Vendor: _____

ATTACHMENT H: SCOPE OF WORK – EXHIBIT 1 TECHNICAL DOCUMENT AS OUTLINED BY ANDREW CONSULTING ENGINEERS

March 18, 2025

Bid Documents for

North Carolina State Ports Authority

TWO NEW 32' GAGE RAIL HOPPERS

Morehead City, NC

ACE Project No. 24047

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Technical Document List:

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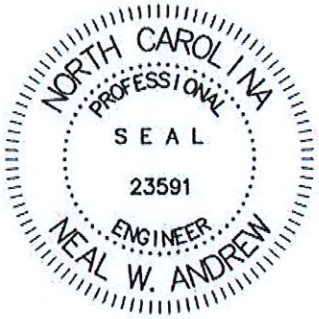
DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Designer:

1. Neal W. Andrew, PE, SECB
2. Andrew Consulting Engineers, P.C.
3. Firm License No. C-2461
4. Responsible for Divisions 01-49 Sections except where indicated as prepared by other design professionals of record.



B. Electrical Engineer:

1. Mark Ciarrocca, PE
2. Cheatham & Associates, PA.
3. Firm License No. C-1073.
4. Responsible for Division 26.

Electrical specifications digitally sealed separately.

END OF DOCUMENT 000107

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and quality-control services required by Designer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Designer.

1.3 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Designer.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Designer for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Designer for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Reports: Prepare and submit certified written reports and documents as specified.

F. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.

9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located (North Carolina) and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Designer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents after the first reinspection will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

F. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel, but not less than 24 hours. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspection equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Designer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Designer with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Designer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Designer's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:

1. Section 099600 "High-Performance Coatings" for surface-preparation and priming requirements.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

B. Heavy Sections: Rolled and built-up sections as follows:

1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches (38 mm).
2. Welded built-up members with plates thicker than 2 inches (50 mm).
3. Column base plates thicker than 2 inches (50 mm).

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Morehead City State Port.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Tension-control, high-strength, bolt-nut-washer assemblies.
3. Shop primers.

F. Source quality-control reports.

G. Field quality-control and special inspection reports.

1.7 QUALITY ASSURANCE

A. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P3 or to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

C. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W and WT shapes: ASTM A992/A992M.

B. Channels, Angles: ASTM A36/A36M.

C. Plate and Bar: ASTM A36/A36M.

D. Hollow Structural Sections: ASTM A500/A500M, Grade B.

E. Welding Electrodes: Comply with AWS requirements.

2.2 PRIMER

A. Primer: Comply with Section 099600 "High-Performance Coatings."

2.3 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Fabricate beams with rolling camber up.
2. Identify high-strength structural steel according to ASTM A6/A6M and maintain markings until structural steel has been erected.
3. Mark and match-mark materials for field assembly.
4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."

F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.4 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.5 SHOP PRIMING

A. Shop prime steel surfaces except the following: Retain, revise, or delete any of six subparagraphs below to suit Project.
1. Surfaces to be field welded.
2. Surfaces of high-strength bolted, slip-critical connections.
3. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Specified in Section 099600 "High-Performance Coatings."

D. Painting: Specified in Section 099600 "High-Performance Coatings."

2.6 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E165.
2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
3. Ultrasonic Inspection: ASTM E164.
4. Radiographic Inspection: ASTM E94.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Contractor has the option to field-assemble fabricated items at the project site.

3.2 EXAMINATION

A. Verify elevations of steel-bearing surfaces and locations of bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.4 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

D. Splice members only where indicated.

E. Do not use thermal cutting during erection.

F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.5 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts."

C. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

    a. Liquid Penetrant Inspection: ASTM E165.
    b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    c. Ultrasonic Inspection: ASTM E164.
    d. Radiographic Inspection: ASTM E94.

3.7 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A780/A780M.

B. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

END OF SECTION 051200

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal ladders.

1.2 ACTION SUBMITTALS

A. Product Data: For metal ladders and their attachments.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Identify field welds.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Manufacturer's specification and other data needed to prove compliance with the specified requirements.

C. Manufacturer's recommended installation procedures.

D. Mill Certificates: Signed by steel manufacturers, certifying that products furnished comply with requirements.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.2 FASTENERS

A. Carbon-Steel Bolts: ASTM A307 Gr A, hot-dip zinc coated.

2.3 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

C. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.

E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.6 METAL LADDERS

A. Provide metal ladders where indicated. Fabricate of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.

B. Galvanize ladders, including treads, railings, brackets, and fasteners.

2.7 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Contractor has the option to field-assemble fabricated items at the project site.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

D. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

3.2 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

SECTION 055119 - METAL GRATING STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes steel, industrial-type, straight-run stairs with steel-grating treads and steel railings attached to metal grating stairs.

1.2 COORDINATION

A. Coordinate installation of anchorages for metal stairs. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data: For metal grating stairs and each type of product.

B. Shop Drawings: Include plans, elevations, sections, details of metal grating stairs and their connections. Show anchorage and accessory items.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's specification and other data needed to prove compliance with the specified requirements.

B. Manufacturer's recommended installation procedures.

C. Mill Certificates: Signed by steel manufacturers, certifying that products furnished comply with requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: A firm experienced in producing steel stairs that are similar to those indicated for this project in material, design, and extent, to fabricate stairs, platforms and railings in compliance with industry standards and local codes, with no less than three years of experience.

B. Comply with recommendations of AWS, Structural Welding Code on Steel, D1.1 latest edition.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal grating stairs by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36.

C. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to metals in accordance with ASTM A123.

2.2 FASTENERS

1. Carbon-Steel Bolts: ASTM A307 Gr A, hot-dip zinc coated.

2.3 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.

B. Form exposed work with accurate angles and surfaces and straight edges.

C. Fit and shop assemble stair in the largest practical sections for delivery to the job site.

D. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Weld exposed corners and seams continuously unless otherwise indicated.
5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 4 welds: good quality, uniform undressed weld with minimal splatter.

E. Fabricate joints that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.4 METAL-FRAMED STAIRS

A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," Industrial Class, unless more stringent requirements are indicated.

B. Stair Framing:

1. Fabricate stringers of steel plates or channels.

a. Provide closures for exposed ends of channel stringers.

2.5 GRATING AND TREADS

A. Comply with applicable requirements in Section 055313 "Bar Gratings."

2.6 STAIR RAILINGS

A. Comply with applicable requirements in Section 055213 "Pipe and Tube Railings."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify surfaces to receive structural steel framing and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Contractor has the option to field-assemble fabricated items at the project site.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete through-bolts, lag bolts, and other connectors.

C. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

END OF SECTION 055119

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and tube railings.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work, including anchorage and accessory items.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer's installation instructions.

1.4 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with pipe and tube railings by field measurements before fabrication.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel".

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Provide steel railing for attachment to steel structure.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket that provides 1-1/2-inch (38-mm) clearance from inside face of handrail to guardrail.

2.2 STEEL

A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.

B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade B, Extra strong.

C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 FASTENERS

A. Carbon-Steel Bolts: ASTM A307 Gr A Plain steel with coating as specified in Section 099600 "High-Performance Coatings." (Add Alternate No. 1 – Hot-Dip Galvanized Railings: Hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.).

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.5 FABRICATION

A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

B. Form work true to line and level with accurate angles and surfaces.

C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

D. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

E. Form changes in direction by bending or by inserting prefabricated elbow fittings.

F. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

G. Connect existing railing to new railing unless otherwise indicated.

H. Close exposed ends of railing members with prefabricated end fittings.

1. Close exposed ends of existing railing members at interface with new railing where railings do not connect.

I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

2.6 STEEL FINISHES

A. High-Performance Coating: As specified in Section 099600 "High-Performance Coatings.".

B. Add Alternate No. 1 – Galvanized Railings:

1. Hot-dip galvanize steel railings, including hardware, after fabrication.
2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Contractor has the option to field-assemble fabricated items at the project site.

B. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).

3.2 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055213

SECTION 055313 - BAR GRATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Steel grating at steel platforms.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Clips and anchorage devices for gratings.

B. Shop Drawings: Include plans, sections, details, and attachments to other work.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Comply with OSHA and local building codes.

PART 2 - PRODUCTS

2.1 METAL BAR GRATINGS

A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."

B. Welded Steel Grating:
1. Bearing Bar Depth: As indicated on drawings.
2. Bearing Bar Thickness: As indicated on drawings.
3. Provide toeplates at open-sided edges and penetrations of grating platforms as indicated on drawings.
4. Traffic Surface: Serrated.
5. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. (550 g/sq. m) of coated surface.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Bars for Bar Gratings: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or ASTM A 1018/A 1018M.

C. Wire Rod for Bar Grating Crossbars: ASTM A 510 (ASTM A 510M).

2.3 FASTENERS

A. General: Unless otherwise indicated, provide hot-dipped zinc coated fasteners with coating complying with, ASTM A 153/A 153M for use with galvanized steel. Select fasteners for type, grade, and class required.

2.4 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.5 FABRICATION

A. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

B. Fit exposed connections accurately together to form hairline joints.

2.6 STEEL FINISHES

A. Finish gratings, frames, and supports after assembly.

B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Contractor has the option to field-assemble fabricated items at the project site.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

C. Fit exposed connections accurately together to form hairline joints.

3.2 INSTALLING METAL BAR GRATINGS

A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.

B. Attach units to supporting members with type and size of clips and fasteners as recommended by grating manufacturer for type of installation conditions shown.

3.3 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055313

SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:

1. Exterior Substrates:
   a. Steel.

B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming of structural steel with primers specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Coatings: 5 percent, but not less than [**2 gal. (3.8 L)**] of each material and color applied.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
3. Products shall be of same manufacturer for each coat in a coating system.

C. The top coat colors of the Hopper Platform shall be as follows:

Description	RAL #	Special Instructions
Main Structure	5017	Blue
Operator's Cabin (Interior and Exterior)	9003	White
Ladders, Wheel Boxes, Bottom W10x49	1018	Yellow
Guard Rails, Handrails, Stair Treads and Grating	N/A	Galvanized
Wheels	9005	Black
Sheaves, Safety Devices, Rotator	1018	Yellow

1. Trip hazards and other obstructions shall be painted with diagonal yellow and black stripes.

2.2 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 PREPARATION

A. Contractor has the option to perform cleaning, priming, and painting operations at the project site.

B. The following procedures must be followed:
1. All dirt, oil, grease, chemicals or other surface contaminants shall be removed by solvent cleaning and washing per SSPC-PA1 prior to the start of surface preparation.
2. After cleaning and washing, surfaces shall be blasted to SSPC SP10 (NACE 2) to a surface profile (anchor pattern) of 50-75 microns.
3. Power tool cleaning to SSPC-SP3 will only be approved on a case by case basis. Hand tool cleaning is prohibited.
4. All sharp edges shall be broken to a radius of 2mm (1/16 in).
5. Special attention shall be given to welds and surfaces in difficult to reach areas.
6. After blasting, the surface shall be made dust free prior to application of any coating. Acid washing, rust inhibitors, or other cleaning solvents/solutions are prohibited.
7. Blasted surfaces shall be coated with an initial coat of primer within four (4) hours of blasting.
8. Should visible rust develop or the steel become wet prior to primer application, the surface shall be re-blasted.
9. Blasting and coating application not performed within an atmospherically controlled area shall only occur during daylight on dry surfaces when all required environmental conditions are satisfied.
10. Steel surface temperature shall be greater than 3° C (37° F) above the dew point and relative humidity shall be less than 85% for surface preparation activities to be performed.
11. All steel surfaces shall reveive 20 microns of shop primer after surface preparation.

C. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

3.2 APPLICATION

A. Follow the following procedures for coating application:
1. All materials for coating application shall be new, unopened, and purchased specifically and solely for use on the hopper frame and components.
2. Mixing of different coatings is prohibited.
3. Coating application shall be performed in strict compliance with paint supplier's instructions.
4. Thinning of coating shall be performed in strict compliance with paint supplier's instructions.
5. Environmental conditions must be within the requirements of the paint supplier for coating application to be performed. In the absence of requirements from the paint supplier:
   a. Relative humidity shall be less than 80%
   b. Temperature shall be greater than 5° C (41° F)
   c. Steel surface temperature shall be at least 5° C above the dew point

d. Wind velocity shall be less than 7 m/s (15.6 mph)
e. Steel surface shall be dry.

6. Application of additional coats shall be performed within the recoat interval of the paint supplier.
7. Coating shall not be applied within 200mm (7.9 in) of surfaces which have not been blasted.
8. Coating shall be applied uniformly over the complete surface without skims, skips, sags, drips, runs, pinholes, mud cracks, or other application defects. All defects shall be repaired.
9. Coating application shall be performed to minimize damage to completed coatings.
10. Dry film thickness of each coat shall meet the requirements of these Specifications.
11. Each coat shall be of contrasting color; finish coat colors shall be in accordance with this specification under section 2.1.C.
12. All coating application equipment and materials shall be cleaned, monitored, protected, mixed, etc. according to the paint supplier's requirements.
13. Recommended pot life shall not be exceeded. When exceeded, the spray pot, hoses, pumps, etc. shall be emptied and cleaned and new material shall be used.
14. Use of materials beyond the supplier's recommended shelf life is prohibited.

B. Application methods:
1. All coatings shall be applied by conventional or airless spray unless the Contractor can demonstrate that spray application is not possible or for minimal areas of coating repair.
2. Brush application may be permitted on interior surfaces of air tight members provided that maximum film thickness is not exceeded and sags, runs, mud cracks, and other application defects are avoided.
3. Stripe coating of welds, edges, and difficult to reach areas is permitted by brush application.
4. Stripe coating or special attention during spray application shall be performed for all crevices, corners, and other areas where wet coating can collect to ensure voids, mud cracks, and bubbles are avoided.

C. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for coating and substrate indicated.
2. Coat surfaces behind movable equipment same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment with prime coat only.
3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

3.3 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.

1. Contractor shall touch up and restore coated surfaces damaged by testing.
2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and

apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.5 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Exterior surfaces which include all areas directly exposed to the environment shall be coated as follows:

Coat	Coating Description	Minimum Dry Film Thickness (microns)
Primer	Sigmazinic 68 SP	75-125
Mid-Coat	Amerlock 2 / 400C	100-150
Top Coat	PSX 700	75-125

B. Interior, non-airtight surfaces which include all areas with indirect exposure to the environment shall be coated as follows:

Coat	Coating Description	Minimum Dry Film Thickness (microns)
Primer	Sigmazinic 68 SP	75-125
Mid-Coat	Amerlock 2 / 400C	100-150

C. Interior, airtight surfaces which include all areas with absolutely no exposure to the environment shall be coated as follows:

Coat	Coating Description	Minimum Dry Film Thickness (microns)
Primer	Sigmazinic 68 SP	75-125

1. Pipes less than 800mm (31.5 in) in diameter require no interior coating, but shall be protected from corrosion from receipt of material through sealing. Pipes with corrosion of the interior surfaces prior to sealing shall be replaced.
2. Pipes greater than 800mm shall receive shop primer only on the interior surfaces.

D. Interior surfaces of all cabins and houses shall be coated as follows:

Coat	Coating Description	Minimum Dry Film Thickness (microns)

Primer	Sigmazinic 68 SP	75-125
Mid-Coat	Amerlock 2 / 400C	100-150
Top Coat	PSX 700	75-125

E. Anti-Skid:
1. Anti-skid product shall be provided by the paint supplier and applied evenly on the surface immediately upon application of the mid-coat while the paint is still wet.
2. After the paint dries, sweep out excess material and apply the top coat.
3. Sand or blasting mediums (shot or grit) are prohibited as anti-skid material.

F. Repair/touch up:
1. Care shall be taken to minimize damage to initial coating system application
2. When the coating system is damaged to the base metal, spot cleaning shall be performed.
3. The damaged area shall be power tool cleaned to SSPC-SP3 after the area has been cleaned.
4. The surrounding coating shall be feathered to remove all cracked, loose, or damaged coating.
5. Feathering shall be performed by power or hand sanding with a grit wheel.
6. Feathered areas shall be free of loose, burnt, or blistered coating.
7. Repair coating shall be performed in accordance with the original system for the damaged area.

G. Paint supplier site representative:
1. The paint supplier shall have a full time representative on site during all coating activities identified in this Section.
2. Coating activities are prohibited if the paint supplier's representative is not on site.

END OF SECTION 099600

Electrical Specifications for

Port of Morehead City

TWO NEW 32' GAGE HOPPERS

ACE Project No. 24047

Digitally signed by Mark A. Ciarrocca
Date: 2025.02.18 13:36:21-05'00'

Cheatham & Associates, PA

3412 Enterprise Drive

Wilmington, NC 28405

910-452-4210

NC License # C-1073

PORT OF MOREHEAD CITY, NC
TWO NEW 32' GAGE HOPPERS

SECTION 260000 – ELECTRICAL

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes requirements for electrical equipment and materials.

1.2 CODES AND STANDARDS

A. Building Codes:

1. National Fire Protection Association No. 70, National Electrical Code (NEC).
2. North Carolina State Building Code, Latest Edition and Revisions (NCSBC).

B. Industry Standards:

1. Underwriter's Laboratories, Inc. Standards and approved listings (UL).
2. Electrical Testing Laboratories Standards (ETL).
3. National Electrical Manufacturers Association Standards (NEMA).
4. Insulated Power Cable Engineers Association Standards (IPCEA)
5. American National Standards Institute (ANSI)
6. American Society for Testing Materials Standards (ASTM)
7. Canadian Standards Association (CSA)

1.3 QUALITY ASSURANCE

A. Electrical components, devices, fixtures, accessories, etc. shall be listed and labeled by a third-party agency that is accredited by the North Carolina Building Code Council (NCBCC) to label electrical & mechanical equipment. Listing and labeling shall comply with NC Department of Insurance requirements as detailed in NC General Statutes 66-23 through 66-25.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 – PRODUCTS

2.1 POWER UNIT

A. Diesel-engine driven air compressor / generator / battery charger / crank assist / chassis power.

B. Design Basis: Miller EnPak A60GB with air dryer kit #301488.

C. Diesel Engine: 25 nominal HP, low oil pressure and high coolant temperature shutdowns,

D. Air Compressor: 58 cfm at 100 psi, 60 cfm maximum, 100% duty cycle., 80-175 psig working pressure, automatic high pressure and high temperature shutdown.

E. Generator: 7 kW continuous.

F. Battery Charger: 12/24V, 150A.

G. Crank Assist: 12/24V, 300A.

H. Chassis Power: Battery monitoring and automatic charging.

2.2 POWER DISTRIBUTION:

A. Panelboard:

1. Copper bus.
2. Copper ground and neutral bars.

B. Safety switches: Heavy duty, NEMA 4X enclosure.

2.3 RACEWAYS AND BOXES:

A. Conduit: Rigid aluminum.

B. Conduit Fittings: Aluminum, compatible with raceway, insulated throats.

C. Flexible Conduit: Where required for connection to vibrating equipment; liquid-tight metallic, aluminum.

D. Device / Junction Boxes and Box Covers: Cast aluminum.

2.4 CONDUCTORS:

A. Copper, stranded.

B. Power: Insulation type: RHW-2.

C. Discrete Controls: Machine tool wire or RHW-2.

D. Analog Controls: Shielded cables as recommended by the device manufacturer.

2.5 ENCLOSURES:

A. NEMA 4X, aluminum or stainless steel, gasketed covers.

2.6 WIRING DEVICES:

A. Receptacles: Weather resistant GFCI type, Federal Specification grade W-C-596.

1. Quantity: Two at Level 1.

B. Toggle switches: Federal Specification grade W-C-896.

C. Covers: Cast aluminum, extra-duty rated, in-use type.

2.7 LIGHTING:

A. LED fixtures with internal drivers.

B. 2 kV surge suppression integral to the driver.

C. Standards: Design Lights Consortium (DLC) qualified products list or ENERGY STAR certified.

D. Exterior fixtures: Wet location listed.

E. Rated lamp life of 50,000 hours minimum to L70.

F. Quantities:

1. Eight 18000 lumen flood lights; two on each side of Level 1 centered over rail car path below and two on each side of Level 2 centered over rail car path below.
2. Two 8000 lumen spot lights, centered at Level 1.

2.8 MOUNTING HARDWARE:

A. Stainless steel.

2.9 IDENTIFICATION:

A. Equipment and device ID nameplates: Engraved plastic. Attach with permanent two-part epoxy adhesive.

B. Conductors identified at each termination with numerical tags corresponding to designations on manufacturer drawings.

2.10 CONTROL PANELS:

A. Listed to UL 508A, Industrial Control Panels.

2.11 OPERATOR CABIN ELECTRICAL DEVICES & FIXTURES

A. One 60W LED dimmable light fixture.

B. One LED dimmer light switch.

C. Two 120V GFCI receptacles.

D. Outlet for window HVAC unit.

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2.12 OPERATOR CABIN HVAC:

A. Self-contained air conditioning and heating window unit.

B. Externally mounted to the operator cab.

C. 12,000 BTU cooling; 8,000 BTUH heating.

D. 120V power

E. Shipped loose for field installation.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install equipment and materials in accordance with manufacturer instructions, guidelines, and recommendations.

B. Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

END OF SECTION 260000