SECTION 05501 – SUPPLEMENTAL

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SCOPE. Section includes all materials, tools, equipment, apparatus, labor and supervision required to fabricate and furnish all metals to the required dimensions, tolerances and finishes as shown on the drawings.

Fabrications of structural steel consists of manufacturing the parts required to construct the steel frame of buildings and related structures.

1.2 GENERAL.

1.2.01 Governing Standards. Comply with the requirements set forth in the current publications and addenda thereto of the following standards:

ASTM (American Society of Testing and Materials) A27/A27M – Specification for Steel Castings, Carbon, for General Application.

ASTM A36/A36M – Specification for Carbon Structural Steel.

ASTM A53/A53M – Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

ASTM A123/A123M – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

ASTM A143 – Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and procedure for Detecting Embrittlement.

ASTM A153/A153M – Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

ASTM A167 – Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

ASTM A276 – Specification for Stainless Steel Bars and Shapes.

ASTM A283/A283M – Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

ASTM A307 – Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

ASTM A325 – Specification for structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

ASTM A366A366M – Specification for Commercial Steel Sheet, Carbon, Cold-Rolled.

ASTM A500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A501 – Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

ASTM A510 – Specification for General Requirements for Wire Rods and Coarse Round Wire Carbon Steel.

ASTM A786/A786M – Specification for Rolled Steel Floor Plates.

ASTM A1008 – Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

ASTM A1011 – Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

ASW (American Welding Society) A2.4 – Symbols for Welding, Brazing, and Nondestructive Examination.

AWS D1.1 – Structural Welding Code – Steel.

AWS D1.3 – Structural Welding Code – Sheet Steel.

SSPC (Steel Structures Painting Council) – Painting Manual.

1.3 QUALITY ASSURANCE.

1.3.01 Welding Qualifications. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification. Quality welding processes and welding operators in accordance with AWS D1.1 “Structural Welding Code – Steel, D1.2 “Structural Welding Code – Sheet Steel”, and D1.2 “Structural Welding Code – Aluminum”.

1.3.02 Fabricator Qualifications. Firm shall have five years documented experience in successfully producing and erecting metal fabrications of type indicated for this Project, with sufficient production capacity to produce required units without causing delay in the work.

1.3.03 Installer Qualifications. If possible, Fabricator shall erect metal fabrications. Otherwise, installer shall have five years documented experience in successfully erecting metal fabrications of this type and shall be approved and certified by manufacturer.

1.3.04 Engineer Qualifications. The design Engineer shall be licensed in Michigan and have five years documented experience successfully providing engineering services of this type indicated for this project.

1.4 SUBMITTALS.

1.4.01 Drawings and Data. Submit shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.

Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

Where installed, metal fabrications are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified Professional Engineer who was responsible for their preparation.

Submit product data for products used in miscellaneous metal fabrications, including paint products and grout.

1.4.02 Certifications. Welder certificates signed by Contractor certifying that welders comply with requirements specified under “Quality Assurance” article.

Submit certifications for firms and persons specified in “Quality Assurance” article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Engineers and Owners, and other information specified.

1.4.03 Samples. Samples representative of materials and finished products as may be requested by Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING. Accept metal fabrications on site in labeled shipments. Inspect for damage. Protect metal fabrications from damage by exposure to weather.

PART 2 - PRODUCTS

2.1 SERVICE CONDITIONS. Check actual locations of walls and other construction to which metal fabrications must fit, before fabrication; show recorded field measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.

Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

2.2 METALS.

2.2.01 Metal Surfaces. For metal fabrications exposed to view upon completion of the work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

2.2.02 Steel.

Plates, Shapes, and Bars	ASTM A786
Rolled Steel Floor Plates	ASTM A36
Bars for Gratings	ASTM A1011 or ASTM A36

Wire Rod for Grating Cross Bars	ASTM A510
Tubing, Cold-Formed	ASTM A500, Grade A or B as indicated
Tubing, Hot-Formed Steel	ASTM A501
Coatings for Exterior Tubing or as indicated	ASTM A53, hot-dip galvanized coating
Uncoated Structural Sheet, Cold-Rolled	ASTMA 1008, Grade A
Uncoated Structural Sheet, Hot-Rolled	ASTM A1011, Grade 30
Uncoated Sheet, Cold-Rolled	ASTM A366
Uncoated Sheet, Hot-Rolled	ASTMA 1011
Galvanized Sheet, Structural quality	ASTM A653; Grade A, and G90 coating designation unless otherwise indicated
Galvanized Sheet, Commercial quality	ASTM A653, G90 coating designation unless otherwise indicated
Pipe	ASTM A53, Schedule 40, Type F or S, Grade A or B, black finish unless otherwise indicated. Galvanized finish for exterior installations

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

2.2.04 Concrete Inserts. Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A153.

2.2.05 Welding Rods and Bare Electrodes. Select in accordance with AWS specifications for the metal alloy to be welded.

2.2.06 Stainless Steel.

Bar Stock	Type 304L, 36 ksi yield
Shapes and Plate	Type 304L, 36 ksi min. yield
Bolts and Nuts	ASTM F593 bolts and F94 nuts, Type 304
Plate Material	Type 316

2.3 GROUT AND ANCHORING CEMENT.

2.3.01 Nonshrink Metallic Grout. Provide premixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C621, specifically recommended by manufacturer for heavy duty loading applications of type specified in this section.

2.3.02 Interior Anchoring Cement. Provide factory pre-packaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound. Use for interior applications only.

2.3.03 Erosion-Resistant Anchoring Cement. Provide factory pre-packaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.

2.3.04 Acceptable Manufacturers. Subject to compliance with requirements, provide one of the following or an approved equal:

Nonshrink Metallic Grouts:

"Metox RM"; Chem-Masters Corp.
"Hi Mod Grout"; Euclid Chemical Co.
"Embeco 885 and 636"; Master Builders.
"Ferrolith G Redi-Mix and G-NC": Sonneborn Building Product Div., Rexnord Chemical Products, Inc.
"Stonecrete MG1"; Standard, Inc.

Nonshrink Nonmetallic Grouts:

"Bonsal Construction Grout"; W.R. Bonsal Co.
"Diamond-Crete Grout"; Concrete Service Materials Co.
"Euco N-S Grout"; Euclid Chemical Co.
"Kemset"; Chem-Masters Corp.
"Crystex"; L&M Construction Chemicals, Inc.
"Masterflow 713"; Master Builders.
"Sealtight 588 Grout"; W.R. Meadows, Inc.
"Sonogrout"; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.
"Stonecrete NM1"; Stonehard, Inc.
"Five Star Grout"; U.S. Grout Corp.
"Vibropruf #11"; Lambert Corp.

Interior Anchoring Cement:

"Bonsal Anchor Cement"; W.R. Bonsal Co.
"Por-Rok"; Minwax Construction Products Division.

Erosion-Resistant Anchoring Cement:

"Super Por-Rok"; Minwax Construction Products Division.

2.4 FASTENERS. Provide stainless steel fasteners for exterior use or where exposed to moisture. Select fasteners for the type, grade, and class required.

Bolts and Nuts Regular hexagon head type
ASTM F593 bolts and F94 nuts, Type 304

Plain Washers Type 304
Expansion Anchors
Type 316 stainless steel, externally threaded stud anchors with flat washers and nuts; Powers, Power-Stud, or as approved. Provide sufficient length to allow for 5 inch minimum embeddment

Lock Washers	Helical spring-type carbon steel, FS FF-W-84

2.5 PAINTS AND FINISHES.

2.5.01 Shop Primer for Ferrous Metal. Provide manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of FS TT-P-645. Also comply with Master Specification Section 09900, Painting.

2.5.02 structural Steel Primer Paint. Provide Universal rust inhibiting primer which can accept epoxy, epoxy esters and phenolic paint as finish coats.

2.5.03 Zinc Chromate Primer. Shall meet FS TT-P-645.

2.5.04 Galvanizing Repair Paint. Provide high zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC Paint -20.

2.5.05 Bituminous Paint. Provide cold-applied asphalt mastic complying with SSPC Paint-12 except containing no asbestos fibers.

2.5.06 Shop Coatings Manufacturers. Provide one of the following or an approved equal:

Universal Primer	Ameron "Americoat 180 Synthetic Resin Coating, Carboline "888 Primer", or Tnemec Series 37H Chem-Prime H.S."
Red Oxide Primer	SSPC 15, Type 1, or Fed Spec TT-P-636
Epoxy Enamel	Gray; Ameron "Amerlock 400 High-Solids Epoxy Coating", Carboline "Super-Hi-Gard 891", or Tnemec "Series 140 Pota-Pox Plus"
Asphalt Varnish	Fed Spec TT-C-494

2.5.07 Galvanizing. All galvanizing shall be done by the hot-dip process after fabrication, in conformity with the requirements of ASTM A123, A153 and A385.

Alternatively, blast clean and flux steel. The average minimum thickness of galvanizing shall be 5.0 mils (0.1 mm). The purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed by ASTM A123 and the specified minimum thickness of 5.0 mils (0.1 mm) has been met. A report of the test results shall be furnished to the purchaser.

Galvanize bolts, nuts and washers and iron and steel hardware components in accord with ASTM A153. Where galvanized bolts are indicated on the drawings or specified, the use of zinc-plated bolts will not be acceptable.

Safeguard products against steel embrittlement in conformance with ASTM A143. Handle galvanized articles in manner to avoid mechanical damage and to minimize distortion.

2.5.08 Post-Galvanizing Treatments. Shall comply with Master Specification Section 09900, Painting, on shop priming and painting. Prepare galvanized metal surfaces to be field-painted in accord with paint manufacturer's recommendations. Shop-coat galvanized metal surfaces with approval primers for galvanized or other approved coatings.

2.6 CONCRETE FILL AND REINFORCING MATERIALS.

2.6.01 Concrete Materials and Properties. Comply with requirements of Master Specification Division 3, Concrete, for normal weight, ready-mix concrete with minimum 28-day compressive strength of 2,500 psi (17,237 kPa), 440 lb/ft^3 (7,048.2 kg per cu m) cement minimum, and W/C ratio of 0.65 maximum, unless higher strengths indicated.

2.6.02 Nonslip Aggregate Finish. Provide factory-graded, packaged material containing fused aluminum oxide grits or crushed emery as abrasive aggregate; rust-proof and non-glazing unaffected by freezing, moisture, or cleaning materials.

2.7 ROUGH HARDWARE. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring and securing woodwork to concrete or other structures.

Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.8 LOOSE BEARING AND LEVELING PLATES. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free

from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.9 MISCELLANEOUS FRAMING AND SUPPORTS. Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.

Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

Except as otherwise indicated, space anchors 24 inches (61.0 cm) o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches (3.2 cm) wide by 1/4 inch (6.4 mm) by 8 inches (20.3 cm) long.

Galvanize miscellaneous framing and supports in exterior locations and interior locations where indicated.

2.10 FINISHES. Comply with NAAMM “Metal Finishes Manual” for recommendations relative to application and designation of finishes. Finish metal fabrications after assembly.

2.10.01 Steel and Iron Finishes. For those items indicated for galvanizing, apply zinc coating by the hot-dip process in compliance with the following requirements:

ASTM A153 for galvanizing iron and steel hardware.

ASTM A123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch 90.8 mm) thick and heavier.

For shop priming, prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

Exteriors (SSPC Zone 1B): SSPC-SPC “Commercial Blast Cleaning”.

Interiors (SSPC Zone 1A): SSPC-SP2 “Power Tool Cleaning”.

Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SspC-PA1 “Paint Application Specification No. 1” for shop painting.

Stripe paint all edges, corners, crevices, bolts, welds, and sharp edges.

2.11 MANUFACTURE AND FABRICATION. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication. Work shall be true to line and level with accurate angles and surfaces and straight sharp edges.

Allow for thermal movement resulting from a maximum change of 100 degrees F (55.5 degrees C) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

Shear and punch metals cleanly and accurately. Remove burrs. Ease exposed edges to a radius of approximately 1/32 inch (0.8 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Remove sharp or rough areas on exposed traffic surfaces.

Weld corners and seams continuously to comply with AWS recommendations. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base materials. Obtain fusion without undercut or overlap. Remove welding flex immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joint where least conspicuous.

Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
Preassemble items in shop to greatest extent possible to minimum field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.

Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

PART 3 - EXECUTION

3.1 PREPARATION. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeved anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION.

3.2.01 Sequencing and Scheduling. Sequence and coordinate installation of wall handrails as follows:

Mount handrails only on completed walls. Do not support handrails temporarily by any means not satisfying structural performance requirements.

Mount handrails only on wall assemblies reinforced to receive anchors, and where the location of concealed anchor plates has been clearly marked for benefit of Installer.

3.2.02 Fastening to In-Place Construction. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

Center nosings on tread widths with noses flush with riser faces and tread surfaces. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves

from water and concrete entry.

3.2.03 Cutting, Fitting, and Placement. Perform curing, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rake; and measure from established lines and levels.

Provide temporary bracing of anchors in formwork for items that are to be built into concrete masonry or similar construction.

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 the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

3.2.04 Welding. Welding and related operations shall conform to applicable provisions of the Structural Welding Code, AWS D1.1. All welding shall be performed in accordance with written procedures, using only those joint details which have prequalified status when performed in accordance with AWS D1.1. Welding processes shall be limited to those listed in AWS D1.1, Paragraph 1.3.1, except that the short circuiting transfer mode shall not be used. Filler metal shall be of the type listed in AWS D1.1. Connections for structural steel and for stairs shall be made with filler metal having minimum tensile strength of 70 ksi (482.6 MPa).

Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces. Leave finish surfaces of members exposed in final structure free of markings, burrs and other defects.

Connections for miscellaneous steel fabrications not included in the AISC definition of structural steel, except stairs, shall be made with filler metal having a minimum tensile strength of 60 ksi (413.7 MPa) or greater.

Welds not dimensioned on the drawings shall be sized to develop the full strength of the least strength component of the connection.

When the steel is to be welded, a welding procedure suitable for the grade of steel and intended use or service shall be utilized. See ASTM A6 for information on weldability.

Where structural or miscellaneous steel connections are welded, all butt and miter welds shall be continuous and, where exposed to view, shall be ground smooth. Intermittent welds shall have an effective length of at least 2 inches (5.1 cm) and shall be spaced not more than 6 inches (15.2 cm) apart.

Stiffener plates shall be tightly fitted to bear against both flanges and web before welding.

3.2.05 Field Welding. Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made and methods used in correcting welding work. In addition, use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

Inspect and test during erection of structural steel. Certify welders and conduct inspections and tests. Record types and locations of defects found in work. Record work required and performed to correct deficiencies. Perform visual inspection of all welds.

Perform tests of welds as follows:

Liquid Penetrant Inspection	ASTM E165
Magnetic Particle Inspection	ASTM E109 performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable
Radiographic Inspection	ASTM E94 and ASTM E142; minimum quality level “2-2T”
Ultrasonic Inspection	ASTM E164

Correct deficiencies in structural steel work which inspections and laboratory test reports show as not in compliance with requirements. Carry out additional tests, at Contractor’s expense, to reconfirm any original work non-compliance and to show corrected work compliance.

3.2.06 Corrosion Protection. Coat concealed surfaces of aluminum that will come

into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

3.3 SETTING LOOSE PLATES. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.

Use metallic nonshrink grout in concealed locations where not exposed to moisture; use nonmetallic, nonshrink grout in exposed locations, unless otherwise indicated. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.65 mm)

3.4.01 Touch-Up Painting. Clean and touch up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal. Refer to Master Specification Section 09900, Painting.

End of Supplemental Section

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