1.7 MOCKUPS

A. CONSTRUCT TYPICAL MOCKUP PANEL 48" X 48" TO ILLUSTRATE STONE, COURSING OR BOND PATTERN, JOINTS BETWEEN UNITS, AND MOVEMENT CONTROL JOINTS.

B. CONSTRUCT MOCKUP TO ILLUSTRATE BACKUP WALL, EXTERIOR SHEATHING, AIR BARRIER, CONNECTORS, WEEP HOLES, AND THROUGH WALL FLASHING.

C. MOCKUP MAY REMAIN PART OF THE FINISHED WORK.

1.8 DELIVERY, STORAGE AND HANDLING

A. DELIVER MORTAR MATERIALS IN ORIGINAL UNBROKEN AND UNDAMAGED PACKAGES WITH THE MAKER'S NAME AND BRAND DISTINCTLY MARKED THEREON, AND UPON DELIVERY STORE IN A SHED THEY WILL NOT BE USED ON THE WORK.

B. STORE OR PILE SAND ON A PLANK PLATFORM AND PROTECT FROM DIRT AND RUBBISH. STORE MORTAR MATERIALS AND SAND IN SUCH A MANNER AS TO PREVENT DETERIORATION OR CONTAMINATION BY FOREIGN MATERIALS.

C. DELIVER AND STORE STONE IN A MANNER DESIGNED TO PREVENT DAMAGE AND STAINING OF UNITS. PREVENT DAMAGE TO UNITS.

D. LIFT SLABS WITH PROPER AND SUFFICIENTLY LONG SLINGS OR CHOKES WITH PROTECTION TO PREVENT DAMAGE TO UNITS. PROTECT EDGES AND CORNERS.

E. STACK UNITS ON TIMBERS OR PLATFORMS AT LEAST 3" ABOVE GRADE.

F. PLACE POLYETHYLENE OR OTHER NON-STAINING PLASTIC FILM BETWEEN UNITS AND OTHER FINISHED SURFACES OF UNITS WHEN STORED FOR EXTENDED PERIODS OF TIME.

G. COVER STORED UNITS WITH NON-STAINING, WEATHERPROOF PROTECTIVE ENCLOSURE IF EXPOSED TO WEATHER.

H. DO NOT USE SALT OR CALCIUM CHLORIDE TO REMOVE ICE FROM SURFACES.

1.9 ENVIRONMENTAL REQUIREMENTS

A. PERFORM WORK TO REQUIREMENTS OF DIVISION 1.

B. MAINTAIN MATERIALS AND SURROUNDING AIR TEMPERATURE TO MINIMUM 50 DEGREES F (10 DEGREES C) PRIOR TO AND 48 HOURS AFTER COMPLETION OF STONEWORK.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. CAST STONE UNITS SHALL BE BY ARRISCRAFT INTERNATIONAL, INC. OR APPROVED EQUAL.

2.2 MORTAR MATERIALS

A. MORTAR FOR CALCIUM SILICATE MASONRY UNITS: TO ASTM C270. PROPORTION SPECIFICATION: PORTLAND CEMENT, 1 PART HYDRATED LIME, 6 PARTS MORTAR AGGREGATE BY VOLUME FOR BOTH CEMENTITIOUS MATERIALS AND AGGREGATE. INTEGRAL COLOR CHOSEN BY BRANDPARTNERS.

B. HYDRATED LIME: TO ASTM C207, TYPE S.

C. MORTAR AGGREGATE: TO ASTM C144, STANDARD MASONRY TYPE. CLEAN, DRY, PROTECTED AGAINST DAMPNESS, FREEZING, AND FOREIGN MATTER.

D. COLOR PIGMENT: PER REQUIREMENTS OF MANUFACTURER. COLOR BY BRANDPARTNERS.

E. WATER: POTABLE, CLEAN AND FREE OF DETRIMENTAL AMOUNTS OF ACIDS, ALKALIES AND ORGANIC MATERIALS.

2.3 STONE MATERIALS

A. ADAIR LIMESTONE AS MANUFACTURED BY ARRISCRAFT, OR APPROVED EQUAL. STARTER COURSE LOCATED AT ANCHOR BELOW GRADE. PROVIDE UNITS WITH THE FOLLOWING PROPERTIES:

1. COMPRESSIVE STRENGTH: 29,900 PSI, TO ASTM C170
2. ABSORPTION: 0.75 PERCENT, TO ASTM C97.
3. DENSITY: 167LBS/CU FT, TO ASTM C97.
4. MODULUS OF RUPTURE: 2,280 PSI, TO ASTM C99.
5. FLEXURAL STRENGTH: 1,598 PSI TO ASTM C880.
6. ABRASION RESISTANCE: 19.9 TO ASTM C241.
7. SIZES:
   a. 8"-5/8" X 7-5/8" X 15-5/8": EXTERIOR-STARTER COURSE AT AND/OR BELOW GRADE.

2.4 MANUFACTURED UNITS

A. RENAISSANCE BUILDING STONE MASONRY UNITS, AS MANUFACTURED BY ARRISCRAFT (GEORGIA PLANT), OR APPROVED EQUAL:

1. THICKNESS: 3-5/8" THICK.
2. SIZES: AS SHOWN ON DRAWINGS.
3. FINISH: SMOOTH FINISH ON EXPOSED FACES AND ENDS.
4. COLOR AND PATTERN: AS SHOWN ON DRAWINGS OR AS CHOSEN BY BRANDPARTNERS.

2.5 REINFORCEMENT AND ANCHORAGE

A. WALL TIES: STEEL WIRE TYPE, HOT DIP GALVANIZED, DUO-TIE SERIES AS MANUFACTURED BY HOHMANN & BARNARD, INC. OR EQUAL BY DUR-O-WALL & NATIONAL WIRE PRODUCTS.

B. FASTENERS: HOT-DIPPED GALVANIZED AS MANUFACTURED BY HOHMANN & BARNARD, INC.

C. ARRISCRAFT NOTE VOLUME 1, NO. 4, DIMENSION STONE ANCHORS: BED JOINT REINFORCEMENT: SINGLE-WIRE TYPE, 0.187" DIAMETER HOT DIPPED GALVANIZED STEEL, TO ASTM A82.

D. BED JOINT REINFORCEMENT: SINGLE WIRE, 9 GA., HOT-DIPPED GALVANIZED STEEL, TO ASTM A82.

2.6 EMBEDDED FLASHING MATERIALS

A. CONCEALED FLASHING: FOR FLASHING NOT EXPOSED TO THE EXTERIOR, USE THE FOLLOWING, UNLESS OTHERWISE INDICATED:

1. COPPER-LAMINATED FLASHING: MANUFACTURER'S STANDARD LAMINATED FLASHING CONSISTING OF (5-KG/SQ. M) (2-KG/SQ. M) SHEET COPPER BONDED WITH ASPHALT BETWEEN 2 LAYERS OF GLASS-FIBER CLOTH. USE ONLY WHERE FLASHING IS FULLY CONCEALED IN MASONRY.

B. ADHESIVES, PRIMERS, AND SEAL TAPES FOR FLASHINGS: FLASHING MANUFACTURER'S STANDARD PRODUCTS OR PRODUCTS RECOMMENDED BY THE FLASHING MANUFACTURER FOR BONDING FLASHING SHEETS TO EACH OTHER AND SUBSTRATES.

2.7 ACCESSORIES

A. NONMETALLIC EXPANSION JOINT STRIPS: PREMOLDED FILLER STRIPS COMPLYING WITH ASTM D 1056, TYPE 2 (COMPRESSIBLE CELL), CLASS A (CELLULAR RUBBER AND RUBBER-LIKE MATERIALS WITH SPECIFIC RESISTANCE TO PETROLEUM BASE OILS), GRADE 1 (COMPRESSION-DEFLECTION RANGE OF 2-5 PSI), COMPRESSIBLE UP TO 50 PERCENT OF WIDTH AND THICKNESS INDICATED, FORMULATED FROM THE FOLLOWING MATERIAL:

1. NEOPRENE.

B. PREFORMED CONTROL JOINT GASKETS: MATERIAL AS INDICATED BELOW, DESIGNED TO FIT STANDARD SASH BLOCK AND TO MAINTAIN LATERAL STABILITY IN MASONRY WALL; SIZE AND CONFIGURATION AS INDICATED.

1. STYRENE-BUTADIENE RUBBER COMPOUND: ASTM D 2000, DESIGNATION 2AA-805.

C. BOND BREAKERS FOR EIFS: ASPHALT-SATURATED ORGANIC ROOFING FELT COMPLYING WITH ASTM D 226, TYPE I (NO. 15 ASPHALT FELT).

D. WEEP HOLES: PROVIDE THE FOLLOWING:

1. ROUND PLASTIC TUBING: MEDIUM-DENSITY POLYETHYLENE, 3/8 INCH OUTSIDE DIAMETER BY 2" LONG.

E. SETTING BUTTONS: RESILIENT PLASTIC TYPE, NON-STAINING, SIZED TO SUIT JOINT THICKNESSES AND BED DEPTHS WITHOUT INTRUDING INTO REQUIRED DEPTHS OF JOINT SEALANTS OR CAUSING THIRD-SIDE ADHESION BETWEEN SEALANT AND SETTING BUTTON.

2.8 WATER REPELLANT SEALER

A. SILANE (SILOXENE SEALER): PROSOCO "SALTGUARD HD" APPLY PER MANUFACTURER'S WRITTEN RECOMMENDATIONS.

PART 3 - EXECUTION

3.1 EXAMINATION

A. VERIFY THAT SITE CONDITIONS ARE READY TO RECEIVE WORK.

B. BEGINNING OF INSTALLATION MEANS ACCEPTANCE OF SITE CONDITIONS.

3.2 PREPARATION

A. VERIFY ITEMS PROVIDED BY OTHER SECTIONS OF WORK ARE PROPERLY SIZED AND LOCATED.

3.3 CUTTING OF MASONRY UNITS

A. CUT MASONRY UNITS WITH WET-SAW.

B. PRE-SOAK UNITS USING CLEAN WATER PRIOR TO CUTTING.

C. CLEAN CUT UNITS USING A STIFF FIBER BRUSH AND CLEAN WATER. ALLOW UNITS TO SURFACE DRY PRIOR TO PLACEMENT.

3.4 COURSING

A. PLACE MASONRY TO LINES AND LEVELS INDICATED.

B. MAINTAIN MASONRY COURSES TO UNIFORM WIDTH. MAKE VERTICAL AND HORIZONTAL JOINTS EQUAL AND OF UNIFORM THICKNESS.

C. LAY MASONRY UNITS IN HALF-RUNNING BOND.

D. COURSE ONE MASONRY UNIT AND ONE MORTAR JOINT TO EQUAL

E. MAINTAIN MORTAR JOINT THICKNESS OF 3/8".

F. TOOL JOINTS PER DIRECTION FROM BRANDPARTNERS.

3.5 PLACING AND BONDING

A. LAY MASONRY IN FULL BED OF MORTAR, PROPERLY JOINTED WITH OTHER WORK.

B. FULLY BOND INTERSECTIONS AND EXTERNAL CORNERS.

C. ISOLATE MASONRY PARTITIONS FROM VERTICAL STRUCTURAL FRAMING MEMBERS WITH A CONTROL JOINT AS INDICATED.

D. DO NOT ADJUST MASONRY UNITS AFTER LAYING. WHERE RESETTING OF MASONRY IS REQUIRED, REMOVE, CLEAN UNITS AND RESET IN NEW MORTAR.

3.6 CAVITY WALL

A. INSTALL WEEP VENTS IN VENEER AT 24" O.C. HORIZONTALLY ABOVE THROUGH-WALL FLASHING, ABOVE SHELF ANGLES, AND AT BOTTOM OF WALLS.

3.7 TOLERANCES

A. VARIATION IN ALIGNMENT FROM UNIT TO ADJACENT UNIT: 1/16" MAXIMUM.

B. VARIATION OF MORTAR JOINT THICKNESS: 1/8" EVERY 36".

3.8 REINFORCEMENT AND ANCHORAGE

A. PLACE BED JOINT REINFORCEMENT IN MORTAR BEDS, SPACED NOT GREATER THAN 16" O.C. VERTICALLY.

B. EMBED WALL TIES IN MASONRY BACK-UP FOR VENEER AT MASONRY 16" O.C. VERTICALLY AND 16" O.C. HORIZONTALLY.

C. INCREASE QUANTITY OF WALL TIES AROUND PERIMETER OF OPENINGS, AT WALL TERMINATIONS AND CORNERS, ALONG PARAPET WALLS, PLACED WITHIN 8" OF OPENINGS AND EDGES OF MASONRY.

3.9 MASONRY FLASHING

A. EXTEND FLASHING THROUGH VENEER, TURN UP AND SEAL INTO SHEATHING OVER STEEL STUD FRAMED BACK-UP.

B. LAP END JOINTS AND SEAL WATERTIGHT.

3.10 MOVEMENT CONTROL JOINTS

A. CONSTRUCT MOVEMENT JOINTS IN LOCATIONS NOTED ON DRAWINGS.

B. DO NOT CONTINUE HORIZONTAL JOINT REINFORCING ACROSS MOVEMENT CONTROL JOINTS.

C. FORM MOVEMENT CONTROL JOINTS BY LEAVING HEAD JOINTS BETWEEN STACKED UNITS VOID OF MORTAR. BEAR EDGE OF SEALANT ON BOND BREAKER AND JOINT SEALANT.

3.11 CLEANING

A. CLEAN MASONRY AS WORK PROGRESSES. ALLOW MORTAR DROPPINGS ON MASONRY TO PARTIALLY DRY. THEN REMOVE BY MEANS OF BRUSHING WITH A STIFF FIBER BRUSH.

B. POST-CONSTRUCTION: CLEAN MOCK-UP PANEL AS DIRECTED BELOW AND PROTECT FOR ONE WEEK. IF NO HARMFUL EFFECTS APPEAR AND AFTER MORTAR HAS SET AND CURED, CLEAN MASONRY AS FOLLOWS:

1. PROTECT windows, SILLS, DOORS, TRIM AND OTHER WORK FROM DAMAGE.
2. REMOVE LARGE PARTICLES WITH STIFF FIBER BRUSHES WITHOUT DAMAGING SURFACE.
3. SATURATE MASONRY WITH CLEAN WATER AND FLUSH OFF LOOSE MORTAR AND DIRT.
3. SCRUB WITH SOLUTION OF 1 TBSP. TRISODIUM PHOSPHATE AND 1 TSP. HOUSEHOLD DETERGENT DISSOLVED IN 4 CUPS OF CLEAN WATER USING STIFF FIBER BRUSHES, THEN CLEAN OFF REMOVED DIRT WITH CLEAN WATER USING HOSE.
4. REPEAT CLEANING PROCESS AS OFTEN AS NECESSARY TO REMOVE MORTAR AND OTHER STAINS.

C. USE ALTERNATIVE CLEANING SOLUTIONS AND METHODS FOR DIFFICULT TO CLEAN MASONRY ONLY AFTER CONSULTATION WITH MASONRY MANUFACTURER.

3.12 PROTECTION

A. PROTECT MASONRY UNITS FROM DAMAGE RESULTING FROM SUBSEQUENT CONSTRUCTION OPERATIONS.

B. USE PROTECTION MATERIALS WHICH WILL NOT STAIN OR DAMAGE MASONRY UNITS.

C. REMOVE PROTECTION MATERIALS UPON SUBSTANTIAL PERFORMANCE OF THE WORK, OR WHEN RISK OF DAMAGE IS NO LONGER PRESENT.

END OF SECTION

DIVISION 5

SECTION 05100 - STRUCTURAL STEEL

(SEE STRUCTURAL DRAWINGS FOR STRUCTURAL STEEL REQUIREMENTS)

SECTION 05400 - COLD-FORMED METAL FRAMING

(SEE STRUCTURAL DRAWINGS FOR COLD-FORMED METAL FRAMING REQUIREMENTS)

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:
   1. STEEL FRAMING AND SUPPORTS FOR MECHANICAL AND ELECTRICAL EQUIPMENT.
   2. STEEL FRAMING AND SUPPORTS FOR APPLIANCES NOT SPECIFIED IN OTHER SECTIONS.
   3. METAL BOLLARDS.
   4. STEEL DOWNSPOUT ADAPTERS.
   5. EXTERIOR METAL TUBE RAILINGS.

B. PRODUCTS FURNISHED, BUT NOT INSTALLED, UNDER THIS SECTION INCLUDE THE FOLLOWING:
   1. LOOSE STEEL LINTELS.
   2. ANCHOR BOLTS, STEEL PIPE SLEEVES, AND WEDGE-TYPE INSERTS INDICATED TO BE CAST INTO CONCRETE OR BUILT INTO UNIT MASONRY.

C. RELATED SECTIONS INCLUDE THE FOLLOWING:
   1. DIVISION 3 SECTION "CAST-IN-PLACE CONCRETE" FOR INSTALLING ANCHOR BOLTS, STEEL PIPE SLEEVES, WEDGE-TYPE INSERTS AND OTHER ITEMS INDICATED TO BE CAST INTO CONCRETE.
   2. DIVISION 4 SECTION "UNIT MASONRY ASSEMBLIES" FOR INSTALLING LOOSE LINTELS, ANCHOR BOLTS, AND OTHER ITEMS INDICATED TO BE BUILT INTO UNIT MASONRY.
   3. DIVISION 5 SECTION "STRUCTURAL STEEL."
   4. DIVISION 6 SECTION "ROUGH CARPENTRY" FOR METAL FRAMING ANCHORS.

1.3 PERFORMANCE REQUIREMENTS

A. THERMAL MOVEMENTS: PROVIDE EXTERIOR METAL FABRICATIONS THAT ALLOW FOR THERMAL MOVEMENTS RESULTING FROM THE FOLLOWING MAXIMUM CHANGE (RANGE) IN AMBIENT AND SURFACE TEMPERATURES BY PREVENTING BUCKLING, OPENING OF JOINTS, OVERSTRESSING OF COMPONENTS, FAILURE OF CONNECTIONS, AND OTHER DETRIMENTAL EFFECTS. BASE ENGINEERING CALCULATION ON SURFACE TEMPERATURES OF MATERIALS DUE TO BOTH SOLAR HEAT GAIN AND NIGHTTIME-SKY HEAT LOSS.
   TEMPERATURE CHANGE (RANGE): 120 DEG F (67 DEG C); AMBIENT, 180 DEG F (100 DEG C), MATERIAL SURFACES.

1.4 QUALITY ASSURANCE

A. WELDING: QUALIFY PROCEDURES AND PERSONNEL ACCORDING TO THE FOLLOWING:
   1. AWS D1.1 "STRUCTURAL WELDING CODE--STEEL."
   2. AWS D1.3 "STRUCTURAL WELDING CODE--SHEET STEEL."

1.5 PROJECT CONDITIONS

A. FIELD MEASUREMENTS: VERIFY ACTUAL LOCATIONS OF WALLS AND OTHER CONSTRUCTION CONTIGUOUS WITH METAL FABRICATIONS BY FIELD MEASUREMENTS BEFORE FABRICATION AND INDICATE MEASUREMENTS ON SHOP DRAWINGS.
   1. PROVIDE ALLOWANCE FOR TRIMMING AND FITTING AT SITE.

1.6 COORDINATION

A. COORDINATE INSTALLATION OF ANCHORAGES FOR METAL FABRICATIONS. FURNISH SETTING DRAWINGS, TEMPLATES, AND DIRECTIONS FOR INSTALLING ANCHORAGES, INCLUDING SLEEVES, CONCRETE INSERTS, ANCHOR BOLTS, AND ITEMS WITH INTEGRAL ANCHORS, THAT ARE TO BE EMBEDDED IN CONCRETE OR MASONRY. DELIVER SUCH ITEMS TO PROJECT SITE IN TIME FOR INSTALLATION.

B. COORDINATE INSTALLATION OF STEEL WELD PLATES AND ANGLES FOR ADJACENT WOODWORK THAT ARE SPECIFIED IN THIS SECTION BUT REQUIRED FOR WORK OF ANOTHER SECTION. DELIVERS SUCH ITEMS TO PROJECT SITE IN TIME FOR INSTALLATION.PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. OTHER PART 2 ARTICLES WHERE TITLES BELOW INTRODUCE LISTS, THE FOLLOWING REQUIREMENTS APPLY TO PRODUCT SELECTION:
   1. AVAILABLE PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, PRODUCTS SPECIFIED.
   2. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, MANUFACTURERS SPECIFIED.

2.2 METALS, GENERAL

A. METAL SURFACES, GENERAL: PROVIDE MATERIALS WITH SMOOTH, FLAT SURFACES, UNLESS OTHERWISE INDICATED. FOR METAL FABRICATIONS EXPOSED TO VIEW IN COMPLETED WORK, PROVIDE MATERIALS WITHOUT SEAM MARKS, ROLLER MARKS, ROLLED TRADE NAMES, OR BLEMISHES.

2.3 FERROUS METALS

A. STEEL PLATES, SHAPES, AND BARS: ASTM A 36/A 36M.

B. ROLLED-STEEL FLOOR PLATE: ASTM A 786/A 786M, ROLLED FROM PLATE COMPLYING WITH ASTM A 36/A 36M OR ASTM A 283/A 283M, GRADE C OR D.

C. STEEL TUBING: ASTM A 500, COLD-FORMED STEEL TUBING.

D. STEEL PIPE: ASTM A 53/A 53M, STANDARD WEIGHT (SCHEDULE 40), UNLESS ANCHOR WEIGHT IS INDICATED OR REQUIRED BY STRUCTURAL DESIGN.

2.4 FASTENERS

A. GENERAL: UNLESS OTHERWISE INDICATED, PROVIDE TYPE 316 STAINLESS-STEEL FASTENERS FOR EXTERIOR USE AND ZINC-PLATED FASTENERS WITH COATING COMPLYING WITH ASTM B 633, CLASS FE/ZN 5, AT EXTERIOR WALLS. PROVIDE STAINLESS-STEEL FASTENERS FOR CONTACT WITH ALUMINUM. SELECT FASTENERS FOR TYPE, GRADE, AND FINISH REQUIRED.

B. STEEL BOLTS AND NUTS: REGULAR HEXAGON-HEAD BOLTS, ASTM A 307, GRADE A (ASTM F 568M, PROPERTY CLASS 4.6); WITH HEX NUTS, ASTM A 563 (ASTM A 563M); AND, WHERE INDICATED, FLAT WASHERS.

C. ANCHOR BOLTS: ASTM F 1554, GRADE 36. PROVIDE HOT-DIP GALVANIZED OR ZINC-DEPOSITED, ZINC-COATED ANCHOR BOLTS WHERE ITEM BEING FASTENED IS INDICATED TO BE GALVANIZED.

D. EYEBOLTS: ASTM A 489.

E. MACHINE SCREWS: ASTM B16.6.3 (ASTM B16.6.7M).

F. LAG BOLTS: ASME B18.2.1 (ASME B18.2.3.8M).

G. WOOD SCREWS: FLAT HEAD, ASME B18.6.1.

H. PLAIN WASHERS: ROUND, ASME B18.22.1 (ASME B18.22M).
   LOCK WASHERS: HELICAL, SPRING TYPE, ASME B18.21.1 (ASME B18.21.2M).

J. CAST-IN-PLACE ANCHORS IN CONCRETE: ANCHORS CAPABLE OF SUSTAINING THEIR FAILURE, A LOAD EQUAL TO FOUR TIMES THE LOAD IMPOSED, AS DETERMINED BY TESTING ACCORDING TO ASTM E 488, CONDUCTED BY A QUALIFIED INDEPENDENT TESTING AGENCY.
   THREADED OR WEDGE TYPE; GALVANIZED FERROUS CASTINGS, EITHER ASTM A 47/A 47M MALLEABLE IRON OR ASTM A 27/A 27M CAST STEEL. PROVIDE BOLTS, WASHERS, AND SHIMS AS REQUIRED, HOT-DIP GALVANIZED PER ASTM A 153/A 153M.

K. EXPANSION ANCHORS: ANCHOR BOLT AND SLEEVE ASSEMBLY WITH CAPABILITY TO SUSTAIN THEIR FAILURE, A LOAD EQUAL TO SIX TIMES THE LOAD IMPOSED WHEN INSTALLED IN UNIT MASONRY AND FOUR TIMES THE LOAD IMPOSED WHEN INSTALLED IN CONCRETE, AS DETERMINED BY TESTING ACCORDING TO ASTM E 488, CONDUCTED BY A QUALIFIED INDEPENDENT TESTING AGENCY.
   1. MATERIAL FOR ANCHORS IN INTERIOR LOCATIONS: CARBON-STEEL COMPONENTS ZINC-PLATED TO COMPLY WITH ASTM B 633, CLASS FE/ZN 5.
   2. MATERIAL FOR ANCHORS IN EXTERIOR LOCATIONS: ALLOY GROUP 1 (A) STAINLESS-STEEL BOLTS COMPLYING WITH ASTM F 593 (ASTM F 738M) AND NUTS COMPLYING WITH ASTM F 594 (ASTM F 836M).

2.5 MISCELLANEOUS MATERIALS

A. WELDING RODS AND BARE ELECTRODES: SELECT ACCORDING TO AWS SPECIFICATIONS FOR METAL ALLOY WELDER.

B. SHOP PRIMERS: PROVIDE PRIMERS THAT COMPLY WITH DIVISION 4 PAINTING SECTIONS.

C. GALVANIZING REPAIR PAINT: HIGH-ZINC-DUST-CONTENT PAINT FOR REGALVANIZING WELDS IN STEEL, COMPLYING WITH SSPC-PAINT 20.

D. BITUMINOUS PAINT: COLD-APPLIED ASPHALT EMULSION COMPLYING WITH ASTM D 1187.

E. NONSHRINK, NONMETALLIC GROUT: FACTORY-PACKAGED, NONSTAINING, NONCORROSIVE, NONGASEOUS GROUT COMPLYING WITH ASTM C 1107. PROVIDE GROUT SPECIFICALLY RECOMMENDED BY MANUFACTURER FOR INTERIOR AND EXTERIOR APPLICATIONS.

F. CONCRETE MATERIALS AND PROPERTIES: COMPLY WITH REQUIREMENTS IN DIVISION 3 SECTION "CAST-IN-PLACE CONCRETE" FOR MINIMUM HEIGHT, AIR-ENTRAINED, READY-MIX CONCRETE WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI (20 MPA), UNLESS OTHERWISE INDICATED.

2.6 FABRICATION, GENERAL

A. SHOP ASSEMBLY: PREASSEMBLE ITEMS IN THE SHOP TO GREATEST EXTENT POSSIBLE. 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.

B. 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.

C. FORM BENT-METAL CORNERS TO SMALLEST RADIUS POSSIBLE WITHOUT CAUSING GRAIN SEPARATION OR OTHERWISE IMPAIRING WORK.

D. FORM EXPOSED WORK TRUE TO LINE AND LEVEL WITH ACCURATE ANGLES AND SURFACES AND STRAIGHT EDGES.

E. 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 SO NO ROUGHNESS SHOWS AFTER FINISHING AND CONTOUR OF WELDED SURFACE MATCHES THAT OF ADJACENT SURFACE.

F. FORM EXPOSED CONNECTIONS WITH HAIRLINE JOINTS, FLUSH AND SMOOTH, USING CONCEALED FASTENERS WHERE POSSIBLE. WHERE EXPOSED FASTENERS ARE REQUIRED, USE PHILLIPS FLAT-HEAD (COUNTERSUNK) SCREWS OR BOLTS, UNLESS OTHERWISE INDICATED. LOCATE JOINTS WHERE LEAST CONSPICUOUS.

G. FABRICATE SEAMS AND OTHER CONNECTIONS THAT WILL BE EXPOSED TO WEATHER IN A MANNER TO EXCLUDE WATER. PROVIDE WEEP HOLES WHERE WATER MAY ACCUMULATE.

H. CUT, REINFORCE, DRILL, AND TAP METAL FABRICATIONS AS REQUIRED TO RECEIVE FINISH HARDWARE, SCREWS, AND SIMILAR ITEMS. PROVIDE FOR ANCHORAGE OF FINISH HARDWARE. COORDINATE WITH SUPPORTING STRUCTURE. SPACE ANCHORING DEVICES TO SECURE METAL FABRICATIONS RIGIDLY IN PLACE AND TO SUPPORT INDICATED LOADS.
   1. WHERE UNITS ARE INDICATED TO BE CAST INTO CONCRETE OR BUILT INTO MASONRY, FURNISH WITH INTEGRALLY WELDED STEEL STRAP ANCHORS, 1/8 BY 1-1/2 INCHES (3 BY 38 MM), WITH A MINIMUM 6-INCH (150-MM) EMBEDMENT AND A TEE OR BENT END. NOT LESS THAN 6 INCHES (200 MM) FROM ENDS AND CORNERS OF UNITS AND 24 INCHES (600 MM) O.C., UNLESS OTHERWISE INDICATED.

2.7 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 NECESSARY TO ACHIEVE A RIGID CONSTRUCTION RETAINED BY FRAMING AND SUPPORTING CUT, DRILL, AND TAP UNITS TO RECEIVE HARDWARE, HANGERS, AND SIMILAR ITEMS.
   1. FURNISH INSERTS IF UNITS ARE INSTALLED AFTER CONCRETE IS PLACED.

C. GALVANIZE MISCELLANEOUS FRAMING AND SUPPORTS WHERE INDICATED.

2.8 LOOSE STEEL LINTELS

A. FABRICATE LOOSE STEEL LINTELS FROM STEEL ANGLES AND SHAPES OF SIZE INDICATED FOR OPENINGS AND RECESSES IN MASONRY WALLS AND PARTITIONS AT LOCATIONS INDICATED. PREPARE ADJOINING MEMBERS TOGETHER TO FORM A SINGLE UNIT WHERE INDICATED.

B. SIZE LOOSE LINTELS TO PROVIDE BEARING LENGTH AT EACH SIDE OF OPENING EQUAL TO 1/24 OF CLEAR SPAN BUT NOT LESS THAN 8 INCHES (200 MM), UNLESS OTHERWISE INDICATED.

C. GALVANIZE LOOSE STEEL LINTELS LOCATED IN EXTERIOR WALLS. REFER TO DIVISION 9 FOR PAINTING REQUIREMENTS WHERE INDICATED

2.9 METAL BOLLARDS

A. FABRICATE METAL BOLLARDS FROM 1/4-INCH (6.4-MM) WALL-THICKNESS STEEL SHAPES, AS INDICATED.

B. GALVANIZE ALL METAL BOLLARDS. REFER TO DIVISION 9 FOR PAINTING REQUIREMENTS WHERE INDICATED.

2.10 METAL DOWNSPOUT ADAPTER

A. PROVIDE DOWNSPOUT BOOTS MADE FROM CAST GRAY IRON WITH NO-HUB OUTLET TO FIT OUTSIDE OF SIZE AND SHAPE TO SUIT DOWNSPOUTS. PROVIDE SPECIAL TIGHT RADIUS FOR 9-INCH (230-MM) INSTALLATION).
   1. OUTLET: HORIZONTAL TO DISCHARGE INTO PIPE.

2.11 FINISHES, GENERAL

A. COMPLY WITH NAAMM'S "METAL FINISHES MANUAL FOR ARCHITECTURAL AND METAL PRODUCTS" FOR RECOMMENDATIONS FOR APPLYING AND DESIGNATING FINISHES.

B. FINISH METAL FABRICATIONS AFTER ASSEMBLY.

2.12 STEEL AND IRON FINISHES

A. GALVANIZING: HOT-DIP GALVANIZE ITEMS AS INDICATED TO COMPLY WITH APPLICABLE STANDARD LISTED BELOW:
   1. ASTM A 123/A 123M, FOR GALVANIZING STEEL AND IRON PRODUCTS.
   2. ASTM A 153/A 153M, FOR GALVANIZING STEEL AND IRON HARDWARE.

B. PREPARATION FOR SHOP PRIMING: PREPARE UNCOATED FERROUS-METAL SURFACES TO COMPLY WITH MINIMUM REQUIREMENTS INDICATED BELOW FOR SSPC SHOP PRIMER, PRETREATMENT, AND ENVIRONMENTAL EXPOSURE CONDITIONS OF INSTALLED FABRICATIONS:
   1. EXTERIORS (SSPC ZONE 1B) AND ITEMS INDICATED TO RECEIVE PRIMER: SSPC-SP 6/NACE NO. 3, "COMMERCIAL BLAST CLEANING."
   2. INTERIORS (SSPC ZONE 1A): SSPC-SP 3, "POWER TOOL CLEANING."

C. SHOP PRIMING: APPLY SHOP PRIMER TO UNCOATED SURFACES OF METAL FABRICATIONS, EXCEPT THOSE WITH GALVANIZED FINISHES AND THOSE TO BE EMBEDDED IN CONCRETE, SPRAYED-ON FIREPROOFING, OR MASONRY, UNLESS OTHERWISE INDICATED. COMPLY WITH ANSI/AISC "ANALYSIS APPLICATION SPECIFICATION NO. 1: SHOP, FIELD, AND TRANSPORTATION OF STEEL," FOR SHOP PAINTING.
   1. STRIPE PAINT CORNERS, CREVICES, BOLTS, WELDS, AND SHARP EDGES.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. CUTTING, FITTING, AND PLACEMENT: PERFORM CUTTING, DRILLING, AND FITTING AS REQUIRED FOR INSTALLING METAL FABRICATIONS. SET METAL FABRICATIONS ACCURATELY IN LOCATION, ALIGNMENT, AND ELEVATION, WITH EDGES AND SURFACES LEVEL, PLUMB, TRUE, AND FREE OF RACKING AND MEASURED FROM ESTABLISHED LINES AND LEVELS.

B. FIT EXPOSED CONNECTIONS ACCURATELY TOGETHER TO FORM HAIRLINE JOINTS. PROVIDE CONNECTIONS THAT ARE NOT TO BE LEFT AS EXPOSED JOINTS BUT CANNOT BE WELDED AS STITCH WELDS OR 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.

C. 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.

D. FASTENING TO IN-PLACE CONSTRUCTION: PROVIDE ANCHORAGE DEVICES AND FASTENERS WHERE METAL FABRICATIONS ARE BOLTED OR SCREWED TO IN-PLACE CONSTRUCTION. PROVIDE THREADED FASTENERS FOR USE WITH CONCRETE AND MASONRY INSERTS, THROUGH BOLTS, THROUGH BOLTS, LAG BOLTS, WOOD SCREWS, AND OTHER CONNECTORS.

E. PROVIDE TEMPORARY BRACING OR ANCHORS IN FORMWORK FOR ITEMS THAT ARE TO BE BUILT INTO CONCRETE, MASONRY, OR SIMILAR CONSTRUCTION.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. GENERAL: INSTALL FRA