

ATTACHMENT B – TECHNICAL SPECIFICATIONS

IFB No. 026-009

BROAD RUN EXPANSION SPECIAL TRACKWORK MATERIALS

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SECTION 34 11 19 RAIL AND JOINT BARS

PART 1 – GENERAL

1.1 SUMMARY

- A. The Work of this Section consists of furnishing rail and joint bars for construction of railway tracks as indicated in the Plans, as specified herein, and as otherwise required for the proper and timely completion of the work.

1.2 RELATED DOCUMENTS

- A. Specification Sections:
 - 1. Section 34 11 19, "Rail and Joint Bars."
 - 2. Section 34 11 23, "Special Trackwork."
 - 3. Section 34 11 33, "Timber Ties and Switch Ties."
 - 4. Section 34 11 93, "Other Track Materials."

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. American Railway Engineering and Maintenance-of-Way Association (AREMA)
 - a. Manual of Railway Engineering
 - 2. American Society for Testing and Materials (ASTM):
 - a. A 325, Structural Bolts, Steel, Heat Treated, 125/105 ksi Minimum Tensile Strength

PART 2 – PRODUCTS

2.1 RAIL

- A. New 132 rail shall be used throughout all new proposed trackwork. Relay turnouts may be accepted upon inspection and approval of Virginia Railway Express (VRE). Contractors proposing Relay Turnouts shall deliver the Turnout to the Broad Run Yard for inspection by VRE. VRE shall not be responsible for any cost incurred by the Contractor for purchase, delivery, disposal, delays, or replacement of any Relay Turnout due to rejection by VRE for any reason.
- B. For tracks outside of new proposed trackwork, select relay rail is acceptable.

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1. Relay bolted or welded rail shall be of either 132 section or match existing. Drilling for joint bars shall match AREMA MRE Chapter 4.
 2. Relay rail shall comply fully with requirements of AREMA MRE, Chapter 4, Section 2.4 for Class II Relay Rail, as well as the provisions below.
 3. Appearance: Relay rail shall be free from obvious defects and clean in appearance. Rail that has severe pitting and corrosion or has been flame-gouged, or spike nipped will not be accepted. Rail bases shall be solid, full width, and free from visual defects such as plate wear, spike notching, pitting, flame-gouging. Webs must be free of visual defects or pitting. Rails shall have gauge wear on one side only. The sum of any metal flow on both sides of the head shall not exceed 1/8 inch. No flat spots are permitted on the heads. Engine burns shall not be greater than 3/8 inch wide by 1 inch long by 1/32 inch deep and shall not exceed two per rail.
 4. Running Surface Damage: Damage in the running surface of any kind other than engine burns shall not exceed 1/4-inch long by 1/2-inch wide and shall be no greater than 1/32 inch deep. No flat spots are permitted on the railhead.
 5. Side wear shall have occurred on one side only and shall be measured 5/8 inch below the top of rail.
 6. Lengths: Rails shall be a minimum of 33 feet in length except where cut to fit new work against existing work. No rail less than 19 feet in length will be permitted to remain in track unless specifically authorized by the Project Engineer.

2.2 JOINT BARS

- A. Provide either new or relay grade joint bars to match the rail provided. Joint bars shall match the sections and drillings of rail. All joint bars should be the standard six-hole design for the rail section.
- B. Joint Bars: Conform to AREMA MRE Chapter 4, Parts 1 and 2, specifying requirements of either the "Specifications for High Carbon Steel Joint Bars" or the "Specifications for Quenched Carbon-Steel Joint Bars and Forged Compromise Joint Bars."
- C. Relay Grade Joint Bars: Used joint bars in good condition shall be used in conjunction with relay rail only.
 1. Used joint bars shall be straight, free from cracks, breaks, and other visual defects. Excessive rust, dirt, and other foreign materials on the joint bars are not permitted. Used joint bars shall be of the proper size and condition to make good contact with the underside of the railhead and the top of the rail base on the rails being joined. Joint bars that have been flame-gouged, flame cut or otherwise altered shall not be used.
 2. Excessively worn joint bars not in firm contact with the rail head and base or allowing any

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- discernible differential movement between the two abutting rails will be rejected.
3. Bolt holes shall not show excessive wear that would prevent the use of the size of oval neck track bolt normally used with that joint bar. Bolt holes shall not show any evidence of cracks.
 4. "Toed" or "skirted" joint bars are not acceptable for use with the rail sections specified for this contract. All joint bars shall be of toeless design.
 5. Joint bars shall have alternating round and oval bolt holes.
 6. Joint bars need not be the same bars as were previously used to join the rail provided. The Contractor shall indicate in his submittals if the sources of the rail and joint bars differ.
- D. Compromise Joints: Provide compromise joints where trackwork to be provided by this Contract connects to existing track. Compromise joint bars shall be new and conform to the requirements of AREMA MRE Chapter 4, Part 2, "Specifications for Quenched Carbon-Steel Joint Bars and Forged Compromise Joint Bars."
1. Compromise joint bars shall be of the size, shape, and punching pattern to fit the rail sizes and sections being joined. Only factory designed and constructed (forged or cast) compromise joint bars shall be used to join rails of different sizes. Compromise joints shall be designed for six-hole drilling and be a minimum of 36 inches in length.
 2. Contractor shall inspect the rail at various sides and connection points along the alignment, to verify existing rail sections for purposes of ordering compromise joints.
- E. Insulated Rail Joints
1. Insulated rail joints shall be of the epoxy-bonded type as manufactured by Allegheny Rail Products, Co., or equal.
 2. Insulated rail joints shall be complete with bars, end posts, bushing, washers, pin bolts, collars, washers and adhesives.
 3. Straight bars shall be new and smooth and will be providing full face contact, conforming to the applicable rail section, and fabricated from material which meets or exceeds the mechanical properties and workmanship requirements of the current AREMA Volume 1, Chapter 4, Part 3, Section 3.4, "Specifications for Quenched Carbon-Steel Joint Bars, Micro-alloyed Joint Bars and Forged Compromise Joint Bars". The toe of the joint bar shall properly fit against the web of the rail. When elastically fastened, the joint bar shall provide adequate clearance to maintain electrical isolation.

4. Pin bolts shall be of ASTM A325 structural steel furnished with the appropriate collar.
5. Flat circulars shall be hardened steel washers in accordance with ASTM F436.
6. Bolt hole size shall be in accordance with the bonded insulated joint Vendor's recommendation. If bolt hole diameter is larger than 1-3/16 inches, place ASTM A325 hardened washers between the joint bars and the nut.
7. The bolt hole locations shall be as specified in AREMA, Chapter 4, Part 3, Section 3.3, Rail for a 36-inch joint bar. Insulated joint bar lengths for main track installations shall be 36 inches.
8. Insulated material shall be high pressure, laminated design, impervious to oil, grease, and water, and having electrical characteristics equal to or greater than fiber insulation meeting requirements of the AAR Manual, Part 14.5.1, and electrical resistance tested as specified.
9. Each plug shall be Megohmmeter electrical resistance tested as per AREMA Manual.

PART 3 – EXECUTION

3.1 GENERAL

- A. Rail and joint bars shall be handled by methods that will not result in damage by kinking, bending, nicking, or otherwise. Rail shall not be dropped or struck sharply.
- B. Installation of rails and joint bars shall be as indicated in Section 34 11 00 and 34 11 93.
- C. No torch-cut rail shall be permitted to remain on track. Torch cutting of rail is permitted only if field conditions demand it, such as when rail compression prevents the use of a rail saw. If rail is cut by torch, the rail shall be replaced.
- D. When cutting new rail into existing work, always cut the used rail to fit the new rail, not vice versa.

PART 4 – MEASUREMENT AND PAYMENT

4.1 DESCRIPTION

- A. Measurement: Work of this section will be measured in accordance with the "Method of Measurement and Payment" description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans.
- B. Payment: Payment of the work of this section will be included in the payment(s) for the applicable

“Pay Item” and in accordance with the “Method of Measurement and Payment” description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans.

END OF SECTION 34 11 19

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**SECTION 34 11 23
SPECIAL TRACKWORK****PART 1 GENERAL****1.1 SUMMARY**

- A. The work of this Section consists of furnishing and installing special trackwork materials and incidental work related to special trackwork installations, as indicated on the Plans and as specified herein.
- B. Precedence: In case of any conflicts or inconsistencies among the above references as to supply or installation of special trackwork, the order of precedence of procedures shall be as follows:
 - 1. Contract Documents
 - 2. Norfolk Southern Railway Company (NSRC) Standard Plans
 - 3. AREMA MRE
 - 4. AREMA PTWP

1.2 RELATED DOCUMENTS

- A. Specification Sections:
 - 1. Section 34 11 19, "Rail and Joint Bars."
 - 2. Section 34 11 23, "Special Trackwork."
 - 3. Section 34 11 33, "Timber Ties and Switch Ties."
 - 4. Section 34 11 93, "Other Track Materials."

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. American Railway Engineering and Maintenance-of-Way Association (AREMA):
 - a. Manual of Railway Engineering (MRE)
 - b. Portfolio of Trackwork Plans (PTWP)
 - 2. American Society for Testing and Materials (ASTM):
 - a. D 217, Test Methods for Cone Penetration of Lubricating Grease
 - b. D 445, Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of dynamic Viscosity)
 - c. D 566, Test Method for Dropping Point of Lubricating Grease
 - 3. NSRC Standard Plans
 - a. Plan 1-4: Bolts Used in Trackwork
 - b. Plan 2-4: No. 8 132/136RE Turnout
 - c. Plan 2-11: No. 15 132/136RE Turnout
 - d. Plan 7-9: Switch point derail
 - e. Plan 3-3: For Curved Switch Details
 - f. Plan 3-15: Switch Heel Block
 - g. Plan 3-16: Switch Heel Base Plate
 - h. Plan 3-19: Switch Lugs (Clips)
 - i. Plan 3-20: Switch Rod
 - j. Plan 3-21: Switch Plates
 - k. Plan 3-22: Adjustable Plates & Braces
 - l. Plan 4-10: S.M.S.G. Frogs
 - m. Plan 4-11: Frog Plates for S.M.S.G. Frogs

- n. Plan 7-3A: Industry Track Spiking Pattern
- o. Plan 7-4: Rail Anchoring Pattern

1.4 SUBMITTALS

- A. Product data for all items to be furnished in the performance of this work.
- B. Shop drawings are required both for items that are made by Contractor and those that are made by subcontractors at any time. Show the following in complete detail:
 - 1. Complete layout plans and fabrication detail plans, including component and assembly drawings for each item of special trackwork.
 - 2. Switch and frog plates.
 - 3. Layout of crossties, switch ties, and rail fasteners beneath special trackwork assemblies.
 - 4. Turnout assembly drawing with location and type of rail joints.
- C. Certificates: Documentation that welding performed on any special trackwork item was done by a welder qualified to perform such work.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Ship assembled special trackwork items as complete turnout units with the size and identification number of each turnout clearly indicated on each package or container. All switch components shall be created or bundled as indicated on accepted working drawings and shipped with other parts of the assembly.

1.6 WARRANTIES AND GUARANTEES

- A. Warrant that special trackwork materials will be free from defects for a period of two years after Final Acceptance of the work.

PART 2 PRODUCTS

2.1 GENERAL

- A. The component parts of the turnouts to be furnished shall be the products of manufacturers regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use at least two years before bid opening. The parts need not all be made by the same manufacturer, but each category of turnout component (e.g. switch stands, frogs, switch rails, etc.) shall be the product of a single firm unless otherwise approved by the Project Engineer. The objective of this requirement is to ensure interchangeability of parts for future maintenance.
- B. Switch assemblies, stands, frogs, and guardrail assemblies shall conform to the requirements of the Norfolk Southern Standard Drawings. Standard Drawings for components not covered by NSRC Standard Drawings shall comply with AREMA PTWP, Plan 100. All special trackwork material provided for this Project shall be new. Relay turnouts may be accepted upon inspection and approval of Virginia Railway Express (VRE). Contractors proposing Relay Turnouts shall deliver the Turnout to the Broad Run Yard for inspection by VRE. VRE shall not be responsible for any cost incurred by the Contractor for purchase, delivery, disposal, delays, or replacement of any Relay Turnout due to rejection by VRE for any reason.
- C. Switch shall be of a non-insulated design.

2.2 SWITCH TIES

- A. See Section 34 11 33

2.3 RAILS AND JOINT BARS

- A. See Section 34 11 19
- B. Unless specified otherwise, all rail joints shall be drilled for 6-hole joint bars.
- C. All stock rails, frog rails, and other rails within the limits of the ling timbers shall be high strength rail.

2.4 FASTENER

- A. Pandrol system consisting of e-type clips and associated plates as specified in Section 34 11 93 shall be used throughout all special trackwork.

2.5 OTHER TRACK MATERIALS

- A. See Section 34 11 93

2.6 FROGS, SWITCHES, GUARDRAILS, AND APPURTENANCES

- A. All turnout materials will be new material. Materials used in the turnout shall be of the same weight and section. Materials shall be free from excessive rust, dirt, and other foreign materials. Rail section shall be 132RE. All items supplied shall be bare metal; painted items will be rejected on the premise that the paint may be concealing a rejectable defect.
- B. Switches: As described in NSRC Standard Plans. Stock rail braces shall be boltless adjustable type.
- C. Frogs: As described in NSRC Standard Plans
- D. Guard Rails: Guard rails shall be installed for all frogs except self-guarded frogs. They should be new or second-hand with good quality approved design (AREMA or equal) and equipped with proper plates.
- E. Frog Plates: As described in NSRC Standard Plans

2.7 SWITCH STANDS

- A. Switch stands shall be installed for each turnout and derail. Switch machines shall be Racor 22E for hand throw application and Alstom 5 for powered application or approved equal. All switch machines to be equipped with Aldon switch cubes or approved equal flagging system to indicate open or closed switch Position. All switch stands shall be complete in every respect and throw rods adjusted for proper throw, including grinding of stock rails if necessary for positive closure of switch point against stock rail. Switch stands and latches shall be securely fastened to head block ties using 5/8" bolts, or standard cut spikes as specified by the Company. Switch stand cranks shall be made of forged steel.

2.8 GREASE

- A. Grease for lubricating moving parts in turnouts and other trackwork shall have the characteristics listed in the following table. Other types of grease or lubricating oil may be used providing that the grease or oil has been used successfully by local commercial railroads and has the approval of the Project Engineer.
 1. Calcium Soap: 9.0 percent
 2. Solid Additive (Graphite): 11.5 percent
 3. Penetration, ASTM D 217 at 25 degrees Celsius (77 degrees Fahrenheit) Worked: 340
 4. Dropping Point, ASTM D 566 at 25 degrees Celsius (77 degrees Fahrenheit): 101/214
 5. Oil Viscosity, ASTM D 445, CST at 40 degrees Celsius: 81.8

2.9 TURNOUT CONSTRUCTION

- A. Turnout shall be located as indicated on the Plans. Construction shall be in accordance with AREMA MRE Chapter 5, AREMA PTWP Plan 100 and NSRC Standard Plans.
 - B. Switch, Frog, and Guardrail Assemblies: Complete; stock rails shall be accurately bent. Changes in rail weight or section will not be permitted within the limits of the switch ties except as otherwise directed by Contract Drawings. Switch point/ stock rails, rail joints, frog castings, and other parts of the turnout that must fit together shall fit properly and be of the proper match. Both rail ends at all rail joints throughout the turnout and at the joints at the frog shall be matched on both the top (tread portion) and on the gauge side of the rail. Where bolted joints are installed, rail end welding and grinding are acceptable to achieve a good match.
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- C. Joints in Turnouts:
1. Turnout joints shall be bolted except in roadway crossing. Contractor shall submit procedure for welding joints (where required) to the Project Engineer for approval.
 2. If the turnout is of a different rail section than abutting rail, locate all compromise joints outside the switch timber area, unless otherwise directed in the Contract Drawings.
 3. When new rail is joined to a different section or a worn section, build up the worn rail ends in accordance with Section 34 11 16.
- D. Gauge:
1. Track gauge shall conform to the requirements of Section 34 11 00.
 2. Guard Face Gauge: Guard face gauge is the distance between the guard lines measured across the track at right angles to the gauge line and is measured at the point of frog on both sides of the turnout. The design value for guard face gauge is 52-3/4 inches. Guard face gauge shall be within plus or minus 1/8 in. of the design value.
 3. Guard Check Gauge: Guard check gauge is the distance between the gauge line of a frog and the guard line of its guardrail, or guarding face, measured across the track at right angles to the gauge line. The design value for guard check gauge is 54-5/8 inches. Guard check gauge shall be within plus or minus 1/8 inch of the design value.
- E. Headblocks: At right angles to the main track and shall be securely affixed to plates using the fastening system specified in the NSRC Standard Drawings. Except where directed otherwise, switch stands shall be installed so that when the switch is set for the normal position, the connecting rod keeps the points closed with a pulling force. The switch stand shall be installed and the switch operating mechanisms adjusted so that the switch operates smoothly and without excessive force being required.

PART 4 MEASUREMENT AND PAYMENT

3.1 DESCRIPTION

- A. Measurement: Work of this section will be measured in accordance with the "Method of Measurement and Payment" description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans.
- B. Payment: Payment of the work of this section will be included in the payment(s) for the applicable "Pay Item" and in accordance with the "Method of Measurement and Payment" description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans.

END OF SECTION 34 11 23

SECTION 34 11 33 TIMBER TIES AND SWITCH TIES

PART 1 – GENERAL

1.1 SUMMARY

- A. The work of this Section consists of requirements for the manufacture, treatment and delivery of Contractor-furnished timber cross ties and switch ties for use in railway track.

1.2 RELATED DOCUMENTS

- A. Specification Sections:
 - 1. Section 34 11 19, "Rail and Joint Bars."
 - 2. Section 34 11 23, "Special Trackwork."
 - 3. Section 34 11 33, "Timber Ties and Switch Ties."
 - 4. Section 34 11 93, "Other Track Materials."

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. American Railway Engineering and Maintenance-of-Way Association (AREMA), Manual of Railway Engineering (MRE).
 - 2. American Wood Preservers Association (AWPA):
- B. Ties shall be produced by a member of the RTA.
- C. Contractor's Inspection: Obtain the services of an independent tie inspection service to perform inspections that will assure compliance with the Contract requirements. Inspections shall cover the following:
 - 1. Perform an inspection of each tie before shipping.
 - 2. Ties shall be judged independently without regard to decisions made on other ties from the same lot. Ties too muddied for ready examination will be rejected.
 - 3. Examine top, bottom, sides and ends of each tie in accordance with AREMA "Specification for Timber Crossties," Article 1.1.4 – Inspection. Ties handled by hoist shall be turned over for inspection.

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4. Examine records of preservatives used and treatment of the ties and withhold approval of ties for shipment until such records indicate that the ties comply with the requirements of this Section.
- D. Project Engineer's Inspections: The Project Engineer may elect to perform additional inspections of the ties at any time. Notify the Project Engineer at least 15 days prior to the shipment of any treated ties or timbers from the manufacturer's plant to provide opportunity to inspect the materials before shipment. When inspections of on-site materials result in product rejection, Contractor shall promptly segregate and remove rejected material from the premises. VRE may also charge Contractor any additional cost of inspection or test when prior rejection makes re-inspection or retesting necessary. Final acceptance of ties will occur only at the time of Final Inspection of the completed track in which the ties are incorporated.

1.4 SUBMITTALS

- A. Before Ordering Ties:
1. Name of the tie manufacturer, the name(s) and location(s) of the sawmill, the seasoning yard, the type of seasoning, and the treatment plant.
 2. Certification of the manufacturer's RTA membership.
 3. Wood species proposed.
- B. After treatment and a minimum of 7 days before any ties being installed in track, provide notarized records concerning the seasoning and treatment of ties.

1.5 DELIVERY STORAGE, AND HANDLING

- A. Timber cross ties and switch ties shall be carefully handled to avoid damage in accordance with AREMA MRE, Chapter 30.
- B. Bundling: Ties shall be bundled and shipped in groups according to type, size, and length.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Timber cross ties and switch ties shall be manufactured and treated in accordance with AREMA MRE, Chapter 30, Part 3 except as those documents may be amended by this Section.
- B. Cross Ties: AREMA Specifications for Timber Cross Ties.
- C. Switch Ties: AREMA Specifications for Timber Switch Ties

2.2 SIZE

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- A. Ties under new oil collector pans on new track shall be 10'-0"-long timber switch ties and be AREMA "7-inch grade". Timber cross ties on existing tracks receiving new oil collector pans shall remain.
 - B. Switch ties shall be AREMA "7-inch grade" ties with lengths as shown on the Contract Drawings or approved Shop Drawings.
 - C. All other timber ties shall be AREMA "7-inch grade" timber cross ties, 8 feet 6 inches in length.

2.3 WOOD SPECIES

- A. Timber cross ties and switch ties shall be Red Oak or White Oak.
- B. All ties shall be straight, well sawed, be square at the ends, have bottom and top parallel, and have bark entirely removed.
- C. A tie will be considered straight when:
 - 1. A straight line along the top from the middle of one end to the middle of the other end is entirely within the tie; and
 - 2. When a straight line along a side from the middle of one end to the middle of the other is everywhere more than 2 inches from the top and bottom of the tie.
- D. The top and bottom of a tie will be considered parallel if any difference in the thickness at the sides or ends does not exceed 1/2 inch.
- E. A tie is not well sawed when its surfaces are cut into with score-marks more than 1/2-inch deep or when its surfaces are not even.

2.4 QUALITY TIES

- A. All ties shall be free from any defects that may impair their durability or strength as crossties, such as decay, splits, large shakes, slanting grain, large or numerous holes or knots. Definition of terms as follows:
 - 1. Holes: A large hole is one more than 1/2 inch in diameter and 3 inches deep within, or more than 1/4 the width of the surface on which it appears, and 3 inches deep outside the rail bearing areas. Numerous holes are any number equaling a large hole in damaging effect.
 - 2. Knots: A large knot is one whose average diameter exceeds one quarter of the width of the surface on which it appears, but such a knot may be allowed if it occurs outside the rail bearing areas. Numerous knots are any number equaling a large knot in damaging effect.
 - 3. Shake: One that is not greater than 1/3 the width of the tie will be allowed, however, any shake that extends nearer than 1 inch to any surface of a tie is unacceptable.

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4. Slanting Grain: Except in woods with interlocking grain, a slant in grain more than 1in per 15in shall not be permitted.
 5. Split: One which is not over 5 inches will be allowed. Splits no larger than 3/8 inch wide and not more than 8 inches long will be allowed, provided that after the application of approved anti-splitting devices in accordance with MW-171, no separation is observed along the splitting plane.
 6. Season Checks: Ties with checks, over 1/2 inch in width on any face and longer in aggregate than 2/3 of the tie length, shall be rejected.

2.5 SEASONING

- A. Timber crossties and switch ties shall be well seasoned and shall be in accordance with AREMA MRE Chapter 30, Part 3.6. Provide the Project Engineer with 14 days written notice of the date(s) scheduled for artificial seasoning and treatment of ties. Timber ties manufactured from red or white oak shall be dried to oven dry moisture content of 50 percent or less before preservative treatment. The wood may be air dried, vapor dried, or burnettized.
- B. Ties that are to be dried by artificial means shall be seasoned and treated as soon as possible after sawing but in no case more than 30 days later.
 1. Burnettized: The temperature used shall be as high as possible but in no case less than 200-degrees Fahrenheit.
 2. Vapor Dried Ties: Vapor dried ties shall be transferred from drying cylinders to treatment cylinders as quickly as possible to avoid loss of heat from the seasoned ties.

2.6 INCISING

- A. Timber crossties and switch ties shall be incised on all four sides in the pattern specified in AREMA MRE Chapter 30, Part 3.6.

2.7 BRANDING

- A. Treated ties shall be permanently marked or branded by the producer in accordance with AWPA M6. Each cross tie accepted by the Project Engineer shall be legibly branded with letter for plant identification, not less than 3/4-inch high.

2.8 ANTI-SPLITTING DEVICES

- A. Anti-splitting devices shall be galvanized steel nail plates conforming to AREMA Specifications for Devices to Control the Splitting of Wood Ties. Nail plates shall be 5 to 7 inches deep by 6 to 8 inches wide. Apply nail plates to both ends of all ties in accordance with AREMA Application of Anti-Splitting Devices.

2.9 PRESERVATIVE TREATMENT

- A. Condition, handle, and treat the ties in accordance with AREMA, Chapter 30, Section 3.6, Wood Preserving and AWPA C6. Preservative shall be a 60/40 creosote/coal tar solution (Grade C) conforming to AWPA P2.

PART 3 – NOT USED**PART 4 – MEASUREMENT AND PAYMENT****4.1 DESCRIPTION**

- A. Measurement: Work of this section will be measured in accordance with the “Method of Measurement and Payment” description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans.
- B. Payment: Payment of the work of this section will be included in the payment(s) for the applicable “Pay Item” and in accordance with the “Method of Measurement and Payment” description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans

END OF SECTION 34 11 33

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SECTION 34 11 93 OTHER TRACK MATERIALS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. The work of this Section consists of requirements for miscellaneous Contractor-furnished Other Track Materials (OTM). All OTM shall be new, except second-hand Pandrol tie plates may be substituted if they meet the specified requirements.
- B. OTM Materials shall include rail fastening systems, screw spikes, track bolts, nuts, spring washers, tie plates, rail anchors and fasteners, standard toeless joint bars, compromise joint bars, insulated joints, and bumping posts.

1.2 RELATED DOCUMENTS

- A. Specification Sections:
 - 1. Section 34 11 19, "Rail and Joint Bars."
 - 2. Section 34 11 23, "Special Trackwork."
 - 3. Section 34 11 33, "Timber Ties and Switch Ties."
 - 4. Section 34 11 93, "Other Track Materials."

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. American Railway Engineering and Maintenance-of-Way Association (AREMA):
 - a. Manual of Railway Engineering (MRE).

1.4 SUBMITTALS

- A. Notarized certificates of compliance shall be provided for all new materials furnished along with copies of test results and reports required under this Specification or referenced specifications.
- B. Samples of fit second-hand Pandrol tie plates if second-hand plates are proposed. Any Contractor-furnished materials that are installed in the track and subsequently found to be defective shall be replaced by the Contractor at no cost to VRE.

PART 2 – PRODUCTS

2.1 SCREW SPIKES

- A. 15/16-inch diameter by 6 inches long under head
- B. Pandrol part number 5760, or approved equal
- C. Material: ASTM A66 and coated to resist corrosion

2.2 PANDROL RAIL FASTENING SYSTEM AT BALLASTED TRACK

- A. Fasteners shall be single rail fasteners that restrain the running rail longitudinally. Standard spring clips shall be used. Standard spring clips shall be forged from alloy steel bars, quenched to achieve the spring action holding power specified, and shall conform to the following criteria:
 - 1. Pandrol Clips or approved equal: Resilient spring clips shall be right hand mounting.
 - 2. Rail clips shall be of a boltless, threadless, elastic design, permitting removal of the rail, switch, or frog without the removal of plat holding screw spikes from the timber ties. Clip shall be one piece, threadless, and detachable. Two clips shall be provided per each complete rail fastener.
 - 3. Rail holding force shall be generated by spring action. The minimum vertical hold down force per elastic rail clip fastener shall be 2,000 pounds with a minimum hold down force of 4,000 pounds per rail seat. The minimum static longitudinal slip per complete rail fastener assembly with two resilient fasteners in place shall be 2,800 pounds force.
 - 4. At short-toe joint bars, provide clips with a modified configuration so that the clip bears on the toe of the joint bar. If toeless joint bars are used, provided modified Pandrol clips, or approved equal, with part of the clip bar modified to clear the joint bar.
- B. Rolled steel tie plates, whether new or used, shall fit a 6" rail base and with 1" diameter circular holes to fit the screw spikes, or approved equal. Material of new plates shall conform to AREMA Specifications for Steel Tie Plates. Used plates shall be free from cracks, breaks, excessive rust, pitting, mechanical damage, dirt and other foreign materials. Shoulders on the tie plates shall project a minimum of 3/8 inch above the plane of the rail seat. Spike holes shall be circular and not corroded, worn, or mechanically enlarged.

2.3 BOLTS, NUTS, AND SPRING WASHERS

- A. New track bolts, nuts, and spring washers shall be used throughout the project.
- B. Track bolts and nuts shall be new, sized to match the rail and joint bar sections with which they will be used and conform to AREMA "Design for Track Bolts and Nuts," "Rail Drillings, Bar Punching and Track Bolts," "Design for Track Bolts and Nuts" and "Specifications for Heat Treated Carbon Steel Track Bolts and Carbon Steel Nuts." Bolts shall be proper length for the joint bar to allow at least one full bolt thread to extend past the outside of the nut.

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- C. Spring washers shall be new, sized to ensure that the spring washer develops its full reactive force and does not jam into the joint bar hole, and shall conform to the AREMA MRE "Specifications for Spring Washers," Section M12, "Spring Washers."

2.4 JOINT BAR

- A. See Section 34 11 19, "Rail Joints and Bars."

2.5 COMPROMISE JOINTS

- A. See Section 34 11 19, "Rail Joints and Bars."

2.6 INSULATED JOINT BARS

- A. See Section 34 11 19, "Rail Joints and Bars."

2.7 BUMPING POSTS

- A. Bumping posts from Track No. 1, 2, 3 and 8 may be salvaged and reused.
- B. New Bumping Posts (Tracks No. 0, 9, and 10) shall be Type WA by Western-Cullen-Hayes, Inc. and shall include Hayes Shock Free Head or approved equal.

2.8 TIE PLATE RAIL FASTENING SYSTEM AT BALLASTED TRACK

- A. Tie plates shall be in accordance with Norfolk Southern Specifications for Design and Construction of Privately Owned Industry Tracks 9.07 "Tie Plates"
- B. Spike pattern shall be in accordance with Norfolk Southern Standard Drawing for Spiking Pattern.

2.9 DERAILS

- A. Derails should be new or approved relay and must be the type indicated on the approved plans at the designated location. Where double switch point derails are required, they shall be installed in accordance with the Company's Standard Plan for Derails. The standard double switch point derail is 43 feet long. Derails other than double switch point derails shall be Hayes Sliding Derail, Model HB or approved equal. They shall be sized to fit the rail and thrown with an operating stand per Section 9.18 "Switch Stands" of the Specifications for Design and Construction of Privately Owned Industry Tracks. Operating stands shall be furnished with targets. Care shall be taken when installing derails to ensure that they are installed in the proper direction to derail cars away from the main track.

Derails are to be painted international orange. Glass beads should be sprinkled on after

painting while paint is still wet to increase night-time viability (NSRC MW&S Standard Procedure 100).

PART 3– EXECUTION

3.1 TRACK SPIKES

- A. Track spikes shall be delivered in the manufacturer's original never-opened containers.

3.2 BOLTS, NUTS, AND SPRING WASHERS

- A. Bolt assemblies shall be delivered in the manufacturer's original never-opened containers.

PART 4– MEASUREMENT AND PAYMENT

4.1 DESCRIPTION

- A. Measurement: Work of this section will be measured in accordance with the "Method of Measurement and Payment" description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans.
- B. Payment: Payment of the work of this section will be included in the payment(s) for the applicable "Pay Item" and in accordance with the "Method of Measurement and Payment" description as included in PAY ITEM DESCRIPTION & QUANTITY SUMMARY of the plans.

END OF SECTION 34 11 93

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