SECTION 02450
RAILROAD TRACKWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. The work specified in this Section consists of designing, furnishing materials, fabricating, erecting, and removing railroad track construction (trackwork) as shown on the Contract Drawings, as specified in this Section and as needed for a complete installation.

B. This Section includes:

1. Final design of:
   a. Railroad track alignments and profiles.
   b. Turnouts, crossovers and crossing diamonds, including layout drawings.
   c. Grade crossings.

2. Demolition:
   a. Track, turnout and crossover removals.

3. Furnishing and installing
   a. Trackwork.
   b. Turnouts and crossovers.
   c. Crossing diamonds.
   d. Grade crossings.

1.02 RELATED SECTIONS

A. Division 1 – General Requirements

B. Section 02500 – Paving, for hot-mix asphalt pavement at grade crossings.

C. Section 13575 – Switch and Lock Movements, for switch machines.

D. Section 13584 – Electric Snow Melting Devices.

E. Section 16060 – Grounding and Bonding, for traction return bonds.

1.03 DESIGN/PERFORMANCE REQUIREMENTS.

A. Design new track and special trackwork to integrate seamlessly with existing track.

B. Perform track horizontal and vertical geometry design in accordance with AREMA Manual for Railway Engineering Chapter 5 and SEPTA standards.
C. Track Gage: 5 feet 2-1/4 inches, 5 feet 2-1/2 inches on newly-constructed tangent track; 5 feet 2-1/4 inches, 5 feet 2-1/2 inches in special trackwork, curves, and existing tracks.

D. IMPORTANT: MSHL trolleys have cylindrical wheels. Contractor shall design, furnish and install track and special trackwork to accommodate the cylindrical wheel profile of the MSHL trolleys and in accordance with SEPTA standard plans for the MSHL.

1.04 SUBMITTALS

A. Provide submittals in accordance with Section 01300.

B. CDRLs

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1.05 QUALITY ASSURANCE

A. Referenced Standards:

1. American Railway Engineering and Maintenance-of-Way Association (AREMA):
   b. Portfolio of Trackwork Plans


3. SEPTA Standard Trackwork Plans

B. Maximum Allowable Tolerances:

1. Gage: Measured from rail to rail 1/4 inch below the top of rail -- deviation from design gage on tangents: Plus or minus 1/8 inch.

2. Horizontal Track Alignment: Deviation from approved final alignment design: Plus or minus 1/4 inch.

3. Surface:
   a. Deviation from approved final vertical profile design: Plus or minus 1/4 inch.
   b. Deviation from zero cross level on tangents: Plus or minus 1/4 inch.

C. Inspections and Acceptance:
1. All track materials shall be subject to inspection and acceptance by the SEPTA Project Manager.

D. Following the final lining, the Contractor shall string line all track in the presence of the SEPTA Project Manager to verify that the specified track alignment tolerances have been met. Calibrated lining equipment that provides a paper printout record of the existing and final alignment may be used as an alternate to string lining. The lining equipment shall be subjected to approval by the SEPTA Project Manager. Perform string lining in accordance with SEPTA Manual TS-1, “Track Specifications for Regional High Speed Lines.” [CDRL 02450-001]

1. Field inspection of track construction shall be performed by the SEPTA Project Manager.

E. General

1. Prior to commencement of the work, field verify existing dimensions, elevations, locations and conditions applicable to the work. Report potential interferences to the SEPTA Project Manager.

2. Perform topographic survey in accordance with Section 01050 prior to the preparation of final design drawings.

3. Submit for approval by the SEPTA Project Manager the independent inspectors that the Contractor will use. [CDRL 02450-002]

4. The Contractor shall be responsible for engaging the services of a qualified independent inspection agency, approved by SEPTA, for all in-plant inspection and testing of all running rail and related materials furnished by the Contractor as specified herein. Inspection services shall include visual inspection and measurements of the subject materials and a review of plant records to assure compliance with plans and specifications. All costs related to the inspection services shall be included as part of the bid proposal. Inspection and laboratory reports are to be forwarded to the SEPTA Project Manager for review prior to scheduling the material for shipment. [CDRL 02450-003]

5. Satisfactorily complete all qualification tests specified herein prior to the fabrication.

F. Rail Production, Inspection, and Testing:

1. Perform all rail tests and inspections in accordance with the current AREMA Manual for Railway Engineering, Chapter 4.

2. Perform Brinell Hardness test on all heat treated rail in accordance with the current AREMA Manual for Railway Engineering, Chapter 4.

3. Perform all rail inspection and testing at the rail mill or supplier's storage prior to shipment.

G. Timber Cross-Ties:
1. Inspect ties in accordance with the current AREMA Manual for Railway Engineering, Chapter 30, Timber Cross Ties for standard ties.

2. Inspect ties at the point of shipment.

3. All inspection pertaining to the manufacture and treatment of ties shall be performed by an approved independent agency.

4. Inspect closely the top, bottom, sides, and ends of each tie.

5. Judge each tie and timber independently without regard for the decisions on others in the same lot.

6. Those covered with ice, or too muddied for ready examination, shall be rejected.

7. When conditions warrant, in the judgment of the SEPTA Project Manager, ties shall be inspected at additional points. All ties will be subject to inspection at delivery.

H. Insulated Joints

1. The bonded joints shall be tested as specified in this Section. Shop drawings and installation procedures of the bonded joint shall be submitted to, and shall be approved by, the SEPTA Project Manager before testing commences. Tests shall be certified by a laboratory accepted by SEPTA, and the test results shall be submitted to the SEPTA Project Manager for review.

   a. Electrical Resistance Test - A rail joint shall be assembled in accordance with manufacturer's recommendations and supported on non-conducting material. With 500 volts dc applied to the rail across the insulated joint for a duration of three minutes, the current flow through the joint should be measured to the nearest 0.01 micro ampere. The minimum acceptance resistance for the test shall be 10 megohms. With 50 volts ac applied to the rail across the bonded insulated joint for a duration of three minutes, the impedance shall be measured with an accuracy of plus or minus two (2) percent. This test shall be repeated three (3) times: once with a frequency in the range of 20 Hz to 100 Hz, again with a frequency in the range from 200 Hz to 1000 Hz, and again in the range from 2000 Hz to 10 KHz. The minimum acceptable impedance for any of these shall be 10,000 ohms.

   b. Rolling Load Test - The rail joint used in the Electrical Resistance Tests shall be mounted on a 33-inch stroke rolling load test machine supported on 36 inch centers with the joint centered between the supports. Apply a 44,400 lb. wheel load on the rail for 2,000,000 cycles. Measure and record to the nearest 0.001 inch deflection of the rail at the centerline of the joint. Total range of deflection of the joint shall not exceed 0.065 inches during the test and the joint shall show no evidence of failure by bending. The electrical resistance test shall then be repeated and the test results shall be within the acceptance criteria specified.
c. Longitudinal Compression Test - The assembled joint shall be sawn in half where the rails are joined together in a manner which will prevent overheating and damage to the epoxy bond. The cut shall be perpendicular to the centerline of the top of rail. A fixture or device shall be used so that the reaction at the sawn ends occurs only on the face of the joint bars when a load is applied to the centroid of the rail at the opposite end. The load shall be applied in increments of 25,000 pounds, maintaining each load increment until the deflection of the rail stops before increasing the load. The load shall be increased to 650,000 pounds and a record of loading and differential be measured for each increment. The joint shall show no indication of slippage prior to reaching a compressive load of 650,000 pounds and the movement shall be less than 1/8 inch in any direction. The relative position of the rail and joint bar shall be within 1/32 inch of its original value when the load is removed.

2. After complete assembly, the joint shall be given an insulation breakdown test (Hi-Pot) by the manufacturer. The insulation shall resist the application of 2,200 volts at 60 Hz for a duration of 15 seconds. Provide manufacturer's test results for approval.

3. The Contractor may submit certified test results from the manufacturer that previously tested insulated joints meet the qualification testing specified herein. SEPTA may accept these test results in lieu of the requirements of Paragraph 1.

I. Stone Ballast

1. The Contractor shall notify the SEPTA Project Manager no less than 30 days prior to the shipment of any ballast to the work site of the proposed source and location of the crushed stone ballast, which shall be subject to the approval of the SEPTA Project Manager.

2. Contractor shall have sampling and testing of ballast performed before delivery, by an independent testing agency approved by SEPTA.

3. Three ballast samples shall be taken from the quarry representative of material to be furnished under this contract. These samples shall be tested for gradation, bulk specific gravity, water absorption, resistance to abrasion, soundness, flat and/or elongated particles and friable particles. Furnish the original and one copy of the report to SEPTA.

4. In the event that the material fails any of the specified tests an additional sample shall be taken and tested. In the event that three successive samples fail to meet the specifications set forth by this Specification, approval of the material source shall be denied and an alternate source shall be used by the Contractor.

5. At the discretion of the SEPTA Project Manager, it may be required that field samples of stone ballast be taken and tested. Ballast not conforming to these
Specifications will be rejected and shall be removed and disposed of by the Contractor.

6. If, during the installation of ballast, the ballast source changes, the Contractor shall sample and perform all specified tests on ballast from the new source. The new source of ballast shall meet all requirements of these Specifications. Work site delivery of the new ballast shall not commence until the SEPTA Project Manager has approved the new source of ballast.

7. All samples secured for test purposes shall be obtained in accordance with the current ASTM methods of sampling, designation D75.

1.06 PRODUCT DELIVERY, HANDLING AND STORAGE

A. Exercise care to avoid bending, scraping or overstressing rails. Block with wood, or otherwise protect projecting parts that could be damaged.

B. Pack separately each length and diameter of bolt or anchor and each size of nut and washer. Plainly mark and provide an itemized list and description of the contents on the outside of each container.

C. Load, transport, unload, and store all materials in such a manner that the material is kept clean and free from damage. Store materials above ground on platforms, skids, or other supports, and cover and protect them from corrosion or deterioration.

D. Bundle and ship ties in groups according to type, size and length.

E. Handle ballast at the quarry, production plant, in transit and at the site in such manner that material is clean and free from segregation.

F. Any materials damaged during shipping, handling and storage will be rejected by the SEPTA Project Manager and replaced by the Contractor at no cost to SEPTA.

1.07 WARRANTY

A. Provide insulated joint assemblies with one (1) year warranty against defect in material or workmanship from time of installation. Material and labor costs for replacement of defective insulated joints shall be at the Contractor's expense.

PART 2– PRODUCTS

2.01 BALLAST

A. Size 3-4 in accordance with SEPTA specification F-T_92-20.

2.02 TIES

A. Provide solid sawn timber cross ties and switch ties in accordance with AREMA Manual for Railway Engineering Chapter 30.
B. Provide ties that are straight, square-sawn, cut squarely at the ends, have top and bottom parallel, and have bark entirely removed.

C. Acceptable woods:
   1. Black Locust
   2. Honey Locust
   3. Red Oak
   4. White Oak
   5. Black Walnut

D. Size:
   1. Standard ties: 7-inch grade, 8’-6” long.
   2. Ties for turnouts and crossovers: 7-inch grade, in lengths required by design.
   3. Switch ties: 7-inch x 10-inch deep, in lengths required by design, dapped for switch machine installation.

E. Anti-Splitting Devices
   1. Type: steel, multi-nail plate, 18 gage, or heavier, galvanized steel (ASTM A653 Grade 40, galvanizing designation G60), sized to cover a minimum of 75% of the end of the tie.
   2. Provide multi-nail plates that are stamped to identify the tie manufacturer and SEPTA identification, SEP-XX, where XX indicates the year of manufacture.
   3. Install anti-splitting devices to both ends of each tie prior to seasoning and treatment. Center anti-splitting devices on the end face of the tie. Install anti-splitting device flush with end face, with nails completely engaged in the wood of the tie.

F. Seasoning: incise and air season ties for 12 months prior to preservative treatment.

G. Preservative treatment:
   1. Preservative: 60/40 creosote coal-tar solution (Grade C).
   3. Retention: 8 pounds of solution per cubic foot of wood.

H. Inspection
   1. All ties are at the manufacturer’s risk until accepted.
   2. The inspection and acceptance of ties will be done by inspectors approved by SEPTA, with all costs borne by the Contractor.
3. Ties may be inspected prior to treatment, after treatment and at the time of
delivery. Inspection may also include sampling and testing the preservative
and examination of equipment used for preservative treatment.

2.03 RAIL

A. Weight: 115 RE100-8

B. Type:

1. In tangent: 100-8, Standard strength, low alloy, control cooled (CC).
2. In curves: 100-8, head-hardened (HH).
3. In special trackwork: 100-8, head-hardened (HH).

C. Manufacture rail in 39-foot standard lengths or as shown on the approved on shop
drawings.

D. Main line track: Construct continuous welded rail, except within special trackwork,
by electric flash butt welding in accordance with SEPTA welding standards.
Thermite welding will not be permitted.

E. Special Trackwork: Make connections with 6-hole bolted joints in accordance with
the drilling and bolt diameters as shown on SEPTA standard plan 5-W-31093.

F. Provide compromise joint bars in locations where new rail meets existing rail of a
different section.

2.04 OTHER TRACK MATERIAL (OTM)

A. Provide new OTM that is compatible with 115 RE100-8 rail and the rail fastening
system.

B. Tie Plates:

1. Mainline Track: Rolled or cast, low-carbon steel tie plates conforming to
ASTM A67 and as follows:
   a. Designed for 100-8 rail section and 1:40 cant
   b. Compatible with Resilient Rail Fastener.
   c. Weld-on Shoulders (sleepers) compatible with the Resilient Rail
      Fastener and dimensioned as shown attached to the plate in accordance
      with the Contract Drawings.
   d. Punched with round holes to accommodate 1-inch diameter screw spike
      and insulation collars.
   e. Roll the plates smooth and free from warp and projections of metal
      caused by shearing and punching.
f. Marking: The tie plate rail section designation, the name or branch of the manufacturer and the last two digits of the year rolled shall be stamped in raised letters and figures on the top of the plate to the outside of the shoulders.

2. Stray current mitigation items:
   a. Insulating Pad: Polyethylene Tie Pad as supplied by Advanced Track Products or approved equal.
   b. Double Coil Spring Washer: For 7/8 inch lag screw (extra wide) as supplied by Advanced Track Products.
   c. Plastic Flat Washer: 7/8 inch diameter.
   d. Insulating Sleeve: Fiberglass reinforced 1/4 inch high above top of plate dimension to suite screw spikes, plate holes, and plate thickness.

C. Screw spike

D. Resilient Rail Fasteners: "PR" Series Clip as manufactured by Pandrol, Incorporated, or approved equal, meeting the following requirements:
   1. Fabricated from high-quality spring steel bar stock.
   3. Nominal Toe Load: 2,000 pounds.
   4. Working Deflection: 0.56 inch.
   5. Nominal Rail Seat Clamping Force: 4,000 pounds.
   6. Insulated joints shall be fastened with modified “PR” clips as manufactured by Pandrol or a system approved by the SEPTA Project Manager which assures isolation of the electrical current through the tie plates. Standard joints shall be fastened with Pandrol "J" clips or a system approved by the SEPTA Project Manager.

E. Track circuit connections: “ERICO” plug bond track connectors Part #SBPAC3B.

2.05 INSULATED JOINTS

A. Provide full contact, epoxy glued type, preassembled by the manufacturer, such as manufactured by Allegheny Drop Forge Co., Portec Rail Products, Inc., or approved equal, with the following appurtenances:

B. Rail: 445-RE100-8 end-hardened, minimum of twenty-six (26) feet in length in accordance with the Rail Article of this Section. Rail ends at joint must remain paired; no mismatching. "A" rails will not be accepted.
C. Joint bars: Metro "D" bar as manufactured by Allegheny Drop Forge Co. or approved equal and conforming to the following:

1. Thirty-six inches (36") plus or minus 1/8" long by not less than 1-1/2" thick.
2. Outer side of joint bar to be tapered to allow for proper wheel clearance on upper part, and lower part of joint bar shall have a minimum of three-quarter inch (3/4") clearance from edge of rail base.
3. Fabricate joint bar from hot rolled AISI high carbon Grade 1045 steel, heat treated and oil quenched to AREMA “Specifications for Joint Bars”. Straighten bars to 1/64" in all planes.

D. Use High Strength Track Bolts as specified in the OTM Article of this Section.

E. Insulation: Treated, hardened, pre-molded, phenolic fiber with the following physical properties:

1. Water Absorption: Maximum 2.4% submerged four (4) days.
2. Dielectric Loss Factor after four (4) days at eighty percent (80%) ambient humidity: Three tenths (0.3) at eight hundred (800) Hertz.
3. Insulation Resistance: Two hundred forty thousand (240,000) ohm to infinite.
4. End Post Thickness: one quarter inch (1/4").
5. Lateral insulation thickness: One Thirty second (1/32) min. pre-molded.

F. Adhesive: Cold curing reactive type epoxy. Shear strength shall not be less than three thousand five hundred (3,500) psi and shall include four layers of fiberglass mesh for reinforcing and metering of adhesive.

G. Assembly: Provide adhesive bonded, factory assembled insulated rail joint with a section of rail as follows:

1. Overall length of joint assembly: Minimum thirty-nine (39) feet or as required in turnouts. Minimum arm length: 13 feet.
2. All assemblies shall be tangent.
3. Identify each assembly with corresponding manufacturer, overall length and rail quality (end hardened) located on an identification plate and adhered to one of the joint bars or the rail web.
4. Apply sufficient bonding agent to ensure proper distribution throughout the contact AREMA rail and joint bar bolt holes and thread. Distribute excess epoxy around joint bar, nut, and excess thread to form an insulated layer.
5. Provide a finished water-tight assembly.
6. Apply fiberglass mesh to both sides of lateral insulation for even distribution and reinforcement of adhesives.
7. Paint entire bond AREMA approximately twenty inches (20 inches) to either side from center with an insulating epoxy base paint, such as General Electric...
Glyptal 1201, or approved equal, to reduce electrical bridging of the insulated AREMA by environmental contamination.

8. After complete assembly, the joint shall be given an insulation breakdown test (Hi-Pot) by the manufacturer. The insulation shall resist the application of two thousand two hundred (2,200) volts at sixty (60) Hz. for a duration of fifteen (15) seconds. Provide manufacturer's test results for approval.

2.06 TRACTION RETURN RAIL HEAD BONDS

A. Refer to Section 16060 Grounding and Bonding.

2.07 SPECIAL TRACKWORK

A. Sizes: based on frog size, as shown on the Construction Drawings.

B. Design and provide turnouts and crossovers in accordance with AREMA standard track plans, the design requirements in this Section and with the following modifications:

1. Frogs shall be rail-bound manganese, level point design.
2. Switch points shall be ¼-inch Samson cut design with graduated uniform risers.
3. All turnouts with radii less than 800 feet shall be furnished with restraining rail affixed to the inside rail and raised ¼-inch above the head of running rail from the heel of switch through the heel of frog.
4. Track gage shall be 5 feet – 2 ¼ inches 5 feet 2-1/2 inches.
5. Switch point/ frog combinations shall be as follows:
   a. Number 6 and 7 frogs switch ends shall be 13'-0" curve point design.
   b. Numbers 8, 9, 10, and 11 shall be 19'-6" curve point design.
   c. Numbers 12 and 15 shall be 26'-0" curve point design.
6. Turnout lead lengths shall be designed such that the curve points on the closure rail align at the heel of switch and toe of frog.

2.08 CROSSING DIAMONDS

A. Angle: based on Final Design.

B. Provide crossing diamond design in accordance with AREMA standard track plans with the following modifications:

1. Track gage shall be 5 feet - 2 ¼ inches for both tracks.
2. Provide manganese insert type of crossing.
3. Provide explosive-hardened running surfaces.
2.09 GRADE CROSSINGS

A. Design and provide hot-mix asphalt with rubber rail interface and rubber boot.
   1. Rail boot: provide a fully-booted system to electrically isolate the running rail.
   2. Provide grade crossing typical section design, including pavement design, manufacturer's catalog cuts and installation instructions for rubber rail interface and rail boot.

B. Rail interface products:
   1. Epflex Railseal by Polycorp.
   2. HiRAIL RS by HiRAIL Corporation.
   3. Rail Seal by International Track Systems, Inc.
   4. Approved equal.

C. Design and provide hot-mix asphalt pavement in accordance with Specification Section 02500.

PART 3 – EXECUTION

3.01 DESIGN

A. Provide final design of railroad track alignments and profiles, turnouts, crossovers and crossing diamonds, including layout drawings, typical cross-sections for mainline track; grade crossing layout and typical cross-sections. Perform no track construction until the SEPTA Project Manager approves all aspects of track design. [CDRL 02450-004]

3.02 GENERAL

A. Build-up rail ends as necessary on existing rails abutting new rail in order to provide a smooth transition. Mismatch of rails at joints may not be more than 1/16 inch on the tread or gage side of rail ends.

B. Alignment and Profile: Construct new track in accordance with the approved final design. Track alignment is based on the centerline of track. Track Profile refers to the top of rail in final position on tangent track and the low rail in curved track with superelevation.

3.03 TRACK CONSTRUCTION GEOMETRY

A. Track Alignment:
   1. Final detail lining shall be accomplished with the referencing unit of the lining equipment set for the rail.
2. Establish track alignment in the field to conform to the computed geometric tabulation designed for each track. The Contractor is responsible for insuring that the track layout conforms to the computed geometrics.

B. Track Profile: Construct track to the designed profile. Tie the profile of the reconstructed mainline track to the existing mainline track. The Contractor is responsible for insuring that the track layout conforms to the computed geometry.

1. All final lining and surfacing shall be accomplished using production tamper with Jupiter 5 computer system or approved equal.

3.04 BALLASTED TRACK CONSTRUCTION

A. Subgrade Preparation:

1. Excavate soil materials to establish the subgrade surface based on the proposed rail profile and ballast depth requirements.
2. Consolidate subgrade to 95% maximum dry density.
3. Use only pneumatic tired vehicles on top of prepared subgrade prior to construction of ballast section.

B. Ballast Construction:

1. Distribute ballast using pneumatic-tired vehicles which may use the existing subgrade or subballast and previously distributed ballast for a roadway.
2. Construct ballast on Mainline tracks level with the top of tie and match adjacent ballast cross-sections.
3. Construct ballast in a manner to prevent damage to the geotextile fabric or subballast. Place ballast to a minimum depth of eight (8) inches under tie over the geotextile fabric prior to performing any mechanical tamping.
4. Construct ballast in layers not more than 8" deep before compaction. Avoid rutting of existing subgrade, subballast or ballast during distribution and compacting.
5. Compact each layer with a 10 ton vibratory drum roller approved by the SEPTA Project Manager. Make a minimum of three passes and more as required for maximum compaction as determined by the SEPTA Project Manager and indicated by:
   a. That point at which no further consolidation occurs; or
   b. That point where particles commence breaking down into fines.
6. Assemble track on the compacted ballast, assembled to permit placement of additional ballast for subsequent raising and tamping.
7. If, during construction operations, any amount of ballast becomes contaminated with foreign materials, remove and replace contaminated ballast and regrade and recompact ballast at no additional cost to SEPTA. If the
compacted surface is disturbed, regrade and compact at no additional cost to SEPTA.

C. Placement of Ties:

1. Space cross ties at twenty and one half inch (20.5”) centers, for main line track and in accordance with the approved final design drawings for special trackwork switch ties. Variations in the spacing shall not exceed plus or minus 1/2 inch. Skewing in excess of one inch measured from gage to gage will not be permitted.

2. Place ties with heartwood face down and square to the rail. The line side of standard 8'-6" ties shall be brought to a uniform line 18-1/2" from the edge of the base of rail. Line the right hand ends of mainline track ties to match existing track. Line side of turnout and/or crossover ties shall be defined as the ends of ties along the straight side of the turnouts. Do not damage ties with spiking hammers or picks when handling or spacing ties. Use tie tongs, lining bars, other suitable tools or ties spacing equipment.

D. Installation of Rail Fastener Plates:

1. Position plate with the shoulder tight against the outside base of the rail, square with the rail and centered on the face of the tie. In no case shall the tie plate extend beyond the edge of tie.

2. Spiking: Conform to details on approved final design drawings for spiking patterns. Care shall be taken to set and drive spikes at right angles to the surface, straight down to the proper depth.

3. Machine tamp all ties and timber tight to the rail prior to spiking.

E. Furnishing and Installation of Insulated Joint Assemblies:

1. Install insulated joints assemblies after rail is fully anchored and for CWR track, thermal adjustment is complete.

2. Cut out length of anchored rail and cut off a piece at the end of the rail of the insulated joint assembly required to conform to the following:
   a. Locate insulated joint assemblies as directed by the SEPTA Project Manager. Install insulate joint assemblies with a stagger of not less than thirty-two inches (32") or more than fifty-six inches (56") or as shown otherwise.
   b. Retain as such of the full length of the assembly as possible, but retain not less than thirteen (13) feet.
   c. Weld assemblies into place and test welds as specified elsewhere in this section.
   d. Install insulated joints as suspended joints, with the center of the joint a minimum of three inches from the nearest rail fastener plate when track is in final position.
e. After installation, if recommended by the manufacturer, paint the insulated joint with a liberal coating of insulating paint such as General Electric Glyptal 1201, or approved equal.

3.05 RAIL CUT-INS

A. Rail cut-ins in continuous welded rail shall be box anchored for 200 feet on each side of the cut-in and thermally adjusted in accordance with SEPTA CWR manual.

3.06 GRADE CROSSINGS

A. Install rubber rail boot and grade crossing material in accordance with manufacturer’s instructions.

B. Install hot-mix asphalt pavement in accordance with Specification Section 02500.

3.07 CLEANUP

A. The Contractor shall be responsible for the complete cleanup and removal from the right-of-way of all rail, track, material, debris, containers, etc., that has accumulated from the work.

3.08 FIELD QUALITY CONTROL

A. Track Gage:

1. Points of Measurement:
   a. Track Gage: Measured between points 1/4 inch below the top of the rail on the inside of the rail (gage side).
   b. Dimensions: In accordance with requirements in this Section.

B. Ballast:

1. Acquire SEPTA Project Manager’s approval of source of ballast prior to ordering.

C. All track materials will be subject to inspection and acceptance by the SEPTA Project Manager.

END OF SECTION 02450