

**SP- 121023
(New)**



Iowa Department of Transportation

SPECIAL PROVISIONS

FOR

MASONRY

Polk County

Project No. NHS-U-1945(409)--8G-77

Effective Date

May 21, 2013

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

MASONRY

1. GENERAL INFORMATION

1.1 SUMMARY

A. THIS SPECIAL PROVISION INCLUDES

1. All labor materials, equipment and supervision required to furnish and install MASONRY PIER and MASONRY BENCH.
2. This section includes the requirements for face brick, accent brick, concrete masonry units, precast concrete caps, mortar, grout, reinforcing bars, steel ties, and joint reinforcement.

B. MEASUREMENT AND PAYMENT

1. Measurement of MASONRY PIER and MASONRY BENCH will be the count to the number of piers or benches installed of the size and type specified.
3. For the number of piers and benches constructed, of the size and type specified, the Contractor will be paid the contract unit price. This payment shall be full compensation for all labor, materials, tools, equipment, and supervision required to furnish and install these elements, as detailed on the plans, including the concrete footings, face brick, accent brick, concrete masonry units, precast concrete caps, expansion joints, mortar, grout, reinforcing bars, steel ties and joint reinforcement. Items to be paid under this special provision include MASONRY PIER and MASONRY BENCH.

1.2 QUALITY ASSURANCE:

- A. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface of visually related surfaces.
- B. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- C. Field Constructed Mock-Ups: Prior to installation of masonry work, erect sample wall panels to further verify selections made for color and textural characteristics, under sample submittals of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials and construction; build mock-ups to comply with the following requirements:
 1. Build mock-ups for the following types of masonry, including mortar and accessories and structural backup.
 - a. One typical short pier showing, face and accent bricks, brick recess pattern, and one 2 foot wall extension. Precast cap and light fixture not required.
 2. Retain mock-ups during construction as standard for judging completed masonry work. When directed, demolish mock-ups and remove from site.

1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Shop Drawings: Submit cutting and setting drawings for stone caps showing sizes, profiles, and locations.
- C. Samples for Initial Selection: Unit masonry samples showing full extent of colors and textures available for each type of exposed masonry unit required.
- D. Color Selection Samples: Sealant color samples for brick and precast concrete caps.

1.4 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, or other causes.
 - 1. Limit moisture absorption of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.
- C. Store cementitious materials off the ground, under cover, and in dry location.
- D. Store aggregates where grading can be maintained.
- E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.5 PROJECT CONDITIONS:

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
- B. Extend cover a minimum of 20 inches down both sides and hold cover securely in place.
- C. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with such masonry.
- D. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
- E. Protect sills, ledges, and projections from droppings of mortar.
- F. Cold Weather Protection (NOTE: No additional compensation will be provided for cold weather protection):
 - 1. Do not lay masonry units which are wet or frozen.
 - 2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to touch.
 - 3. Remove masonry damaged by freezing conditions.

- G. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:
1. For units with surface temperatures above 32° F, wet with water heated to above 70° F.
 2. For units with surface temperatures below 32° F, wet with water heated to above 129° F.
- H. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout.
- I. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 43° F.
1. 39° F to 32° F:
 - a. Mortar: Heat mixing water to produce mortar temperature between 39° F and 120° F.
 - b. Grout: Follow normal masonry procedures.
 2. 32° F to 25° F:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 39° F and 120° F; maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90° F to produce in-place grout temperature of 70° F at end of work day.
 3. 25° F to 19° F:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 39° F and 84° F; maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90° F to produce in-place grout temperature of 70° F at end of work day.
 - c. Heat both sides of walls under construction using salamanders or other heat sources.
 - d. Use windbreaks or enclosures when wind is in excess of 15 mph.
 4. 19° F and below:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 39° F and 120° F.
 - b. Grout: Heat grout materials to 90° F to produce in place grout temperature of 70° F at the end of work day.
 - c. Masonry Units: Heat masonry units so they are above 20° F at time of laying.
 - d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 39° F for 24 hours after layout units.
 5. Do not heat water for mortar and grout to above 160° F.
- J. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry, temperature ranges apply to anticipated minimum night temperatures.
1. 39° F to 32 °F:
 - a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
 2. 32° F to 25° F:
 - a. Completely cover masonry with weather-resistive membrane for at least 24 hours.
 3. 25° F to 20° F:

- a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours; 40 hours for grouted masonry.
4. 20° F and below:
 - a. Except as otherwise indicated, maintain masonry temperature above 32° F for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other methods proven to be satisfactory. For grouted masonry, maintain heated enclosure to 39° F for 48 hours.

2. PRODUCTS

2.1 BRICK MADE FROM CLAY OR SHALE:

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required. The product will need to match the color, texture, and performance characteristics of the precast units found on the adjacent MLK Jr Parkway project. The contractor is responsible for reviewing these existing units and submitting samples that confirm this requirement to match the existing.
 1. Size: Standard Modular: 2-1/4 inches x 3-5/8 inches x 7-5/8 inches.
- B. Facing Brick: ASTM C 216, and as follows:
 1. Grade SW.
 2. Type FBS (normal size and color variations).
 3. Application: Use where brick is exposed, unless otherwise indicated.

2.2 CONCRETE MASONRY UNITS:

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Concrete Block: Provide units complying with characteristics indicated below for Grade, Type, face size, exposed face, and, under each form of block included, for weight classification.
 1. Grade N.
 2. Manufacturer's standard units with nominal face dimensions of:
 - a. 8 inches x 8 inches x 16 inches.
 - b. 6 inches x 8 inches x 16 inches.
 - c. 4 inches x 8 inches x 16 inches.Both ends plain.
 3. Type 1, moisture-controlled units. Cure units by ASTM Type 1 method.
 4. Hollow Load-bearing Block: ASTM C 90 and as follows:
 - a. Weight Classification: Normal weight.

2.3 PRECAST CONCRETE CAPS AND INSERTS:

- A. Precast Concrete shall be used. Comply with referenced plans for dimensions. The product will need to match the color, texture, and performance characteristics of the precast units found on the adjacent MLK Jr Parkway project. The contractor is responsible for reviewing these existing units and submitting samples that confirm this requirement to match the existing.

2.4 MORTAR AND GROUT MATERIALS:

- A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold weather construction.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inches use aggregate graded with 100% passing the No. 16 sieve.
- D. Aggregate for Grout: ASTM C 404 for coarse aggregate and sand for fine aggregate.
- E. Water: Clean and potable.
- F. Mortar color: Natural Grey.

2.5 MISCELLANEOUS MASONRY ACCESSORIES:

- A. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60.
- B. Galvanized Steel Ties: ASTM A 526 (commercial quality) for anchors in mortar. 53 L.
- C. Multiple wythe Joint Reinforcement: ladder type, adjustable, steel wire, hot dip galvanized to ASTM A153, B-2 after, fabrication, 0.1574 inches side rods and cross ties.
- E. Copper Fabric Flashing: 5 oz/sq ft sheet copper bonded to and between 2 layers of asphalt impregnated fiberglass fabric manufactured by Afco Products, Inc., Phoenix Building Products, York Manufacturing or Sandell Manufacturing.
- F. Weeps: Cotton rope of length as required producing 2 inch exposure on exterior and 18 inches in cavity. Trim rope flush with face of brick after mortar has set.
- G. Expansion Joint Sealant and backer rod to meet brick manufacturer's requirements and to closely match the brick and precast concrete colors. Sample and color submittal required.
- H. Epoxy Paint on metal lintels and plates to be a high performance coating system. Sample and color submittal required.

2.6 MASONRY CLEANERS:

- A. Cleaner: Manufacturer's standard strength general purpose cleaner designed for new masonry surfaces of type indicated; composed of blended organic and inorganic acids combined with special wetting systems and inhibitors; expressly approved for intended use by manufacturer of masonry units being cleaned.

2.7 MORTAR AND GROUT MIXES:

- A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
- B. Mixing: Combine and thoroughly mix cementitious, water, and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types or mortar required, unless otherwise indicated.
 - 1. Limit cementitious materials in mortar to Portland cement-lime.
 - 2. Use Type S mortar for all masonry.
- D. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of reinforced and non-reinforced unit masonry. Use grout of consistency indicated or, if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

2.8 ANTI-GRAFFITI PROTECTANT

- A. Penetrating product comprised of silicone rubber designed to protect vertical masonry and precast concrete construction from absorbing spray paint.
 - 1. Finish: Clear, Matte Finish.
 - 2. Stability: Resistant to UV rays and salt spray.

3. EXECUTION

3.1 INSTALLATION, GENERAL:

- A. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C 67 initial rates of absorption (suction) of more than 1.06 ounces per 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated but surface dry when laid.
- B. Do not wet concrete masonry units.
- C. Cleaning Reinforcing: Before placing, remove loose rust, ice, and other coatings from reinforcing.
- D. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- E. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.
- F. Use dry cutting saws to cut concrete masonry units.

3.2 CONSTRUCTION TOLERANCES:

- A. Variation in Cross-Sectional Dimensions: For all elements, from dimensions shown, do not exceed minus 1/4 inches nor plus 1/2 inches.
- B. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8 inches, with a maximum thickness limited to 1/2 inches. Do not exceed head joint thickness indicated by more than plus or minus 1/8 inches.

3.3 LAYING MASONRY WALLS:

- A. Layout columns in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns, and offsets. Avoid the use of less than half-size units at corners.
- B. Lay-up columns to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Pattern Bond: Lay exposed masonry in the bond pattern shown or, if not shown, lay in running bond with vertical joint in each course centered on units or courses above and below.
- D. Stopping and Resuming Work: Rack back 1/2 unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

3.4 MORTAR BEDDING AND JOINTING:

- A. Lay solid brick size masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- C. Set stone caps in full bed or mortar. Fill dowel, anchor, and similar holes solid. Wet stone joint surface thoroughly before setting; for stone surfaces which are soiled, clean bedding, and exposed surfaces with fiber brush and soap powder followed by thorough rinsing with clear water.
- D. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8 inches joints.
- E. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.
- F. Rake joints of all brick.
- G. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.
- H. Rake back head joints in precast concrete caps and all joints between precast concrete caps and brick 5/8 inches and seal joints with sealant. Sealant color to match precast concrete.

3.5 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.6 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers at masonry cavity walls with masonry-veneer anchors to comply with the following:
 - 1. Use adjustable (two-piece) type reinforcement installed in horizontal mortar joints.
 - 2. Embed tie sections in masonry veneer joints.
- B. Masonry Veneer Tie Spacing:
 - 1. Provide ties installed in horizontal joints, at not less than one metal tie for 1.77 sq. ft. of wall area, spaced not to exceed 16 inches o.c. horizontally and 16 inches o.c. vertically.
 - 2. Stagger ties in alternate courses.
 - 3. Install additional anchors within 12 inches of openings and at intervals, not exceeding 16 inches, around perimeter
 - 4. At intersecting and abutting walls, provide ties at no more than 16 inches o.c. vertically.

3.7 REPAIR, POINTING, AND CLEANING:

- A. Remove and replace masonry units which are loose, chipped, broken, stained, or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings, and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final Cleaning: After mortar is thoroughly set and cured, clean masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample column; leave 1/2 column uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 4. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - 5. Use bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale using job mixed detergent solution.
 - 6. Clean concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.
- D. Apply anti-graffiti protectant to all brick, mortar, and precast concrete surfaces following cleaning per the manufacturer's recommendations. Cover joint sealant to prevent application to sealant.

- E. Protection: Provide final protection and maintain conditions in a manner acceptable to installer, which ensures unit masonry work being without damage and deterioration at time of substantial completion.

END OF SPECIAL PROVISION