included or partially contained within the limits of the concrete barrier section or within the limits of the concrete curb for the steel bridge rail section; and bridge number plates.

Removal and disposal of existing rail elements is subsidiary.

Payment will be made under:

PAY ITEM		
Item Number	**Item Description**	**Unit**

507.0004.0000	Concrete Bridge Barrier	LF
507.2000.0000	Steel Bridge Railing Replacement, 2-Tube	LF

SECTION 508
WATERPROOFING MEMBRANE

508-1.01 DESCRIPTION. *Add the following*: The spray-applied waterproofing membrane system consists of a primer, a membrane, and a tack coat.

508-3.01 CONSTRUCTION. *Replace the first paragraph in 1. General with the following*: Install the waterproofing membrane system in accordance with the manufacturer's installation procedure and the approved submittal. Use the primer and tack coat listed in the approved submittal. Do not apply primers or membranes until the end of the curing period and until concrete and grout has reached at least 80 percent of the specified 28-day compressive strength (f'c). Apply the membrane system vertically at curb faces up to the pavement thickness shown on the Plans. Protect adjacent surfaces not to be covered with the membrane from splatter or coating. Ensure the surface of the membrane is dry when applying tack coat. Use pavement overlay material within the membrane manufacturer's temperature limitations.

Replace the first paragraph in 2. Deck Preparation with the following: Remove existing pavement and membrane systems by methods that do not damage the concrete deck. Do not use a mechanical milling machine such as a reclaimer or planer. Meet the requirements of Subsection 105-1.12. Prepare the concrete surfaces that are to receive the waterproofing membrane system as required by the manufacturer.

508-3.02 QUALITY CONTROL. *Replace the first paragraph in 2. Spray-Applied Waterproofing Membrane with the following*: Perform tensile adhesion bond testing of the waterproofing membrane system, at locations determined by the Engineer, in accordance with ASTM D7234 at least once every 2000 square feet of coated area.

508-3.03 ACCEPTANCE TESTING. *Replace the first paragraph in 1. Flood Testing with the following*: Perform flood testing of spray-applied waterproofing membrane prior to placement of tack coat or asphalt. With the written approval of the manufacturer's on-site representative, perform flood testing of sheet waterproofing membrane prior to asphalt overlay, otherwise perform flood testing after asphalt overlay.

503-3.04 MEMBRANE REPAIRS. *Replace the first paragraph in 3. Sheet Waterproofing Membrane with the following*: If flood test acceptance testing is used after placement of asphalt and breaches in the membrane system are found, repairs may be attempted with the written approval of the manufacturer's on-site representative. Patch areas where asphalt overlay is removed to the satisfaction of the Engineer.

508-5.01 BASIS OF PAYMENT. *Add the following:*

Payment will be made under:

PAY ITEM		
Item Number	**Item Description**	**Unit**
508.0001.0000	Waterproofing Membrane, Spray-Applied	LS

Insert the following Section:

SECTION 517
POST-INSTALLED CONCRETE ANCHORS

517-1.01 DESCRIPTION. Furnish and install adhesive anchors in existing concrete.

517-1.02 DEFINITIONS.

ANCHOR. A steel element post-installed into a hardened concrete member and used to transmit applied loads to the concrete. Steel elements for adhesive anchors include threaded rods, deformed reinforcing steel bars, or internally threaded steel sleeves with external deformations.

Adhesive Anchor. A post-installed anchor, inserted into hardened concrete with an anchor hole diameter not greater than 1.5 times the anchor diameter, that transfers loads to the concrete by a bond between the anchor and the chemical adhesive, and a bond between the chemical adhesive and the concrete.

ANCHOR PULLOUT STRENGTH. The strength corresponding to the anchoring device or a major component of the device sliding out from the concrete without breaking out a substantial portion of the surrounding concrete. The anchor manufacturer provides a pullout strength.

CARTRIDGE SYSTEM. A type of adhesive dispensing means, consisting of two round tubes or vessels containing the A and B components of the adhesive. The components are dispensed using either manually (caulk-type gun) or power-driven dispensers through a zig-zag, end mixing nozzle attached to the open end of the dispenser. Metering and mixing of the components is automatically controlled as the adhesive is dispensed through a manifold and disposable mixing nozzle.

EVALUATION SERVICE REPORT (ESR). A report developed by an independent testing agency reporting the anchor system strength according to ACI 355.4 (AC 308).

INTERNATIONAL CODE COUNCIL – EVALUATION SERVICES (**ICC-ES).** An independent evaluation service.

MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII). Published instructions for the correct installation of an anchor under all covered installation conditions as supplied in the product packaging.

MINIMUM PULLOUT FORCE. The minimum tension force specified in the contract that is applied through a testing apparatus in accordance with ASTM E488 to determine the load, displacement, or both exhibited by the anchor being tested.

STICK-OUT. The length of anchor, reinforcing steel bar, or threaded bar protruding out of the hole beyond the concrete surface, required to engage the attachment, connection plate, or concrete member installed at a future time. Stick-out distance is measured perpendicular to the surface of the concrete.

UNIFORM EVALUATION SERVICES (UES). An independent evaluation service.

MATERIALS.

517-2.01 MATERIALS.

Reinforcing Bars	Subsection 709-2.01
Anchor Adhesive	Subsection 712-2.23

517-2.02 INSTALLER QUALIFICATIONS.

1. Manufacturer's Training. Conduct a training with the manufacturer or the manufacturer's representative for the installer(s) on the project and Department personnel designated by the Engineer. At a minimum, the training must provide product-specific handling, installation, and safety information.

2. Adhesive Anchor Installer Certification. Employ installers with current ACI Adhesive Anchor Installer Certification.

517-2.03 SUBMITTALS. At least 15 days prior to the start of installation submit a written procedure stating the product proposed for use, MPII for the proposed product including complete installation procedure, manufacturer's training date, and certified installer(s) with ACI registration number. Do not start anchor work until the Engineer approves the submittals.

CONSTRUCTION REQUIREMENTS

517-3.01 PREPARATION. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage or deterioration.

Store anchoring adhesives at temperatures prescribed by the manufacturer. Store materials according to the storage conditions specified in the MPII. Do not use adhesive anchor materials beyond the expiration date.

517-3.02 INSTALLATION. Conform to the MPII for installation. Install anchors into sound concrete that is free of surface moisture and cracks. Do not install anchors unless the concrete surface temperature meets the manufacturer's recommendations.

Identify the location of existing reinforcing steel and other embedded items prior to drilling holes for anchors. Install post-installed concrete anchors at locations shown on the Plans or as authorized by the Engineer. Do not damage existing reinforcing, embedded items, or concrete that is to remain. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. If reinforcing steel is encountered during drilling, move the hole to a different location approved by the Engineer. The Engineer will evaluate holes in which reinforcing steel or prestressing steel is encountered during drilling for structural adequacy and durability. Fill abandoned holes with an approved material. Thoroughly clean holes as specified in the MPII before patching.

Drill holes perpendicular to the concrete surface. Do not core holes. Clean holes according to the MPII. Protect drilled and cleaned anchor holes from contamination until the adhesive is installed. Re-clean a drilled anchor hole if the hole has become contaminated after initial cleaning.

If the hole has any water, blow out the water using compressed air and follow the MPII for water-saturated installation.

Use anchors that are clean, oil-free, and free of loose rust, mill scale, paint, or other coatings. Clean residual chemicals from hot-dip galvanized threaded bars or reinforcing according to ASTM D6386.

Secure installed adhesive anchors in-place to prevent displacement while the adhesive cures. Install anchors perpendicular to the concrete surface. Anchors displaced before full adhesive cure will be rejected.

Do not bend reinforcing steel or all-thread bars after embedded in concrete.

517-3.03 TOLERANCES. Install anchors conforming to the following tolerances:

1. Angular: 1.5 degrees from plumb or the angle shown on the Plans.

2. Length: ±1/4 inch stick-out beyond the concrete surface.

3. Horizontal Position: comply with Subsection 501-3.10.11.

517-4.01 METHOD OF MEASUREMENT.

Drill and Bond Anchors are not measured.

517-5.01 BASIS OF PAYMENT.

Drill and Bond Anchors are subsidiary to 507.2000.0000.

Remove and replace heading with:

SECTION 510
REMOVAL AND REPAIR OF CONCRETE BRIDGE DECK

510-1.01 DESCRIPTION. *Add the following*: Remove and repair all damaged (e.g., gouged, deteriorated, cracked, or broken) reinforcing steel.

510-2.01 MATERIALS. *Add the following*:

Reinforcing Steel	Section 503
Polyester Concrete	Section 525

CONSTRUCTION REQUIREMENTS

510-3.01 GENERAL. *Add the following*:

Do not begin concrete bridge deck removal unless completion of the removal and polyester concrete overlay can be completed within the same construction season.

The existing deck may have areas where reinforcing steel has less than one inch of cover. Identify and map locations where planned removal depth will damage reinforcing steel. Submit a map to the Engineer prior to beginning concrete removal.

Do not damage sound concrete, reinforcing steel, and other elements designated to remain in place.

After removing the existing deck surface and before placing the concrete overlay, identify and locate areas of the deck that require repair according to Subsection 510-3.07. Remove and repair areas of unsound concrete according to Subsection 510-3.04. Remove and replace reinforcing steel or portions of reinforcing steel according to Subsection 510-3.05.

510-3.02 METHOD OF REMOVAL. *Replace this Subsection with the following*: Do not use rotary milling or hydrodemolition machines.

Grind concrete bridge deck to the depth shown on the Plans and as specified by the Engineer. Demonstrate to the Engineer that the grinding machine has the ability to grind deck as shown on Plans without being affected by surface irregularities in existing deck surface.

For concrete not accessible to grinding and around joints and deck drains, remove concrete to the depth shown on the Plans using mechanical impact methods according to Subsection 510-3.01.

510-3.03 MILLING. *Delete this Subsection.*

510-3.04 HYDRODEMOLITION. *Delete this Subsection and replace with the following:*

510-3.04 GRINDING.

1. Equipment. Use a self-propelled grinding machine that meets the following:

    1. Equipped with diamond embedded saw blades gang mounted on a machine that is specifically designed to smooth and texture concrete pavement.

    2. Does not damage the underlying surface, cause fractures, or cause spalling.

Provide information for the machine type selected to the Engineer no less than 5 working days prior to commencing concrete bridge deck removal.

2. Concrete Removal. Before concrete removal begins, the Engineer will select a trial area of sound concrete approximately 30 ft^2 in size. Advance the machine over this area and adjust the machine to remove the full-depth of concrete shown on the Plans using one pass or several partial-depth passes. Do not damage portions of the bridge to remain, such as drains, expansion joints, and barriers.

Remove materials which may act as a bond breaker between the existing concrete and the new concrete overlay. Remove any remaining concrete or concrete patch material according to Subsection 510-3.05.

3. Controlling Wastewater and Debris. Submit a Wastewater Treatment Plan no less than 5 working days prior to the preconstruction conference. Include methods for containment, collection, filtration, storage, and disposal of wastewater and debris. The plan must be stamped by an Engineer registered in the State of Alaska and must be acceptable to the Alaska Department of Environmental Conservation.

Perform the following:

1. Capture and contain all wastewater and debris within the work area.
2. Filter wastewater to ensure that it is free of concrete particles and sediment before being discharged.

510-3.05 MECHANICAL METHODS. *Replace this Subsection with the following*: Use mechanical impact methods in areas:

1. not accessible to self-propelled grinding equipment and around deck drains.
2. where unsound concrete remains after grinding.
3. where there is a lack of bond between the existing concrete and reinforcing steel.
4. where reinforcing steel or sections of reinforcing steel will be replaced.

Utilize and operate mechanical impact tools according to Subsection 501-3.16.

Remove concrete to the same depth as adjacent areas. Remove materials which may act as a bond breaker between the existing concrete and the new concrete overlay.

Protect adjacent traffic and property from damage due to concrete removal operations.

510-3.06 CLEANUP. *Replace the first sentence with the following*: Following concrete removal, reinforcing steel repairs, and unsound concrete repairs, clean the job site and remove debris.

510-3.07 UNSOUND CONCRETE. In the presence of the Engineer, sound the existing bridge deck according to ASTM D4580, procedure B. Repair areas where chain sounding identifies unsound concrete, a lack of bond between the existing concrete and reinforcing steel, or where existing patches have not been fully removed.

1. Removal. Remove concrete in the delineated repair area using mechanical methods specified in Subsection 501-3.16 or by other acceptable means approved by the Engineer in writing. Remove concrete to a depth necessary to remove loose concrete, unsound concrete, and existing patches.

Replace damaged reinforcing steel that is exposed during concrete removal according to Subsection 510-3.08.

2. Patching. Before applying the deck repair patch, clean the surface according to ASTM D4258 within 24 hours of applying the repair material. Remove materials which may act as a bond breaker between the existing concrete, reinforcing steel, and the patch material.

Use water meeting the requirements of Subsection 712-2.01 for removal operations.

Install the patch material between ambient temperatures of 50˚F and 80˚F unless otherwise specified by the manufacturer. Apply patch material according to the manufacturer's recommendations. Level the patch with and match the surface texture of the surrounding concrete. Cure the patch material according to the manufacturer's recommendations.

After curing and before final acceptance, sound patched areas. Remove and replace unsound or cracked areas at no further cost to the Department and with no extension of contract time.

510-3.08 REINFORCING STEEL. *Add the following Subsection:* Abrasive blast clean exposed reinforcing steel that is to remain in place. Remove rust and corrosive materials immediately prior to concrete placement. Remove oil, dirt, concrete fragments, laitance, loose scale, and other coating that would destroy or inhibit the bond with the new concrete overlay. If the reinforcing steel becomes contaminated, sandblast the surface again at no additional cost to the Department.

Remove and replace sections of reinforcing steel that are cracked, damaged or deteriorated at any point to less than 80% of their original cross section. Determine remaining section using the Concrete Reinforcing Steel Institute (CRSI) nominal bar diameter and the segment determined either by measuring the chord length or the maximum crack depth with calipers. Splice a new bar the same size as the damaged bar and extend the spliced reinforcing steel beyond each end of the damaged area following Table 503-2.

Remove concrete around unbonded reinforcing steel to provide 3/4 inch minimum clearance around the bar. Remove concrete around damaged reinforcing steel to provide 3/4 inch minimum clearance around the bar and to allow for the new splice bar.

510-4.01 METHOD OF MEASUREMENT. *Replace this Subsection with the following:*
See Section 109 and as follows:
Item 510.0001.0000, by the area of removed surface, regardless of the depth of removal. Item 510.2001.0000, measured on a contingent sum basis as specified by the Directive authorizing the work.
510-5.01 BASIS OF PAYMENT. *Add the following*:

Bridge Deck Repair. Payment for Bridge Deck Repair includes labor, equipment, and materials related to deck repairs as determined by the Engineer.

1. Unsound concrete repair will only be eligible for payment if:

a. not damaged by Contractor operations, or
b. damage is located within the delineated repair areas.

2. Reinforcing steel repair will only be eligible for payment if:

a. not damaged by Contractor operations,
b. damage is located within the delineated repair areas, or
c. damage is a result of the existing concrete cover being 1 inch or less.

Payment will be made under:

Pay Item	**Pay Unit**
510.2001.0000 Bridge Deck Repair	Contingent Sum

***Note to designer, use standard mod HSM20-26 and regional special N83.**

SECTION 606
GUARDRAIL

606-2.01 MATERIALS. *Add the following:*

Thrie-Beam Guardrail	Subsection 710-2.04
Symmetric and Asymmetric W-Thrie Beam Transition Section	Subsection 710-2.04
Connection Hardware	Subsection 722-2.01
Bridge Railing Elements	Subsection 722-2.01

606-5.01 BASIS OF PAYMENT.

4. Transition Rail. *Delete and replace with the following:* 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, including the Guardrail Connection plate. Removal and disposal of existing transition rail elements is subsidiary.

Add the following:

Payment will be made under:

PAY ITEM		
Item Number	**Item Description**	**Unit**
606.0016.0000	Transition Rail	EA

SECTION 701
HYDRAULIC CEMENT AND SUPPLEMENTARY CEMENTITIOUS MATERIALS

Replace the following:

701-2.08 POST-TENSIONED GROUT. *RESERVED*

Add the following:

701-2.10 CONCRETE PATCH MATERIAL. Use pre-packaged concrete formulated for repair and patching of concrete structures in aggressive exposures. Concrete may be extended with aggregate according to the manufacturer's written recommendations and instructions.

Provide concrete patch material that meets the requirements of ASTM C928 and Table 701-2. Use water that meets the requirements of Subsection 712-2.01. Provide the manufacturer's recommended batching and installation procedures and minimum cure time.

Protect concrete from moisture during shipment and storage. Do not use concrete that has been manufactured more than 6 months before usage, unless the manufacturer retests and certifies the product meets the specified requirements.

Submit a quality control data sheet covering the chemical and physical tests conducted on the concrete patch material for the material in each shipment. Submit a Certified Test Report from an independent laboratory, audited by the Cement Concrete Research Laboratory that shows the material meets the property requirements. Test Reports shall be dated within the last 5 years.

TABLE 701-2
CONCRETE PATCH MATERIAL

Property	**Requirements**	**Test Method**
Compressive Strength	Min. 3000 psi after 1 day Min. 5000 psi after 28 days	ASTM C109
Bond Strength	Min. 2000 psi after 1 day	ASTM C882
Length Change	Max. 0.05% after 28 days	ASTM C157
Scaling Resistance	No Scaling (0 Rating) at 50 cycles	ASTM C672
Chloride Ion Permeability	Very Low (<1000 Coulombs) at 28 days	ASTM C1202

SECTION 710
FENCE AND GUARDRAIL

Note to designer: 710-2.12 is part of the standard modification HSM20-34. Use standard mod along with the change below to revise the spelling error highlighted.

710-2.12 TRANSITION CONNECTION. *Replace item 1. with the following:*

1. Thrie-Beam Terminal Connector. Meet AASHTO M 180, Class B, Type II.

SECTION 712
MISCELLANEOUS

Add the following:

712-2.23 ANCHOR ADHESIVE. Provide an injectable adhesive anchor system with adhesive in a cartridge dispenser, supplied as a system from a single manufacturer listed in Table 712-3. Submit the most recent ICC-ES ESR or UES Evaluation Report (ER) corresponding to the product being used.

TABLE 712-3
APPROVED ADHESIVE ANCHOR PRODUCTS

Manufacturer/Brand Name	Evaluation Report Number	Minimum Concrete Temperature at Time of Installation (°F)	Maximum Concrete Temperature at Time of Installation (°F)
Hilti, HIT-RE 500 V3	ESR-3814	23	104
Adhesives Technology Corp, ULTRABOND HS-1CC	ESR-4094	43	110
Adhesives Technology Corp, ULTRABOND HYB-2CC	ESR-4535	23	103
DEWALT Pure 110+	ESR-3298	41	110
DEWALT AC200+	ESR-3298	14	104
Hilti HIT-HY 200	ESR-3187	14	104
Simpson Strong-Tie SET-3G	ESR-4057	40	100
MKT Fastening, LLC. Anchoring GmbH Liquid Roc 200	ESR-4252	23	104
Dayton Superior Corporation ProAnchor Elite	UES ER-690	43	110

SECTION 716
STRUCTURAL STEEL

Replace the 5th and 6th paragraphs with the following:

716-2.07 GALVANIZING.

In lieu of hot-dip galvanizing, steel bridge members may be spray-metalized. Apply 10 mils zinc galvanizing by the spray-metalizing process according to Steel Structures Painting Council's coating system guide SSPC-CS 23.00. Prepare surfaces before galvanizing according to Steel Structures Painting Council's surface preparation guide SSPC-SP 5/NACE No. 1, White Metal Blast Cleaning.

Repair damaged coatings according to ASTM A780 Annex A1 or Annex A3, except as modified herein. Clean the damaged area according to SSPC-SP 3, Power Tool Cleaning for repairs meeting Annex A1 and SSPC-SP 5/NACE No. 1, White Metal Blast Cleaning for repairs meeting Annex A3. Extend the cleaned area 1/2 inch to 3/4 inch into the undamaged section of the coating. Keep the cleaned area dry and free of rust and soiling. Within 24 hours of cleaning, coat the cleaned section with zinc to a thickness of not less than 10 mils when using the method in Annex A3 and not less than 3 mils when using the method in Annex A1. Taper the thickness of the repair coating to match the original coating thickness at the edges of the cleaned section. Apply two coats of zinc rich paint containing a minimum of 65% zinc dust following repairs made in accordance with Annex A1. Where repairs are made in accordance with Annex A3, use zinc wire containing not less than 99.98 percent zinc.

***Note to designer, use standard mod HSM20-37.**

SECTION 722
BRIDGE RAILING

722-2.01 BRIDGE RAILING. *Replace with the following:*

Steel Tube Bridge Rail Elements	ASTM A500, Grade B or Grade C
Thrie-Beam Bridge Rail Elements	AASHTO M 180, Class B, Type II
Bridge Rail Posts	ASTM A709, Grade 50
Bronze Bridge Number Plate	ASTM B98, UNS Alloys C65100 or C65500 or ASTM B584, UNS Alloy C92200
Cable Safety Railing Posts and Braces	AASHTO M181, Grade 1 or Grade 2, or ASTM A53
Cable Safety Railing Cable	¼ inch galvanized wire rope with a minimum breaking force of 7,000 pounds.
Machine Bolts, Cap Screws, Nuts and Washers	ASTM A307
High Strength Bolts, Nuts and Washers	Subsection 716-2.03
Anchor Bolts and Rods	ASTM F3125, Grade A325 or ASTM A449, Type 1
Welded Studs	AASHTO M 169, Grade 1015 or Grade 1020
Bent Anchor Rods	ASTM A709, Grade 36 or Grade 50
Shims, Plates, Rail Caps, Plate Washers, Angles, Sleeves, and Scuppers	ASTM A709, Grade 50
Guardrail Connection Plate	ASTM A709, Grade 50
Beveled Washers and Tapered Plate Washers	ASTM F436
Galvanize steel portions of railing after fabrication.	AASHTO M 111 or AASHTO M 232 and Subsection 716-2.07

SECTION 731
WATERPROOFING MEMBRANE

731-2.01 SPRAY-APPLIED WATERPROOFING MEMBRANE. *Replace Table 731-1 SPRAY-APPLIED WATERPROOFING MEMBRANE with the following*:

Test	Requirements	Test Method
Adhesion to Concrete	100 psi min., with failure in concrete	ASTM D7234
Tensile Strength at Break	1500 psi min.	ASTM D638
Elongation at Break	130% min.	ASTM D638
Crack Bridging	Pass at 10 cycles of 1/8 inch when tested at -15°F	ASTM C1305
Interlayer Shear Strength	30 psi min.	AASHTO TP-114