

**THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
TWO MONTGOMERY STREET - 1st FLOOR
JERSEY CITY, NJ 07302**

August 13, 2021

ADDENDUM NO. 4

TO PROSPECTIVE BIDDERS ON CONTRACT **PN-654.001** – PORT NEWARK – PORT STREET CORRIDOR IMPROVEMENTS AND CONTRACT **PN-654.001M** – PORT NEWARK – PORT STREET CORRIDOR IMPROVEMENTS – AGREEMENT TO PERFORM LANDSCAPE MAINTENANCE

The following changes are hereby made in the Contract Documents for the subject Contract.

This communication should be physically annexed to back cover of the book and initialled by each bidder before submitting his bid.

In case any bidder fails to conform to these instructions, his Bid will nevertheless be construed as though this communication had been so physically annexed and initialled.

CHANGES IN THE CONTRACT BOOKLET FOR CONTRACT PN-654.001

- | | |
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| Pages 162 –
through 164 | Delete these pages in their entireties and substitute therefor new pages 162 through 164B (5 pages) which are attached hereto and made a part hereof. |
| Page 258 – | Delete the entire page and substitute therefor new pages 258 and 258A which are attached hereto and made a part hereof. |
| Page 274 – | Delete the entire page and substitute therefor new page 274 which is attached hereto and made a part hereof. |
| Page 623 – | Delete the entire page and substitute therefor new page 623 which is attached hereto and made a part hereof. |
| Page 633 – | Delete the entire page and substitute therefor new page 633 which is attached hereto and made a part hereof. |
| Page 642 – | Delete the entire page and substitute therefor new page 642 which is attached hereto and made a part hereof. |
| Page 644 – | Delete the entire page and substitute therefor new page 644 which is attached hereto and made a part hereof. |
| Page 647 – | Delete the entire page and substitute therefor new page 647 which is attached hereto and made a part hereof. |

Page 1225 – Delete the entire page and substitute therefor new page 1225 which is attached hereto and made a part hereof.

REVISED CONTRACT DRAWINGS

Drawings G006, G007, G008, G009, CS001, GT003, GT006, GT009, GT010, GT011, E102, E103, E104, E201, E202, E203, E204, E205, E206, E207, E208, E209, E210, E211, E212, E213, E214, E215, E216, E217, E218, E219, E220, E221, E222, E223, E224, E225, ES201, ES202 and MT057 have been revised as of 08/11/2021. A copy of these drawings is forwarded herewith electronically (via email or downloaded). Destroy the drawings of these numbers now in your possession and substitute therefor the revised drawings.

ADDED CONTRACT DRAWINGS

Copies of new drawings E105, E106, E107, E108, E109, E110, E111, E112, E113, E114, E115, E116, E117, E118, E119, E226, E227, E228, E229, E230, E231, E232, E233, E234, ES203, ES204, ES205, ES206, ES207, ES208, ES209, ES210, ES211, ES212, ES213, ES214, ES215, ES216, ES217, ES218, ES219, ES220 and ES221 dated 08/11/2021 are forwarded herewith electronically (via email or downloaded) and are to be included in the set of Contract Drawings.

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY

James Starace, P.E.
Chief Engineer/Director

INITIALLED BY THE BIDDER:

<u>Drawing No.</u>	<u>Title</u>	
E104	REMOVAL PLAN -4-	Electrical
E105	REMOVAL PLAN -5-	Electrical
E106	REMOVAL PLAN -6-	Electrical
E107	REMOVAL PLAN -7-	Electrical
E108	REMOVAL PLAN -8-	Electrical
E109	REMOVAL PLAN -9-	Electrical
E110	REMOVAL PLAN -10-	Electrical
E111	REMOVAL PLAN -11-	Electrical
E112	REMOVAL PLAN -12-	Electrical
E113	REMOVAL PLAN -13-	Electrical
E114	REMOVAL PLAN -14-	Electrical
E115	REMOVAL PLAN -15-	Electrical
E116	REMOVAL PLAN -16-	Electrical
E117	REMOVAL PLAN -17-	Electrical
E118	REMOVAL PLAN -18-	Electrical
E119	REMOVAL PLAN -19-	Electrical
E201	LIGHTING PLAN SHEET 1 OF 19	Electrical
E202	LIGHTING PLAN SHEET 2 OF 19	Electrical
E203	LIGHTING PLAN SHEET 3 OF 19	Electrical
E204	LIGHTING PLAN SHEET 4 OF 19	Electrical
E205	LIGHTING PLAN SHEET 5 OF 19	Electrical
E206	LIGHTING PLAN SHEET 6 OF 19	Electrical
E207	LIGHTING PLAN SHEET 7 OF 19	Electrical
E208	LIGHTING PLAN SHEET 8 OF 19	Electrical
E209	LIGHTING PLAN SHEET 9 OF 19	Electrical
E210	LIGHTING PLAN SHEET 10 OF 19	Electrical
E211	LIGHTING PLAN SHEET 11 OF 19	Electrical
E212	LIGHTING PLAN SHEET 12 OF 19	Electrical
E213	LIGHTING PLAN SHEET 13 OF 19	Electrical
E214	LIGHTING PLAN SHEET 14 OF 19	Electrical
E215	LIGHTING PLAN SHEET 15 OF 19	Electrical
E216	LIGHTING PLAN SHEET 16 OF 19	Electrical
E217	LIGHTING PLAN SHEET 17 OF 19	Electrical

<u>Drawing No.</u>	<u>Title</u>	
E218	LIGHTING PLAN SHEET 18 OF 19	Electrical
E219	LIGHTING PLAN SHEET 19 OF 19	Electrical
E220	DUCTBANK PLAN - SHEET 1 OF 2	Electrical
E221	DUCTBANK PLAN - SHEET 2 OF 2	Electrical
E222	LIGHTING STANDARD DETAILS & FIXTURE SCHEDULE	Electrical
E223	LIGHTING STANDARD DETAILS AND WIRING	Electrical
E224	LIGHTING BASE, UTILITY SERVICE AND CONDUIT FITTING DETAILS	Electrical
E225	HANDHOLE DETAILS	Electrical
E226	SIGN LIGHTING DETAILS	Electrical
E227	SIDEWALK BOX DETAILS	Electrical
E228	UNDERDECK LIGHTING DETAIL - 1	Electrical
E229	UNDERDECK LIGHTING DETAIL - 2	Electrical
E230	BRIDGE MEMBER CONDUIT ATTACHMENT DETAILS	Electrical
E231	DUCTBANK AND LOAD CENTER CABINET DETAILS	Electrical
E232	LOAD CENTER WIRING AND PANELBOARD SCHEDULES	Electrical
E233	DUCTBANK DETAILS - 1	Electrical
E234	DUCTBANK DETAILS - 2	Electrical
E301	ITS ELECTRICAL PLAN - LOCATION DMS-PN-01, DMS-PN-02, CCTV-1, AND TTS-PN-04	Electrical
E302	ITS ELECTRICAL PLAN - LOCATION MVDS-PN-01	Electrical
E303	ITS ELECTRICAL PLAN - LOCATION MVDS-PN-02	Electrical
E304	ITS ELECTRICAL PLAN - LOCATION DMS-PN-03	Electrical
E305	ITS ELECTRICAL CONSTRUCTION PLAN LOCATION MVDS-PN-03, AND TTS REMOVAL	Electrical
E401	ELECTRICAL DISTRIBUTION DIAGRAMS LOCATION DMS-PN-01, DMS-PN-02, DMS-PN-03, CCTV-1, AND TTS-PN-04	Electrical
E402	ELECTRICAL DISTRIBUTION DIAGRAMS LOCATION MVDS-PN-01, MVDS-PN-02, AND MVDS-PN-03	Electrical
E501	LOAD CENTER DETAILS LOCATION DMS-PN-01, DMS-PN-02, CCTV-1, AND TTS-PN-04	Electrical
E502	DMS SIGN GROUNDING DETAIL LOCATION DMS-PN-01, DMS-PN-02, AND DMS-PN-03	Electrical
E503	CONDUIT INSTALLATION DETAIL	Electrical
E504	ELECTRICAL HANDHOLE DETAIL	Electrical

<u>Drawing No.</u>	<u>Title</u>	
ES001	GENERAL ELECTRONICS NOTES, LEGENDS, AND ABBREVIATIONS	Electronics
ES002	ITS COMMUNICATION PLAN LOCATION DMS-PN-01, DMS-PN-02, CCTV-1, AND TTS-PN-04	Electronics
ES003	ITS COMMUNICATION PLAN LOCATION MVDS-PN-01	Electronics
ES004	ITS COMMUNICATION PLAN LOCATION MVDS-PN-02 (DRAWING 1 OF 2)	Electronics
ES005	ITS COMMUNICATION PLAN LOCATION MVDS-PN-02 (DRAWING 2 OF 2)	Electronics
ES006	ITS COMMUNICATION PLAN LOCATION MVDS-PN-03 AND TTS REMOVAL	Electronics
ES007	ITS COMMUNICATION PLAN LOCATION MVDS-PN-03	Electronics
ES008	ITS COMMUNICATION PLAN LOCATION MVDS-PN-02	Electronics
ES009	ITS COMMUNICATION PLAN LOCATION DMS-PN-03	Electronics
ES010	ITS DEVICE ONE LINE DIAGRAM	Electronics
ES011	BLOCK WIRING DIAGRAM	Electronics
ES012	DUCTBANK INSTALLATION AND RISER DETAILS	Electronics
ES013	COMMUNICATION MANHOLE DETAILS	Electronics
ES101	GRADE CROSSING WARNING SIGNALS CIRCUIT PLAN ABBREVIATIONS AND LEGEND	Electrical
ES102	GRADE CROSSING WARNING SIGNALS CIRCUIT PLAN LEGEND	Electrical
ES201	UTILITY RELOCATION PLAN SHEET 1 OF 19	Electrical
ES202	UTILITY RELOCATION PLAN SHEET 2 OF 19	Electrical
ES203	UTILITY RELOCATION PLAN SHEET 3 OF 19	Electrical
ES204	UTILITY RELOCATION PLAN SHEET 4 OF 19	Electrical
ES205	UTILITY RELOCATION PLAN SHEET 5 OF 19	Electrical
ES206	UTILITY RELOCATION PLAN SHEET 6 OF 19	Electrical
ES207	UTILITY RELOCATION PLAN SHEET 7 OF 19	Electrical
ES208	UTILITY RELOCATION PLAN SHEET 8 OF 19	Electrical
ES209	UTILITY RELOCATION PLAN SHEET 9 OF 19	Electrical
ES210	UTILITY RELOCATION PLAN SHEET 10 OF 19	Electrical
ES211	UTILITY RELOCATION PLAN SHEET 11 OF 19	Electrical
ES212	UTILITY RELOCATION PLAN SHEET 12 OF 19	Electrical
ES213	UTILITY RELOCATION PLAN SHEET 13 OF 19	Electrical

<u>Drawing No.</u>	<u>Title</u>	
ES214	UTILITY RELOCATION PLAN SHEET 14 OF 19	Electrical
ES215	UTILITY RELOCATION PLAN SHEET 15 OF 19	Electrical
ES216	UTILITY RELOCATION PLAN SHEET 16 OF 19	Electrical
ES217	UTILITY RELOCATION PLAN SHEET 17 OF 19	Electrical
ES218	UTILITY RELOCATION PLAN SHEET 18 OF 19	Electrical
ES219	UTILITY RELOCATION PLAN SHEET 19 OF 19	Electrical
ES220	OUTER PORT STREET GRADE CROSSING WARNING SIGNALS PLAN	Electrical
ES221	PORT STREET GRADE CROSSING WARNING SIGNALS PLAN	Electrical
ES301	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS BATTERY CHARGING CIRCUITS	Electrical
ES302	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS GCP CIRCUITS PLAN	Electrical
ES303	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS SEAR EVENT RECORDER PLAN	Electrical
ES304	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS TRACK CONNECTOR PLAN	Electrical
ES305	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS SSCC-1 PLAN	Electrical
ES306	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS SSCC-2 PLAN	Electrical
ES307	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS SIGNAL "A" HORN DETAIL PLAN	Electrical
ES308	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS TERMINAL BOARD CIRCUIT PLAN	Electrical
ES309	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS POWER CIRCUIT PLAN	Electrical
ES310	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS SIDE A&C LAYOUT PLAN	Electrical
ES311	OUTER PORT STREET BUNGALOW 'O' - GRADE CROSSING WARNING SIGNALS GCP 4000 PROGRAM	Electrical
ES312	OUTER PORT STREET BUNGALOW '1W' - GRADE CROSSING WARNING SIGNALS 1W SSCC PLAN	Electrical
ES313	OUTER PORT STREET BUNGALOW '1W' - GRADE CROSSING WARNING SIGNALS TERM BOARD AND SIDE C LAYOUT PLAN	Electrical
ES314	OUTER PORT STREET BUNGALOW '1W' - GRADE CROSSING WARNING SIGNALS 1W POWER CIRCUIT PLAN	Electrical

<u>Drawing No.</u>	<u>Title</u>	
ES315	OUTER PORT STREET BUNGALOW '1W' - GRADE CROSSING WARNING SIGNALS SSCC SETUP PLAN	Electrical
ES316	OUTER PORT STREET BUNGALOW 'P' - GRADE CROSSING WARNING SIGNALS BATTERY CHARGING CIRCUITS	Electrical
ES317	OUTER PORT STREET BUNGALOW 'P' - GRADE CROSSING WARNING SIGNALS GCP CIRCUIT PLAN	Electrical
ES318	OUTER PORT STREET BUNGALOW 'P' - GRADE CROSSING WARNING SIGNALS SEAR EVENT RECORDER PLAN	Electrical
ES319	OUTER PORT STREET BUNGALOW 'P' - GRADE CROSSING WARNING SIGNALS TRACK CONNECTOR PLAN	Electrical
ES320	OUTER PORT STREET BUNGALOW 'P' - GRADE CROSSING WARNING SIGNALS SSCC-1 PLAN	Electrical

- 3.) At no time are any water supply valves to be operated by the Contractor. The Contractor shall notify the Engineer four business days in advance for a Contractor-requested operation of any water supply valve. The Engineer will notify the Contractor within two business days of the Contractor's request if the request has been granted or not granted.
- 4.) The Contractor shall select and use a City-approved subcontractor. Contractor shall contact the City for a list of current, City-approved subcontractors for work on City Water Facilities. Only City-approved water facility subcontractors may perform Work on City Water Facilities.

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- 5.) XPO Logistics is the sole downstream user of the Newark water main being relocated. At least seven (7) days before a complete water supply interruption is scheduled by the Contractor and then two (2) days before the complete water supply interruption, the Contractor shall inform the Engineer of the shutdown. The Engineer will coordinate with XPO Logistics. For each full day or partial day of interrupted water supply service, the Contractor shall provide and deliver to XPO Logistics three cases of 24, 20-ounce bottles of drinking water delivered the day before the shutdown. For each full day or partial day of shutdown the Contractor shall provide and maintain one portable restroom trailer delivered and set-up the day before a shutdown. The portable restroom trailer shall be:
 - a. Private Portable Restroom Trailer as supplied by 123 Portable Toilet Rental, or
 - b. Emerald II Series as supplied by Johnny-on-the-Spot, or
 - c. approved equal.Power to the portable restroom trailer will be supplied by XPO Logistics at no cost to the Contractor.
- 6.) At least twenty-one (21) days prior to commencing any Work on City Water Facilities, the Contractor, the Contractor's selected City-approved subcontractor and the Engineer shall meet for a Preconstruction Meeting with the City to discuss the Work including but not limited to the time and manner of the Work to be performed, design and installation of safety precautions and any limitations on the Work (collectively "Contractor's City Water Relocation Plan"). No Work shall commence on City Water Facilities without the approval of the Contractor's City Water Relocation Plan by both the City and the Authority.
- 7.) After the Preconstruction Meeting and seven (7) days in advance of every week thereof when Work is scheduled by the Contractor on City Water Facilities and until the Work on City Water Facilities is completed, the Contractor shall prepare and provide the Engineer with a two-week look ahead of the Contractor's planned activities on City Water Facilities. Based on each two-week look-ahead the Engineer will determine the need to notify and/or meet with the City and the Contractor.

- 8.) The Engineer will coordinate with the City for on-site inspection and other City-required services as determined to be required by the City including but not limited to the operation of City water valves. Backfilling will not be permitted unless the Work is inspected by the City and the City approves the Work.

B. Construction Staging

- 1.) Work shall be performed sequentially in accordance with the numerical Stage sequence 1, 2, 3, 4, 5, 6 then 7 as shown on Contract Drawings CS001 through CS704 unless otherwise specified. Sub-stages are shown on Contract Drawings MT001 through MT147. All Work in each construction stage and construction sub-stage shall be completed to the satisfaction of the Engineer prior to the commencement of any Work in the subsequent construction stage or sub-stage, unless otherwise noted. Within six (6) calendar days of approval of the completion of the stage, the Engineer will make available the next area of Work.
- 2.) Stage 1
 - a. Perform Work in Work Areas identified in Stage 1.
 - b. Perform Work involving PSE&G duct bank in Stage 1.
 - c. Work in Stage 1 may be performed concurrently with Stages 2 and 3. Stage 1 Inner Port Street shall be completed before the start of Stage 4 and Stage 1 Outer Port Street shall be completed before the start of Stage 6.
- 3.) Stage 2
 - a. Perform Work in Sub-Stages 2A, 2B, 2C, 2D and 2E sequentially in alphanumeric order, unless otherwise specified.
 - b. Sub-Stage 2B shall commence only after the temporary traffic signal at Kellogg Street and Corbin Street is complete and operational. Removal of existing traffic signal shall commence only after the temporary traffic signal is complete and operational.
 - c. Perform Work in Sub-Stage 2C within 15 feet horizontally from the centerline of the existing FAPs Lead Track during "Weekend Hours".
 - d. No disturbance will be permitted to the Port Newark Channel March 1 through June 30 each year.
 - e. Sub-Stage 2E Work may be performed concurrently with Sub-Stages 2A, 2B, 2C and 2D.
- 4.) Stage 3
 - a. Perform Work in Sub-Stages 3A and 3B, sequentially in alphanumeric order, unless otherwise specified. Work in all Sub-Stages shall be scheduled 30 days in advance of Work.
 - b. Sub-Stage 3A Work may be performed concurrently with Stages 1 and 2.
 - c. When Sub-Stage 3B Work requires maintenance of traffic controls on NJ Turnpike Authority property as shown in the Contract Drawings, perform Sub-Stage 3B Work during "NJ Turnpike Authority Restricted Hours".
 - d. Sub-Stage 3B may be performed concurrently with Stage 4B.
 - e. During Sub-Stage 3B, after removal of the existing Corbin Street Ramp, but before installation of the Corbin Street Ramp, allow Williams Pipeline Company access to the area shown on the Contract Drawings for a period of 45 calendar days.
 - f. Foundation Work and superstructure steel Work in Sub-Stage 3B shall be performed during "Nighttime Hours". Other Work on the ramp may be performed during unrestricted hours once shielding is installed.

DIVISION 26

SECTION 260101

AHCW EQUIPMENT REMOVAL

PART 1. GENERAL

1.01 SUMMARY

- A. The Contractor shall remove the existing Automatic Highway Crossing Warning (AHCW) system, as shown on the Contract Drawings and Reference Drawings, including at a minimum, the existing flashers, existing cross bucks, existing signals and other material and equipment to be retired under this Contract. The Contractor shall protect-in-place signal equipment affected by both temporary and permanent modifications to the signal system.
- B. The Engineer will determine the final disposition of all retired material and equipment prior to scheduled removal, whether it is shown on the Contract Drawings and Specifications. All retired equipment shall be salvaged and delivered to the Authority. The retired equipment shall be delivered to a site within Port Newark/Elizabeth Port Authority Marine Terminal, as determined by the Engineer, no farther than five (5) miles from the construction site. The Contractor shall provide the approved documentation to the Engineer recording the delivery of the materials and acceptance by the Engineer's designated party.
- C. Material and equipment that cannot be identified as either salvage, or scrap, shall be stored by the Contractor, in a secured area, until the final disposition is determined by the Engineer.
- D. Removal, extraction or demolition of materials and equipment shall result in the complete elimination of all scrapped equipment from the site.
- E. In a manner approved by the Engineer, dispose of unwanted material and associated debris. The Contractor is responsible for all required permits (if needed).

1.02 QUALITY ASSURANCE

- A. The Contractor shall comply fully with the requirements of the Contract Drawings and Specifications.
- B. All Work specified herein shall be performed in close coordination with, and under the supervision of, the Engineer or their representative before and during the actual removal, salvage and disposal of any existing railroad signal, communications and electrical system equipment.

1.03 SUBMITTALS

- A. See Appendix "A" for submittal requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall comply fully with the requirements of the Contract Drawings and Specifications.

2.02 SYSTEM CIRCUIT DESIGN REQUIREMENTS

- A. The Contract Drawings and Specifications depict generic circuits and should not be considered complete. They are provided to the Contractor to define design intent and merely represent the amount and layout of the signal system components required under this Contract. The Contractor shall carefully review these drawings and complete the design specific to the final Engineer approved Signal Manufacturer in accordance with the organizations and federal and state agencies stated within the Contract Drawings and Specifications.
- B. The Contract Drawings and Specifications include a "Truth Table" that is supplied to the Contractor to present an understanding of the intended operation of the AHCW system. This does not relieve the Contractor from meeting the requirements as delineated in the Contract Drawings and Specifications.
- C. The Contractor shall incorporate predictor type track circuits to be used under normal conditions for Train Detection. The AHCW system shall be immune to AC interference at each of the three crossings.
- D. The AHCWs shall control all of the wayside components shown on the Contract Drawings and Specifications including an interface with supervisory circuits for the intersection preemption.
- E. The Contractor shall furnish the services of a railroad signal manufacturer to assist in the design, installation, testing (FAT and FIT) and commissioning of the AHCW system. The signal manufacturer(s) shall be submitted for the approval of the Engineer and shall have successfully demonstrated the ability in the past to provide a fully functional and compliant AHCW system in the past that were in accordance with AREMA, CFR, FHWA and MUTCD.
- F. The Contractor shall verify that the signal manufacturer has carefully reviewed the Contract Drawings and Specifications and can provide the final vital circuits, wiring plans and detailed design plans required to provide a fully functional and operating AHCW system.
- G. Upon Engineer approval the Signal Manufacturer shall construct the AHCW system in accordance the Contract Drawings and Specifications after obtaining the approval of the Engineer.

2.03 FAIL SAFE DESIGN CRITERIA

- A. Vital circuits, as depicted on the Contract Drawings, shall be designed on fail-safe design principles: i.e., broken wires, damaged or dirty contacts, a relay failing to respond when energized, or a loss of power supply energy shall not result in unsafe conditions.
- B. Component or system failures which are not self-detecting shall not cause unsafe conditions, even if combined with other failures. Any number of simultaneous component or system failures attributable to the same cause or related causes shall not cause unsafe conditions.
- C. Any component or wire becoming grounded or any combination of such grounds shall not cause unsafe conditions.

DIVISION 26**SECTION 260505****MISCELLANEOUS AHCW COMPONENTS AND PRODUCTS****PART 1. GENERAL**

1.01 SUMMARY

This Section specifies requirements for miscellaneous Automatic Highway Crossing Warning (AHCW) system components.

1.02 REFERENCES

- A. The following is a listing of the publications referenced in this Section:

American National Standards Institute (ANSI)

IEEE C37.14 Standard For DC (3200 V and Below) Power Circuit Breakers Used In

American Railway Engineering Association (AREMA)

AREMA Communications & Signals Manual

ASTM International (ASTM)

ASTM A123 – Specification for Zin (Hot-Dip Galvanized) Coatings and Iron and Steel Products

Electronic Code of Federal Regulations (CFR)

49 CFR Part 222 – Use of Locomotive Horns at Public Highway-Rail Grade Crossing

National Electrical Manufacturers Association (NEMA)

NEMA LI 1-1998 (2011) – Industrial Laminating Thermosetting Products

NEMA Standard Industrial Controls

1.03 QUALITY ASSURANCE

Comply fully with the requirements of Specification Section 260100 entitled "AHCW BASIC TECHNICAL REQUIREMENTS, ABBREVIATIONS AND DEFINITIONS".

1.04 SUBMITTALS

See Appendix "A" for submittal requirements.

PART 2. PRODUCTS

2.01 PRINTED CIRCUIT CARDS

- A. Printed circuit (PC) cards shall be of glass epoxy construction. Card material shall meet the requirements of NEMA Type FR-4. Cards will have sufficient thickness to permit easy insertion and removal, and shall be physically keyed to protect against incorrect interchange. Circuits shall be formed by etching. Conductor material shall be copper and shall be protected from exposure to air.
- B. PC cards containing components that may be damaged in the event a plug connector or plug-in unit is removed while the equipment is energized shall be clearly marked or labeled with a warning note and means provided to remove power to the PC cards.

- B. The type of insulator shall be individual for each terminal post and shall be fire-resistant.

2.11 INSULATED TEST LINK

Insulated test links shall be Invensys Gold NVT, 024620-lx, Type 0255-101 as manufactured by Western-Cullen-Hayes, Inc., Chicago, IL. or approved equal.

2.12 LIGHTNING ARRESTERS AND EQUALIZERS

Air Gap Lightning arresters and equalizers shall be mounted on 3-post porcelain type base or approved equal and shall be in accordance with all the applicable sections of the AREMA Signal Manual.

2.13 TERMINALS FOR WIRES AND CABLES

- A. All solderless terminals shall be in accordance with all the applicable sections of the AREMA Signal Manual, or as specified in the Contract Drawings and Specifications.
- B. Terminals shall be of the solderless crimp-on type. Samples of all solderless terminals shall be submitted to the Engineer for approval.
- C. All stranded copper wire shall be fitted with an approved type of terminal at all points where the wires shall be terminated on terminal binding posts.
- D. Terminal type shall be as follows:
 - 1. A lug for terminating heavy wires or signal power wires;
 - 2. A solder-less insulated terminal as manufactured by AMP, Inc., Santa Ana, CA, under the trade name of "Ring Tongue Plasti-Bond", similar to Catalog No. 35628; Hubbel, Shelton, CT; Thomas & Betts, Memphis, TN; or approved equal, for terminating No. 16 and No. 14 AWG stranded wires;
 - 3. A solder-less insulated terminal similar to AMP, Inc, Santa Ana, CA, Catalog No. 35627; Hubbel, Shelton, CT; Thomas & Betts, Memphis, TN; or approved equal, for terminating insulated wires Nos. 12-10;
 - 4. A solder-less insulated terminal similar to AMP, Inc, Santa Ana, CA Catalog No. 324108; Hubbel, Shelton, CT; Thomas & Betts, Memphis, TN; or approved equal, for terminating other stranded vital circuit insulated wires No. 20-16 AWG having a maximum diameter of 0.200 inches;
 - 5. A solder-less insulated terminal, AMP, Inc., Santa Ana, CA Catalog No. 320554; Hubbel, Shelton, CT; Thomas & Betts, Memphis, TN; or approved equal, will be furnished for No. 8 studs and AMP, Inc., Santa Ana, CA Catalog No. 320571; Hubbel, Shelton, CT; Thomas & Betts, Memphis, TN; or approved equal, will be furnished for ¼" studs for non-vital circuit insulated stranded wires No. 22-16 AWG having a maximum diameter of 0.125 inches. Where flag type terminals are required they shall be similar to AMP, Inc., Santa Ana, CA Catalog No. 322313 or approved equal, for terminating No. 16 and No. 14 AWG stranded wires.
- E. The terminals shall be for attaching to the ends of the conductor in such a manner that the flexibility of the conductor shall not be destroyed and the possibility of breakage at the terminal shall be reduced to a minimum. No more than two wires shall be terminated on one post.
- F. The method for attaching the terminals to the wires shall be with a tool made, or approved and recommended, by the manufacturer of the terminals being furnished.
- G. The tool shall be equipped with a ratchet device to insure proper indentation of the terminal and shall not release until proper indentation is complete. The Contractor shall supply three (3) of every type needed to correctly terminate wires to the devices.

vertically to the exterior of the enclosure and door in a manner to mate. A 1 inch hole shall be drilled in each end for the application of a padlock. This security arrangement shall be for each door in addition to the normal locking mechanism and handle. Each plate shall be fastened with 2 3/8 inch by 1-1/2 inch carriage bolts. This material shall be cadmium plated or hot-dip galvanized as specified in 2.16.

2.20 CABINET LOCKS, CAM LOCKS AND KEYS

- A. Padlocks for signal apparatus requiring padlocks will be furnished by the Authority.
- B. Install signal padlocks for all housings, doors, and covers of signal equipment installed under this Contract. Furnish and install switch padlocks for trainman's access of the hand-throw lever of the switch-and-lock movement, junction boxes, and pushbutton control boxes requiring access by train crews.
- C. A minimum of 12 keys shall be included for cabinet and cam locks and 12 keys for each type of signal and switch padlock.

2.21 SEALING COMPOUND

Sealing compound for use in sealing cable entrances shall be in accordance with all the applicable sections of the AREMA Signal Manual and the cable manufacturer's written recommendations.

2.22 PAINT AND FINISH

All paint and painting procedures shall be in accordance with all the applicable sections of the AREMA Signal Manual.

2.23 CABLE ENTRANCE PIPES

- A. Cable entrance pipes for ground-mounted wayside signal cases shall be 4 inch ID galvanized steel, threaded on one end, reamed and chamfered and shall be furnished complete with one (1) locknut and one (1) bushing for each such pipe. One spare entrance pipe assembly shall be furnished for each ground mounted wayside case.
- B. Cable entrance for ground-mount SIH's shall be a cable chute furnished by the signal house manufacturer as determined by the signal manufacturers design.

2.24 RUBBER MATS

Rubber mats shall be furnished for installation in the SIH. Rubber mats shall meet the applicable sections of ANSA-STANDARD C-37-14 and NEMA-Standard ICS-1970.

2.25 EVENT RECORDER

- A. Event recorder shall be capable of monitoring and recording the functions and alarm conditions of the AHCW. The event recorder shall be a stand-alone device with a minimum of 32 inputs that can be monitored remotely. The event recorder supplied shall be of a type currently used on AHCW systems of Class 1 railroads for a minimum of three years. The Contractor shall supply proof of this requirement, along with manufacturers' Shop Drawings to the Engineer for approval.
- B. The event recorder shall be capable of direct I/O with all of the other electronic components of the AHCW system. The method of interface shall be clearly shown on the signal manufacturer Shop Drawings and in accordance with the Contract Drawings and Specifications.

ASTM G 154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Non- Metallic Materials.
	<u>Federal Highway Administration (FHWA)</u>
FP-03	Standard Specifications for the Construction of Roads and Bridges on Federal Highway Projects.
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways.
	<u>Federal Standards</u>
FED. STD 595B	Colors used in Government Procurements.

1.03 WARRANTY

- A. Warrant the completed marking installation, except for temporary markings, to the Authority, from the date of issuance of the Certificate of Final Completion, against peeling, chipping, flaking and delamination for a period of one (1) year. The warranty shall run to the Authority's benefit and shall grant the Authority a direct right of action against the Contractor. Submit manufacturer's warranty that the materials provided to the applicator are free from manufacturing defects and conform to the standards listed herein. Submit applicator's warranty that the workmanship has been completed complying to the installation methods herein.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. The thermoplastic material shall be packaged in suitable containers to which it will not adhere during shipment or storage. Each container shall be sealed at the point of manufacture and plainly marked with the color, basic resin type, wet reflective reflective elements and glass bead types included in the mix, manufacturer's name, batch number and date of manufacture, and a statement stating the contents meet the requirements of this Section. Each batch manufactured shall have its own separate number. The label shall warn the user that the material shall not be heated in excess of 440 degrees F.
- B. The wet reflective elements and glass spheres for drop-on application shall be shipped in strong moisture resistant bags. Each bag shall be marked with the name and address of the manufacturer, the name and weight of the material, a statement confirming that the contents meet the requirements of this Section, date of manufacture and batch number.
- C. Primer shall be shipped in pails, drums or other strong substantial containers. Each container shall be plainly marked with the brand name of the product, name and address of the manufacturer, date of manufacture, quantity of material, date of expiration or shelf life, and appropriate hazard warnings. Primers shall be shipped to the construction site with instructions for use affixed to each container.

1.05 SUBMITTALS

- A. See Appendix "A" for submittal requirements.

1.06 PRODUCTS

1.07 MATERIALS

- A. The thermoplastic material shall be homogeneously composed of pigment, binder, glass beads and wet reflective bonded core elements and shall be free of skins, dirt and foreign debris.
- B. The binder shall be based on maleic modified rosin ester resin and high boiling point plasticizer. The binder shall be a minimum of 50 percent maleic modified rosin ester.
- C. The pigment, glass beads and binder shall be well dispersed in the resin.