SECTION 26 2816- ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED WORK

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables

B. Section 26 0526 - Grounding and Bonding for Electrical Systems

C. Section 26 0529 - Hangers and Supports for Electrical Systems

D. Section 26 0553 - Electrical Systems Identification

E. Section 26 2813 - Fuses

1.2 REFERENCE

A. The Work under this Section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements.

1.3 DESCRIPTION

A. This Section includes fusible and non-fusible disconnect switches and circuit breakers in individual enclosures.

1.4 REFERENCE STANDARDS

A. ANSI//NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting

B. NEMA AB 1 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breakers Enclosures

C. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

D. NFPA 70 - National Electrical Code

E. UL 98 - Enclosed and Dead Front Switches

F. UL 486A - 468B - Wire Connectors

G. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures

H. UL 869A - Reference Standard for Service Equipment

1.5 SUBMITTALS

A. Product Data:

1. Submit catalog cut sheet indicating voltage, amperage, HP ratings, enclosure type, and dimension, fuse clip features, terminal lugs and accessories including interlock devices, short circuit current ampere rating and factory settings of individual protective devices.

B. Manufacturer's Installation Instructions:
   1. Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

C. Test Reports:
   1. Indicate field test and inspection procedures and interpret test results and corrective action taken for compliance with specification requirements.

D. Closeout Submittals:
   1. Project Record Documents:
      a. Record actual locations of disconnect switches and ratings of installed fuses.
      b. Record actual locations and continuous current ratings of enclosed circuit breakers.
   2. Operation and Maintenance Data:
      a. Include manufacturer's recommended operating instructions, maintenance procedures and intervals, and preventive maintenance instructions.
      b. Include spare parts data listing, source, and current prices of replacement parts and supplies.
      c. Include Manufacturer's Seismic Qualification Certification and Installation Seismic Qualification Certification.

1.6 QUALITY ASSURANCE

A. Obtain disconnect switches and enclosed circuit breakers from one source and by single manufacturer.

B. Regulatory Requirements:
   1. Comply with NFPA 70 for components and installation.
   2. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect from dirt, water, construction debris, and traffic.

B. Comply with manufacturer's written instructions.

1.8 WARRANTY

A. Manufacturer shall provide standard 1-year written warranty against defects in materials and workmanship for products specified in this Section. Warranty period shall begin on date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square D

B. General Electric

C. Cutler-Hammer

D. Siemens.

2.2 DISCONNECT SWITCHES

A. NEMA KS 1, UL 98

B. Load interrupter enclosed knife switch, heavy-duty type

C. Fusible or non-fusible type as indicated.

D. Switch Interiors:
1. Switch blades that are visible in "OFF" position when switch door is open
2. Plated current carrying parts
3. Removable arc suppressors to permit easy access to line side lugs

E. Switch Mechanism:
1. Quick-make, quick-break, with visible blades and externally operable handle
2. Lockable only in "OFF" position and accept three industrial type, heavy-duty padlocks
3. Dual cover interlock to prevent unauthorized opening of switch door when handle is in "ON" position, and to prevent closing of switch mechanism with door open
4. Defeater mechanism to bypass interlock
5. Operating handle integral part of enclosure
6. Handle to physically indicate "ON" and "OFF" position

F. Ratings:
1. Ampacity as indicated on drawings
2. Horsepower rated

G. Fusible Switches:
1. Rejection clips for Class R fuses specified
2. Provisions for Class J or Class L fuses, as applicable
3. Fuses: per requirements in Section 26 2813 - Fuses

2.3 ENCLOSED CIRCUIT BREAKERS

A. NEMA AB 1, UL 489

B. Enclosed molded-case circuit breakers:
1. Tripped indication clearly shown on breaker handle taking position between "ON" and "OFF".
2. 225A frame size and below: thermal-magnetic trip

C. Breaker Mechanism:
1. Quick-make, quick-break

D. Ratings:
1. Ampacity as indicated on drawings
2. Listed as Type HACR for air conditioning equipment circuits
3. Listed as Type SWD for lighting circuits

2.4 LUGS

A. Front removable lugs

B. Labeled for 75°C copper and aluminum conductors

C. Multiple lugs to match number of conductors per phase

D. Termination of field installed conductors: pressure wire connectors, except wire-binding screws for No. 10 AWG or smaller conductors

2.5 Accessories:

A. Solid neutral assembly, where required

B. Equipment ground kit

C. Blown fuse indicators on fused disconnect switches

D. Factory installed fuse puller on fused disconnect switches

2.6 Enclosures

A. NEMA KS 1, NEMA AB 1, UL 98, UL 489, as applicable.

B. NEMA Type 1, Type 3R (outdoor locations) enclosure.

C. Code-gauge galvanized steel

D. Manufacturer's standard gray enamel finish over prime coat

E. Surface-mounted.

2.7 SERVICE ENTRANCE

A. UL 869A

B. Switches and circuit breakers identified for use as service entrance equipment are to be labeled for this application, provided with solid neutral assembly and equipment ground bar, and must include connection for bonding and grounding of neutral conductor.

2.8 Short Circuit CURRENT Rating

A. Each circuit breaker shall have minimum short circuit current rating as indicated on drawings.

PART 3 - EXECUTION

3.1 COORDINATION WITH MANUFACTURER

A. Instruct manufacturer about location of incoming lugs, i.e., top or bottom feed based on incoming feeder entrance location.

B. Verify that "touch-up" paint kit is available for repainting.

3.2 EXAMINATION

A. Examine areas and surface to receive disconnect switches and enclosed circuit breakers for compliance with requirements, installation tolerances, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that space indicated for disconnect switches and enclosed circuit breakers mounting meets code-required working clearances.

C. Notify Architect/Engineer of discrepancies prior to submittal of product data and shop drawings.

3.3 INSTALLATION

A. Install disconnect switches and/or enclosed circuit breakers in accordance with ANSI/NECA 1.

B. Install disconnect switches and/or enclosed circuit breakers level and plumb, in accordance with manufacturer's written instruction.

C. Disconnect switches and enclosed circuit breakers mounting and seismic restraints:

1. Fasten disconnect switches and enclosed circuit breakers firmly to walls and structural surfaces, ensuring they are permanently and mechanically anchored.
2. Anchor and fasten disconnect switches and enclosed circuit breakers and their supports to building structural elements (wood, concrete, masonry, hollow walls and nonstructural building surfaces) by methods described in Section 26 0529 - Hangers and Supports for Electrical Systems.
3. Install 2 rows of steel slotted channel, with minimum of 4 attachment points, for each disconnect switch and enclosed circuit breaker.
4. When not located directly on wall, install support frame of steel slotted channel anchored to floor and ceiling structure.

D. Do not support disconnect switches and/or enclosed circuit breakers only by raceway.

E. Install top disconnect switch and/or enclosed circuit breaker handle a maximum of 6 ft-6" above finished floor.

F. Tighten electrical connectors and terminals according to equipment manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A - 486B.

G. Install engraved plastic nameplates under provisions of Section 26 0553 - Electrical Systems Identification. Attach nameplate to exterior of each switch and/or enclosed circuit breaker using small corrosion-resistant metal screws or rivets. Do not use contact adhesive.

1. Include switch and/or enclosed circuit breaker name, amperage, voltage, phase, and number of wires.

H. Install fuses in fusible switches at job site per requirements in Section 26 2813 - Fuses.

3.4 CONNECTIONS

A. Ground equipment according to Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Connect wiring according to Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.

3.5 FIELD QUALITY CONTROL

A. Inspect for physical damage, proper alignment connections, anchorage, and grounding.

B. Correct malfunctioning units on-site and retest to demonstrate compliance. Remove and replace with new units and retest.

C. Test disconnect switches and/or enclosed circuit breakers per requirements in Section 26 0800 - Commissioning of Electrical Systems and Section 26 0813 - Commissioning of Electrical Systems Test Tables 1-14

D. Interpret test results in writing and submit to Engineer.

3.6 REPAINTING

A. Remove paint splatters and other marks from surface of equipment.

B. Touch-up chips, scratches, or marred finishes to match original finish, using manufacturer-supplied paint kit. Leave remaining paint with Owner.

3.7 ADJUSTING

A. Circuit Breakers: set field-adjustable trip settings or change the trip settings, as indicated on drawings.

3.8 CLEANING

A. Vacuum dirt and construction debris from interior and exterior of equipment; do not use compressed air to assist in cleaning.

END OF SECTION

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SECTION 26 2816- ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED WORK

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables

B. Section 26 0526 - Grounding and Bonding for Electrical Systems

C. Section 26 0529 - Hangers and Supports for Electrical Systems

D. Section 26 0553 - Electrical Systems Identification

E. Section 26 2813 - Fuses

1.2 REFERENCE

A. The Work under this Section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements.

1.3 DESCRIPTION

A. This Section includes fusible and non-fusible disconnect switches and circuit breakers in individual enclosures.

1.4 REFERENCE STANDARDS

A. ANSI//NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting

B. NEMA AB 1 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breakers Enclosures

C. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

D. NFPA 70 - National Electrical Code

E. UL 98 - Enclosed and Dead Front Switches

F. UL 486A - 468B - Wire Connectors

G. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures

H. UL 869A - Reference Standard for Service Equipment

1.5 SUBMITTALS

A. Product Data:

1. Submit catalog cut sheet indicating voltage, amperage, HP ratings, enclosure type, and dimension, fuse clip features, terminal lugs and accessories including interlock devices, short circuit current ampere rating and factory settings of individual protective devices.

B. Manufacturer's Installation Instructions:

1. Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

C. Test Reports:

1. Indicate field test and inspection procedures and interpret test results and corrective action taken for compliance with specification requirements.

D. Closeout Submittals:

1. Project Record Documents:
   a. Record actual locations of disconnect switches and ratings of installed fuses.
   b. Record actual locations and continuous current ratings of enclosed circuit breakers.
2. Operation and Maintenance Data:
   a. Include manufacturer's recommended operating instructions, maintenance procedures and intervals, and preventive maintenance instructions.
   b. Include spare parts data listing, source, and current prices of replacement parts and supplies.
   c. Include Manufacturer's Seismic Qualification Certification and Installation Seismic Qualification Certification.

1.6 QUALITY ASSURANCE

A. Obtain disconnect switches and enclosed circuit breakers from one source and by single manufacturer.

B. Regulatory Requirements:

1. Comply with NFPA 70 for components and installation.
2. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect from dirt, water, construction debris, and traffic.

B. Comply with manufacturer's written instructions.

1.8 WARRANTY

A. Manufacturer shall provide standard 1-year written warranty against defects in materials and workmanship for products specified in this Section. Warranty period shall begin on date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square D

B. General Electric

C. Cutler-Hammer

D. Siemens.

2.2 DISCONNECT SWITCHES

A. NEMA KS 1, UL 98

B. Load interrupter enclosed knife switch, heavy-duty type

C. Fusible or non-fusible type as indicated.

D. Switch Interiors:
1. Switch blades that are visible in "OFF" position when switch door is open
2. Plated current carrying parts
3. Removable arc suppressors to permit easy access to line side lugs

E. Switch Mechanism:
1. Quick-make, quick-break, with visible blades and externally operable handle
2. Lockable only in "OFF" position and accept three industrial type, heavy-duty padlocks
3. Dual cover interlock to prevent unauthorized opening of switch door when handle is in "ON" position, and to prevent closing of switch mechanism with door open
4. Defeater mechanism to bypass interlock
5. Operating handle integral part of enclosure
6. Handle to physically indicate "ON" and "OFF" position

F. Ratings:
1. Ampacity as indicated on drawings
2. Horsepower rated

G. Fusible Switches:
1. Rejection clips for Class R fuses specified
2. Provisions for Class J or Class L fuses, as applicable
3. Fuses: per requirements in Section 26 2813 - Fuses

2.3 ENCLOSED CIRCUIT BREAKERS

A. NEMA AB 1, UL 489

B. Enclosed molded-case circuit breakers:
1. Tripped indication clearly shown on breaker handle taking position between "ON" and "OFF".
2. 225A frame size and below: thermal-magnetic trip

C. Breaker Mechanism:
1. Quick-make, quick-break

D. Ratings:
1. Ampacity as indicated on drawings
2. Listed as Type HACR for air conditioning equipment circuits
3. Listed as Type SWD for lighting circuits

2.4 LUGS

A. Front removable lugs

B. Labeled for 75°C copper and aluminum conductors

C. Multiple lugs to match number of conductors per phase

D. Termination of field installed conductors: pressure wire connectors, except wire-binding screws for No. 10 AWG or smaller conductors

2.5 Accessories:

A. Solid neutral assembly, where required

B. Equipment ground kit

C. Blown fuse indicators on fused disconnect switches

D. Factory installed fuse puller on fused disconnect switches

2.6 Enclosures

A. NEMA KS 1, NEMA AB 1, UL 98, UL 489, as applicable.

B. NEMA Type 1, Type 3R (outdoor locations) enclosure.

C. Code-gauge galvanized steel

D. Manufacturer's standard gray enamel finish over prime coat

E. Surface-mounted.

2.7 SERVICE ENTRANCE

A. UL 869A

B. Switches and circuit breakers identified for use as service entrance equipment are to be labeled for this application, provided with solid neutral assembly and equipment ground bar, and must include connection for bonding and grounding of neutral conductor.

2.8 Short Circuit CURRENT Rating

A. Each circuit breaker shall have minimum short circuit current rating as indicated on drawings.

PART 3 - EXECUTION

3.1 COORDINATION WITH MANUFACTURER

A. Instruct manufacturer about location of incoming lugs, i.e., top or bottom feed based on incoming feeder entrance location.

B. Verify that "touch-up" paint kit is available for repainting.

3.2 EXAMINATION

A. Examine areas and surface to receive disconnect switches and enclosed circuit breakers for compliance with requirements, installation tolerances, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that space indicated for disconnect switches and enclosed circuit breakers mounting meets code-required working clearances.

C. Notify Architect/Engineer of discrepancies prior to submittal of product data and shop drawings.

3.3 INSTALLATION

A. Install disconnect switches and/or enclosed circuit breakers in accordance with ANSI/NECA 1.

B. Install disconnect switches and/or enclosed circuit breakers level and plumb, in accordance with manufacturer's written instruction.

C. Disconnect switches and enclosed circuit breakers mounting and seismic restraints:

1. Fasten disconnect switches and enclosed circuit breakers firmly to walls and structural surfaces, ensuring they are permanently and mechanically anchored.
2. Anchor and fasten disconnect switches and enclosed circuit breakers and their supports to building structural elements (wood, concrete, masonry, hollow walls and nonstructural building surfaces) by methods described in Section 26 0529 - Hangers and Supports for Electrical Systems.
3. Install 2 rows of steel slotted channel, with minimum of 4 attachment points, for each disconnect switch and enclosed circuit breaker.
4. When not located directly on wall, install support frame of steel slotted channel anchored to floor and ceiling structure.

D. Do not support disconnect switches and/or enclosed circuit breakers only by raceway.

E. Install top disconnect switch and/or enclosed circuit breaker handle a maximum of 6 ft-6" above finished floor.

F. Tighten electrical connectors and terminals according to equipment manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A - 486B.

G. Install engraved plastic nameplates under provisions of Section 26 0553 - Electrical Systems Identification. Attach nameplate to exterior of each switch and/or enclosed circuit breaker using small corrosion-resistant metal screws or rivets. Do not use contact adhesive.

1. Include switch and/or enclosed circuit breaker name, amperage, voltage, phase, and number of wires.

H. Install fuses in fusible switches at job site per requirements in Section 26 2813 - Fuses.

3.4 CONNECTIONS

A. Ground equipment according to Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Connect wiring according to Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.

3.5 FIELD QUALITY CONTROL

A. Inspect for physical damage, proper alignment connections, anchorage, and grounding.

B. Correct malfunctioning units on-site and retest to demonstrate compliance. Remove and replace with new units and retest.

C. Test disconnect switches and/or enclosed circuit breakers per requirements in Section 26 0800 - Commissioning of Electrical Systems and Section 26 0813 - Commissioning of Electrical Systems Test Tables 1-14

D. Interpret test results in writing and submit to Engineer.

3.6 REPAINTING

A. Remove paint splatters and other marks from surface of equipment.

B. Touch-up chips, scratches, or marred finishes to match original finish, using manufacturer-supplied paint kit. Leave remaining paint with Owner.

3.7 ADJUSTING

A. Circuit Breakers: set field-adjustable trip settings or change the trip settings, as indicated on drawings.

3.8 CLEANING

A. Vacuum dirt and construction debris from interior and exterior of equipment; do not use compressed air to assist in cleaning.

END OF SECTION

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SECTION 26 2913- ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.1 RELATED WORK

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables

B. Section 26 0526 - Grounding and Bonding for Electrical Systems

C. Section 26 0529 - Hangers and Supports for Electrical Systems

D. Section 26 0533 - Raceway and Boxes for Electrical Systems

E. Section 26 0553 - Electrical Systems Identification

F. Section 26 2813 - Fuses

1.2 REFERENCE

A. The Work under this Section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements.

1.3 DESCRIPTION

A. This section includes enclosed manual and magnetic motor controllers and enclosed contactors.

B. All motors shown on the drawings or specified in other Divisions of these Specifications shall be provided with the motorized equipment and connected under this section. Provide motor controllers and power circuit disconnect devices for all motors, unless shown or specified to be furnished with the motorized equipment under other Divisions of these Specifications, and/or by others, for installation by this Contract.

C. Variable-frequency controllers furnished by Division 20, for installation by Division 26.

D. Motor Voltage Information:

1. Voltages available are: 208 three phase and 120 and 208 volt single phase. Circuits are designed for motors with voltage ratings as follows:
   a. Smaller than 1/2 HP motors: 115 volts, single phase.
   b. 1/2 HP motors and larger: 200 volts, three phase.

1.4 REFERENCE STANDARDS

A. ANSI/NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting

B. NEMA AB 1 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breakers Enclosures

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

D. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC

E. NEMA ICS 4 - Industrial Control and Systems: Terminal Blocks

F. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices

G. NEMA ICS 6 - Industrial Control and Systems: Enclosures

H. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

I. NEMA MG 1 - Motors and Generators

J. NFPA 70 - National Electrical Code

K. UL 98 - Enclosed and Dead Front Switches

L. UL 486A-486B - Wire Connectors

M. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breakers Enclosures

N. UL 508 - Industrial Control Equipment

1.5 SUBMITTALS

A. Product Data:
   1. Motor controllers: Submit catalog cut sheets showing voltage, size, rating and size of switching and overcurrent protective devices, dimensions, and enclosure details.
   2. Contactors: Submit catalog cut sheets showing voltage, size, current rating, dimensions, and enclosure details.
   3. Factory settings and time-current curves of individual protective devices.
   4. Confirm motor sizes and voltages with submittals of other Divisions of these specifications, and/or by others, prior to this Section submittals.

B. Manufacturer's Installation Instructions:
   1. Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and/or starting of product.

C. Test Reports: Indicate field test and inspection procedures and interpret test results and corrective action taken for compliance with specification requirements.

D. Closeout Submittals:
   1. Project Record Documents:
      a. Record actual locations and ratings of enclosed motor controllers and enclosed contactors.
   2. Operation and Maintenance Data:
      a. Include manufacturer's recommended operating instructions, maintenance procedures and intervals, and preventive maintenance instructions.
      b. Include spare parts data listing, source, and current prices of replacement parts and supplies.
      c. Include Manufacturer Seismic Qualification Certification and Installation Seismic Qualification Certification.

1.6 QUALITY ASSURANCE

A. Obtain motor controllers, and contactors from one source and by single manufacturer.

B. Regulatory Requirements:
   1. Comply with NFPA 70 for components and installation.
   2. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.

1.8 WARRANTY

A. The manufacturer shall provide a standard one-year warranty against defects in materials and workmanship for all products specified in this Section. The warranty period shall begin on the date of substantial completion.

1.9 MAINTENANCE

A. Extra Materials: Furnish extra materials described below that match product installed, are packaged with protective covering for storage, and are identified with labels describing contents.
   1. Spare pilot lights: Furnish 1 spare lamp for every 5 installed units, but not less than 1 set of 3 of each kind.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square D

B. General Electric

C. Cutler-Hammer

D. Siemens

E. Allen Bradley

2.2 MANUAL MOTOR CONTROLLERS

A. Description: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller for small motors, with melting alloy type overload relay, red pilot light, and pushbutton operator.

2.3 FRACTIONAL-HORSEPOWER MANUAL CONTROLLERS

A. Description: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller for fractional horsepower induction motors, with melting alloy type overload relay, red pilot light, and toggle operator.

2.4 MOTOR STARTING SWITCHES

A. Description: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, without thermal overload unit, with red pilot light,]and toggle operator.

2.5 FULL-VOLTAGE NON-REVERSING MAGNETIC MOTOR CONTROLLERS

A. Description: NEMA ICS 2, AC general-purpose, Class A, magnetic controller for induction motors rated in horsepower, three-phase and single-phase, as scheduled, except where single-phase motors scheduled to be provided with built-in overload elements:
   1. Size 1 minimum.
   2. Control Voltage: 120 volts, 60 hertz.
   3. Overload Relays: NEMA ICS 2, solid-state bimetal, one overload relay per phase:
      a. Solid-state type:
         1). Class 10 and 20 inverse-time tripping characteristics
         2). Non-volatile operating memory
         3). 3:1 current adjustment range
         4). Phase loss/phase unbalance protection
         5). Ambient temperature insensitive
         6). Self-powered
         7). Manual reset. Automatic recent not acceptable.
         8). Manual trip
         9). Visible trip indication
         10). 1 normally open and 1 normally closed isolated auxiliary contract.
      b. Bimetallic type:
         1). Class 10, and 20 inverse-time tripping characteristics
         2). Manual reset
         3). 1 normally open and 1 normally closed isolated auxiliary contract
   4. Features:
      a. Auxiliary Contacts: NEMA ICS 2, 2 each normally open and normally closed contacts in addition to seal-in contact.
      b. Pilot Lights NEMA ICS 5: push-to-test LED incandescent type.
      c. Hand-Off-Auto (H-O-A) Selector Switches: Rotary type.
      d. Control Power Transformers: 120-volt secondary, adequate capacity to operate connected pilot, indicating and control devices, plus 100 percent spare capacity in each motor controller, but not less than 100VA. Fused primary and secondary, and unfused leg of secondary bonded to enclosure.
      e. Terminals: NEMA ICS 4.
      f. Other accessories detailed or required by drawings.

2.6 COMBINATION CONTROLLERS

A. Factory-assembled motor controllers with externally operable disconnect, fusible switch type, in common enclosure; means for locking disconnect handle and means for defeating cover interlock.
   1. Fusible Switch: NEMA KS 1 and UL 98; enclosed knife switch, heavy-duty type, external operable handle, clips or pads to accommodate specified fuses:
      a. Rejection clips for Class R fuses
      b. Provisions for Class J or Class L fuses, as applicable
      c. Fuses: Per requirements in Section 26 2813 - Fuses

2.7 MOTOR CONTROLLER ACCESSORIES

A. Factory installed devices in controller enclosure, unless otherwise indicated, as follows:
   1. "On-Off" and "Start-Stop" pushbutton stations, pilot lights, selector switches: NEMA ICS 2, heavy duty type.
   2. 120 volt control circuits and pilot light, unless noted otherwise.
   3. Red pilot light to indicate motor operation.
   4. Green pilot light to indicate motor stopped.
   5. Minimum wire size for control circuits: #14 AWG.
   6. Stop and Lockout Pushbutton Station: Momentary-break pushbutton station with a factory-applied hasp arranged so a padlock can be used to lock pushbutton in depressed position with control circuit open, where indicated.

B. Control services: As scheduled on motor schedule or indicated.

2.8 GENERAL PURPOSE MAGNETIC CONTACTORS

A. Description: NEMA ICS 2, same as magnetic controllers, except without overload protection.

B. Poles: To match circuit configuration and control function.

C. Configuration: Mechanically held.

D. Contact Rating: Match branch circuit overcurrent protection.

2.9 LIGHTING MAGNETIC CONTACTORS

A. Description: NEMA ICS 2, same as magnetic controller, except without overload protection.

B. Poles: To match circuit configuration and control function.

C. Configuration: Mechanically held.

D. Contact Rating: Match branch circuit overcurrent protection.

2.10 LUGS

A. Labeled for 75°C copper and aluminum conductors.

B. Multiple lugs to match number of conductors per phase.

C. Termination of field installed conductors: Pressure wire connectors, except wire-binding screws for No. 10 AWG or smaller conductors.

D. For equipment specified in this section and for equipment furnished under other Divisions of this specification and/or by others.

2.11 MOTOR CONTROLLERS AND CONTACTOR ENCLOSURES

A. NEMA 250, NEMA 1CS 6

B. NEMA Type 1, Type 3R (outdoor locations) enclosure.

C. Code-gauge galvanized steel.

D. Manufacturer's standard gray enamel finish over prime coat.

E. Surface-mounted.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate motor control wiring with Division 23 of these specifications.

B. Coordinate motor sizes and voltages with submittals of other Divisions of these specifications and/or by others.

C. Verify with manufacturer that "touch-up" paint kit is available for repainting.

3.2 EXAMINATION

A. Examine areas and surface to receive motor controllers and contactors for compliance with requirements, installation tolerances, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that space indicated for motor controllers and contactors mounting meets code-required working clearances.

C. Notify Architect/Engineer of any discrepancies prior to submittal of product data.

3.3 INSTALLATION

A. Install motor controllers and contactors in accordance with ANSI/NECA 1.

B. Install level and plumb, in accordance with manufacturer's written instruction.

C. Motor controllers and contactors mounting and seismic restraints:
   1. Fasten motor controllers and contactors firmly to walls and structural surfaces, ensuring they are permanently and mechanically anchored.
   2. Anchor and fasten motor controllers and contactors and their supports to building structural elements (wood, concrete, masonry, hollow walls and nonstructural building surfaces) by the methods described in Section 26 0529 - Hangers and Supports for Electrical Systems.
   3. Install 2 rows of steel slotted channel, with minimum of 4 attachment points, for each motor controller and contactor.
   4. When not located directly on wall, install support frame of steel slotted channel anchored to floor and ceiling structure.
   5. Do not support motor controllers and contactors only by raceway.

D. Tighten electrical connectors and terminals according to equipment manufacturer's published torque-tightening valves. Where manufacturer's torque valves are not indicated, use those specified in UL 486A-486B.

E. Install engraved plastic nameplates under provisions of Section 26 0553 - Electrical Systems Identification. Attach nameplate to exterior of each motor controller and contactor, using small corrosion resistant metal screws or rivets. Do not use contact adhesive:

1. Indicate motor served, nameplate horsepower, full load amperes, code letter, service factor, voltage/phase rating, and fuse size and type, when applicable.

F. Connect each motor terminal box to rigid conduit system with maximum 18" of flexible liquid-tight metal conduit. Install conduit per requirements in Section 26 0533 - Raceway and Boxes for Electrical Systems.

G. Check for proper rotation and phase relationship of each motor.

H. Install fuses in fusible switch at job site pre requirements in Section 26 2813 - Fuses.

I. Control Wiring Installation:

1. Install wiring between motor control devices according to Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
2. Install motor control wiring in accordance with control wiring diagrams and in raceways where indicated or required by contract drawings.
3. Bundle, train, and support wiring in enclosures.
4. Connect hand-off-automatic switch and other automatic-control devices where applicable.
   a. Connect selector switches to bypass only manual- and automatic-control devices that have no safety functions when switch is in hand position.
   b. Connect selector switches with motor-control circuit in both hand and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.4 APPLICATION

A. Select features of each motor controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, and configuration of pilot device and control circuit affecting controller functions.

3.5 CONNECTIONS

A. Provide green wire ground through flexible conduit to interconnect motor frame and rigid conduit system.

B. Ground and bond motor controller and contactor enclosures according to Section 26 0526 - Grounding and Bonding for Electrical Systems.

C. Connect power and control wiring according to Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.

D. Connect control wiring for operation, control and supervision of motorized equipment as shown on drawings and/or specified in this and other Divisions of these Specifications.

3.6 FIELD QUALITY CONTROL

A. Inspect motor controllers and contactors for physical damage, proper alignment, connections, anchorage, seismic restraints and grounding.

B. Correct malfunctioning motor controllers and contactors on-site and retest to demonstrate compliance. Remove and replace with new units and retest.

C. Test continuity of each circuit.

D. Test motor controllers per requirements in Section 26 0800 - Commissioning of Electrical Systems and Section 26 0813 - Commissioning of Electrical Systems Test Tables 1-14.

E. Interpret test results in writing and submit to Engineer.

3.7 REPAINTING

A. Remove paint splatters and other marks from surface of equipment.

B. Touch-up chips, scratches or marred finishes to match original finish, using manufacturer-supplied paint kit. Leave remaining paint with Owner.

3.8 ADJUSTING

A. Set field-adjustable circuit breakers trip settings or change the trip settings as indicated on drawings.

B. Adjust motor circuit protectors.

3.9 CLEANING

A. Vacuum dirt and construction debris from interior and exterior of equipment; do not use compressed air to assist in cleaning.

END OF SECTION

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SECTION 28 3113- FIRE DETECTION AND ALARM SYSTEMS

PART 1 - GENERAL

1.1 RELATED WORK

A. Section 21 1318 - Fire Protection Systems

B. Section 26 0000 - General Electrical Requirements

C. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables

D. Section 26 0526 - Grounding and Bonding for Electrical Systems

E. Section 26 0533 - Raceway and Boxes for Electrical Systems

F. Section 26 0553 - Electrical Systems Identification

1.2 REFERENCE

A. The Work under this Section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements.

1.3 DESCRIPTION

A. In general work consists of:
   1. Furnish and install complete Hard-wired, Zoned, Non-coded Fire Suppression System as shown on plans.
   2. System to be wired, connected, and left in first class operating condition.
   3. System includes:
      a. Control Panel
      b. Annunciator Panel
      c. Manual Stations
      d. Heat Detectors
      e. Smoke Detectors
      f. Alarm indicating appliances
      g. Terminations
      h. Other necessary material for complete operating systems.
   4. Fire suppression system shall allow for loading and editing special instructions and operating sequences as required.
   5. Systems shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.
   6. Software operations shall be stored in non-volatile programmable memory within fire suppression control panel. Loss of primary and secondary power shall not erase instructions stored in memory.

1.4 REFERENCE STANDARDS

A. IBC - 2000 - International Building Code

B. IFC - 2000 - International Fire Code

C. NECA 305 - Standard for Fire Alarm System Job Practices

D. NFPA 72 - National Fire Alarm Code

E. NFPA 101 - Life Safety Code

F. UL 268 - Smoke Detectors for Fire Protective Signaling Systems

G. UL 497B - Protectors for Communications and Fire Alarm Circuits

H. UL 521 - Heat Detectors for Fire Protective Signaling Systems

I. UL 864 - Control Units for Fire Protective Signaling Systems

J. UL 1481 - Power Supplies for Fire Protective Signaling Systems

1.5 QUALIFICATIONS

A. Equipment shall be supplied by company specializing in fire alarm and smoke detection systems with 5 years documented experience

B. Work shall be performed by licensed contractor regularly engaged in installation and servicing of alarm systems.

C. Proof of 5 years documented experience and factory authorization to furnish and install equipment proposed shall be furnished.

D. Contractor shall be located within 100 miles or less from site of project.

1.6 SUBMITTALS

A. Submit Shop Drawings for equipment provided under this Section.

B. Bill of materials listing part number and quantity of components and devices.

C. Block diagrams showing layout and operation of entire system.

D. Schematic diagrams of circuits from field devices to terminal strip(s) associated with Control Panel.
   1. Diagrams shall show schematic wiring of equipment and connections to be made to devices.
   2. Terminal connections in equipment shall be numbered to correspond to diagrams.
   3. Wiring diagrams shall be coordinated so that terminal numbering, circuit designation and equipment or device designations are same on drawings.

E. Standby battery power calculations.

F. Sound amplifier and strobe power supply calculations showing current draws for devices and modules during standby and alarm and trouble conditions.

G. Voltage drop calculations for both initiating and alarming circuits.

H. Submission to Authority Having Jurisdiction:
   1. Copy of shop drawings as required to show component locations.

2. Upon receipt of comments from Authority, make resubmission if required to make clarifications or revisions to obtain approval.
3. All fees associated with this shall be included in Bid.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.2 FIRE SUPPRESSION CONTROL PANEL

A. Acceptable manufacturers:
   1. Simplex (8 input zone, 4 output circuits).
   2. Siemens (8 input zone, 4 output circuits).

B. Panel shall be UL 268, UL 864, UL 1481 and UL 497B listed.

C. System shall monitor alarm, trouble, and supervisory signals.

D. Provide a system bypass switch to allow bypass of off site transmissions via DACT for testing purposes.

E. Standby power battery: Minimum battery capacity shall be for 24 hours standby mode plus 10 minutes alarm mode. Battery derating factor shall be 1.2. and batteries shall be sealed lead-acid type.

F. Automatic battery charger with high rate charging to recharge batteries to 70% within 12 hours for fully discharged batteries. Battery charger shall be supervised by panel.

G. Provide control panel functioning at 120V, UL listed.

H. System alarm operation after activation of any manual station, automatic detection device, or sprinkler flow switch shall be:
   1. Signal to notify the supervising station shall be activated via Digital Alarm Communication Transmitter (DACT).
   2. Activate exterior horn/strobe only upon sprinkler flow switch activation.
   3. Identify zone control panel display.

I. System supervisory operation of sprinkler tamper or pressure monitor switch shall be :
   1. A signal to notify the supervising station shall be activated via DACT.
   2. Identify zone control on panel display.

J. Supervision
   1. System shall independently supervise:
      a. Initiating device circuits.
      b. Sprinkler flow and tamper switches.
      c. Independently fused indicated appliance circuits for alarm horn/strobe units.
      d. Incoming power. Power failure shall be audibly and visually indicated at Control Panel and remote annunciator. Green "power on" LED shall be displayed continuously while incoming power is present.
      e. System Batteries: Low battery condition or disconnection of battery shall be audibly and visually indicated at Control Panel.

f. DACT dialer

g. Sprinkler system pressure switch sensors.

K. Power Requirements

1. Electrical contractor to provide 120 VAC power via dedicated branch circuit to each control panel or notification device power supply from nearest available branch circuit panel board

L. Sprinkler System Operation/Interface

1. Control Panel shall provide differentiation between valve tamper switch operation and open and or ground initiation circuit wiring.

M. System shall provide communications with initiating and control devices individually.

1. All sprinkler system waterflow devices shall be on a zone only for waterflow devices.
2. All sprinkler tamper devices shall be on a zone only for tamper devices.
3. All smoke detector devices shall be on a zone only for smoke detector devices.
4. All pull stations shall be on a zone only for pull stations.
5. All pressure switch sensors shall be on a zone only for pressure switch sensors.

N. Devices shall be individually annunciated at control panel audibly and visually for alarm, supervisory, and trouble conditions.

O. Smoke Detector Bases and Heads (Provide smoke detector within 10 feet of control panel)

1. Smoke detector head shall be photoelectric.
2. Either base or head shall contain electronic circuits that communicate detector's status (normal, alarm, trouble) to Control Panel over two wires. Same two wires shall also provide power to base and detector.
3. Contacts between base and head shall be of bifurcated type using spring-type, self-wiping contacts.
4. Base shall have locking capability. Locking feature must be field removable when not required.
5. Upon removal of detector's head, trouble signal shall be sent to Control Panel.

P. Manual Stations (Provide adjacent to control panel)

1. Manual stations shall:
   a. Be single action.
   b. Be constructed of high impact, red Lexan with raised white lettering and smooth high gloss finish.
   c. Be provided with vandal resistant plexiglass cover.
   d. Contain circuits that communicate station's status (alarm, normal) to Control Panel over two wires.

Q. Interface Modules – Supervised Monitoring

1. Interface Modules shall:
   a. Be provided for monitoring of water-flow, pressure switch, valve tamper, and non-intelligent detectors.
   b. Addressable interface module shall be provided for interfacing normally open direct-contact devices to an intelligent initiating circuit.
   c. Provide power to and monitor status of zone consisting of conventional 2-wire devices and N/O contact devices.

d. Communicate zone's status (normal, alarm, trouble, supervisory) to Control Panel.

R. Provide UL listed Digital Alarm Communicator Transmitter (DACT) transmitter with two telephone line capacity for off-site transmission of trouble, alarm, and supervisory signals to UL listed and FM approved supervising central station monitoring facility.

S. Class B circuiting shall be used for standard detection device wiring.

T. Installation shall be done in neat, workman like manner in accordance with manufacturer's recommendations.

U. All system wiring shall be separate from other building wiring and installed in conduit. See section 26 0533 Raceway and Boxes for Electrical Systems.

V. Minimum ¾" steel raceway for all system wiring.

W. Conductors:
1. Cables and wires shall be provided per manufacturer shop drawings.
2. Conductors shall be color-coded. Coding shall be consistent throughout the facility.
3. Green wire shall be used only for equipment ground.
4. Control Panel power wiring shall be #12 AWG.
5. Control Panel shall have #12 AWG equipment ground wire.
6. Where the system circuits enter or leave the building, additional transient 75 to 90 volt gas tube protection shall be provided for each conductor.
7. Cable Detector Loops shall be twisted pair with shield jacket. Shield shall be connected to earth ground only at control panel.
8. Detector wirings shall not be in same conduit with 120/240 VAC wiring or other high current circuits.
9. T-Taps or branch circuit connections allowed for class B intelligent loop circuits.
10. Wiring of initiating device circuits, alarm horn circuits and alarm strobe circuits shall be #14 AWG minimum.
11. System cable shall be held in place at device box, by means of 2-screw connector, (do not use squeeze or crimp type connectors).
12. Splices or connections shall be made within approved junction boxes and with approved fittings.

X. Provide 2 dedicated telephone lines for connection upstream if any internal telephone system disconnect for use by system DACT dialer.

2.3 ENCLOSURE

A. Provide cabinets of sufficient size to accommodate equipment.

B. Cabinet shall be equipped with locks and transparent door panel providing tamper proof enclosure yet allowing full view of various lights and controls.

2.4 HORN/STROBE UNITS

A. Alarm horns shall:
1. Operate on 24 VDC circuit.

2. Include separate wire leads for in/out wiring for each leg of associated signal circuit. T tapping of signal device conductors to signal circuit conductors shall NOT be accepted.
3. Be suitable for rear mounting behind audio-visual assemblies, which shall be flush or semi-flush mounted, with manufacturer backboxes and flush trim ring.
4. Provide minimum sound pressure level of 88 dB at 10'.

B. Strobes shall be:
1. Multi tap units with taps at 15, 30, 75 and 110 cd.
2. Tapped at 15 candela peak power or as noted on drawings.
3. In compliance with ADA requirements.
4. On separate supervised circuit from horn circuit.
5. Synchronized so strobes units within sight of each other flash simultaneously.
6. Cover plate shall be White with "FIRE" in red lettering.

C. Strobe circuit loading shall be calculated at 75 cd tap for all devices.

PART 3 - EXECUTION

3.1 GENERAL

A. Class B circuiting shall be used.

B. Installation shall be done in neat, workmanlike manner in accordance with manufacturer's recommendations.

C. Smoke detectors shall not be mounted until construction is completed.

3.2 RACEWAYS

A. Fire Suppression Control Risers shall be in conduit system separate from other building wiring.

B. Branch Circuit wiring shall be in conduit system separate from other building wiring.

C. Minimum 3/4" steel raceway. See Section 26 0533 - Raceway and Boxes for Electrical Systems.

D. Contractor shall size conduit and boxes by circular mil size of cable in conduit or box.

E. Surface access to existing alarm initiating circuits in public areas shall be via UL listed surface metal raceways (minimum equivalent to 3/4" conduit) and box extensions.

F. Existing conduit and surface metal raceway that are not 3/4" size may be reused if found to have adequate space for existing and new conductors.

3.3 CONDUCTORS

A. Cables and wires shall be provided per manufacturer shop drawings.

B. Wiring shall be supervised.

C. Conductors shall be color-coded. Coding shall be consistent through out facility.

D. Green wire shall be used only for equipment ground.

E. Control Panel Power wiring shall be #12 AWG.

F. Control Panel shall have #12 AWG equipment ground wire.

G. Wiring of initiating device circuits, alarm horn circuits, and alarm strobe circuits shall be #14 AWG minimum.

H. Fire suppression cable shall be held in place at device box, by means of 2-screw connector, (do not use squeeze or crimp type connectors).

I. Splices or connections shall be made within approved junction boxes and with approved fittings.

J. Boxes shall be red and labeled "FIRE SUPPRESSION" by decal or other approved markings.

3.4 DEVICE MOUNTING

A. Recommended mounting heights, and requirements are as follows:
   1. Fire Suppression Control Panel
      a. Mount Control Panel so visual indicators and controls at 60" above floor level.
   2. Audio-Visual Devices
      a. Install surface mount at height indicated on drawings above finished grade.
      b. For surface mounting, use manufacture-supplied backboxes and trim plates.
      c. Mark each device with its circuit number.
   3. Manual Stations
      a. Operable part of manual stations shall be installed not less than 3-1/2' (42") and not more than 4-1/2' (54") above finished floor.
      b. Manual Stations shall be in unobstructed locations.
      c. For surface mounting, use manufacturers supplied backboxes and trim plates
      d. Mark unit's address on inside and outside of housing.
   4. Heat and Smoke Detectors
      a. Location of detectors shown on plans is schematic only. Detectors must be located according to code requirements.
      b. Surface mounted detectors shall be installed using back boxes equal to base size. Standard octagon and square boxes are not acceptable.
      c. Mark zone number and ranking of each detector on its base.
      d. For intelligent systems, mark address and loop number on each detector's base.

3.5 IDENTIFICATION LABELS

A. Junction boxes shall be painted red and labeled "Fire Suppression".

B. Circuits must be labeled with name of circuit and area being served by circuit.

C. Labels shall be permanent, and be machine generated. NO HANDWRITTEN OR NON-PERMANENT LABELS SHALL BE ALLOWED.

D. Labels shall be self-laminating, white/transparent vinyl and be wrapped around cable.

E. Flag type labels are not allowed.

F. Labels shall be of adequate size to accommodate circumference of cable being labeled and properly self-laminate over full extent of printed area of label.

G. Adhesive type labels not permitted except for wire identification.

H. Wiring color code shall be maintained throughout installation.

I. Green wire shall be used only for equipment ground.

3.6 MANUFACTURER'S SERVICES

A. Supervision of installation shall be provided by trained service technician from manufacturer of fire suppression equipment.

B. Technician shall be US certified and have had minimum of 2 years of service experience in fire alarm industry.

C. Technician's name shall appear on equipment submittals and letter of certification from alarm manufacturer shall be sent to project engineer.

D. Manufacturer's service technician shall be responsible for following items:
   1. Pre-installation visit to job site to review equipment submittals and verify method by which system shall be wired.
   2. Make periodic job site visits to verify installation and wiring of system.
   3. Upon completion of wiring, final connections shall be made under supervision of technician.
   4. At time of final checkout, technician shall give operational instructions to Owner and/or his representative.
   5. Job site visits shall be dated and documented in writing and signed by electrical contractor.
   6. Discrepancy shall be noted on document and copy kept in system job folder, which shall be available to project engineer any time during project.

3.7 TESTING

A. Manufacturer's authorized representative shall perform complete functional test of each system and submit written report to Contractor attesting to proper operation of completed system prior to final inspection.

B. Contractor shall test each device in system before system is considered substantially complete.

C. Completed fire suppression system shall be fully tested by Contractor in presence of the Owner's representative and local Fire Marshal.

D. Upon completion of successful test, Contractor shall:
   1. Certify system to Owner in writing
   2. Provide as-builts and O&M manuals.

3.8 WARRANTY

A. Contractor shall warrant completed fire suppression system wiring and equipment to be free from inherent mechanical and electrical defects for a period of 2 years from the date of substantial completion of project.

B. Contractor shall post warranty period along with company's name and telephone number inside fire alarm panel.

C. Warranty service for equipment shall be provided by system supplier's factory trained representative.

D. Warranty shall include parts, labor and necessary travel.

E. Occupied facility shall not be without UL and NFPA approved and fully operational fire suppression system for period longer than 2 hours. Emergency response shall be provided within 2 hours of notification, to contractor, of failure of system to perform operationally per UL and NFPA standards.

F. Non-emergency service calls shall be responded to within 24 hours of notification to contractor.

G. Repairs and/or replacement shall be completed within 72 hours of time of notification. Other than emergency, actual repairs and /or replacement shall be provided during normal working hours, Monday through Friday, excluding holidays.

H. If repair and/or replacement cannot be made within prescribed time, other means and methods of protection shall be provided to insure safety of building occupants during which time system is not in compliance with standards. This may involve up to and include hiring Owner approved qualified personnel to stand fire watch, at contractor's expense.

3.9 TRAINING

A. Contractor shall provide minimum of 2 hours system operation training for Owner, Architect/Engineer, and fire department personnel.

B. Training session shall be at a time to be stipulated by the Owner.

C. Training shall be completed prior to final inspection.

3.10 MAINTENANCE CONTRACT

A. Equipment manufacturer shall make available to Owner, maintenance contract proposal to provide minimum of 2 inspections and tests per year in compliance with NFPA-72 Codes.

END OF SECTION

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SECTION 310513 - SOILS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Subsoil materials.

2. Topsoil materials.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.

2. Section 024113 – Site Demolition.

3. Section 024114 – Utility Abandonment and Removal.

4. Section 310516 - Aggregates.

5. Section 312213 - Rough Grading.

6. Section 312317 – Site Excavation, Backfill and Compaction.

7. Section 312513 – Erosion and Sediment Control: Slope protection and erosion control.

1.2 REFERENCES

A. City of Madison Standard Specifications for Public Works Construction, 2007 Edition (MSSPWC).

B. State of Wisconsin Department of Transportation

1. Standard Specifications for Highway and Structure Construction, 2003 Edition including latest Supplements. (WISDOT)

C. ASTM International (American Society for Testing and Materials)

1. ASTM D2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System).

2. ASTM D5268 – Topsoil Used for Landscaping Purposes.

1.3 SUBMITTALS

A. Division 01 - Submittal Procedures: Requirements for submittals.

B. Samples: Submit, in airtight containers, 10 lb. sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of source of imported materials.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with City of Madison Standard Specification for Public Works Construction and State of Wisconsin Department of Transportation Standards.

B. City of Madison Standards shall control discrepancies between City and State Standards.

PART 2 - PRODUCTS

2.1 SUBSOIL MATERIALS

A. Subsoil Type S1:

1. Excavated and re-used material.

2. Graded.

3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

4. Contractor shall provide 10 lb sample of existing site material to laboratory for soil classification analysis conforming to ASTM D2487.

B. Subsoil Type S2:

1. Imported borrow.

2. Graded.

3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

4. Imported subsoil and borrow shall be similar in composition when compared to existing site subsoil.

5. Contractor shall provide 10 lb sample of proposed imported borrow material to laboratory for soil classification analysis conforming to ASTM D2487.

2.2 TOPSOIL MATERIALS

A. Topsoil Type T1:

1. Excavated and reused material.

2. Graded.

3. Soil shall be free of roots, twigs, stones, subsoil, debris, weeds, and foreign matter larger than 1/2 inch.

4. Topsoil shall be evaluated in accordance with ASTM D5268.

5. Contractor shall provide 10 lb sample of excavated and reused material to laboratory for soil classification analysis conforming to ASTM D2487.

B. Topsoil Type T2:

1. Imported borrow.

2. Friable loam.

3. Soil shall be free of roots, twigs, stones, subsoil, debris, weeds, and foreign matter larger than 1/2 inch.

4. Acidity range (pH) of 5.5 to 7.5.

5. Containing minimum of 4 percent and maximum of 25 percent inorganic matter.

6. Limit decaying matter to 5 percent of total content by volume.

7. Topsoil shall be evaluated in accordance with ASTM D5268.

8. Contractor shall provide 10 lb sample of proposed imported borrow material to laboratory for soil classification analysis conforming to ASTM D2487.

2.3 SOURCE QUALITY CONTROL

A. Division 01 - Quality Requirements: Testing and Inspection Services; Testing and analysis of soil material.

B. Testing and Analysis of Topsoil Material designated for Landscaping Purposes: Perform in accordance with ASTM D5268.

C. When tests indicate materials do not meet specified requirements, change material and retest.

D. Furnish materials of each type from same source throughout the Work.

PART 3 - EXECUTION (Not Used)

END OF SECTION 310513

SECTION 310516 - AGGREGATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aggregate materials and designations for pavement aggregate base course.

2. Aggregate materials and designations for backfill.

3. Materials and designations for drainage aggregate.

4. Aggregate materials and designations for grading purposes.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.

2. Section 024113 - Site Demolition.

3. Section 024114 - Utility Abandonment and Removal.

4. Section 310513 - Soils.

5. Section 312213 - Rough Grading.

6. Section 312317 - Site Excavation, Backfill and Compaction.

7. Section 321123 - Aggregate Base Course.

1.2 REFERENCES

A. City of Madison Standard Specifications for Public Works Construction, 2007 Edition (MSSPWC).

B. State of Wisconsin Department of Transportation

1. Standard Specifications for Highway and Structure Construction, 2003 Edition, including latest supplements. (WISDOT).

1.3 SUBMITTALS

A. Division 01 - Submittal Procedures: Requirements for submittals.

B. Samples: Submit, in airtight containers, 10 lb. sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of source of imported materials.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with City of Madison Standard Specification for Public Works Construction and State of Wisconsin Department of Transportation Standards.

B. City of Madison Standards shall control discrepancies between City and State Standards.

PART 2 - PRODUCTS

2.1 AGGREGATE MATERIALS

A. Aggregate Type A1 (Gravel): Crushed Gravel: free of organic matter and debris; graded in accordance with:

1. WisDOT 3/4 Inch Gradation.

B. Aggregate Type A2 (Gravel): Crushed Gravel: free of organic matter and debris; graded in accordance with:

1. WisDOT 1-1/4 Inch Gradation.

C. Aggregate Type A7 (3/4-Inch Stone Chips): Crushed stone; free of clay, shale, organic matter; graded in accordance with the following limits:

Sieve Size	Percent Passing
1 inch	100
3/4 inch	90 - 100
3/8 inch	20 - 55
No. 4	0 - 10
No. 8	0 – 5

D. Aggregate Type A10 (Bank Run Sand/Gravel): Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with following limits:

Sieve Size	Percent Passing
2-inch	95 to 100
No.4	35 to 60
Finer Than No.200	5 to 15

E. Aggregate Type A12 (Sand Fill): Natural river or bank sand; free of silt, clay, or loam, friable or soluble materials, or organic matter; consisting of durable particles ranging in size from fine to coarse in uniform combinations; maximum moisture content shall be 10 percent, graded within following limits:

Sieve Size	Percent Passing
3/8-inch	100
No. 4	95 to 100
No. 8	75 to 90

No. 16	55 to 75
No. 30	30 to 50
No. 50	10 to 25
No. 100	2 to 10
No. 200	0

2.2 SOURCE QUALITY CONTROL.

A. Division 01 - Quality Requirements: Testing and inspection services: Testing and analysis of aggregates.

B. When tests indicate materials do not meet specified requirements, change material or material source and retest.

C. Furnish materials of each type from same source throughout the Work.

PART 3 - EXECUTION (Not Used)

END OF SECTION 310516

SECTION 312213 – ROUGH GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removal of topsoil and subsoil

2. Cutting, grading, filling, rough contouring and compacting site for site structures and pavements.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.

2. Section 024113 - Site Demolition.

3. Section 310513 - Soils.

4. Section 310516 - Aggregates.

5. Section 312317 - Site Excavation, Backfilling and Compaction.

1.2 REFERENCES

A. City of Madison Standard Specifications for Public Works Construction, 2007 Edition (MSSPWC).

B. State of Wisconsin Department of Transportation.

1. Standard Specifications for Highway and Structure Construction, 2003 Edition, including latest Supplements. (WISDOT)

C. ASTM International (American Society for Testing and Materials)

1. ASTM C136 – Standard Test Method For Sieve Analysis of Fine and Coarse Aggregates.

2. ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.- lbf/ft^3 (600 kN-m/m^3)).

3. ASTM D6938 – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 CLOSEOUT SUBMITTALS

A. Division 01 - Execution Requirements: Requirements for project closeout submittals.

B. Division 01 - Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with City of Madison Standard Specification for Public Works Construction and State of Wisconsin Department of Transportation Standards.

B. City of Madison Standards shall control discrepancies between City and State Standards.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Type T1 and T2 as specified in Section 310513 - Soils.

B. Subsoil Fill: Type S1 and S2 as specified in Section 310513 - Soils.

C. Granular Fill: Type A2 as specified in Section 310516 - Aggregates.

PART 3 - EXECUTION

3.1 NOTIFICATION

A. Contractor, prior to any excavation work, shall notify (1) a designated locating service; (2) all utilities, governmental agencies, entities, known to, or which can reasonably be assumed to have above or below ground pipe, conduit cables, structures, or similar items within limits of project; to locate and mark location of such items.

B. In accordance with Wisconsin Statute 182.0175, "Damage to Transmission Facilities," Excavator, as defined in 182.0175(1)(bm), shall be solely responsible to provide advance notice to "Diggers Hotline, Inc." (800-242-8511) not less than three working days prior to commencement of any Excavation, as defined in the statute, required to perform work contained in this Project, and further, Excavator shall comply with all other requirements of this Statute relative to Excavation.

3.2 EXAMINATION

A. Division 01 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify project survey benchmarks and intended elevations are as indicated on Drawings.

3.3 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect utilities indicated to remain, from damage.

D. Notify utility company to remove and relocate utilities.

E. Protect above and below grade utilities indicated to remain.

F. Protect plant life, lawns, and other features remaining as portion of final landscaping.

G. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.4 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion.

D. Protect stockpiled material from erosion. Provide silt fencing or other approved erosion prevention method.

E. Remove excess topsoil from site.

F. Excess topsoil to be disposed off site shall become property of Contractor.

3.5 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.

B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

C. When excavating through roots, perform Work by hand and cut roots with sharp ax.

D. Remove excess subsoil not intended for reuse, from site.

E. Stability: Replace damaged or displaced subsoil as specified for fill.

3.6 FILLING

A. Install Work in accordance with City of Madison Standard Specifications for Public Works Construction, 2007 Edition (MSSPWC).

B. Fill areas to contours and elevations with unfrozen materials.

C. Place fill material on continuous layers and compact in accordance with schedule at end of this section.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise.

F. Make grade changes gradual. Blend slope into level areas.

G. Remove surplus fill materials from site.

3.7 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.8 FIELD QUALITY CONTROL

A. Division 01 - Quality Requirements: Testing and inspection services.

B. Density Testing: In accordance with ASTM D1557.

C. Moisture Testing: In accordance with ASTM D6938.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

E. Frequency of Tests: As determined by Testing Agency.

3.9 SCHEDULES

A. Granular Fill:

1. Fill Type A2: Maximum 7-inch loose lifts.

2. Compact each lift to minimum 95 percent of modified proctor density.

B. Subsoil Fill:

1. Fill Type S1 and S2: Maximum 12-inch loose lifts.

2. Compact each lift to minimum 95 percent of modified proctor density.

C. Topsoil Fill:

1. Fill Type T1 and T2: Maximum 12-inch loose lifts.

2. Compact each lift to minimum 85 percent of modified proctor density.

END OF SECTION 312213

SECTION 312317 - SITE EXCAVATION, BACKFILL, AND COMPACTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Verification of subsurface conditions and utilities prior to excavation.
2. Sawcutting of pavements prior to excavation.
3. Excavation for building drainage system.
4. Excavation of trenches for storm sewer collection system.
5. Building backfilling to subgrade elevations.
6. Backfill requirements for utility trenches.
7. Backfill for over-excavation corrections.
8. Consolidation and compaction.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.
2. Section 310516 - Aggregates: Aggregate backfill materials.
3. Section 312213 - Rough Grading: Topsoil and subsoil removal from site surface.
4. Section 321123 - Aggregate Base Course: Preparation for aggregate base course.
5. Section 334100 - Site Storm Sewer System: Installation of storm sewer system.

1.2 REFERENCES

A. ASTM International (American Society for Testing and Materials)

1. ASTM D698 - Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.-lbf/ft^3 (600 kN-m/m^3)).
2. ASTM D1556 - Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft.-lbf/ft^3 (2,700 kN-m/m^3)).

4. ASTM D6938 – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Division 01 - Submittal Procedures: Requirements for submittals.

B. Samples: Submit 10 lb. sample of each type of specified fill to testing laboratory, in air-tight containers.

C. Provide certified analysis of material(s) to Architect/Engineer and Testing Agency prior to any use on Work.

1.4 REGULATORY REQUIREMENTS

A. Contractor shall comply with all local, state, and federal regulations applicable to Work of this Section.

B. Contractor shall comply with and be solely responsible for compliance with U.S. Department of Labor OSHA Part 1926 Safety and Health Regulations for Construction for this Work.

C. Contractor performing Work of this Section shall be solely responsible for identifying, furnishing, installing and maintaining equipment and materials required by state and federal regulations to establish safe working conditions during Work of this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 NOTIFICATION

A. Contractor, prior to any excavation work, shall notify (1) a designated locating service; (2) all utilities, governmental agencies, entities, known to, or which can reasonably be assumed to have above or below ground pipe, conduit cables, structures, or similar items within limits of project; to locate and mark location of such items.

B. In accordance with Wisconsin Statute 182.0175, "Damage to Transmission Facilities," Excavator, as defined in 182.0175(1)(bm), shall be solely responsible to provide advance notice to "Diggers Hotline, Inc." (800-242-8511) not less than three working days prior to commencement of any Excavation, as defined in the statute, required to perform work contained in this Project, and further, Excavator shall comply with all other requirements of this Statute relative to Excavation.

3.2 SITE VERIFICATION

A. Verify that survey benchmark and intended elevations for Work are as indicated.

3.3 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the Work are as shown on Drawings.

B. Primary line and grade will be furnished by Owner and will be established by Contractor.

C. Contractor shall employ a Registered Land Surveyor, registered in the State of Wisconsin to perform all survey work related to primary line and grade for project utilities.

D. Contractor shall check accuracy of line and grade stakes by means of visual and taping checks and shall be responsible for protection and preservation of such stakes established by Registered Land Surveyor.

E. Contractor shall bear sole responsibility for correct transfer of all construction lines and grades from primary line and grade points and for correct alignment and grade of finished structure, based upon primary line and grade established by Registered Land Surveyor.

F. Except for those lot corners and survey monuments that fall within trench excavation, Contractor shall be solely responsible for protection and/or replacement of all survey corners that exist throughout work area.

G. Corners will be located and marked by Owner, upon request by Contractor, prior to commencing its work.

H. A Registered Land Surveyor shall replace damaged corners at Contractor's expense.

3.4 SAWING AND BREAKING PAVEMENT

A. Concrete pavement, slabs or bases shall be sawed to a minimum 1/2 of the depth of existing pavement, slab or base prior to being removed.

B. Asphalt surface course and asphalt base course shall be saw cut full depth before being removed.

C. Pavements shall be cut evenly along edges of excavation prior to their removal in such a way as to avoid excessive removal or ragged, uneven edges.

D. A drop weight or other type of machinery for breaking pavement when approved by Architect may be used when such usage does not become a nuisance or a source of damage to underground or adjacent structures.

E. Prior to employing a drop weight, Contractor shall verify that there is no nearby underground structure that would be injured by its use.

F. Contractor shall be solely responsible for any damage caused thereby.

G. Architect reserves right to order discontinuance of use of such drop weight at any time.

3.5 PREPARATION FOR EXCAVATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Notify utility company to remove and relocate utilities that interfere with Work.

D. Protect above and below grade utilities indicated to remain.

E. Protect plant life, lawns and other features remaining as portion of final landscaping.

F. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.6 FIELD QUALITY CONTROL FOR EXCAVATION

A. Provide for visual inspection of bearing surfaces.

3.7 EXPOSING EXISTING STORM SEWER

A. Before excavation of trench is begun, Contractor shall uncover stub end of existing utility to which new utility is to be connected. This will permit adjustments in line and grade and verify connection required.

B. Existing terminations in manholes to which new utilities are to be connected shall be securely plugged to prevent entry of construction water and debris into active system.

3.8 BUILDING DRAINAGE EXCAVATION

A. Underpin adjacent entities that may be damaged by excavation work, including utilities and pipe chases.

B. Excavate subsoil required to accommodate new building drainage system and construction operations.

C. Machine slope banks to angle of repose or less, until shored.

D. Excavation cut not to interfere with normal 45 degree bearing splay of foundation.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Hand trim excavation. Remove loose matter.

G. Remove lumped subsoil, boulders, and rock.

H. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

I. Correct unauthorized excavation at no extra cost to Owner.

J. Correct areas over-excavated in error.

K. Stockpile excavated material in area designated on site and remove excess material not being reused, from site.

3.9 TRENCH EXCAVATION

A. Excavate subsoil required for installation of utility.

B. Excavate trenches at top of pipe to a maximum width based on dimension of outside diameter of pipe plus 24 inches to enable installation of pipe and to allow inspection.

C. Width at top of pipe may be increased with prior approval of Architect/Engineer to allow for stringers and sheathing when required.

D. Pipe to be laid in open-cut trench shall have 6-inch minimum clearance between outside face of pipe barrel and face of sheathing or sidewall of trench.

E. Maximum width of trench at ground surface shall not exceed width of trench at top of pipe by more than 2 feet without prior request to Architect/Engineer, unless it is specifically allowed on construction drawings.

F. Excavated material stored along trench excavation shall be placed a minimum distance back from edge of trench. Said distance shall be determined by angle of repose of trench material to prevent surcharging of trench wall material leading to potential shearing of trench wall and collapse of trench.

G. Excavated material to be used for trench backfilling shall be stored so that it will cause no interference to; (1) public travel; (2) adjacent owners or tenants; (3) other Contractors.

H. Excavated material, which is not to be used as trench backfill, shall be immediately removed from site and disposed of by Contractor, unless directed otherwise by Contract Documents.

I. Owner reserves right to order up to 10 percent of surplus excavated material to be delivered to Owner's streets, alleys, public properties, or locations designated by Architect.

J. Cost of delivering and leveling such surplus material to any point within a driving distance of two miles from site of work shall be include in bid for work.

K. After delivery to designated location, material shall be leveled off at direction of Architect.

L. Contractor shall maintain all finished excavations free of water or sewage during Work.

M. Hand trim excavation. Remove loose matter.

N. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard, measured by volume.

O. Correct unauthorized excavation and over-excavated areas at no cost to Owner.

P. No more trench shall be excavated in advance of completed pipe laying operations than can be completed and backfilled by end of workday.

Q. Not more than one street crossing may be obstructed by same trench at any one time.

3.10 TRENCH BEDDING

A. Trench bottom shall be free of water prior to placement of bedding and laying of pipe.

B. Place and shape bedding material to pipe, to a minimum depth of three inches under bell and four inches under spigot.

C. Support pipe during placement and compaction of bedding material.

D. Bring bedding and cover material over top of pipe to a minimum depth of twelve inches compacted depth.

E. Where sand is used for cover material, it shall be compacted with a portable plate compactor to a depth of twelve inches in two lifts of six inches each for initial compaction over pipe.

F. Apply remaining backfill in loose lift layers not exceeding 12 inches. Use compaction equipment that will achieve desired compaction requirements.

G. Contractor shall be responsible to verify that plug(s) are in place at end of each workday.

H. Contractor shall remove any water or debris from terminal manhole as required but not less than once a week.

3.11 PROTECTION

A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

3.12 EXAMINATION PRIOR TO BACKFILLING

A. Verify fill material to be reused are acceptable.

B. Verify foundation perimeter drainage installation has been inspected.

3.13 PREPARATION FOR BACKFILLING

A. Generally, compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of establishing compaction. Backfill with Type A2 fill, and compact to density equal to or greater than requirements for subsequent backfill material.

C. Where side wall material is loose or unstable, place geotextile cloth material over sidewall prior to backfilling.

3.14 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

C. Employ a placement method that does not disturb or damage foundation perimeter drainage, foundation waterproofing and utilities in trenches.

D. Maintain optimum moisture content of backfill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise.

F. Make grade changes gradual. Blend slope into level areas.

G. Leave fill material stockpile areas completely free of excess fill materials.

H. Remove surplus backfill materials from site.

3.15 TOLERANCES FOR BACKFILL

A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.16 FIELD QUALITY CONTROL FOR BACKFILL

A. Field inspection and testing will be performed under provisions of Division 01 – Quality Requirements.

B. Testing and analysis of fill material will be performed in accordance with ASTM D1556, ASTM D1557 and Division 01 - Quality Requirements.

C. Compaction testing will be performed in accordance with ASTM D6938 and Division 01 - Quality Requirements.

D. If tests indicate Work does not meet specific requirements, remove Work, replace and retest at no cost to Owner.

3.17 PROTECTION OF FINISHED BACKFILL

A. Protect finished Work under provisions of Division 01 - Temporary Facilities and Controls.

B. Re-compact fills disturbed by vehicular traffic.

3.18 MECHANICAL COMPACTION

A. Backfill shall be mechanically compacted by means of a tamping roller, sheepsfoot roller, pneumatic tire roller, vibrating roller, or other mechanical tampers. Impact, free-fall, or "stomping" type compaction equipment shall not be allowed.

B. Flooding or jetting of backfill for compaction purposes shall not be allowed.

C. Contractor shall furnish written notification to Architect/Engineer prior to start of work as to size and type of mechanical compaction equipment to be used.

D. Material for mechanically compacted backfill shall be placed in lifts, which, prior to compaction, shall not exceed thickness specified below for type of compaction equipment used:

1. Vibratory equipment including vibratory plate, vibratory smooth-wheel rollers, and vibratory pneumatic-tired rollers: maximum lift thickness two (2) feet.

2. Rolling equipment, including sheepsfoot (both vibratory and nonvibratory), grid, smooth-wheel (nonvibratory), pneumatic-tired (nonvibratory), and segmented wheels: maximum lift thickness one (1) foot.

3. Hand-directed mechanical tampers: maximum lift thickness of six (6) inches.

3.19 COMPACTION REQUIREMENTS

A. Granular Material shall be compacted to a density of 95 percent modified proctor.

B. Excavated Material to be used for backfill shall be compacted to a density equal to adjacent undisturbed trench wall.

3.20 SCHEDULE OF BACKFILL

A. Section 310516 - Aggregates defines "A" designated fill materials and Section 310513 - Soils defines "S" designated fill materials.

B. Fill to Correct Over-Excavation:

1. Aggregate Type A2 fill, flush to required elevation, compacted to 90 percent modified proctor density.

C. Exterior Slab-On-Grade:

1. Aggregate Type A2 fill, Place materials in continuous loose lifts layers not exceeding 7-inch depth, compacted to 95 percent modified proctor density.

D. Foundation Drainage - Stone Cover:

1. Aggregate Type A7 fill, Place materials in continuous loose lifts layers not exceeding 9-inch depth, compacted to 95 percent modified proctor density.

E. Utility Piping - Stone Bedding and Cover:

1. Aggregate Type A7 fill, Place materials in continuous loose lifts layers not exceeding 9-inch depth, compacted to 95 percent modified proctor density.

F. Utility Trench - Backfill in Paved Areas:

1. Aggregate Type A10 fill, Place materials in continuous loose lifts layers not exceeding 12-inch depth, compacted to 95 percent modified proctor density.

G. Utility Trench - Backfill in Non-paved Areas:

1. Subsoil Type S1 and S2 fill, to 6 inches below finish grade. Place materials in continuous loose lifts layers not exceeding 12-inch depth, compacted to 90 percent modified proctor density.

END OF SECTION 312317

SECTION 312513 – EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment and materials for erosion and sediment control to minimize erosion and siltation during construction.

2. Erosion and sediment control provisions detailed on Drawings and specified herein are minimum requirements for erosion control program.

3. Contractor to provide additional erosion and sediment control materials and methods required by state or local ordinances, whichever is more stringent.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.

2. Section 310513 - Soils: Existing topsoil and subsoil.

3. Section 310516 - Aggregates: Drainage stone.

4. Section 312213 - Rough Grading: Rough grading and contouring of project site.

5. Section 312317 - Site Excavation, Backfill and Compaction.

1.2 REFERENCES

A. ASTM International (American Society for Testing and Materials)

1. ASTM D3786 - Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.

2. ASTM D4491 – Water Permeability of Geotextiles by Permittivity.

3. ASTM D4533 – Trapezoid Tearing Strength of Geotextiles.

4. ASTM D4632 - Grab Breaking Load and Elongation of Geotextiles.

5. ASTM D4833 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

B. State of Wisconsin Department of Natural Resources, (WDNR)

1. Storm Water Construction and Post-Construction Technical Standards.

C. City of Madison, Wisconsin

1. Ordinance for Construction Site Erosion Control.

1.3 SUBMITTALS

A. Submittals to be provided in accordance with Division 01 - Submittal Procedures.

B. Provide erosion control plan indicating proposed methods, materials, and schedule for effecting erosion and siltation control to prevent erosion damage to site and adjacent area.

C. Plan shall include following:

1. Proposed methods for erosion and siltation control.

2. Erosion plan scale of 1 inch equals 40 feet, indicating location of erosion control materials, siltation basins, etc.

3. Schedule for implementation of plan.

4. Provision for maintenance and upkeep of erosion control and siltation materials, identifying persons responsible for said maintenance.

1.4 REGULATORY REQUIREMENTS

A. Comply with City of Madison, Wisconsin ordinance for construction site erosion control.

B. Comply with applicable state and federal rules and regulations governing erosion and siltation on construction sites.

C. Permit

1. Apply for, pay fee, and obtain State stormwater discharge permit.

2. Prepare construction site erosion control plan, Notice of Intent form, and submit form and current fee to Wisconsin Department of Natural Resources at least 14 working days prior to the commencement of land disturbing construction activities. At completion of construction activity, file Notice of Termination.

1.5 EROSION CONTROL PRINCIPLES

A. Keep disturbed area small.

B. Stabilize disturbed areas with mechanical or structural and vegetative methods.

C. Keep runoff low through use of short slopes, low gradients, and preservation of natural vegetative cover.

D. Protect disturbed areas from storm water runoff.

E. Retain sediment within site boundaries.

F. Implement a thorough maintenance and follow-up program.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sand Bags: Minimum unfilled size of 16 by 26 inches; completely filled with a sandy soil.

B. Erosion Bales: Tightly compacted bales of grain straw, hay, or other suitable material.

C. Geotextile Fabric: The textile shall be polyethylene fabric with properties as follows:

Property	Property Value
Grab Tensile Strength	120 lb. min. ASTM D4632
Elongation	15% x 15% max. per ASTM D4632
Mullen Burst Strength	260 psi min. ASTM D3786
Puncture	60 lb min. per ASTM D4833
Trapezoidal Tear	60 lb min per ASTM D4833
Apparent Size Opening	U.S. 30 sieve per ASTM D4751
Water Flow Rate	10 gal/min/sq.ft. max. per ASTM D4491
Ultra violet radiation stability	70 percent min. per ASTM D4355

D. Fabric with support netting shall be reinforced with an industrial polypropylene netting with 3/4-inch spacing and heavy-duty nylon top support cord or equivalent.

E. Support Posts: Wood or steel construction, minimum length 5 feet, supply staple, cord or other suitable means to attach geotextile to support posts.

F. Riprap and Breaker Run Stone: Riprap and breaker run stone shall conform to the following classifications:

1. Heavy Riprap Rock:

Given Size	Percent Total Weight Smaller Size of Stone
500 lbs.	100%
400 lbs.	90%
150 lbs.	50%
40 lbs.	20%

2. Light Riprap Rock:

Given Size	Percent Total Weight Smaller Size of Stone
150 lbs.	100%
60 lbs.	80%
20 lbs.	20%
2 lbs.	10%

3. Breaker Run Rock or 6-inch Crushed Rock:

Sieve Size	Percentage Passing by Weight
7-inch	100%
6-inch	90%
4-inch	75%
3-inch	10%

G. Temporary Vegetative Cover: Temporary seed mixture components as follows:

Species	Minimum Percent Purity	Minimum Percent Germination	Pounds per Acre
Oats	98%	90%	80
Annual Rye	98%	85%	100

1. Use rye grass when permanent seeding is to follow within one (1) year.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Erosion Bales Fencing

1. Place bales end to end across ditches or other location as designated on the plans.

2. Place bales at right angles to the direction of water flow with bandings oriented around sides.

3. Tightly abut ends of bales and fill any gaps between bales with bale material wedged in.

4. Embed straw bales a minimum 4 inches into ground.

5. Securely anchor bales with at least two wood or steel stakes driven a minimum 8 inches into ground.

B. Straw Bale Barrier

1. Install straw bale barriers in same manner as erosion bale fences.

2. Place bales such that one full bale length on either side of the drainage way is above anticipated flow line.

3. Where heavy flows are anticipated, supplement bales with a filter fabric fence installed on downstream side of bales.

C. Catch Basin and Inlet Protection on Soil

1. Install inlet barrier, a combination of filter fabric fencing and bale fencing, around the entire perimeter of inlet.

2. Install filter fabric fence as specified below except posts shall have a maximum spacing of 4 feet.

3. Install bale fence on exterior of filter fence as specified in (A).

D. Catch Basin and Inlet Protection on Paved Area

1. Remove inlet grate from basin.

2. Place filter fabric over inlet opening and push down in center to form a basket.

3. Install fabric such that it extends minimum 12 inches beyond inlet casting edges.

4. Re-install inlet grate to hold filter fabric in place.

5. Verify that fabric is retained in place by grate.

6. Place bales around perimeter of inlet and secure with a minimum of two perimeter rope or cable restraints.

E. Filter Fabric Fencing

1. Install filter fence to maximum height of 24 inches.

2. Install support posts on downstream side of fencing to depth that is adequate to insure stability of fence and at maximum spacing of 8 feet.

3. Excavate 4-inch by 4-inch trench up-slope along the line of support posts to anchor fabric.

4. Staple filter material to up-slope side of posts and extend fabric into trench.

5. Backfill and compact filter fabric in trench.

6. Provide silt fence surrounding existing catch and inlet basins affected by site work.

F. Riprap

1. Furnish and install riprap to the thickness and lateral extent necessary to prevent erosion and/or control sedimentation.

G. Mulch

1. Install mulch within seven days of active disturbance of soil surface.

2. Area to be mulched shall be reasonably free of sticks, stones larger than 3 inches in diameter, and rills and gullies.

3. Apply mulch at following rates:

Straw	70-90 pounds	per 1,000 sq. ft.
Wood Chips	275-425 pounds	per 1,000 sq. ft.
Wood Fiber	35-50 pounds	per 1,000 sq. ft.

4. Anchor mulch by one of following methods at time of spreading or immediately after spreading.

   a. Punch mulch into soil with weighted disc of similar implement to a depth of 2 inches.

   b. Application of emulsified asphalt or synthetic binder material intended for mulch retention purposes. Emulsified asphalt shall be placed at a rate of 75-100 gallons per ton of mulch.

   c. Apply synthetic materials in accordance with manufacturer's instructions.

H. Erosion Nets and Mats

1. Erosion nets and mats include excelsior retention blankets, jute matting, and polypropylene netting.

2. Install erosion nets and matting in accordance with manufacturer's instructions.

I. Vegetative Cover.

1. Install vegetative cover in accordance with manufacturer's instructions.

3.2 MAINTENANCE

A. Inspect erosion control devices within 24 hours after each rainfall or daily during periods of prolonged rainfall.

B. Repair or replace damaged or defective materials or installation immediately.

C. Remove sediment deposits within 24 hours after each storm event or when deposits reach one-half height of fence or barrier, whichever occurs first.

D. Apply replacement bales, additional mulch, netting or matting immediately to maintain suitable cover.

E. Where vegetative cover has been placed, inspect until vegetative cover is established and functioning as intended.

3.3 REMOVAL OF EROSION CONTROL DEVICES

A. Maintain erosion control measures disturbed earth has been paved or vegetated.

B. Remove erosion control devices prior to final inspection and acceptance of Project site by Owner.

C. Restore or replace areas disturbed or damaged by removal of erosion control devices to satisfaction of Architect.

END OF SECTION 312513

SECTION 321123 – AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aggregate Materials.
2. Sub-grade Preparation.
3. Test Rolling Equipment and Procedures.
4. Aggregate Installation Requirements.
5. Base Course Schedule.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.
2. Section 310516 - Aggregates.
3. Section 312213 - Rough Grading: Preparation of site for base course.
4. Section 312317 - Site Excavation, Backfill and Compaction.
5. Section 321313 - Exterior Concrete Pavement: Finish concrete gutter.

1.2 REFERENCES

A. State of Wisconsin Department of Transportation

1. Standard Specifications for Highway and Structure Construction, 2003 Edition with latest supplements. (WISDOT)

B. ASTM International (American Society for Testing and Materials)

1. ASTM D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1556 - Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft.-lbf/ft3 (2,700 kN-m/m3)).
4. ASTM D6938 – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

PART 2 - PRODUCTS

2.1 AGGREGATE MATERIALS

A. Aggregate Material: Type A2: As specified in Section 310516 - Aggregates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 SUBGRADE PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and recompacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 TEST ROLLING SUBGRADE

A. Test Rolling shall be used when verifying stability and uniformity of subgrade. This procedure shall be performed in presence of Architect/Engineer and Geotechnical Engineer.

B. Use test rolling equipment conforming to following description:

1. Tandem axle, dual wheel dump truck.

2. Tire pressure shall be no less than 90 percent of manufacturer's recommended maximum inflation.

3. Minimum gross weight of loaded truck shall be 60,000 pounds.

4. Provide weigh slip to Architect/Engineer and Geotechnical Engineer.

C. Test Rolling Procedure shall be performed as follows:

1. Operate equipment at a rate not to exceed 3 to 5 mph or a comfortable walking pace. Adjust speed to allow Architect/Engineer and Geotechnical Engineer to measure any deflections and areas of rutting.

2. Operate proof roller equipment in a pattern so that affected areas are loaded with at least one pass.

3. After proof rolling, check subgrade for conformance to drawings, and correct all surface irregularities. Re-shape subgrade within tolerances specified.

D. Test Rolling Evaluation:

1. Rutting up to 1-inch is acceptable. Rutting in excess of 1 inch but not more than 6 inches, shall be considered a failure and will require that soil be reworked and compacted to

required density.

2. Deflection (pumping) up to 1-inch is acceptable. Deflection in excess of 1 inch but not more than 2-inches shall be acceptable if there is not substantial cracking or lateral movement of soil. Deflection in excess of 2-inches but not more than 6-inches shall be considered a failure, and will require that soil be reworked and compacted to required density.

3. Rutting and deflection in excess of 6 inches will require review and recommendation for corrective action by an approved Geotechnical Engineer.

4. After remedial work is performed, a final test roll shall be performed upon completion of work. If remedial work is performed as directed, a second test roll may be required at discretion of Architect/Engineer and Geotechnical Engineer.

3.4 AGGREGATE INSTALLATION REQUIREMENTS

A. Spread aggregate over prepared substrate to a total compacted thickness as indicated on Drawings.

B. Place aggregate in maximum 7-inch loose lifts and compact to specified density.

C. Level and contour surfaces to elevations and gradients indicated.

D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.5 TOLERANCES

A. Flatness: Maximum variation of 1/2 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation From Design Elevation: Within 1/2 inch.

3.6 FIELD QUALITY CONTROL

A. Perform compaction testing in accordance with ASTM D698, ASTM D1556, ASTM D1557 and Division 01 - Quality Requirements.

B. Perform moisture content testing in accordance with ASTM D6938 and Division 01 - Quality Requirements.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

D. Frequency of Tests: As determined by Geotechnical Engineer and Certified Testing Agency.

3.7 BASE COURSE SCHEDULE

A. Under Concrete Gutter:

1. Aggregate Type A2, compact to 95 percent, modified proctor density.

END OF SECTION 321123

SECTION 321313 – EXTERIOR CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Materials and Installation requirements for exterior concrete components as follows:

a. Sidewalks.

b. Gutters.

c. Aggregate base course.

2. Exterior Concrete Design Requirements as follows:

a. Concrete mix design.

b. Reinforcement.

c. Concrete curing and sealing.

d. Jointing.

e. Quality control and testing.

f. Concrete placement and finishing.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.

2. Section 312213 - Rough Grading: Preparation of site for paving and subbase.

3. Section 321123 - Aggregate Base Course: Aggregate base course.

1.2 REFERENCES

A. American Concrete Institute (ACI)

1. ACI 301 – Structural Concrete.

2. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.

3. ACI 305 - Hot Weather Concreting.

4. ACI 306 - Cold Weather Concreting.

5. ACI 308 – Standard Practice for Curing Concrete.

6. ACI 309 – Guide for Consolidation of Concrete.

7. ACI 325 – Guide for Construction of Concrete Pavements and Concrete Bases.

8. ACI 347 – Guide to Formwork for Concrete.

B. ASTM International (American Society for Testing and Materials)

1. ASTM A82 - Steel Wire, Plain, for Concrete Reinforcement.

2. ASTM A184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.

3. ASTM A185 - Steel Welded Wire Reinforcement, Plain, for Concrete.

4. ASTM A497 - Steel Welded Wire Reinforcement, Deformed, for Concrete.

5. ASTM A615 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

6. ASTM A767 – Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.

7. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.

8. ASTM A884 - Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.

9. ASTM A934 - Epoxy-Coated Prefabricated Steel Reinforcing Bars.

10. ASTM C31 - Making and Curing Concrete Test Specimens in the Field.

11. ASTM C33 - Concrete Aggregates.

12. ASTM C39 - Compressive Strength of Cylindrical Concrete Specimens.

13. ASTM C94 - Ready-Mixed Concrete.

14. ASTM C143 - Slump of Hydraulic-Cement Concrete.

15. ASTM C150 - Portland Cement.

16. ASTM C172 - Practice for Sampling Freshly Mixed Concrete.

17. ASTM C231 - Air Content of Freshly Mixed Concrete by the Pressure Method.

18. ASTM C260 - Air-Entraining Admixtures for Concrete.

19. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

20. ASTM C494 - Chemical Admixtures for Concrete.

21. ASTM C618 - Fly Ash as Admixture for Concrete.

22. ASTM C1116 - Fiber-Reinforced Concrete and Shotcrete.

23. ASTM D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction Nonextruding and Resilient Bituminous Types.

24. ASTM D1752 - Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.3 SUBMITTALS

A. Division 01 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on joint filler, reinforcement, admixtures, and curing compounds.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with specified ACI requirements.

B. Maintain one copy of each document on site.

C. Obtain cementitious materials from same source throughout.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Form Materials: Conform to ACI 301 and 347.

B. Joint Filler: ASTM D1751 type; 1/2- inch thick.

2.2 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615; 60 ksi yield grade; deformed billet steel bars; with ASTM A775 epoxy coated finish.

B. Welded Steel Wire Fabric: Plain type, ASTM A185; in flat sheets; with ASTM A884 epoxy coated finish.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150 Normal – Type 1A, gray color.

B. Fine and Coarse Mix Aggregates: ASTM C33.

C. Water: Potable, not detrimental to concrete.

D. Air Entrainment: ASTM C260.

E. Flyash: ASTM C618, Class C.

2.4 CHEMICAL ADMIXTURES

A. Chemical admixtures shall be in accordance with ASTM C494.

B. Concrete may contain Type A Water-reducing admixture.

C. Admixtures are to be used in accordance with manufacturer's recommendations.

D. Chemical admixtures containing chlorides, sulfides, or nitrides are not permitted.

E. A single manufacturer shall supply permitted admixtures.

F. Admixture manufacturer's are to be approved in writing by Engineer prior to use.

2.5 ACCESSORIES

A. Joint Filler: ASTM D1751, Bituminous fiber, 1/2-inch wide by depth of concrete less 1/8-inch.

B. Form Release Agent: Colorless material which will not stain concrete, absorb moisture or impair natural bonding or color characteristics of coating, intended for use on concrete;

1. Manufacturers

a. Symons Corporation; Series: Magic Kote.

b. W. R. Meadows; Series; Duogard.

c. BASF Building Products - Sonneborn; Series Sonocrete Castoff.

d. Dayton Superior; Series: Clean Strip C&M (J-1-A).

e. Substitutions: Not Permitted.

2.6 CURING AND TREATMENT MATERIALS

A. Water: Potable and clean.

B. Membrane Curing Compound: ASTM C309, Type II, white pigmented;

1. Manufacturers:

a. BASF Building Products - Sonneborn; Type: Sonocrete Kure-N-Seal.

b. W. R. Meadows - Sealtight; Type CS-309-1315.

c. Dayton Superior - Type: General Purpose Cure & Seal (J20).

d. BASF Building Products - MasterBuilders; Type: Masterkure N-Seal-W.

e. L & M Construction Chemicals; Type: L&M Cure R.

f. Symons Corporation; Type: Resi-Chem Clear Cure.

g. Substitutions: Not Permitted.

2.7 CONCRETE MIX - BY PERFORMANCE CRITERIA

A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

B. Provide concrete to the following criteria:

1. Compressive Strength: 2,500 psi at 7 days.

2. Compressive Strength: 4,000 psi at 28 days.

3. Slump: 3 to 4 inches.

4. Air Entrained: 6 ± 1 percent.

2.8 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94.

B. Schedule of Mixes:

Class	Name	Max. Agg. Size (inch)	Max. Slump** (inch)	Min. Cement Sacks/cu.yd.	Min. Comp. Strength (psi/28 days)	Max. Water Cement Ratio
9*	Exterior Walks, Gutters,	3/4	3	6.25	4000	0.45

* Air Entrained Concrete Mix. Normal Acceptable range of air content 5%-7%.
** Slump Tolerances Max Slump of: 3 inch plus 1 inch minus 1/2-inch.

C. Concrete mix designs shall be prepared and submitted in accordance with Division 01 – Submittal Procedures, and included as part of cost of this Work.

D. Mix designs shall be prepared by a qualified agency acceptable to Architect/Engineer. Six (6) copies of mix designs shall be submitted for Architect/Engineer's review prior to placing any concrete.

E. Mix design shall indicate brands, types, and quantities of admixtures included, compressive strength, slump, sieve analysis for fine and coarse aggregate, quantities of all ingredients, type and brand of cement, source of aggregate, whether fine aggregate is natural or manufactured.

F. Use accelerating admixtures in cold weather only when approved by Engineer in writing. Use of admixtures will not relax cold weather placement requirements.

G. Use calcium chloride only when approved by Engineer in writing.

H. Use set retarding admixtures during hot weather only when approved by Engineer in writing.

2.9 SOURCE QUALITY CONTROL AND TESTS

A. Submit proposed mix design of each class of concrete to appointed firm for review prior to commencement of Work.

B. Tests on cement, aggregates, and mixes will be performed to ensure conformance with specified requirements.

C. Test samples in accordance with ACI 301.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade and granular base is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 AGGREGATE BASE COURSE

A. Section 321123 - Aggregate Base Course, forms the base construction for Work of this section.

3.3 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of inlet and related utility frames with oil to prevent bond with concrete pavement.

C. Notify Architect/Engineer minimum 24 hours prior to commencing concrete operations.

3.4 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.5 REINFORCEMENT

A. Place reinforcement as indicated.

B. Interrupt reinforcement at expansion joints.

3.6 PLACING CONCRETE

A. Place concrete in accordance with specified ACI Requirements.

B. Concrete may be placed using the slip form technique.

C. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

3.7 JOINTS

A. Place control joints as follows for identified entities;

1. Gutter: 10 feet.

2. Sidewalks: Match existing.

B. Place expansion joints using joint filler as follows for identified entities;

1. Gutter: 300 feet.

2. Sidewalks: 100 feet.

C. Jointing shall be performed to match existing concrete finishes. Jointing tools and equipment must provide minimum joint depth as specified by ACI requirements.

D. If method of jointing is saw cutting, Contractor shall perform sawcutting operations as soon as possible following curing process, without damaging new concrete.

3.8 FINISHING

A. Sidewalk Paving: Broom finish. Edging to match existing.

B. Gutters: Broom finish. Edged with 1/2-inch radius edging tool.

C. Direction of Texturing:

1. Gutters: Parallel to pavement direction.

2. Sidewalks: Transverse to pavement direction.

D. Place curing compound on exposed concrete surfaces immediately after finishing.

3.9 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/2 inch in 10 feet.

B. Maximum Variation From True Position: 1/2 inch.

3.10 FIELD QUALITY CONTROL

A. Concrete testing shall be paid for by Contractor.

B. Testing firm will take cylinders and perform slump and air entrainment tests in accordance with ACI 301.

C. Three concrete test cylinders will be taken for every 75 or fewer cubic yards of concrete placed each day.

D. One additional test cylinder will be taken during cold weather and cured on site under same conditions as concrete it represents.

E. One slump test will be taken for each set of test cylinders taken.

F. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.11 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian traffic over pavement for 2 days minimum after finishing and vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION 321313

SECTION 32 31 00 ALUMINIZED FABRIC ON GALVANIZED FRAMEWORK

PART 1 -GENERAL

1.1 SECTION INCLUDES

A. Aluminum coated chain link fencing and accessories..

1.2 GATES AND RELATED SECTIONS

I. Section 04 20 00 Unit Masonry
Section 1331416 Bleacher Renovation

1.2 SUBMITTALS

A. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.

C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.

D. Samples: 12"x12" sample of fabric, with wires, and accessories.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Products from qualified manufacturers having a minimum of five years experience manufacturing aluminum coated chain link fencing will be acceptable by the architect as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size gauge of metal parts and fabrication.

B. Obtain link fences and gates, including accessories, fittings, and fastenings, from a single source.

2.2 CHAIN LINK FENCE FABRIC

A. Aluminized wire: Aluminum coated wire, ASTM A 491 - 6 & 9 ga., .4 oz/sf [wire spec. A817-83], - 11 ga.,.35 oz/sf.

2. 3 STEEL FENCE FRAMING

A. Steel pipe - Type I: ASTM F 1083, standard weight schedule 40; minimum yield strength of 30,000 psi (205 MPa); sizes as indicated. Hot-dipped galvanized with minimum average 1.8 oz/ft² (550 g/m²) of coated surface area.

B. Steel pipe - Type II: Cold formed and welded steel pipe complying with ASTM F 1043, Group IC, with minimum yield strength of 50,000 psi (344 MPa), sizes as indicated. Protective coating per ASTM F 1043, external coating Type B, zinc with organic overcoat, 0.9 oz/ft² (270 g/m²) minimum zinc coating with chromate conversion coating and verifiable polymer film. Internal coating Type B, minimum 0.9 oz/ft² (270 g/m²) zinc or Type D, zinc pigmented, 81% nominal coating, minimum 3 mils (0.08 mm) thick.

C. Formed steel ("C") sections: Roll formed steel shapes complying with ASTM F 1043, Group II, 45,000 psi (310 MPa) minimum yield strength steel; sizes as indicated. External coating per ASTM F 1043, Type A, minimum average 2.0 oz/ft² (601 g/m²) of zinc per ASTM A 123, or 4.0 oz/ft² (1220 g/m²) per ASTM A 525.

D. Steel square sections: [ASTM A 500, Grade B] Steel having minimum yield strength of 40,000 psi (275 MPa); sizes as indicated. Hot-dipped galvanized with minimum 1.8 oz/ft² (550 g/m²) of coated surface area.

2.4 ACCESSORIES

A. Chain link fence accessories: [ASTM F 626] Provide items required to complete fence system. Galvanize each ferrous metal item and finish to match framing. Fittings should match Master Halco specifications.

B. Post caps: Formed steel, cast malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. Cap to have provision for barbed wire when necessary. "C" shaped line post without top rail or barbed wire supporting arms do not require post caps. (Where top rail is used, provide tops to permit passage of top rail.)

C. Top rail and rail ends: Pressed steel per ASTM F626, for connection of rail and brace to terminal posts.

D. Top rail sleeves: 7" (178 mm) expansion sleeve with a minimum .137" wire diameter and 1.80" length spring, allowing for expansion and contraction of top rail.

E. Wire ties: 9 gauge [0.148" (3.76 mm)] galvanized steel wire for attachment of fabric to line posts. Double wrap 13 gauge [0.092" (2.324 mm)] for rails and braces. Hog ring ties of 12-1/2 gauge [0.0985" (2.502 mm)] for attachment of fabric to tension wire.

F. Brace and tension (stretcher bar) bands: Pressed steel, minimum 300 degree profile curvature for secure fence post attachment. At square post provide tension bar clips.

G. Tension (stretcher) bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16" x 3/4" (4.76 mm x 19 mm). Provide tension (stretcher) bars where chain link fabric meets terminal posts.

H. Tension wire: Aluminum coated steel wire, 7 gauge, [0.177" (4.5 mm)] diameter core wire with tensile strength of 75,000 psi (517 MPa).

I. Truss rods & tightener: Steel rods with minimum diameter of 5/16" (7.9mm). Capable of withstanding a

L. Nuts and bolts are galvanized.

2.5 SETTING MATERIALS

A. Concrete: Minimum 28 day compressive strength of 3,000 psi (20 MPa).

OR

B. Drive Anchors: Galvanized angles, ASTM A 36 steel 1" x 1" x 30" (25 mm x 25 mm x 762 mm) galvanized shoe clamps to secure angles to posts.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify areas to receive fencing are completed to final grades and elevations.

B. Ensure property lines and legal boundaries of work are clearly established.

3.2 CHAIN LINK FENCE FRAMING INSTALLATION

A. Install chain link fence in accordance with ASTM F 567 and manufacturer's instructions.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

C. Space line posts uniformly.

D. Drive Anchor [line] posts: With protective cap, drive post 36" (914 mm) into ground. Slightly below ground level install drive anchor shoe fitting. Install 2 diagonal drive anchors and tighten in the shoe.

E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

F. Bracing: Install horizontal pipe brace at mid-height for fences 6' (1829 mm) and over, on each side of terminal posts. Firmly attach with fittings. Install diagonal truss rods at these points. Adjust truss rod, ensuring posts remain plumb.

G. Tension wire: Provide tension wire at bottom of fabric [and at top, if top rail is not specified]. Install tension wire before stretching fabric and attach to each post with ties. Secure tension wire to fabric with 12-1/2 gauge [0.0985" (2.502 mm)] hog rings 24" (610 mm) oc.

H. Top rail: Install lengths. Connect joints with sleeves for rigid connections for expansion/contraction.

I. Center Rails. Install mid rails between posts with fittings and accessories.

J. Bottom Rails: Install bottom rails between posts with fittings and accessories.

3.0 CHAIN LINK FABRIC INSTALLATION

A. Fabric: Install fabric on security side and attach so that fabric remains in tension after pulling force is released. Leave approximately 2" (50 mm) between finish grade and bottom selvage. Attach fabric with wire ties to line posts at 15" (381 mm) on center and to rails, braces, and tension wire at 24" (600 mm) on center.

B. Tension (stretcher) bars: Pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands or clips spaced maximum of 15" (381 mm) on center.

3.4 ACCESSORIES

A. Tie wires: Bend ends of wire to minimize hazard to persons and clothing.

B. Fasteners: Install nuts on side of fence opposite fabric side for added security.

C. Barbed wire: Uniformly space parallel rows of barbed wire on security side of fence. Pull wire taut and attach in clips or slots of each extension.

D. Slats: Install slats in accordance with manufacturer's instructions.

3.5 CLEANING

A. Clean up debris and unused material, and remove from the site.

SECTION 328400 - SITE IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide irrigation component replacement .

B. Related Sections

1. Applicable provisions of Division 01 shall govern all work under this Section.

2. Section 024114 – Utility Abandonment and Removal: Removal and replacement of landscape irrigation components affected by new construction.

3. Section 312317 – Site Excavation, Backfill and Compaction.

1.2 REFERENCES

A. American Society for Testing and Materials:

1. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

2. ASTM D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

3. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

4. ASTM F645 - Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems.

B. NSF International:

1. NSF 14 - Plastics Piping System Components and Related Materials.

1.3 QUALITY ASSURANCE

A. Trenching, piping, wiring, product installation and related irrigation operations shall be provided by a firm specializing in such work, who shall be responsible for its implementation and initial maintenance.

B. Work and materials shall be in accordance with latest rules and regulations of local ordinances, and other applicable laws or regulations, including any local code requirements.

C. Permits for installation or construction of any work included under this contract, which are required by authorities having jurisdiction, shall be obtained and paid for by Contractor.

D. Contractor shall also arrange for and pay costs in connection with any inspection and examination required by authorities having jurisdiction.

E. Preliminary review of completed replacement installations will be made prior to backfilling of trenches and during hydrostatic testing.

F. Contractor is required to install, adjust and maintain their finished work at their expense for initial one (1) year acceptance period.

1.4 SUBMITTALS

A. Prior to bid acceptance, submit certification of installer's experience identifying a minimum four previous projects with names of Owners and Landscape Architects to Prime Contractor for approval.

B. Substitutions:

1. Contractor shall use materials as specified and as identified in these specifications.

2. Material other than that specified, will be permitted only after written application by Contractor and written approval by project Landscape Architect prior to bid opening.

3. Substitutions will only be allowed when in best interest of Owner.

4. Installation of any approved substitution is Contractor's responsibility. Any changes required for installation of any approved substitution must be made to satisfaction of Owner's Representative and without additional cost to Owner.

5. On or before date of final inspection, Contractor shall deliver one (1) reproducible mylar and two (2) sets of reproducible prints of "Record Drawings" to Owner and Owner's Representative.

6. Delivery of "Record Drawings" shall not relieve Contractor of responsibility of furnishing required information that may have been omitted.

C. Closeout Submittals:

1. Project Record Documents: Provide record of actual locations of concealed components, piping system and conduit.

2. Operation and Maintenance Data:

a. Submit instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.

b. Submit schedule indicating length of time each valve is required to be open to deliver determined amount of water.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials in original factory containers indicating name of manufacturer and model number.

B. Handling of equipment and products shall be in a timely and accurate manner to ensure safe, uninterrupted business operations at site.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum five years documented experience in design and installation of landscape irrigation systems and approved by irrigation system manufacturer.

1.7 EXISTING CONDITIONS

A. Contractor must acknowledge that they have examined project site, drawings and entire Project Manual and submissions of a quotation shall be considered as evidence that examinations have been made.

B. Contractor shall verify drawing dimensions with actual field conditions and inspect related work and adjacent surfaces.

C. Contractor shall report to Architect all conditions which prevent proper execution of this work.

D. Exact location of existing utilities, structures and underground utilities, which may not be indicated on drawings, shall be determined by Contractor.

E. Contractor shall conduct their work so as to prevent interruption of service or damage to existing utilities, structures and underground utilities.

F. Contractor shall protect existing structures and utility services and be responsible for their replacement if damaged during construction activities.

G. Maintain grade stakes set by others. Hand excavate as may be required,

H. Contractor shall verify correctness of finish grades within work area to insure proper soil coverage of sprinkler system pipes.

1.8 CLEAN-UP AND PROTECTION

A. Contractor shall keep premises free from rubbish and debris at all times and shall arrange material storage so as not to interfere with operation of the project.

B. Unused materials, rubbish and debris shall be removed from site immediately.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified and meeting requirements of specified system.

2.2 PIPE

A. Piping shall be from virgin parent material and shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious wrinkles and dents.

B. Pipe shall be National Sanitation Foundation (NSF) approved.

C. Piping and fittings shall be Polyvinyl Chloride (PVC) 1120 with a minimum Class rating matching or exceeding removed piping material.

1. Pipe shall be marked at intervals, not to exceed 5 feet, with following information: Manufacturer's name or trade mark, nominal pipe size, schedule, PVC type and grade, SDR rating class, working pressure at 73 degrees F and (NSF) approval.

D. Piping used as sleeve material shall be Polyvinyl Chloride (PVC) 1120, Schedule 40 rating.

2.3 ACCESSORIES

A. Solvent used for PVC pipe shall bear NSF approval, and shall be Weld-on #705.

2.4 SHUT-OFF VALVES

A. Shut-off valves shall be bronze double-disc wedge type gate valves, with integral taper seats and non-rising stems, same size as line, match existing valve type and series.

2.5 QUICK COUPLE VALVES

A. Quick Couple Valves shall be furnished with two valve keys and fitted with 3/4-inch swivel hose, match existing valve type and series.

B. Note: Quick couple valves are located at each solenoid control station.

2.6 VALVE BOXES

A. Valve boxes and covers shall match existing.

2.7 DRAIN VALVES

A. Manual Drain Valve shall be bronze double-disc wedge type gate valves, with integral taper seals and non-rising stems, same size as line, shall match existing.

2.8 SPRINKLER HEADS

A. Sprinkler heads shall be pop-up type per irrigation plan and details, as manufactured by:

1. Hunter Industries, Inc. (www.hunterindustries.com) 760-591-7383

2. Match existing model new installation.

3. Existing sprinkler heads shall be removed and given to Owner.

2.9 ELECTRICAL CONTROL WIRING

A. Wiring specified for low voltage solenoid valve operations shall be in compliance with local electrical codes, and UL approved for direct burial applications.

B. Solid copper wiring of varying color insulation shall be minimum 24 gauge, sized for current draw at longest run.

C. Common ground wire shall be white insulated.

D. Extend two 10 gauge wires from controller, one within each harness, through full length of electrical trench, and tag each end "not used."

E. Wire splicing is permitted at intervals of 400 lineal feet or greater, utilizing UL approved direct bury splice kit with gel-filled reservoir as manufactured by:

1. 3M Company - DBY-6 600V Direct Bury Splice Kit, 2 Tubes 2 Scotchlock™ Y connectors (www.3m.com) 1-800-245-3573

2.10 SOLENOID STATION VALVES

A. Remote control valves designed to operate from cycling of Automatic Controller shall be low voltage, DC operated globe valves of glass-filled nylon construction, match existing.

2.11 GRANULAR BACKFILL

A. Exclusive use of stone is specified below as backfill material within trench beneath paving, and as french drain infill throughout all manual and automatic drain locations.

B. Provide following material as irrigation cover and backfilling as specified for size as follows:

Sieve Size (In.)	Percent Passing (by weight)
1-1/2	90-100
1	20-55
3/4	0-15
3/8	0-5

PART 3 - EXECUTION

3.1 GENERAL

A. Contractor shall carefully schedule landscape and irrigation work and all other site developments to insure project development progression.

B. Sleeves are required wherever piping or electrical wires are placed under paved surfaces. Install sleeves prior to commencement of paving.

C. Layout irrigation equipment accurately to represent shop drawings.

D. Full and complete irrigation coverage is required. Contractor shall make any necessary minor adjustments to layout as required to achieve full coverage of irrigated areas at no additional cost to Owner.

E. It shall be Contractor's responsibility to establish location of all sprinkler heads in order to assure proper coverage of all areas. In no case shall spacing of sprinkler heads exceed distances shown on shop drawings and/or those specified. Pipe sizes shall match existing.

F. Install sprinkler system after completion of site grading, irrigation system shall be installed and completely operational three days prior to installation of any planting operations.

3.2 TRENCHING

A. Perform all excavations as required for installation of work included under this Section, including shoring of earth banks, if necessary.

B. Restore all surfaces disturbed during underground construction activities. Backfill and compact trenches completely. Compact trench areas to equivalent density of adjacent undisturbed soils.

C. Should un-chartered utilities not shown on drawings be found during excavations, Contractor shall promptly notify Architect for instructions as to further action. Failure to do so will make Contractor liable for any and all damage arising from their operations subsequent to discovery of such utilities.

D. Contractor shall indicate such un-chartered utility crossings on record drawings promptly and provide to Owner at completion of work.

E. Trenches shall be open, vertical sided construction shall be wide enough to provide free working space around work installed and to provide ample space for backfilling and compacting.

F. When two pipes are to be placed in same trench, a 6-inch space is to be maintained between pipes. Contractor shall not install two pipes with one directly above other.

G. Trenches located under paving shall be backfilled with sand, a layer 3 inches below pipe and 6 inches above pipe and compacted in layers to 95 percent modified proctor.

H. Depth of trenching shall be sufficient to protect finished buried services, following minimum cover is required:

1. 12 inches above lateral piping.

2. 18 inches above main supply piping.

3. 18 inches above low-voltage wiring.

4. 24 inches above sleeves at paved surfaces.

I. Contractor shall cut trenches for pipe to required grade lines and compact trench bottom to prove accurate grade and uniform bearing for the full length of line.

J. Laterals and mainline shall be sufficiently sloped to provide positive drainage toward drain valves.

3.3 BACKFLOW PREVENTION

A. Backflow Prevention Device or assembly is required to prevent contaminated irrigation system liquids from entering contiguous potable water system.

B. Installation and equipment shall be provided by others at locations specified on drawings in strict accordance to local codes and manufacturers instructions.

3.4 PIPE INSTALLATION

A. Plastic pipe and fittings shall be installed in a manner so as to provide for expansion and contraction as recommended by manufacturer.

B. Clean all pipes and fittings of dirt, burrs and moisture prior to assembly.

C. All pipe, fittings, valves, and related products shall be carefully placed in trenches.

D. Interior of pipes shall be kept free from dirt and debris and when pipe laying is not in progress, open ends of pipe shall be closed by approved means.

E. Lateral connections to mainline as well as all other connections shall be made in accordance with local code requirements. No connections to top of pipe shall be allowed.

F. Connections and joint of PVC pipe shall be performed as specified by manufacturer.

1. Solvent weld products for PVC pipe is listed in specification. Enlarged view detail is provided on Irrigation Detail sheet.

2. Threaded joints for PVC pipe shall be permitted with Schedule 80 pipe only.

a. Use Teflon tape on all threaded PVC fittings.

b. Use strap-type friction wrench only. Do not use metal-jawed wrench.

c. When connection is plastic to metal, male adaptors shall be used. Male adaptor shall be hand tightened, plus one turn with a strap wrench.

G. Laying of Pipe

1. Pipe shall be bedded on a 2-inch minimum thickness of stone backfill as specified. Stone may be compacted by foot tamp method to ensure uniform bearing.

2. PVC pipe shall be cut with pipe cutters or hacksaw in a manner so as to ensure a square cut. Burrs at cut ends shall be removed prior to installation so that a smooth unobstructed flow will be obtained.

3. Plastic to plastic joints will be solvent-weld joints. All plastic pipe and fittings shall be installed as outlined and instructed by pipe manufacturer.

4. PVC pipe and fittings shall be installed in a manner so as to provide for expansion and contraction as recommended by manufacturer.

5. Do not lay PVC pipe when there is water in trench.

H. PVC Pipe as Sleeve at Crossings

1. Piping used as sleeve shall be PVC 1120 Schedule 40 rating.

2. Plumbing sleeves shall be twice the diameter of the pipe to be sleeved.

3. Electrical sleeves shall be 3-inch diameter.

4. Low voltage wiring shall not be placed within same sleeve as water piping.

5. Construct buried sleeves prior to paving as laid out per enlarged section as provided on Irrigation Detail sheet.

I. Thrust Blocks:

1. Concrete thrust blocks must be provided on thrust side of all PVC pipe wherever pipe line:

a. Changes direction, as at tees or bends.

b. Dead ends.

c. Any other spot where thrust is to be expected.

2. A complete example of thrust block locations is provided on Irrigation Detail sheet.

3.5 VALVE INSTALLATION

A. Valves shall be installed as nearly as possible in positions indicated on shop drawings consistent with conveniences of operating wrench.

B. Valves shall be carefully erected and supported in their respective positions free from all distortion and strain or appurtenances during handling and installation.

C. Material shall be carefully inspected for defects in workmanship and material, debris and foreign material cleaned out of valve openings and seats, operating mechanisms operated to check their proper functioning, and nuts and bolts checked for tightness.

D. Valves and other equipment which does not operate easily or are otherwise defective shall be repaired or replaced at Contractor's expense.

E. Valves shall be set plumb and supported adequately in conformance with instructions of manufacturer.

F. Valve boxes shall be provided with proper length and size extensions, wherever required, to bring valve boxes level with finished grade of 1 inch above when sited within ground cover and shrub bed areas.

G. Shut-Off Valves:

1. Locate bronze gate valves as shut-off valves within lawn areas, enclosed within valve box at following specified locations:

a. After backflow preventer and prior to main supply loop.

b. Between mainline and each solenoid station valve.

c. Same bronze gate valve is also used as manual main system drain, per enlarged detail.

H. Solenoid Station Valves:

1. Install control valves in valve boxes grouping together where practical. Place no closer than 12 inches to walk edges, building, and walls.

2. Pressure regulating remote control valves shall be adjusted so that most remote sprinkler heads operate at pressure specified.

3. Valves shall be installed as shown in details and in accordance with manufacturer's instructions and specifications.

I. Quick Coupling Valves:

1. Shell be set a minimum of 12 inches from walks, curbs, or paved areas where applicable or as otherwise noted.

2. Quick coupling valves shall be housed in same valve boxes with each station valve.

3.6 SPRINKLER INSTALLATION

A. Sprinkler heads within a station shall be of same type and shall have matched precipitation rates.

B. Heads operating on one solenoid station valve shall do so at same pressure.

C. Heads shall be pop-up type as detailed. Permanent shrub risers are not permitted.

D. Place part-circle pop-up sprinkler heads 10 inches centerline from edge of adjacent walks, curbs, fixed features, or paved areas at time of installation.

E. Sprinkler nozzles shall be adjusted for proper radius and direction of spray pattern. Make adjustments to reduce overspraying onto walks and pavement and to eliminate any spray contact with structures.

F. Sprinkler heads and quick coupling valves shall be set perpendicular to finished grade unless otherwise designated on shop drawings.

G. Sprinkler heads shall be installed and plumbed per manufacturer's instructions.

3.7 CONTROLLER INSTALLATION

A. Automatic controller shall be installed at approximate location shown on shop drawing.

B. Controller shall be wall mounted in a locking box, power supply will be supplied by others.

C. Install in accordance with local code, manufacturer's latest printed instructions, and as detailed.

D. Local and other applicable codes shall take precedence in connecting 110-Volt electrical service to controller.

E. It is Landscape Contractor's responsibility to determine water application rates and timer cycling.

F. Irrigation Contractor will instruct Landscape Contractor on operation and programming of controller and will assist Landscape Contractor as necessary in such operations throughout one year maintenance period.

G. Any adjustments or repairs of irrigation system, other than programming, are responsibility of Irrigation Contractor.

3.8 CONTROL WIRING

A. Electrical equipment and wiring shall comply with local and state codes and be installed by those skilled and licensed.

B. Wiring shall occupy same trench and shall be installed along same route as main supply or lateral piping wherever possible, and shall have a minimum of 18-inches cover.

C. Control wires shall be installed to side of main line whenever possible. Placement over pipes is not permitted.

D. Where more than one wire is placed in a trench, wiring shall be taped together at intervals of 20 feet.

E. An expansion curl shall be provided within 3 feet of each wire connection and at least every 100 feet of wire length on runs of more than 100 feet in length.

F. Expansion curls shall be formed by wrapping at least 5 turns of wire around a 1-inch diameter pipe, then with drawing pipe.

G. Control wire splices at remote control valves to be crimped and sealed with specified splicing materials.

H. Line splices will be allowed only on runs of more than 400 feet and they must be located in 10-inch round splice boxes which are green in color. Connector shall be 3M#DBY splice kit.

3.9 FLUSHING THE SYSTEM

A. Thoroughly flush out all water lines under a full head of water before installing heads, valves, and quick coupler assemblies. Maintain flushing for a minimum of three (3) minutes at valve located furthest from water supply.

B. After flushing, cap or plug all openings to prevent entrance of materials that would obstruct pipe or clog heads. Leave in place until removal is necessary for completion of installation.

3.10 TESTING

A. Testing shall be done under supervision of Owner's Representative.

B. Make hydrostatic tests when welded PVC joints have cured as required by manufacturer's instructions.

1. Pressurized Mains:

a. Completely install water meter, water mains, lateral shut-off valve and station valves. Do not install laterals.

b. Close all lateral shut-off valves.

c. Fill all lines with water and shut off at valve.

d. Pressurized the main with air to 70 psi for 4 hours.

e. Leave lines and fittings exposed throughout testing period.

f. Leaks resulting from tests shall be repaired and tests repeated until the system passed.

2. Pressurized Laterals:

a. Test piping after laterals and risers are installed and system is fully operational.

b. Leave trenches open to detect possible leaks.

C. Upon completion of testing, complete assembly and adjust sprinkler heads for proper distribution.

D. Sprinkler heads and quick coupling valves shall be set perpendicular to finished grades unless otherwise designated on drawings, or otherwise specified.

E. Sprinkler heads adjacent to existing walls, curbs and other paved areas, shall be set to grade.

F. Sprinkler heads which are to be installed in lawn areas where turf has not yet been established shall be set 1-inch above proposed finish grade.

G. Heads installed in this manner will be lowered to grade when turf is sufficiently established to allow walking on it without appreciable destruction.

H. Lowering of heads shall be done by Contractor as part of original contract with no additional cost to Owner.

3.11 INSPECTION

A. Contractor shall maintain proper facilities and provide safe access for inspection to all parts of work.

B. Irrigation inspection shall consist of a minimum of:

1. Mainline pressure test.

2. Coverage test.

3. Final irrigation inspection.

C. Contractor shall be solely responsible for notifying Architect and Owner's Representative where and when such work is in readiness for testing.

D. If any work should be covered up without approval of Owner's Representative, it must be uncovered, for examination at Contractor's expense.

E. No inspection will commence without accurate "Record Drawings" and without completing previously noted corrections, or without preparing system for inspection.

3.12 BACKFILLING AND COMPACTION

A. After system is operating and required tests and inspections have been made, backfill excavations and trenches.

B. Backfill for trenches, regardless of type of pipe covered, shall be compacted to minimum 95 percent density of modified proctor under pavements, 85 percent under planted areas.

C. Backfill material shall be approved soil. Unsuitable material, including clods and rocks over 2 inches in size shall be removed from site.

D. A fine granular material shall be placed initially on all lines with minimum of 3 inches cover. No foreign matter larger than 1/2-inch in size shall be permitted in initial backfill.

E. Trenches located under paving shall be backfilled with 6-inch minimum layer of sand below pipe and 3 inches above pipe. Compacted in layers to 95 percent modified proctor.

F. Compact trenches in areas to be planted, by thoroughly flooding backfill through use of adjacent Quick Coupling Valves.

G. Within all planting and lawn areas existing 6 inches of topsoil shall be restored and finish grade shall be re-established.

H. Contractor shall dispose of surplus earth and stone backfill remaining after backfilling at an off-site location.

END OF SECTION 328400

SECTION 334100 - SITE STORM SEWER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sewer Pipe Materials.

2. Pipe Fittings and Accessories.

3. Storm Sewer Manholes, including Frames and Covers.

4. Inlets, including Frames and Grates.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.

2. Section 312317 – Site Excavation, Backfill, and Compaction: Excavating for storm sewer system piping.

1.2 REFERENCES

A. City of Madison Standard Specifications for Public Works Construction, 2007 Edition (MSSPWC).

B. ASTM International (American Society for Testing and Materials)

1. ASTM A48 – Gray Iron Castings..

2. ASTM A615 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

3. ASTM C270 - Mortar for Unit Masonry.

4. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

5. ASTM C478 – Precast Reinforced Concrete Manhole Sections.

6. ASTM D2321 - Underground Installation of Flexible Thermoplastic Sewer Pipe.

7. ASTM D3034 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

8. ASTM D4101 - Standard Specifications for Propylene Plastic Injection and Extrusion Materials.

9. ASTM F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. Code of Federal Regulation (CFR)

1. Title 29, Part 1926 Safety and Health Regulations for Construction, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

1.3 SUBMITTALS FOR REVIEW

A. Division 01 - Submittal Procedures: Requirements for submittals.

B. Product Data: Provide data indicating pipe materials pipe fittings, and precast structures.

C. Submit Structural Design Calculations and detailed Shop Drawings for flat top and special precast concrete manhole structures prepared and sealed by a Professional Engineer licensed in State of Wisconsin.

D. Design of flat top and special precast structures shall be in accordance with ACI 318 and ASTM C478.

E. Submit concrete mix data and test reports from an approved testing laboratory certifying that concrete used in precast structures conforms to specified requirements.

1.4 SUBMITTALS FOR INFORMATION

A. Division 01 - Submittal Procedures: Requirements for submittals.

B. Manufacturer's Instructions: Indicate special procedures required to install Products specified.

C. Certificate: Certify that Products meet or exceed specified requirements.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Division 01 – Project Record Documents: Project Record Drawings.

B. Record actual locations of pipe runs, connections, structures, control points, and invert elevations.

C. Identify, indicate, and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 REGULATORY REQUIREMENTS

A. Contractor shall comply with applicable rules and regulations of:

1. City of Madison Standard Specifications for Public Works Construction, 2007 Edition (MSSPWC).

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store castings and gaskets in shipping containers with labeling in place.

PART 2 - PRODUCTS

2.1 GENERAL

A. All pipes, fittings, and structures shall be manufactured in the United States of America.

2.2 PIPE MATERIALS

A. Polyvinyl Chloride (PVC) Pipe

1. Pipe: ASTM D3034, Type PSM, polyvinyl chloride (PVC) material; inside nominal diameter as shown on Drawings.

2. Joint Device: Bell and spigot style with ASTM F477 rubber ring sealed gasket.

2.3 PIPE FITTINGS AND ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Mortar: ASTM C270, Type S.

C. Filter Fabric: Non-biodegradable, non-woven, Mirafi N-series or approved equal.

2.4 PIPE LOCATION MATERIALS

A. Identification Warning Tape: Heavy plastic underground warning tape, 2-inch width. Color-Bright Green, warning message "Caution Buried SEWER BELOW" to repeat every 30 inches.

2.5 TRACER WIRE MATERIALS

A. Mark all non-conductive lateral pipes with a locating wire system.

B. Locating wire system consists of the following:

1. Tracer Wire: 45-mil solid copper, No. 12 HMW-PE yellow jacket coating. Install to enable electronic locating of underground utility.

2. Tracer Wire Locating Box: 2-1/2-inch diameter, minimum, ABS pipe with 2 point terminal box and cast iron cover.

a. Manufacturer: Valco, Inc. Model C.P. Mini Box, or an approved equal.

2.6 PRECAST CONCRETE STRUCTURES INCLUDING FRAMES AND COVERS

A. Precast Concrete Risers and Cone Sections for Manholes and Inlets: In accordance with ASTM C478, minimum wall thickness, one twelfth of internal diameter of riser or largest cone diameter plus 1 inch.

B. Precast Concrete Base Section with Integral Floor: In accordance with ASTM C478, minimum floor thickness 6 inches for risers up to 48-inches in diameter, and 8 inches for larger diameters; bench minimum slope 1/2-inch per foot from channel to wall; cast in place pipe sleeves.

C. Concrete Flat Slab Top: In accordance with ASTM C478 and approved Shop Drawings; Minimum thickness 6 inches for 48-inch diameter, 8 inches for larger diameters; equipped with lifting hooks.

D. Minimum access opening in cone or top section: 26-inch diameter.

E. Minimum compressive strength of concrete: 4000 psi.

F. Section shall support own weight and live load equivalent to AASHTO HS-20 Highway Loading unless otherwise indicated on Drawings.

G. Exterior wall shall be designed for a minimum equivalent fluid pressure of 90 pounds per square foot and consideration shall be given to additional lateral pressure from approaching truck wheels.

H. Form and cast openings with wall sleeves in base sections as required by Drawings.

I. Horizontal wall joints shall not be located within 18 inches of centerline of wall penetration.

J. Section joints: Reinforced concrete base and riser sections excepting grade rings, designed and formed with tongue and groove ends to produce a continuous, uniform manhole.

K. Identification Markings: Clearly marked on inside of each precast section indicating date of manufacture, name or trademark of manufacturer. Clearly mark on outside of each section vault identification number from Drawings.

L. Precast concrete grade rings shall conform to ASTM C478.

M. Mortar: ASTM C270, Type S.

N. Reinforcement: Formed steel wire, galvanized finish.

O. Manhole Steps

1. Steel reinforced copolymer polypropylene plastic ASTM D4101 PP0344B33534Z02; ASTM A615, Grade 60 steel reinforced 1/2 inch diameter formed; size, placement and embedment shall conform to OSHA 29 CFR 1926.1053 Ladders and ASTM C478; ends of legs tapered with fins for embedment.

2. Rungs and Steps in risers and conical sections: Aligned in each section to form continuous ladder with rungs equally spaced vertically in assembled manhole at maximum vertical spacing of 16 inches.

3. Steps shall be 12 inches wide, 16 inches on center vertically, set into manhole wall.

2.7 STRUCTURE FRAMES, COVERS, AND GRATES

A. Structure Frame and Cover:

1. ASTM A48 Class 30B, Cast iron construction, machined flat bearing surface, removable cover as identified on Drawings.

2. Manufacturers:

a. Neenah Foundry Company Neenah, Wisconsin.

b. East Jordan Iron Works, East Jordan, Michigan.

c. U.S. Foundry & Manufacturing Corporation, Miami, Florida.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that trench cut and excavation base are ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with Type A2 aggregate as specified in Section 310516 - Aggregates.

B. Remove large stones or other hard matter that could damage pipe or impede consistent backfilling or compaction.

C. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

D. Remove scale and dirt on inside and outside before assembly.

E. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 312317 – Site Excavation, Backfill and Compaction for Work of this section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous compacted layer not exceeding 4 inches compacted depth.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions and ASTM D2321.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions.

C. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1:1000.

D. Install bedding at sides and over top of pipe to minimum loose lift thickness of 18 inches; compacted to 95 percent modified Proctor density.

E. Backfill trench in accordance with Section 312317 - Site Excavation, Backfill and Compaction. Do not displace or damage pipe when compacting.

F. Connect to building storm sewer outlet and municipal sewer system, through installed sleeves.

G. Install colored marker tape continuous buried 12 inches below finish grade, above pipe line; coordinate with Section 312317 - Site Excavation, Backfill and Compaction.

H. Coordinate the Work with termination of storm sewer connection outside building, connection to municipal sewer utility service, and trenching.

3.5 PREPARATION FOR STRUCTURES

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.

C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

3.6 INSTALLATION - STRUCTURES

A. Excavation and Backfill:

1. Excavate for drainage structures in accordance with Section 312317 - Site Excavation, Backfill and Compaction. in locations and to depth shown. Provide clearance around sidewalls of structure for construction operations.

2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes or drainage structures in dry trench.

3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation.

4. Backfill excavations for drainage structures in accordance with Section 312317 - Site Excavation, Backfill and Compaction.

B. Install manholes and drainage structures supported at proper grade and alignment on crushed stone bedding to a minimum compacted thickness of 6 inches.

C. Set base section, align pipe sleeve openings to provide straight alignment of pipe through manhole base, level and plumb sections.

D. Set manhole at a grade to assure that no more than 8 inches of precast concrete rings would be required to bring manhole frame and cover to final grade.

E. Lift precast structures at lifting points designated by manufacturer.

F. When lowering manholes and drainage structures into excavations and joining pipe to units, take precautions to ensure interior of structure remains clean.

G. Place preformed flexible joint sealant on either side of tongue portion of joint in base section to assure filling of entire joint when assembled.

H. Set riser section on base, aligning joint prior to setting, lower riser section level and uniformly on to base to squeeze joint compound throughout tongue and groove joint, visible for inspection both interior and exterior for water tight fit.

I. Trowel excess joint compound material flush at interior and exterior surface after placement.

J. Repeat process for remaining riser sections and top, exercising care to align ladder rungs to form uniform vertical ladder.

K. Section shall be vertical and in true alignment with a maximum 1/4-inch tolerance per section allowed.

L. Allow joints to set for a minimum 24-hour period before backfilling.

M. Plug holes in section required for handling or other purposes with a non-shrinking grout, finished flush on inside.

N. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.

O. Cut pipe to finish flush with interior of structure.

P. Provide concrete flowline at bottom of lowest structure section to achieve sloped drainage from entering pipe to exiting pipe. Trowel smooth. Perform backfilling carefully, bringing fill up evenly on all sides.

Q. Compact fill around vault with a mechanical hand operated wacker.

3.7 INSTALLATION - FRAME AND COVER

A. Set frames using mortar and precast concrete adjustment rings as required.

B. Place precast concrete rings in full bed of mortar with completely fill joints. Verify maximum height of adjustment rings allowed by code prior to installing.

C. Plaster adjustment rings on both inside and outside of ring cylinder with mortar.

D. Place flexible joint sealant on centerline circumference of slab top or concrete ring with mortar bed placed on interior and exterior of sealant to full width of frame or ring area.

E. For non-pavement areas set frame and cover two inches above finished grade for manholes and other structures with covers to allow area to be graded away from cover beginning 1 inch below top surface of frame.

3.8 TRACER WIRE INSTALLATION

A. Lateral tracer wire originates and terminates in tracer wire access box located at right-of-way line. Install conductor tracer wire in one continuous loop.

B. Tape conductor tracer wire to top of pipe at minimum 10-foot intervals. Wrapping conductor tracer wire around pipe is prohibited.

C. Field test each locating wire after installation is completed.

3.9 FIELD QUALITY CONTROL

A. Perform compaction and moisture content testing in accordance with Section 312317 - Site Excavation, Backfill and Compaction.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

C. Frequency of Tests: As determined by Testing Agency.

D. Deflection Test: Deflection tests shall be performed for all polyvinyl chloride (PVC) pipe installations.

1. Deflection test shall be performed using a rigid ball or mandrel without a mechanical pulling device.

2. If deflection testing occurs within 30 days of placement of final backfill, deflection shall not exceed 5 percent.

3. When deflection testing occurs more than 30 days after placement of final backfill, maximum deflection shall not exceed 7.5 percent.

3.10 PROTECTION OF FINISHED WORK

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 334100

Department of Public Works
City Engineering Division

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GIS Manager
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NOTICE OF ADDENDUM

ADDENDUM NO. 1

CONTRACT NO. 6044

BREESE STEVENS FIELD RESTORATION – 2007

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

Include as a part of the contract documents, Addendum #1, issued by Isthmus Architecture, pages 1 – 15, as included with this cover sheet.

Please acknowledge this addendum on page E1 of the contract documents.

Electronic version of these documents can be found on the City of Madison web site at:

http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.

James P. Morgan
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ADDENDUM NO. 1

Date 8/06/2007 **Distribution**

Project Breese Stevens Field Rehabilitation

To Parks Department, City of Madison, Wisconsin
Potential Bidders

Project No. 0435

The following addendum is issued to amend the bid documents dated 7-23-07.

Description:

General:

1. The Owner will remove miscellaneous equipment and items from the stadium prior to construction.

2. The Owner will maintain limited access to the building throughout the construction period, primarily at the northeast end of the stadium.

3. The glass at windows to be repaired will be removed by a separate contract prior to the start of construction.

4. The structural engineers at Graef, Anhalt Schloemer can make available upon request a comprehensive photographic catalog of the required concrete repairs.

5. The Contractor will be responsible for providing temporary heat and power during construction.

6. The construction staging area is located at the northeast end of the stadium by the Construction Entrance on the paved area. See Sheet A1.1 of the bid documents. If additional area is required, the grass area immediately to the east may be used. The Contractor will be responsible for repairing and reseeding this area.

Project Manual:

7. Changes to Specifications:
   Section 13 34 16 BLEACHERS
   a) Page 3, 2.1. Acceptable Manufacturer
   B. Change Name from Steel Structures to Steel Stadiums

8. Changes to Specifications:
   Section 08 33 23 OVERHEAD COILING DOORS
   a) Page 2, 2.2 Materials: Omit B. through I. and replace with attached.

Drawings:

9. Sheet S2.1 – Partial Plan A1-G4 :
   ADD section cut T6/S4.1 (similar) to the back "street wall" at top of stadium seating. Section T6/S4.1 applies similarly to the street wall where it is composed of brick.

   CLARIFICATION: Membrane shall extend over curbs and 1'-2" down inside face of existing vomitory walls. Membrane shall be applied over the vomitory stairs and extend a minimum of 6" up the vomitory walls.

10. Sheet S2.2 – Partial Plan G4-O5
    CLARIFICATION: Membrane shall extend over all concrete surfaces, (horizontal, vertical, and over curbs) in the ADA seating platforms.

    CLARIFICATION: Membrane shall extend over curbs and 1'-2" down inside face of existing vomitory walls. Membrane shall be applied over the vomitory stairs and extend a minimum of 6" up the vomitory walls.

    CLARIFICATION: Membrane shall extend over curbs and down inside face of new and existing concrete at the new vomitory. Membrane shall be a minimum of 6" past the joint between existing concrete and the CMU wall.

11. Sheet S3.1 – New Concession and Restroom Foundation/Slab Plan
    MODIFY detail 6/S4.2 near the new accessible entry ramp/stoop to be 7/S4.2.

12. Sheet S3.2 – Enlarged Plans
    CLARIFICATION: Membrane shall extend over curbs and 1'-2" down inside face of existing vomitory walls. Membrane shall be applied over the existing vomitory stairs and extend a minimum of 6" up the vomitory walls.

10. The concrete ramp outside of Door D101A has been enlarged. See attached drawing Addendum 1/1.

11. A new floor drain has been added in room 101 Entry Foyer. See attached drawing Addendum 1 / 2 and

12. MP & E Addendum: See attached.

Attachments:

1. Specification Revision to Section 08 33 23 OVERHEAD COILING DOORS
2. Addendum 1/1 Drawing
3. Addendum 1/2 Drawing

4. ME & P Addendum description.
5. ME & P E-1 drawing.
6. ME & P P-1 drawing.
7. ME & P P-2 drawing.
8. ME & P P-3 drawing.
9. ME & P P-4 drawing.

ADDENDUM 1 1 8/06/07

SECTION 083323 -OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section includes overhead coiling security shutters and grill, locks and cylinders for Concessions Counter Window and at new Vomitory ramp.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's complete product data for all specified components, including specifications, finish information and installation instructions.

B. Shop Drawings: Submit shop drawings showing layout, sizes and types, product materials, components and accessories, fabrication data, operation and wiring diagrams for motor driven operators, finishes, rough-in dimension, anchorage and installation requirements and details.

C. Samples: Manufacturer's standard array of colors for selection by architect.

D. Quality Assurance Submittals:
   1. Certificates: Manufacturer's certification that design criteria meets specified requirements.
   2. Operating and Maintenance Instructions: Submit detailed maintenance requirements and operating instructions.
   3. Warranty: Submit standard warranty documents.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Use only manufacturer's factory trained installers or qualified licensed installers approved by shutter manufacturer.

B. Regulatory Requirements:
   1. Comply with all local and governing code requirements.
   2. Unless required otherwise, fabricate to withstand wind loads that have the same rating as component and cladding of walls.

C. Pre-Installation Conference: Conduct a pre-installation meeting to verify project installation and coordination requirements, field conditions and manufacturer instructions.

1.4 PROJECT CONDITIONS

1.5 WARRANTY

A. Manufacturer's Warranty: Submit, for owner's acceptance, manufacturer's standard warrant document executed by an authorized company official.
   1. Warranty Period: 1 year.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Overhead Coiling Doors:
   1. Overhead Door Corp., Pennsylvania Division; tel. (800) 929-2553

   2. QMI Roll Shutter Supply , 933 North Oaklawn Avenue, Elmhurst, IL 60126, Tel: (800) 446-2500 Fax: (630)782-1911

   2. Approved Equal.

2.2 MATERIALS

A. Shutter Components for Concessions Window:
   1. Slat Types: PVC Slats: Exterior type UV stabilized Extruded polyvinyl chloride: Style: PV-2 with slat reinforcement every 3 slats. Color: Beige.
   2. Bottom Bar: Extruded aluminum, 6063-T5 alloy, 0.050 inch wall thickness.
   3. Operation: Manual
      a. Manual operator type: 3/1 crank-strap recoiler,
      b. End-Caps: Die-cast aluminum. Style: 4 sided. Color: To match slats.
   4. Box Housing: .040 roll formed aluminum. Style 4 sided. Color: To match slats.
   5. Side Tracks: Aluminum extrusion, 6063-T5, lined with insulating woven polypropylene runners. Color: To match slats.
   6. Mounting: Surface.

~~B. Security Grilles for coiling grill at new Vomitory ramp:~~
   ~~1. Material: Aluminum.~~
   ~~2. Finish: Components shall have all non-galvanized, exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.~~

~~C Guides: extruded aluminum shapes with retainer grooves with continuous silicone treated wool-pile strips or PVC inserts to reduce noise and assist operation.~~

~~D. Brackets: minimum 3/16" steel to support barrel and counterbalance.~~

~~E. Counterbalance: helical torsion spring type. Counterbalance shall be housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03" per foot of span. Counterbalance shall be adjustable by means of an adjusting tension wheel.~~

~~F. Hood: galvanized steel, 24 gauge (primed steel, 24 gauge) hood with intermediate supports as required.~~

~~G. Manual Operation: chain hoist.~~

~~H. Locking: chain keeper locks for chain hoist operation.~~

~~I. Framing: free standing tubular steel support frames supplied with grilles.~~

B. Overhead Coiling Service Door at new Vomitory ramp:
   1. Curtain: Interlocking roll-formed galvanized steel slats, flat crown profile type CAW, 26 gauge for widths up to 12 feet 4 inches (3.75 m), 24 gauge for widths up to 16 feet (4.88 m). End of each slat shall be locked from lateral movement by a staking lock system. (Galvanized alternate malleable end locks.)

2. *Finish:*
   a. Curtain slats and hood shall be galvanized in accordance with ASTM A 653 and receive rust inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester top coat.

   b. Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.

3. *Weatherseals: Vinyl bottom seal.*

4. *Bottom Bar: Extruded aluminum.*

4. *Guides: Roll-formed galvanized steel shapes attached to continuous galvanized steel wall angle.*

5. *Brackets: Galvanized steel to support counterbalance and curtain.*

6. *Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel and supporting the curtain with deflection limited to 0.03 inch per foot of span. Spring tension shall be adjustable.*

7. *Manual Operation:*

8. *Locking: Interior bottom bar slide bolt for manually operated doors.*

9. *3x3 Mounting tubes supplied by manufacturer*

PART 3 EXECUTIONS

3.1 EXAMINATION

A. Take field dimensions and examine conditions of substrates to determine if acceptable for installation in accordance with manufacturer's instructions. Correct all unsatisfactory conditions prior to commencing shutter installation.

B. Coordinate installation of coiling door at ramp with ramp manufacturer.

3.2 INSTALLATION

A. Install all components to comply with project shop drawings and manufacturer's written instructions.

B. After installation test and adjust coiling door to operate properly and free from distortion.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

3.3 CLEANING

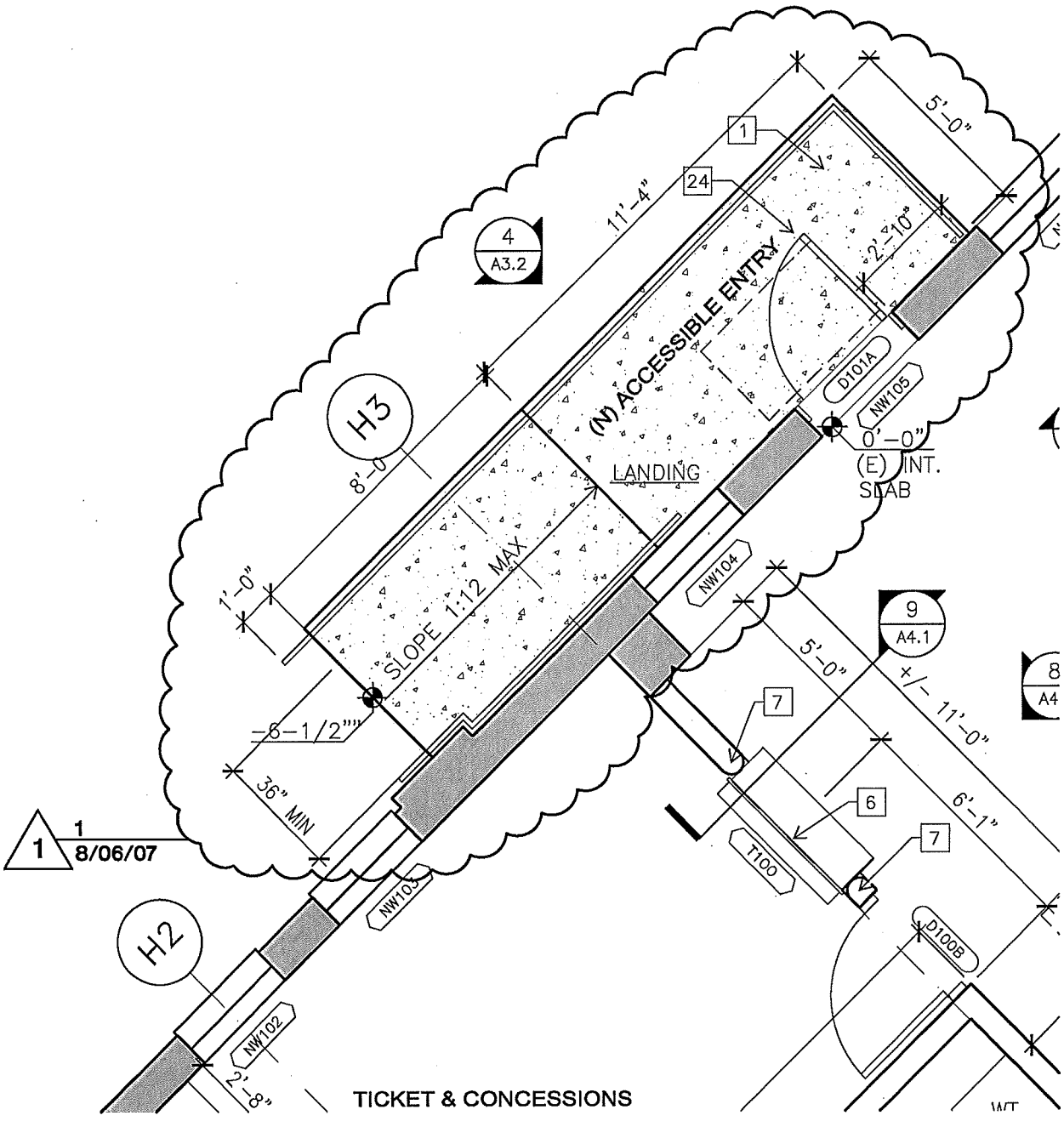
A. Clean installed components in accordance with manufacturer's instruction prior to acceptance. Remove all debris remaining, due to installation, from this installation.

B. Remove labels and visible markings.

3.4 PROTECTION

A. Comply with manufacturer's recommendations and protect completed shutter installations from damage during remaining construction so as not to void warranty.

END OF SECTION



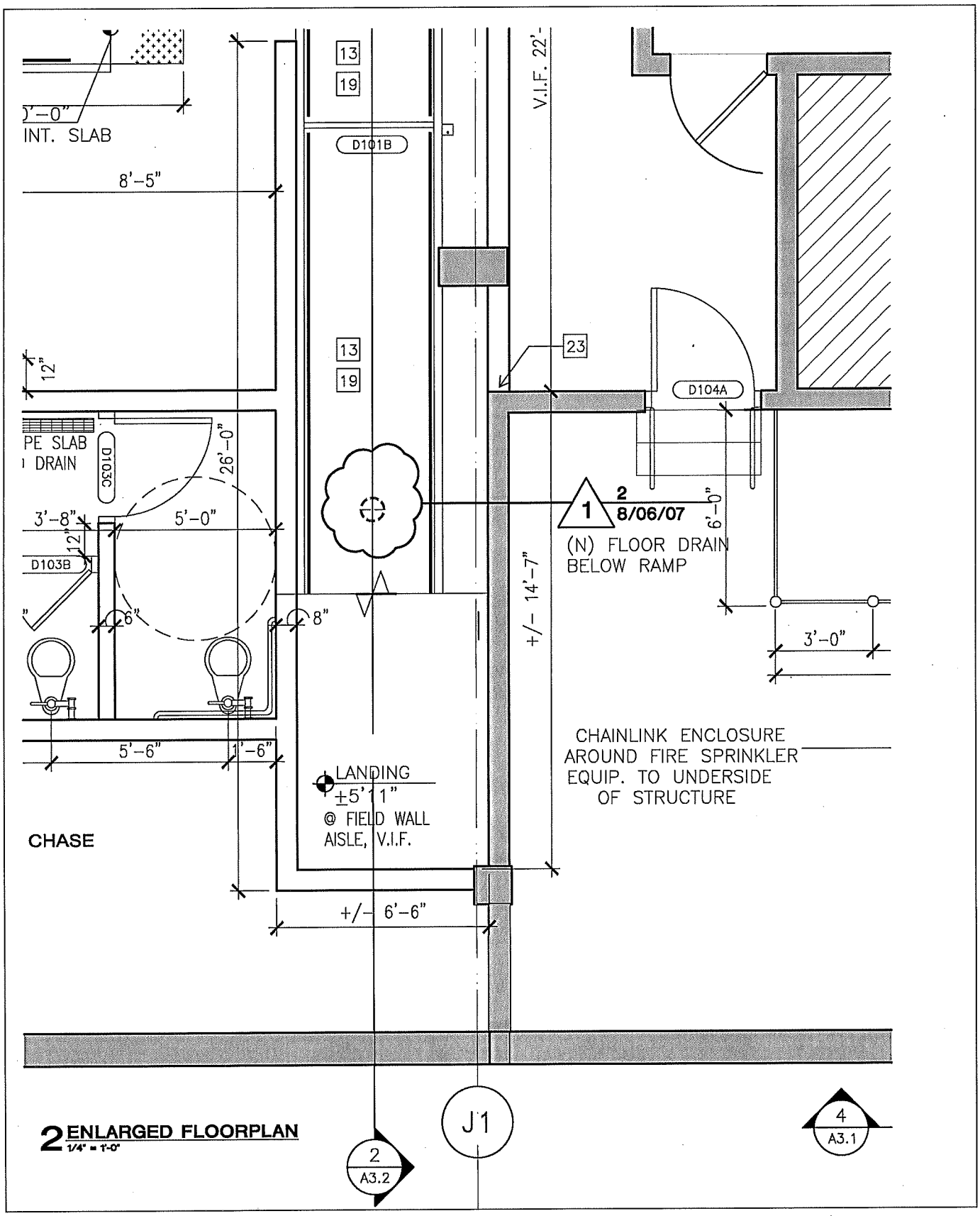
1 ENLARGED FLOORPLAN
1/4" = 1'-0"

ISTHMUS
ARCHITECTURE, INC.
613 Williamson Street
Suite 203
Madison, WI 53703
Phone: 608.294.0206
Fax: 608.294.0207

BREESE STEVENS FIELD REHABILITATION

ADDENDUM 1 1 8/06/07

Date Drawn: 08/06/2007
Revision Date: 08/06/2007
Reference Drawing: A2.4



2 ENLARGED FLOORPLAN
1/4" = 1'-0"

ISTHMUS
ARCHITECTURE, INC.
613 Williamson Street
Suite 203
Madison, WI 53703
Phone: 608.294.0206
Fax: 608.294.0207

BREESE STEVENS FIELD REHABILITATION

ADDENDUM 1 2 8/06/07

Date Drawn: 08/06/2007
Revision Date: 08/06/2007
Reference Drawing: A2.4

Addendum

Affiliated Engineers®

Affiliated Engineers, Inc.
P.O. Box 44991
Madison, WI 53744-4991
Tel 608.238.2616 • Fax 608.238.2614

Breese Stevens Field Rehabilitation Project	1 Addendum Number
Madison, Wisconsin Project Location	07049-00 AEI Project Number
	Client Project Number
Jacqueline Kimber, Jim Rush To	August 6, 2007 Date
August 10, 2007 Bid Due Date	Page 1 of 1 Page Typist

This addendum is issued to modify or interpret previously issued documents by additions, deletions, clarifications, or corrections. It forms a part of the previously issued documents.

This addendum may include revised pages and drawings, which shall be inserted before the corresponding page or drawings in the previously issued documents. Revised pages and drawings are identified by the corresponding addendum number and date

DRAWINGS

SHEET M 2.1

Item 1: Transfer Grilles in the toilet room doors to be furnished by the HVAC Contractor and installed by the General Contractor. Grilles are to be 20" x 12".

Item 2: HVAC Contractor to connect 12" x 12" toilet room exhaust ductwork to 28" x 12" louver furnished and installed by the General Contractor.

SHEET P 2.0

Item 1: Revise Floor Plan as shown on Drawing P-1, included in this Addendum.

Item 2: Revise Floor Plan as shown on Drawing P-2, included in this Addendum.

SHEET P 2.1

Item 1: Revise Floor Plan as shown on Drawing P-3, included in this Addendum.

SHEET P 6.0

Item 1: Revise Detail as shown on Drawing P-4, included in this Addendum.

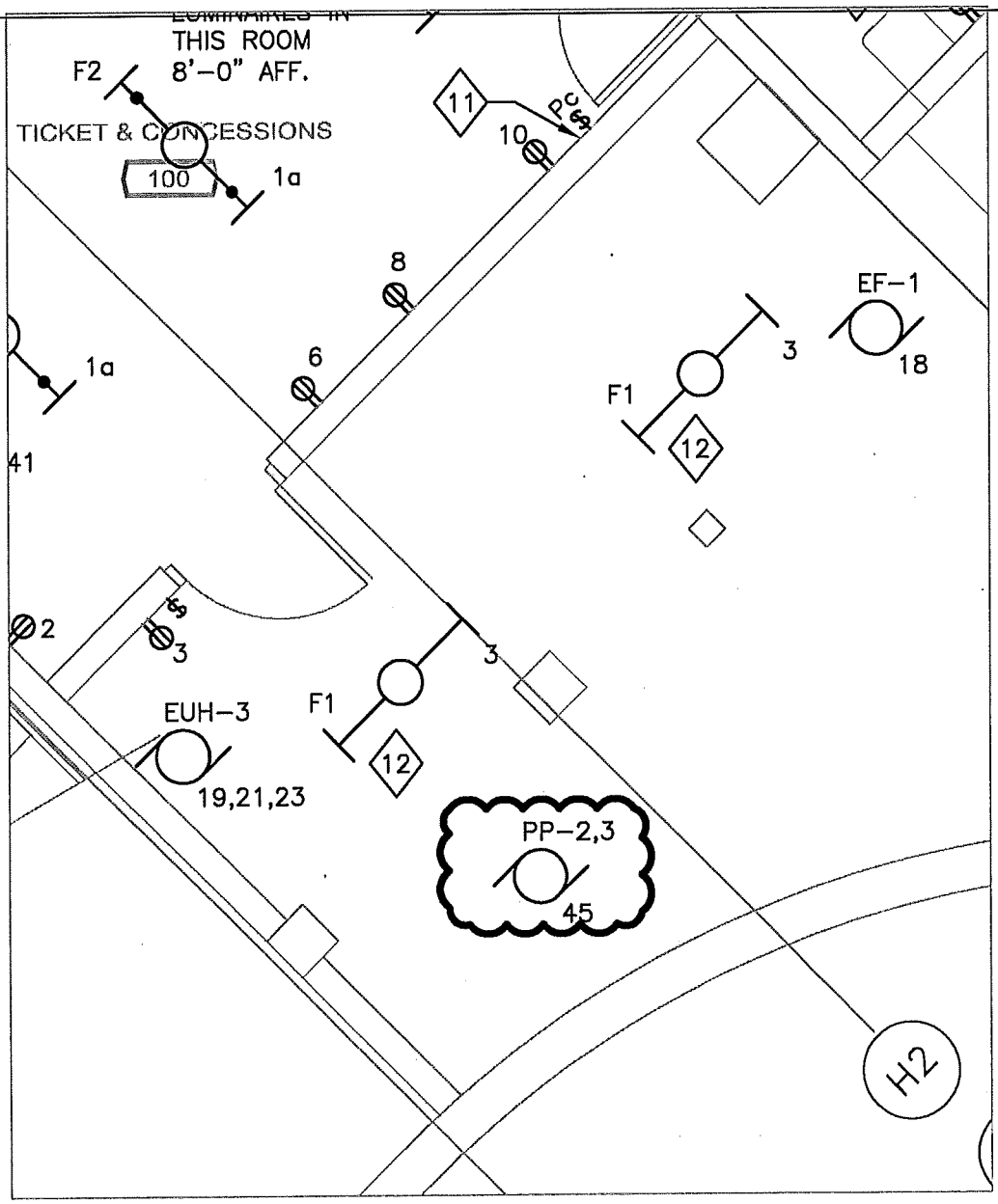
SHEET E2.1

Item 1: Add general notes 2 and 3. See attached drawing E-1, included in this Addendum.

Item 2: Add location of Sump pumps PP-2 and PP-3. See attached drawing E-1, included in this Addendum.

Attachments: P-1, P-2, P-3, P-4, E-1

END OF ADDENDUM



1 ENLARGED FLOOR PLAN

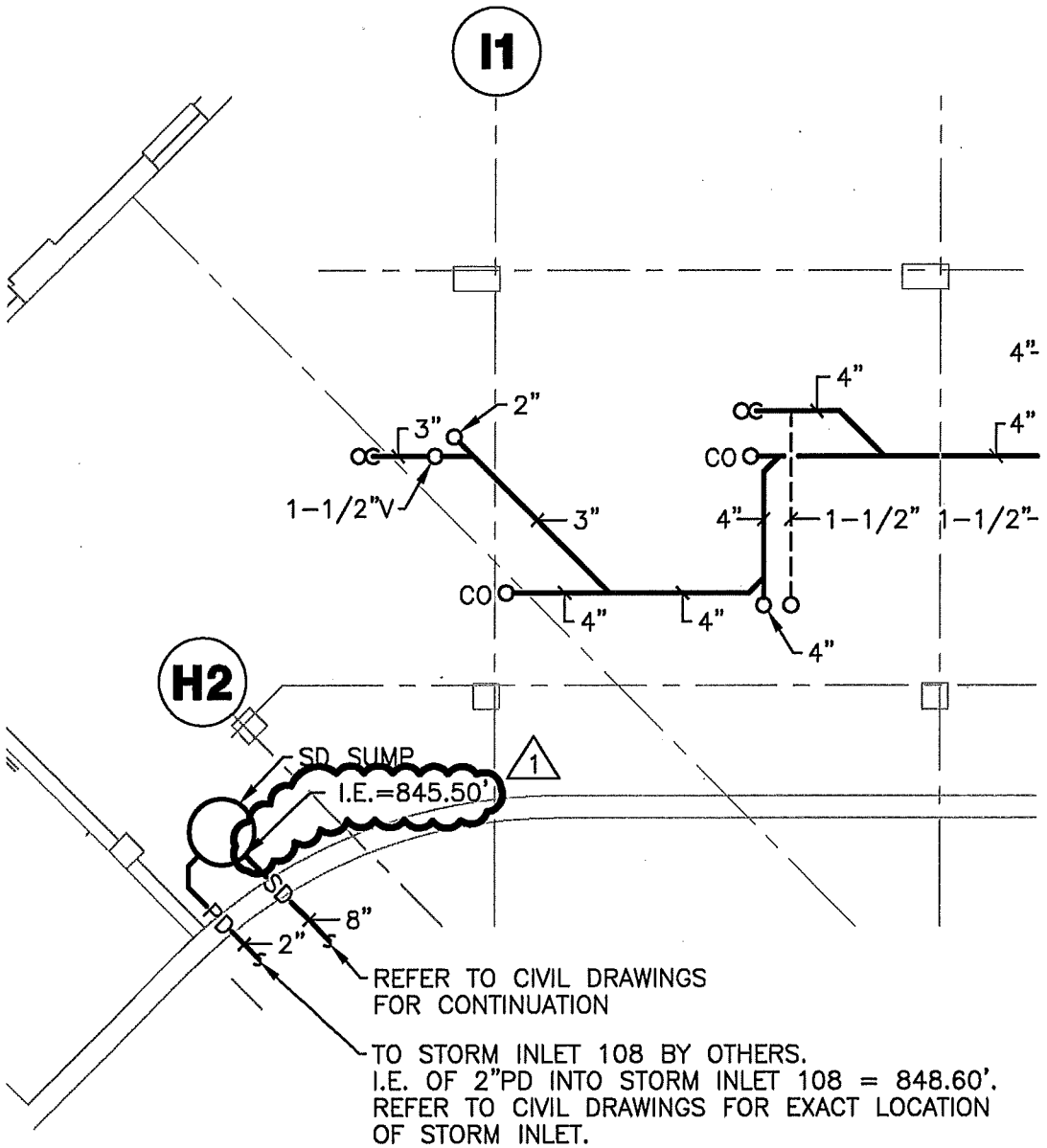
SCALE: 1/4"=1'-0"

General Notes

2. EXISTING PANEL E IS LOCATED APPROXAMATLEY 160' BETWEEN COLUMN LINES L2 AND L3. PANEL IS LOCATED ON SOUTH OF ROOM ON SOUTH SIDE OF WALL. REFER TO DRAWING M2.1 FOR LOCATION.

3. EXISTING LIGHTING AND CONDUIT LOCATED IN AREAS OF NEW ADA SEATING, EXCEPT THOSE BETWEEN COLUMNS J1 AND J2, SHALL BE RELOCATED AND REWIRED. LUMINAIRES SHALL BE RELOCATED TO UNDER SIDE OF BLEACHERS ONE ROW UP FROM NEW ADA STRUCTURE. REFER TO DRAWINGS A1.1, A1.2 AND A2.1 FOR LOCATION.

AUGUST 6, 2008, ADDENDUM #1, REFER TO E2.1



1 PARTIAL FLOOR PLAN

SCALE: 1/8"=1'-0"

AUGUST 6, 2008, ADDENDUM #1, REFER TO P2.0

Affiliated Engineers

P-1

BREESE STEVENS FIELD REHABILITATION FOR CITY OF MADISON PARKS

Project No. 07049-00

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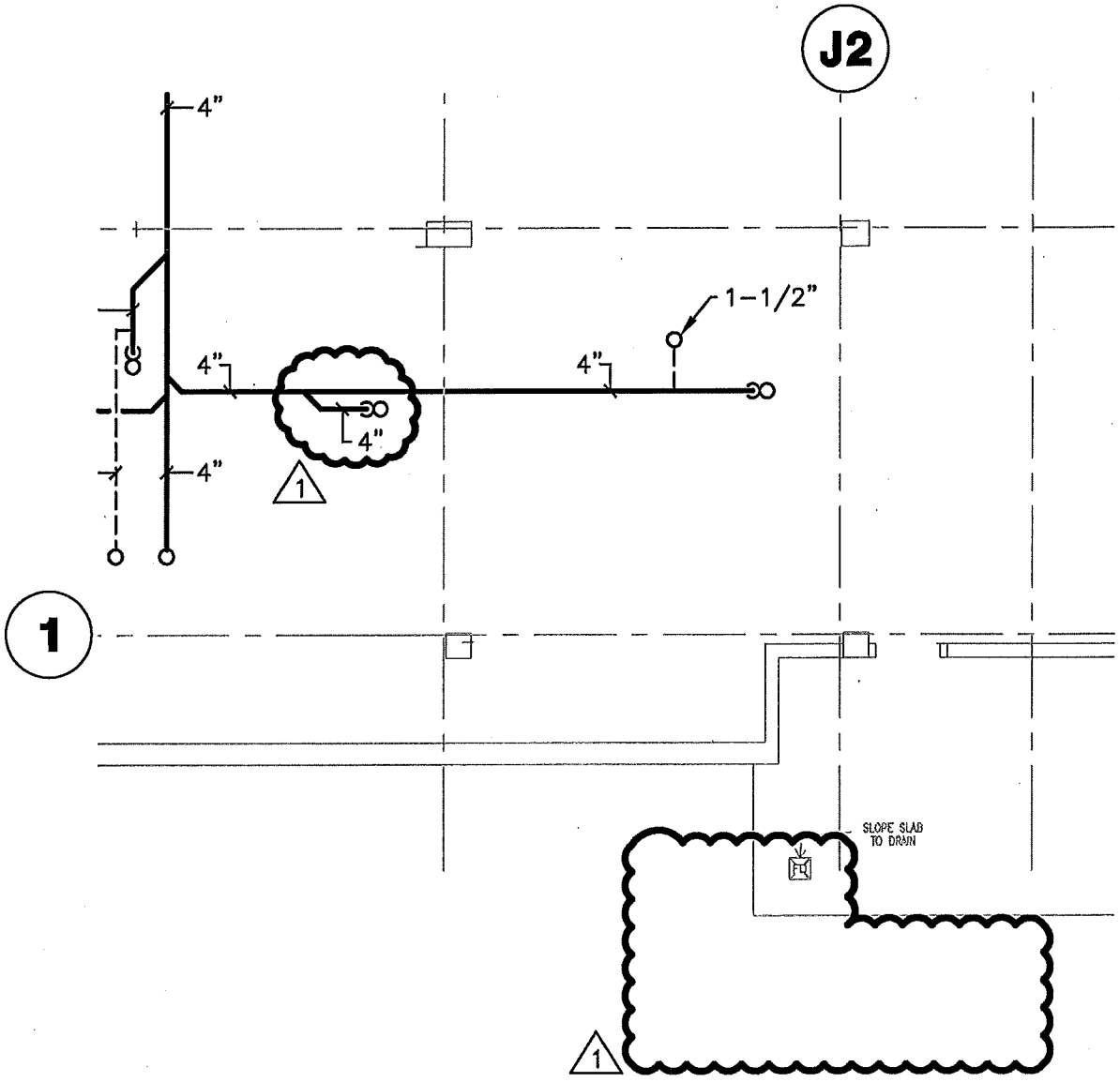
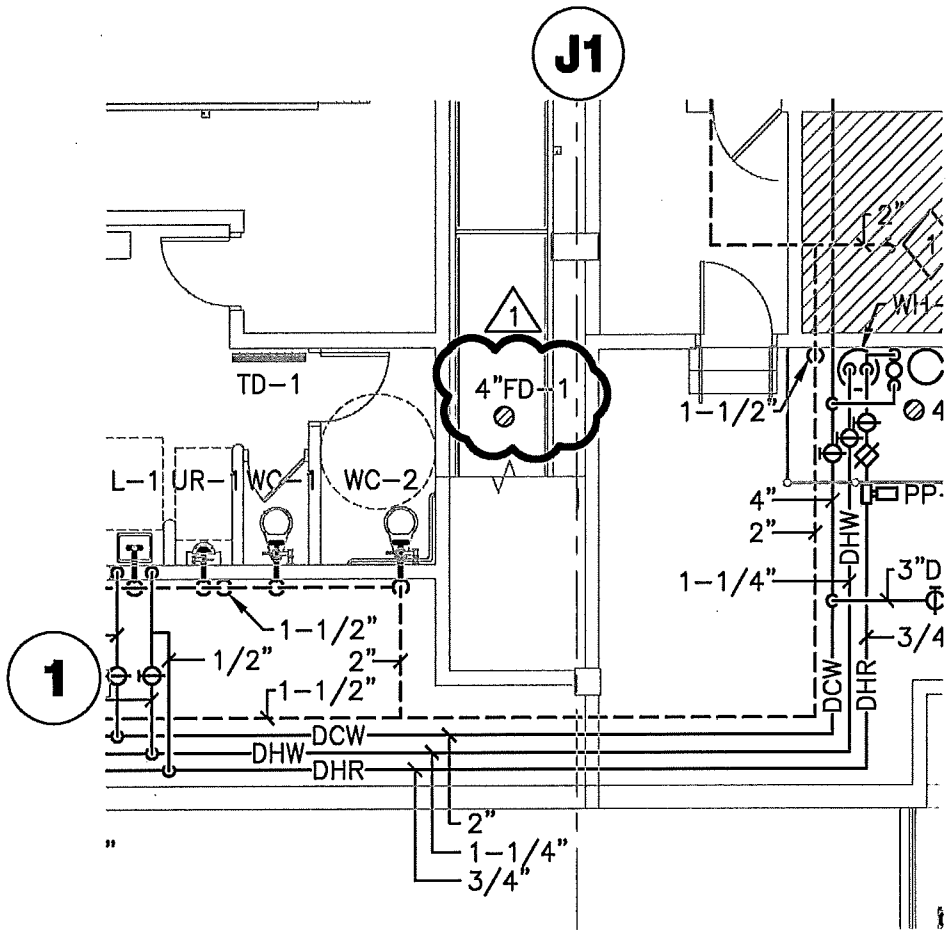


1 PARTIAL FLOOR PLAN

SCALE: 1/8"=1'-0"

AUGUST 6, 2008, ADDENDUM #1, REFER TO P2.0

AEI Affiliated Engineers®	P-2	BREESE STEVENS FIELD REHABILITATION FOR CITY OF MADISON PARKS	Project No. 07049-00



1 PARTIAL FLOOR PLAN

SCALE: 1/8"=1'-0"

AUGUST 6, 2008, ADDENDUM #1, REFER TO P2.1

Affiliated Engineers®	P-3	BREESE STEVENS FIELD REHABILITATION FOR CITY OF MADISON PARKS	Project No. 07049-00

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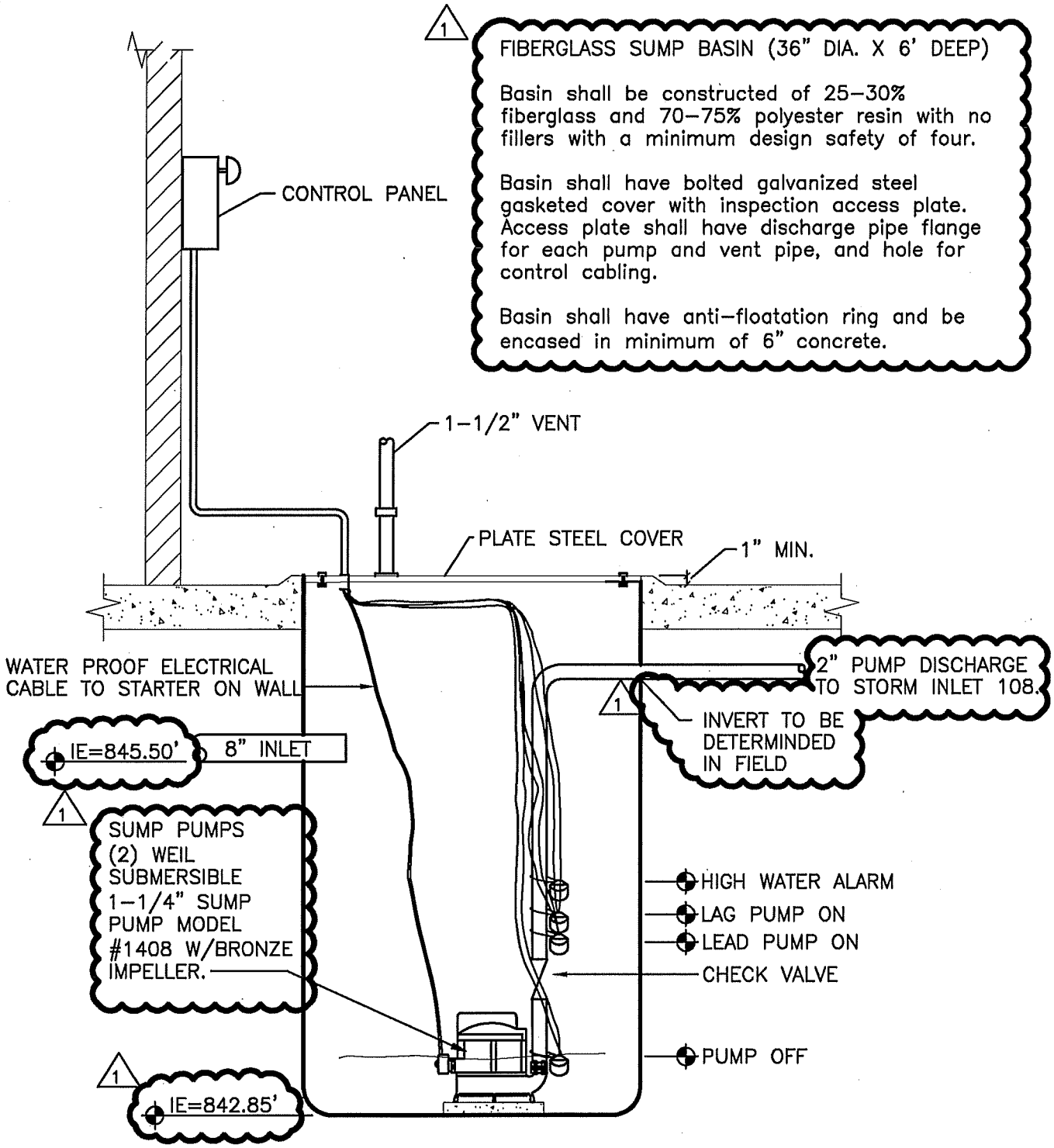

2 DUPLEX SUB SOIL DRAIN SUMP

SCALE: NONE

AUGUST 6, 2008, ADDENDUM #1, REFER TO P6.0

Affiliated Engineers®

P-4

BREESE STEVENS FIELD REHABILITATION FOR CITY OF MADISON PARKS

Project No. 07049–00

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SECTION E: PROPOSAL

Bidder must state a Unit Price and Total Bid for each item. The Total Bid for each item must be the product of quantity, by Unit Price. The Grand Total must be the sum of the Total Bids for the various items. In case of multiplication errors or addition errors, the Grand Total with corrected multiplication and/or addition shall determine the Grand Total bid for each contract. The Unit Price and Total Bid must be entered numerically in the spaces provided. All words and numbers shall be written in ink.

1. The undersigned having familiarized himself/herself with the Contract documents, including Advertisement for Bids, Instructions to Bidders, Form of Proposal, City of Madison Standard Specifications for Public Works Construction - 2007 Edition thereto, Form of Agreement, Form of Bond, and Addenda issued and attached to the plans and specifications on file in the office of the City Engineer, hereby proposes to provide and furnish all the labor, materials, tools, and expendable equipment necessary to perform and complete in a workmanlike manner the specified construction on this project for the City of Madison; all in accordance with the plans and specifications as prepared by the City Engineer, including Addenda to the Contract Nos. 1 through 1 issued thereto, at the prices for said work as contained in this proposal.
2. If awarded the Contract, we will initiate action within seven (7) days after notification or in accordance with the date specified in the contract to begin work and will proceed with diligence to bring the project to full completion within the number of work days allowed in the Contract or by the calendar date stated in the Contract.
3. The undersigned Bidder or Contractor certifies that he/she is not a party to any contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce or any other violation of the anti-trust laws of the State of Wisconsin or of the United States, with respect to this bid or contract or otherwise.
4. Accompanying this Proposal is ☒ Bid Bond or ☐ Certified Check in the amount of _____ Dollars ($_____)or ☐ a Certificate of Annual Bid Bond as required by the Advertisement for Bids.
   (IF BID BOND IS USED, IT SHALL BE SUBMITTED ON THE FORMS PROVIDED BY THE CITY. FAILURE TO DO SO MAY RESULT IN REJECTION OF THE BID).
5. I hereby certify that all statements herein are made on behalf of Bachmann Construction
   (name of corporation, partnership, or person submitting bid)
   a corporation organized and existing under the laws of the State of Wisconsin ~~a partnership consisting of _____; an individual trading as _____; of~~ the City of Madison; State of WI; that I have examined and carefully prepared this Proposal, from the plans and specifications and have checked the same in detail before submitting this Proposal; that I have fully authority to make such statements and submit this Proposal in (its, their) behalf; and that the said statements are true and correct.

Mark Date
Signature

Project Manager
Title, if any

Sworn and subscribed to before me this
10 day of August 2007
Sheryle McFarland
(Notary Public or other officer authorized to administer oaths)
My Commission Expires 10/22/07

NOTARY PUBLIC SHERYLE MCFARLAND STATE OF WISCONSIN

Bidders shall not add any conditions or qualifying statements to this Proposal.

Disclosure Of Ownership

1. **Instructions.** On the date a Contractor submits a bid to, or completes negotiations with, a State agency or Municipality on a Public Works construction project subject to §66.0903(3) or 103.49, Stats., the Contractor shall disclose to the state agency or municipality soliciting or negotiating the bids the name of any other construction business which the Contractor, or a Shareholder, Officer or Partner of the Contractor, owns or has owned within the preceding three (3) years.

   This information is only required to be disclosed if the Contractor, or a Shareholder, Officer, or Partner of the Contractor, owns or has owned at least 25% interest in the other construction business on the date the Contractor submits a bid or completes negotiations, or at any time within the preceding three (3) years, and the Wisconsin Department of Workforce Development has determined that the other construction business failed to pay the prevailing wage rate, or at least time and one-half the hourly basic rate of pay for hours worked in excess of the prevailing hours of labor, to any employee at any time within the preceding three (3) years.

2. **Name and Address of Other Businesses.** Indicate below the name(s) and address(es) of any other construction business which meets the criteria specified above. If none, so state.

   Name/Address: _____

   Name/Address: _____

   Name/Address: _____

I hereby state that the information contained in this document is true and accurate according to my knowledge and belief and understand that the willful falsification of any information may result in a civil or criminal penalty pursuant to Chapter 101, Stats.

Marcel DuBois
Name (Please Print)

Project Manager
Title

Marcel DuBois
Signature

Bachmann Construction
Name of Contractor

General Contractor
Business Type

1201 S. Stoughton Rd.
Address

222-8869
Phone Number

222-8618
FAX Number

E-Mail Address

Statutory Authority: §66.0903(12)(d) and 103.49(7)(d), Stats.

PROPOSAL

Bachmann Construction
BIDDER

NOTE: Bidder must state a Unit Price and Total Amount for bid for each item. The Total Amount for each item must be the product of quantity, by Unit Price.

The "GRAND TOTAL" must be the sum of the Total Amounts for the various items and must be the same as the "LUMP SUM BIDS" written in the contract form.

ALL WORDS AND NUMBERS SHALL BE WRITTEN IN INK

A The undersigned having familiarized him/herself with the Contract documents, including Advertisement for Bids, Instruction to Bidders, Form of Proposal, City of Madison Standard Specifications for Public Works Construction – 1993 Edition thereto, Form of Agreement, Form of Bond, and Addenda Issued and attached to the plans and specifications on file in the office of the City Engineer, hereby proposes to provide and furnish all the labor, materials, tools, and expendable equipment necessary to perform and complete in a workmanlike manner the specified construction on this project for the City of Madison; all in accordance with the plans and specifications as prepared by the City Engineer, including Addenda to the Contract Nos. 1 through 1 issued thereto, at the prices for said work as follows:

BREESE STEVENS FIELD RESTORATION – 2007

CONTRACT NO. 6044

PROPOSAL

BID BY SPECIFICATION DIVISION

Division 1: General Requirements 208,866 Rus ~~198,116~~ /Dollars and 0 /100

Division 2: Existing Conditions 8-10-07 74,900 /Dollars and 0 /100

Division 3: Concrete: please break down as follows:

Concrete 75,330 /Dollars and 0 /100

Concrete Rehabilitation: *break down unit prices as follows:*

Item Description	Unit Measurement	(Qty in Base Bid)	Unit Price	Amount
Topside of seating structure: Surface repair. See Structural Detail T1/S4.1	square foot	1050 SF	17	17,850
Topside of seating structure: Partial depth spall repair. See Structural Detail T2/S4.2	square foot	155 SF	48	7,440
Topside of seating structure: Full depth spall repair. See Structural Detail T3/S4.1	square foot	13 SF	90	1,170
Underside of seating structure: Spall repair. See Structural Detail U1/S4.1	square foot	676 SF	62	41,912
Underside of seating structure: Spall repair with rebar replacement. See Structural Detail U2/S4.1	square foot	109 SF	80	8,720
Underside of seating structure: Typical exposed rebar repair. See Structural Detail U3/S4.1	lineal foot	360 SF	10	3,600
Underside of seating structure: Epoxy crack repair.	lineal foot	569 SF	28	15,932
Field Wall: Partial depth spall repair. Structural Detail W2/S4.1.	square foot	13 SF	120	1,560
Field Wall: Remove and replace. Structural Detail W3/S4.1.	square foot	779 SF	62	48,298

Total Concrete Rehabilitation Unit Prices: $146,482.00 ~~176,282~~ /Dollars and 0 /100

All other concrete rehabilitation items: 29,800 /Dollars and 0 /100

Shotcrete Contractor Option. Unit prices for concrete rehabilitation will apply.

Division 3: Concrete Total TOTAL 251,612 ✓ /Dollars and 0 /100

Division 4: Masonry 53,110 /Dollars and 0 /100

Division 5: Metals 91,300 /Dollars and 0 /100

Division 6: Wood and Plastic _____ /Dollars and 0 /100

Division 7: Thermal & Moisture Protection 86,000 /Dollars and 0 /100

Division 8: Doors & Windows 13,325 /Dollars and 0 /100

PROPOSAL

Division 9:	Finishes	43,215	/Dollars and 0 /100
Division 10:	Specialties	2,135	/Dollars and 0 /100
Division 11:	Equipment		/Dollars and 0 /100
Division 12:	Furnishings		/Dollars and 0 /100
Division 13:	Special Construction	128,000	/Dollars and 0 /100
Division 20:	Mechanical		/Dollars and 0 /100
Division 21:	Fire Suppression	18,260	/Dollars and 0 /100
Division 22:	Plumbing	52,993	/Dollars and 0 /100
Division 23:	Heating, Ventilating, & Air Conditioning	6,000	/Dollars and 0 /100
Division 26:	Electrical	48,000	/Dollars and 0 /100
Division 28:	Electronic Safety & Security		/Dollars and 0 /100
Division 31:	Earthwork	9,000	/Dollars and 0 /100
Division 32:	Exterior Improvements		/Dollars and 0 /100
Division 33:	Utilities	90,000	/Dollars and 0 /100

GRAND TOTAL AMOUNT BID

1,126,716 Dollars and 0 /100

98

SECTION F: BID BOND

KNOW ALL MEN BY THESE PRESENT, THAT Bachmann Construction, Inc. (a corporation of the State of Wisconsin) (individual), (partnership), hereinafter referred to as the "Principal") and ***see below, a corporation of the State of Iowa (hereinafter referred to as the "Surety") and licensed to do business in the State of Wisconsin, are held and firmly bound unto the City of Madison, (hereinafter referred to as the "Obligee"), in the sum of five per cent (5%) of the amount of the total bid or bids of the Principal herein accepted by the Obligee, for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

***Merchants Bonding Company

The conditions of this obligation are such that, whereas the Principal has submitted, to the City of Madison a certain bid, including the related alternate, and substitute bids attached hereto and hereby made a part hereof, to enter into a contract in writing for the construction of:

BREESE STEVENS FIELD RESTORATION - 2007

CONTRACT NO. 6044

1. If said bid is rejected by the Obligee, then this obligation shall be void.

2. If said bid is accepted by the Obligee and the Principal shall execute and deliver a contract in the form specified by the Obligee (properly completed in accordance with said bid) and shall furnish a bond for his/her faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

   If said bid is accepted by the Obligee and the Principal shall fail to execute and deliver the contract and the performance and payment bond noted in 2. above executed by this Surety, or other Surety approved by the City of Madison, all within the time specified or any extension thereof, the Principal and Surety agree jointly and severally to forfeit to the Obligee as liquidated damages the sum mentioned above, it being understood that the liability of the Surety for any and all claims hereunder shall in no event exceed the sum of this obligation as stated, and it is further understood that the Principal and Surety reserve the right to recover from the Obligee that portion of the forfeited sum which exceed the actual liquidated damages incurred by the Obligee.

   The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Obligee may accept such bid, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year set forth below.

N/A
Seal

Bachmann Construction, Inc. — 8-6-07
Principal — Date

By: D. E. Bachmann

Merchants Bonding Company
Name of Surety

By: Debbra A. Hinkes — 8-6-07
Debbra A. Hinkes, Attorney-in-Fact — Date

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under License No. 704031 for the year 2007, and appointed as attorney in fact with authority to execute this bid bond and the payment and performance bond referred to above, which power of attorney has not been revoked.

8-6-07
Date

Debbra A. Hinkes
Agent

P.O. Box 510925
Address

New Berlin, WI 53151
City, State and Zip Code

262-796-8826
Telephone Number

NOTE TO SURETY & PRINCIPAL

The bid submitted which this bond guarantees may be rejected if the following instrument is not attached to this bond:

Power of Attorney showing that the agent of Surety is currently authorized to execute bonds on behalf of the Surety, and in the amounts referenced above.

Merchants Bonding Company
(Mutual)

POWER OF ATTORNEY

Know All Persons By These Presents, that the MERCHANTS BONDING COMPANY (MUTUAL), a corporation duly organized under the laws of the State of Iowa, and having its principal office in the City of Des Moines, County of Polk, State of Iowa, hath made, constituted and appointed, and does by these presents make, constitute and appoint

Debbra A. Hinkes, Charles L. Schiltz, Pamela M. Hineman, Robert M. Tortelli

of New Berlin and State of Wisconsin its true and lawful Attorney-in-Fact, with full power and authority hereby conferred in its name, place and stead, to sign, execute, acknowledge and deliver in its behalf as surety any and all bonds, undertakings, recognizances or other written obligations in the nature thereof, subject to the limitation that any such instrument shall not exceed the amount of:

FIVE MILLION ($5,000,000.00) DOLLARS

and to bind the MERCHANTS BONDING COMPANY (MUTUAL) thereby as fully and to the same extent as if such bond or undertaking was signed by the duly authorized officers of the MERCHANTS BONDING COMPANY (MUTUAL), and all the acts of said Attorney-in-Fact, pursuant to the authority herein given, are hereby ratified and confirmed.

This Power-of-Attorney is made and executed pursuant to and by authority of the following Amended Substituted and Restated By-Laws adopted by the Board of Directors of the MERCHANTS BONDING COMPANY (MUTUAL) on November 16, 2002.

ARTICLE II, SECTION 8 - The Chairman of the Board or President or any Vice President or Secretary shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the Seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof.

ARTICLE II, SECTION 9 - The signature of any authorized officer and the Seal of the Company may be affixed by facsimile to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed.

In Witness Whereof, MERCHANTS BONDING COMPANY (MUTUAL) has caused these presents to be signed by its President and its corporate seal to be hereto affixed, this 16th day of January, 2006.

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

MERCHANTS BONDING COMPANY (MUTUAL)

By Larry Taylor

President

STATE OF IOWA
COUNTY OF POLK ss.

On this 16th day of January, 2006, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of the MERCHANTS BONDING COMPANY (MUTUAL), the corporation described in the foregoing instrument, and that the Seal affixed to the said instrument is the Corporate Seal of the said Corporation and that the said instrument was signed and sealed in behalf of said Corporation by authority of its Board of Directors.

In Testimony Whereof, I have hereunto set my hand and affixed my Official Seal at the City of Des Moines, Iowa, the day and year first above written.

NOTARIAL SEAL IOWA

CINDY SMYTH
Commission Number 173504
My Commission Expires
March 16, 2009

Cindy Smyth

Notary Public, Polk County, Iowa

STATE OF IOWA
COUNTY OF POLK ss.

I, William Warner, Jr., Secretary of the MERCHANTS BONDING COMPANY (MUTUAL), do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said MERCHANTS BONDING COMPANY (MUTUAL), which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Company on this 6th day of August 2007

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

William Warner Jr.

Secretary

POA 0001 (1/06)

SECTION G: AGREEMENT

THIS AGREEMENT made this 11 day of September in the year Two Thousand and Seven between **BACHMANN CONSTRUCTION CO., INC.**, hereinafter called the Contractor, and the City of Madison, Wisconsin, hereinafter called the City.

WHEREAS, the Common Council of the said City of Madison under the provisions of a resolution adopted **SEPTEMBER 4**, 2007, and by virtue of authority vested in the said Council, has awarded to the Contractor the work of performing certain construction.

NOW, THEREFORE, the Contractor and the City, for the consideration hereinafter named, agree as follows:

1. **Scope of Work.** The Contractor shall, perform the construction, execution and completion of the following listed complete work or improvement in full compliance with the Plans, Specifications, Standard Specifications, Supplemental Specifications, Special Provisions and contract; perform all items of work covered or stipulated in the proposal; perform all altered or extra work; and shall furnish, unless otherwise provided in the contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to the prosecution and completion of the work or improvements:

BREESE STEVENS FIELD RESTORATION - 2007

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2. **Completion Date/Contract Time.** Construction work must begin within seven (7) calendar days after the date appearing on mailed written notice to do so shall have been sent to the Contractor and shall be carried on at a rate so as to secure full completion SEE SPECIAL PROVISIONS, the rate of progress and the time of completion being essential conditions of this Agreement.

3. **Contract Price.** The City shall pay to the Contractor at the times, in the manner and on the conditions set forth in said specifications, the sum of **ONE MILLION, ONE HUNDRED SEVENTY-SIX THOUSAND, SEVEN HUNDRED SIXTEEN DOLLARS AND ZERO CENTS ($1,176,716.00)** being the amount bid by such Contractor and which was awarded to him/her as provided by law.

4. **Wage Rates for Employees of Public Works Contractors**

   General and Authorization. The Contractor shall comply with Section 23.01(1) of Madison General Ordinances entitled "Wage Rates for Employees of Public Works Contracts." The Contractor shall compensate its employees at the prevailing wage rate in accordance with section 66.0903, Wis. Stats., DWD 290 of the Wisconsin Administrative Code and as hereinafter provided.

   This provision shall apply to all contracts for public works regardless of any exclusions contained in Wisconsin Statutes, including Sec. 66.0903(5), based on the value of the contract, number of trades involved, or type of work.

   "Public Works" shall include building or work involving the erection, construction, remodeling, repairing or demolition of buildings, parking lots, highways, streets, bridges, sidewalks, street lighting, traffic signals, sanitary sewers, water mains and appurtenances, storm sewers, and the grading and landscaping of public lands.

"Building or work" includes construction activity as distinguished from manufacturing, furnishing of materials, or servicing and maintenance work, except for the delivery of mineral aggregate such as sand, gravel, bituminous asphaltic concrete or stone which is incorporated into the work under contract with the City by depositing the material substantially in place, directly or through spreaders, from transporting vehicle.

"Erection, construction, remodeling, repairing" means all types of work done on a particular building or work at the site thereof in the construction or development of the project, including without limitation, erecting, construction, remodeling, repairing, altering, painting, and decorating, the transporting of materials and supplies to or from the building or work done by the employees of the Contractor, Subcontractor, or Agent thereof, and the manufacturing or furnishing of materials, articles, supplies or equipment on the site of the building or work, by persons employed by the Contractor, Subcontractor, or Agent thereof.

"Employees working on the project" means laborers, workers, and mechanics employed directly upon the site of work.

"Laborers, Workers, and Mechanics" include preapprentices, helpers, trainees, learners and properly registered and indentured apprentices but exclude clerical, supervisory, and other personnel not performing manual labor.

Establishment of Wage Rates. The City of Madison has been granted exemption from applying to the Wisconsin Department of Workforce Development (DWD) for determination of prevailing wage rates in accordance with Sec. 66.0903(3), Wis. Stats. The Department of Public Works shall periodically obtain a current schedule of prevailing wage rates from DWD. The schedule shall be used to establish the City of Madison Prevailing Wage Rate Schedule for Public Works Construction (prevailing wage rate). The Department of Public Works may include known increases to the prevailing wage rate which can be documented and are to occur on a future specific date. Upon approval by the Common Council, the prevailing wage rate shall be included in public works contracts subsequently negotiated or solicited by the City. Except for known increases contained within the schedule, the prevailing wage rate shall not change during the contract. The approved wage rate is attached hereto.

Workforce Profile. The Contractor shall, at the time of signature of the contract, notify the City Engineer in writing of the names and classifications of all the employees of the Contractor, Subcontractors, and Agents proposed for the work. In the alternative, the Contractor shall submit in writing the classifications of all the employees of the Contractor, Subcontractors and Agents and the total number of hours estimated in each classification for the work. This workforce profile(s) shall be reviewed by the City Engineer who may, within ten (10) days, object to the workforce profile(s) as not being reflective of that which would be required for the work. The Contractor may request that the workforce profile, or a portion of the workforce profile, be submitted after the signature of the contract but at least ten (10) days prior to the work commencing. Any costs or time loss resulting from modifications to the workforce profile as a result of the City Engineer's objections shall be the responsibility of the Contractor.

Payrolls and Records. The Contractor shall keep weekly payroll records setting forth the name, address, telephone number, classification, wage rate and fringe benefit package of all the employees who work on the contract, including the employees of the Contractor's subcontractors and agents. Such weekly payroll records must include the required information for all City contracts and all other contracts on which the employee worked during the week in which the employee worked on the contract. The Contractor shall also keep records of the individual time

each employee worked on the project and for each day of the project. Such records shall also set forth the total number of hours of overtime credited to each such employee for each day and week and the amount of overtime pay received in that week. The records shall set forth the full weekly wages earned by each employee and the actual hourly wage paid to the employee.

The Contractor shall submit the weekly payroll records, including the records of the Contractor's subcontractors and agents, to the City Engineer for every week that work is being done on the contract. The submittal shall be within twenty-one (21) calendar days of the end of the Contractor's weekly pay period.

Employees shall be paid unconditionally and not less often than once per week. Employees shall receive the full amounts accrued at the time of the payment, computed at rates not less than those stated in the prevailing wage rate and each employee's rate shall be determined by the work that is done within the trade or occupation classification which should be properly assigned to the employee.

An employee's classification shall not be changed to a classification of a lesser rate during the contract. If, during the term of the contract, an employee works in a higher pay classification than the one which was previously properly assigned to the employee, then that employee shall be considered to be in the higher pay classification for the balance of the contract, receive the appropriate higher rate of pay, and she/he shall not receive a lesser rate during the balance of the contract. For purposes of clarification, it is noted that there is a distinct difference between working in a different classification with higher pay and doing work within a classification that has varying rates of pay which are determined by the type of work that is done within the classification. For example, the classification "Operating Engineer" provides for different rates of pay for various classes of work and the Employer shall compensate an employee classified as an "Operating Engineer" based on the highest class of work that is done in one day. Therefore, an "Operating Engineer's" rate may vary on a day to day basis depending on the type of work that is done, but it will never be less than the base rate of an "Operating Engineer". Also, as a matter of clarification, it is recognized that an employee may work in a higher paying classification merely by chance and without prior intention, calculation or design. If such is the case and the performance of the work is truly incidental and the occurrence is infrequent, inconsequential and does not serve to undermine the single classification principle herein, then it may not be required that the employee be considered to be in the higher pay classification and receive the higher rate of pay for the duration of the contract. However, the Contractor is not precluded or prevented from paying the higher rate for the limited time that an employee performs work that is outside of the employee's proper classification.

Questions regarding an employee's classification, rate of pay or rate of pay within a classification, shall be resolved by reference to the established practice that predominates in the industry and on which the trade or occupation rate/classification is based. Rate of pay and classification disputes shall be resolved by relying upon practices established by collective bargaining agreements and guidelines used in such determination by appropriate recognized trade unions operating within the City of Madison.

The Contractor, its Subcontractors and Agents shall submit to interrogation regarding compliance with the provisions of this ordinance.

Mulcting of the employees by the Contractor, Subcontractor, and Agents on Public Works contracts, such as by kickbacks or other devices, is prohibited. The normal rate of wage of the employees of the Contractor, Subcontractor, and Agents shall not be reduced or otherwise diminished as a result of payment of the prevailing wage rate on a public works contract.

Hourly contributions. Hourly contributions shall be determined in accordance with the prevailing wage rate and with DWD. 290.01(10), Wis. Admin. Code.

Apprentices and Subjourneypersons. Apprentices and subjourneypersons performing work on the project shall be compensated in accordance with the prevailing wage rate and with DWD 290.02, and 290.025, respectively, Wis. Admin. Code.

Straight Time Wages. The Contractor may pay straight time wages as determined by the prevailing wage rate and DWD 290.04, Wis. Admin. Code.

Overtime Wages. The Contractor shall pay overtime wages as required by the prevailing wage rate and DWD 290.05, Wis. Admin. Code.

Posting of Wage Rates and Hours. A clearly legible copy of the prevailing wage rate, together with the provisions of Sec. 66.0903(10)(a) and (11)(a), Wis. Stats., shall be kept posted in at least one conspicuous and easily accessible place at the project site by the Contractor and such notice shall remain posted during the full time any laborers, workers or mechanics are employed on the contract.

Evidence of Compliance by Contractor. Upon completion of the contract, the Contractor shall file with the Department of Public Works an affidavit stating:

a. That the Contractor has complied fully with the provisions and requirements of Sec. 66.0903(3), Wis. Stats., and Chapter DWD 290, Wis. Admin. Code and Sec. 23.01, Madison General Ordinances; the Contractor has received evidence of compliance from each of the agents and subcontractors; and the names and addresses of all of the subcontractors and agents who worked on the contract.

b. That full and accurate records have been kept, which clearly indicate the name and trade or occupation of every laborer, worker or mechanic employed by the Contractor in connection with work on the project. The records shall show the number of hours worked by each employee and the actual wages paid therefor; where these records will be kept and the name, address and telephone number of the person who will be responsible for keeping them. The records shall be retained and made available for a period of at least three (3) years following the completion of the project of public works and shall not be removed without prior notification to the municipality.

Evidence of Compliance by Agent and Subcontractor. Each agent and subcontractor shall file with the Contractor, upon completion of their portion of the work on the contract an affidavit stating that all the provisions of Sec. 66.0903(3), Wis. Stats., and Sec. 23.01, Madison General Ordinances, have been fully complied with and that full and accurate records have been kept, which clearly indicate the name and trade or occupation of every laborer, worker or mechanic employed by the Contractor in connection with work on the project. The records shall show the number of hours worked by each employee and the actual wages paid therefor; where these records shall be kept and the name, address and telephone number of the person who shall be responsible for keeping them. The records shall be retained and made available for a period of at least three (3) years following the completion of the project of public works and shall not be removed without prior notification to the municipality.

Failure to Comply with the Prevailing Wage Rate. If the Contractor fails to comply with the prevailing wage rate or this ordinance, she/he shall be in default on the contract.

5. **Affirmative Action.** In the performance of the services under this Agreement the Contractor agrees not to discriminate against any employee or applicant because of race, religion, marital status, age, color, sex, disability, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, political beliefs, or student status. The Contractor further agrees not to discriminate against any subcontractor or person who offers to subcontract on this contract because of race, religion, color, age, disability, sex or national origin.

The Contractor agrees that within thirty (30) days after the effective date of this agreement, the Contractor will provide to the City of Madison Department of Affirmative Action certain workforce utilization statistics, using a form to be furnished by the City.

If the contract is still in effect, or if the City enters into a new agreement with the Contractor, within one year after the date on which the form was required to be provided, the Contractor will provide updated workforce information using a second form, also to be furnished by the City. The second form will be submitted to the City Department of Affirmative Action no later than one year after the date on which the first form was required to be provided.

The Contractor further agrees that, for at least twelve (12) months after the effective date of this contract, it will notify the City of Madison Department of Affirmative Action of each of its job openings at facilities in Dane County for which applicants not already employees of the Contractor are to be considered. The notice will include a job description, classification, qualifications and application procedures and deadlines. The Contractor agrees to interview and consider candidates referred by the Department of Affirmative Action if the candidate meets the minimum qualification standards established by the Contractor, and if the referral is timely. A referral is timely if it is received by the Contractor on or before the date started in the notice.

Articles of Agreement
Article I

The Contractor shall take affirmative action in accordance with the provisions of this contract to insure that applicants are employed, and that employees are treated during employment without regard to race, religion, color, age, marital status, disability, sex or national original and that the employer shall provide harassment free work environment for the realization of the potential of each employee. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training including apprenticeship insofar as it is within the control of the Contractor. The Contractor agrees to post in conspicuous places available to employees and applicants notices to be provided by the City setting out the provisions of the nondiscrimination clauses in this contract.

Article II

The Contractor shall in all solicitations or advertisements for employees placed by or on behalf of the Contractors state that all qualified or qualifiable applicants will be employed without regard to race, religion, color, age, marital status, disability, sex or national origin.

Article III

The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided by the

City advising the labor union or worker's representative of the Contractor's equal employment opportunity and affirmative action commitments. Such notices shall be posted in conspicuous places available to employees and applicants for employment.

Article V

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison, including the contract compliance requirements. The Contractor agrees to submit the model affirmative action plan for public works contractors in a form approved by the Director of Affirmative Action.

Article VI

The Contractor will maintain records as required by Section 3.58(9)(f) of the Madison General Ordinances and will provide the City's Department of Affirmative Action with access to such records and to persons who have relevant and necessary information, as provided in Section 3.58(9)(f). The City agrees to keep all such records confidential, except to the extent that public inspection is required by law.

Article VII

In the event of the Contractor's or subcontractor's failure to comply with the Equal Employment Opportunity and Affirmative Action Provisions of this contract or Section 3.23 and 3.58 of the Madison General Ordinances, it is agreed that the City at its option may do any or all of the following:

1. Cancel, terminate or suspend this Contract in whole or in part.

2. Declare the Contractor ineligible for further City contracts until the Affirmative Action requirements are met.

3. Recover on behalf of the City from the prime Contractor 0.5 percent of the contract award price for each week that such party fails or refuses to comply, in the nature of liquidated damages, but not to exceed a total of five percent (5%) of the contract price, or five thousand dollars ($5,000), whichever is less. Under public works contracts, if a subcontractor is in noncompliance, the City may recover liquidated damages from the prime Contractor in the manner described above. The preceding sentence shall not be construed to prohibit a prime Contractor from recovering the amount of such damage from the non-complying subcontractor.

Article VIII

The Contractor shall include the above provisions of this contract in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor shall take such action with respect to any subcontractor as necessary to enforce such provisions, including sanctions provided for noncompliance.

Article IX

The Contractor shall allow the maximum feasible opportunity to small business enterprises to compete for any subcontracts entered into pursuant to this contract.

BREESE STEVENS FIELD RESTORATION - 2007

CONTRACT NO. 6044

IN WITNESS WHEREOF, the Contractor has hereunto set his/her hand and seal and the City has caused these presents to be sealed with its corporate seal and to be subscribed by its Mayor and City Clerk the day and year first above written.

Countersigned:

BACHMANN CONSTRUCTION CO., INC.
Company Name

Witness 9/11/07 Date

President 9/11/07 Date

Witness 9-11-07 Date

Secretary 9/11/07 Date

CITY OF MADISON, WISCONSIN

Provisions have been made to pay the liability that will accrue under this contract.

for City Comptroller

Approved as to form:

City Attorney

Signed this 21st day of September, 20 07

Witness

Mayor 9-21-07 Date

Witness

City Clerk for 9-20-07 Date

SECTION H: PAYMENT AND PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we **BACHMANN CONSTRUCTION CO., INC.** as principal, and Merchants Bonding Company Company of Des Moines, IA as surety, are held and firmly bound unto the City of Madison, Wisconsin, in the sum of **ONE MILLION, ONE HUNDRED SEVENTY-SIX THOUSAND, SEVEN HUNDRED SIXTEEN DOLLARS AND ZERO CENTS ($1,176,716.00)**, lawful money of the United States, for the payment of which sum to the City of Madison, we hereby bind ourselves and our respective executors and administrators firmly by these presents.

The condition of this Bond is such that if the above bounden shall on his/her part fully and faithfully perform all of the terms of the Contract entered into between him/herself and the City of Madison for the construction of:

BREESE STEVENS FIELD RESTORATION - 2007

CONTRACT NO. 6044

in Madison, Wisconsin, and shall pay all claims for labor performed and material furnished in the prosecution of said work, and save the City harmless from all claims for damages because of negligence in the prosecution of said work, and shall save harmless the said City from all claims for compensation (under Chapter 102, Wisconsin Statutes) of employees and employees of subcontractor, then this Bond is to be void, otherwise of full force, virtue and effect.

Signed and sealed this 11th day of September, 2007

Countersigned:

Witness

Secretary

BACHMANN CONSTRUCTION CO., INC.
Company Name (Principal)

President No Seal
Seal

Approved as to form:

City Attorney

Merchants Bonding Company
Surety Seal

☐ Salary Employee ☒ Commission

By
Attorney-in-Fact Debbra A. Hinkes

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under License No. 704031 for the year 20 07, and appointed as attorney-in-fact with authority to execute this payment and performance bond which power of attorney has not been revoked.

9-17-07
Date

Agent Debbra A. Hinkes

Merchants Bonding Company
(Mutual)

POWER OF ATTORNEY

Know All Persons By These Presents, that the MERCHANTS BONDING COMPANY (MUTUAL), a corporation duly organized under the laws of the State of Iowa, and having its principal office in the City of Des Moines, County of Polk, State of Iowa, hath made, constituted and appointed, and does by these presents make, constitute and appoint

Debbra A. Hinkes, Charles L. Schiltz, Pamela M. Hineman, Robert M. Tortelli

of New Berlin and State of Wisconsin its true and lawful Attorney-in-Fact, with full power and authority hereby conferred in its name, place and stead, to sign, execute, acknowledge and deliver in its behalf as surety any and all bonds, undertakings, recognizances or other written obligations in the nature thereof, subject to the limitation that any such instrument shall not exceed the amount of:

FIVE MILLION ($5,000,000.00) DOLLARS

and to bind the MERCHANTS BONDING COMPANY (MUTUAL) thereby as fully and to the same extent as if such bond or undertaking was signed by the duly authorized officers of the MERCHANTS BONDING COMPANY (MUTUAL), and all the acts of said Attorney-in-Fact, pursuant to the authority herein given, are hereby ratified and confirmed.

This Power-of-Attorney is made and executed pursuant to and by authority of the following Amended Substituted and Restated By-Laws adopted by the Board of Directors of the MERCHANTS BONDING COMPANY (MUTUAL) on November 16, 2002.

ARTICLE II, SECTION 8 - The Chairman of the Board or President or any Vice President or Secretary shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the Seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof.

ARTICLE II, SECTION 9 - The signature of any authorized officer and the Seal of the Company may be affixed by facsimile to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed.

In Witness Whereof, MERCHANTS BONDING COMPANY (MUTUAL) has caused these presents to be signed by its President and its corporate seal to be hereto affixed, this 16th day of January, 2006.

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

MERCHANTS BONDING COMPANY (MUTUAL)

By Larry Taylor

President

STATE OF IOWA
COUNTY OF POLK ss.

On this 16th day of January, 2006, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of the MERCHANTS BONDING COMPANY (MUTUAL), the corporation described in the foregoing instrument, and that the Seal affixed to the said instrument is the Corporate Seal of the said Corporation and that the said instrument was signed and sealed in behalf of said Corporation by authority of its Board of Directors.

In Testimony Whereof, I have hereunto set my hand and affixed my Official Seal at the City of Des Moines, Iowa, the day and year first above written.

NOTARIAL SEAL IOWA
CINDY SMYTH
Commission Number 173504
My Commission Expires
March 16, 2009

Cindy Smyth

Notary Public, Polk County, Iowa

STATE OF IOWA
COUNTY OF POLK ss.

I, William Warner, Jr., Secretary of the MERCHANTS BONDING COMPANY (MUTUAL), do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said MERCHANTS BONDING COMPANY (MUTUAL), which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Company on this 17th day of Sept. 2007

MERCHANTS BONDING COMPANY (MUTUAL) INCORPORATED -o- 1933

William Warner Jr.

Secretary

POA 0001 (1/06)

MINIMUM WAGE SCALE

FOR

PUBLIC WORKS IMPROVEMENTS

APPROVED BY: BOARD OF PUBLIC WORKS

MADISON, WISCONSIN

FEBRUARY 6, 2007

The attached "Prevailing Wage Rate Determination: (Pages 1 through 13), issued February 6, 2007, is hereby approved as the Minimum Wage Scale of the City of Madison.

PREVAILING WAGE RATE DETERMINATION

Issued by the State of Wisconsin
Department of Workforce Development
Pursuant to s. 66.0903, Stats.
Issued On: 1/02/2007
Corrected On: 1/22/2007
Amended On: 1/22/2007

DETERMINATION NUMBER: 200700007

EXPIRATION DATE: Prime Contracts MUST Be Awarded Or Negotiated On Or Before 12/31/2007. If NOT, You MUST Reapply.

DESCRIPTION OF PROJECT: All Public Works Construction Projects Subject to s. 66.0903, Stats.
PROJECT NO: None

LOCATION OF PROJECT: City of Madison, Dane County, WI

CONTRACTING AGENCY: City of Madison

CLASSIFICATION: Contractors are required to call the Department of Workforce Development if there are any questions regarding the proper trade or classification to be used for any worker on a public works project.

OVERTIME: Time and one-half must be paid for all hours worked over 10 hours per day and 40 hours per calendar week and for all hours worked on Saturday, Sunday and the following six (6) holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25; the day before if January 1, July 4 or December 25 falls on a Saturday; the day following if January 1, July 4 or December 25 falls on a Sunday.

FUTURE INCREASE: If indicated for a specific trade or occupation, the full amount of such increase MUST be added to the "TOTAL" indicated for such trade or occupation on the date(s) such increase(s) becomes effective.

PREMIUM PAY: If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whenever such pay is applicable.

SUBJOURNEY: Wage rates may be available for some of the classifications indicated below with the exception of laborers, truck drivers and heavy equipment operators. Any employer that desires to use any subjourney classification on this project MUST request the applicable wage rate from this department PRIOR to the date such classification is used on this project. Form ERD-10880 is available for this purpose.

BUILDING OR HEAVY CONSTRUCTION

Includes sheltered enclosures with walk-in access for the purpose of housing persons, employees, machinery, equipment or supplies and non-sheltered work such as canals, dams, dikes, reservoirs, storage tanks, etc. A sheltered enclosure need not be "habitable" in order to be considered a building. The installation of machinery and/or equipment, both above and below grade level, does not change a project's character as a building. On-site grading, utility work and landscaping are included within this definition. Residential buildings of four (4) stories or less, agricultural buildings, parking lots and driveways are NOT included within this definition.

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Acoustic Ceiling Tile Installer Future Increase(s): Add $1.35 on 5/27/07	25.51	12.11	37.62
Boilermaker	28.44	15.87	44.31
Bricklayer, Blocklayer or Stonemason Future Increase(s): Add $1.70/hr. 6/4/2007	28.41	12.81	41.22
Cabinet Installer Future Increase(s): Add $1.35 on 5/27/07	25.51	12.11	37.62
Carpenter	25.51	12.11	37.62

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Future Increase(s): Add $1.35 on 5/27/07			
Carpet Layer or Soft Floor Coverer	24.91	11.32	36.23
Cement Finisher	26.58	11.46	38.04
Drywall Taper or Finisher	23.40	9.80	33.20
Electrician	28.82	15.52	44.34
Future Increase(s): Add $1.00 6/1/2007; Add $.65 12/1/2007			
Elevator Constructor	36.39	19.23	55.62
Fence Erector	17.04	3.13	20.17
Fire Sprinkler Fitter	31.29	12.15	43.44
Glazier	32.62	6.03	38.65
Heat or Frost Insulator	29.80	14.25	44.05
Insulator (Batt or Blown)	21.22	9.87	31.09
Ironworker	28.05	14.31	42.36
Future Increase(s): Add $1.65 6/1/2007.			
Lather	24.91	8.38	33.29
Line Constructor (Electrical)	30.22	13.21	43.43
Marble Finisher	24.00	12.00	36.00
Marble Mason	30.00	12.00	42.00
Metal Building Erector	27.05	13.71	40.76
Millwright	26.51	3.77	30.28
Overhead Door Installer	24.16	11.02	35.18
Painter	23.10	11.19	34.29
Pavement Marking Operator	23.46	9.45	32.91
Piledriver	26.01	12.11	38.12
Future Increase(s): Add $1.35 on 5/27/07			
Pipeline Fuser or Welder (Gas or Utility)	38.25	14.05	52.30
Plasterer	24.18	11.48	35.66
Plumber	31.90	11.44	43.34
Future Increase(s): Add $2.00/hr. 6/3/2007; Add $2.20/hr. 6/1/2008			
Refrigeration Mechanic	32.15	11.71	43.86
Roofer or Waterproofer	26.00	6.79	32.79
Sheet Metal Worker	28.03	14.75	42.78
Steamfitter	33.85	11.01	44.86
Teledata Technician or Installer	20.30	10.01	30.31
Temperature Control Installer	34.00	6.04	40.04
Terrazzo Finisher	28.42	11.12	39.54
Terrazzo Mechanic	25.65	11.62	37.27
Tile Finisher	15.00	2.45	17.45
Tile Setter	26.62	12.27	38.89
Future Increase(s): Add $1.62 6/1/2007			
Tuckpointer, Caulker or Cleaner	28.43	13.58	42.01
Underwater Diver (Except on Great Lakes)	37.47	12.90	50.37
Well Driller or Pump Installer	22.52	13.35	35.87
Future Increase(s): Add $1.55/hr. 9/1/2007; Add $1.60/hr. 9/1/2008.			

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Siding Installer	27.78	14.77	42.55
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	29.15	5.85	35.00
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	27.32	14.65	41.97
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	16.00	8.00	24.00
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	19.64	10.14	29.78
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	20.54	9.75	30.29
TRUCK DRIVERS			
Single Axle or Two Axle	27.83	12.03	39.86
Three or More Axle	22.09	10.05	32.14
Articulated, Euclid, Dumptor, Off Road Material Hauler	18.54	2.66	21.20
Pavement Marking Vehicle	18.87	9.39	28.26
Truck Mechanic	13.50	4.50	18.00
LABORERS			
General Laborer Future Increase(s): Add $1.30/hr. 6/7/2007 Premium Pay: Add $1.00/hr for certified welder; Add $.25/hr for mason tender	20.99	10.55	31.54
Asbestos Abatement Worker	19.81	9.64	29.45
Landscaper Future Increase(s): Add $1.45 on 6/1/07; Add $1.50 on 6/1/08; Add $1.35 on 6/1/09.	22.12	10.55	32.67
Gas or Utility Pipeline Laborer (Other Than Sewer and Water)	20.26	10.83	31.09
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	12.25	3.51	15.76
Railroad Track Laborer	11.50	3.59	15.09
HEAVY EQUIPMENT OPERATORS SITE PREPARATION, UTILITY AND LANDSCAPING WORK ONLY			
Crane; Backhoe (Track Type); Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self Propelled or Tractor Drawn) 5cu yards or more capacity; Power Subgrader; Asphalt Milling Machine; Boring Machine (Horizontal, Vertical or Directional); Air Track, Rotary or Percussion Drilling Machine; Trencher; Post Hole Digger or Driver; Tug or Launch (not performing work on the Great Lakes) Future Increase(s): Add $1.60 6/4/2007	27.59	15.40	42.99
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Broom or Sweeper; Environmental Burner Future Increase(s): Add $1.60 6/4/2007	27.59	15.40	42.99
Crusher, Screening or Wash Plant; Air Compressor (400 CFM or Over); Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Skid Steer Loader (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor	26.79	13.38	40.17

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
HEAVY EQUIPMENT OPERATORS EXCLUDING SITE PREPARATION, UTILITY, PAVING AND LANDSCAPING WORK			
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Feet or Over Future Increase(s): Add $1.60 6/4/2007 Premium Pay: Add $.50/hr for cranes with lifting capacity over 200 ton: Add $1.00/hr. at 300 ton; Add $1.50/hr at 400 ton; Add $2.00/hr at 500 ton.	29.62	15.40	45.02
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 175 Feet or Under; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Traveling Crane (Bridge Type); Caisson Rig; Pile Driver; Dredge (Not Performing Work on the Great Lakes) Future Increase(s): Add $1.60 6/4/2007 Premium Pay: Add $.25/hr for cranes with lifting capacity of 45 ton or over	28.62	15.40	44.02
Crane (Go-Devil Type) or Truck Mounted Hydraulic Crane (10 Tons or Under); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs.; Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self Propelled or Tractor Drawn) 5 cu yards or more capacity; Concrete Pump, Grout Pump or Concrete Conveyor (Rotec or Bidwell Type); Concrete Breaker (Manual or Remote); Concrete Batch Plant; Power Subgrader; Concrete Spreader; Concrete Paver; Concrete Grinder or Planing Machine; Concrete Conveyor System; Concrete Slipform Placer; Curb and Gutter Machine; Roller (Over 5 Ton); Shouldering Machine; Boring Machine (Horizontal, Vertical or Directional); Air Track, Rotary or Percussion Drilling Machine; Straddle Carrier or Travel Lift; Forklift (Machinery Moving or Steel Erection); Manhoist or Elevator; Material or Stack Hoist; Trencher; Sideboom; Hydro-Blaster (10,000 PSI or Over); Post Hole Digger or Driver; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment Future Increase(s): Add $1.60 6/4/2007	28.12	15.40	43.52
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Concrete Saw (Vermeer Type); Concrete Bump Cutter or Grooving Machine; Tining or Curing Machine; Roller (5 Tons or Under); Broom or Sweeper; Hoist (Tugger); Environmental Burner Future Increase(s): Add $1.60 6/4/2007	24.89	15.40	40.29
Crusher, Screening or Wash Plant; Air, Electric or Hydraulic Jacking System; Air Compressor (400 CFM or Over); Generator (150 KW or Over); Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Skid Steer Loader (With or Without Attachments); Robotic Tool Carrier (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor	29.15	5.85	35.00
Oiler; Forklift	24.09	14.10	38.19
Gas or Utility Pipeline, Except Sewer and Water (Primary Equipment) Future Increase(s): Add $1.88 11/1/2007.	30.89	16.03	46.92
Gas or Utility Pipeline, Except Sewer and Water (Secondary Equipment)	27.32	14.65	41.97
Fiber Optic Cable Equipment	24.18	11.45	35.63

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
SEWER, WATER OR TUNNEL CONSTRUCTION			
Includes those projects that primarily involve public sewer or water distribution, transmission or collection systems and related tunnel work (excluding buildings).			
Bricklayer, Blocklayer or Stonemason	24.31	12.50	36.81
Carpenter	27.83	12.11	39.94
Cement Finisher	26.58	12.84	39.42
Electrician Future Increase(s): Add $1.55/hr. 6/1/2007; Add $1.65/hr. 6/1/2008; Add $1.70/hr. 6/1/2008.	30.52	15.78	46.30
Fence Erector	17.04	3.13	20.17
Ironworker Future Increase(s): Add $1.65 6/1/2007.	28.05	14.31	42.36
Line Constructor (Electrical)	30.22	13.21	43.43
Pavement Marking Operator	23.46	9.45	32.91
Piledriver Future Increase(s): Add $1.35 on 5/27/07	26.01	12.11	38.12
Plumber	30.60	10.74	41.34
Steamfitter	32.15	10.71	42.86
Teledata Technician or Installer	20.00	9.20	29.20
Tuckpointer, Caulker or Cleaner	28.43	13.58	42.01
Underwater Diver (Except on Great Lakes)	41.92	16.48	58.40
Well Driller or Pump Installer	22.12	12.20	34.32
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	29.15	5.85	35.00
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	27.32	14.65	41.97
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	16.00	8.00	24.00
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	19.64	10.14	29.78
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	20.54	9.75	30.29
TRUCK DRIVERS			
Single Axle or Two Axle	27.83	12.03	39.86
Three or More Axle	17.52	8.26	25.78
Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1.45 5/1/2007; Add $1.45 5/1/2008; Add $1.65 5/1/2009; Add $1.65 5/1/2010.	22.00	12.06	34.06
Pavement Marking Vehicle	18.87	9.39	28.26
Truck Mechanic	13.50	4.50	18.00
LABORERS			
General Laborer Future Increase(s): Add $1.35 6/4/07; Add $1.40 6/2/08; Add $1.45 6/1/09; Add $1.40 6/7/10; Add $1.45 6/ 6/ 11 Premium Pay: Add $.20 for blaster, bracer, manhole builder, caulker, bottomman and power tool; Add $.55 for pipelayer; Add $1.00 for tunnel work 0-15 lbs. compressed air; Add $2.00 for over 15-30 lbs. compressed air;	22.53	10.54	33.07

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Add $3.00 for over 30 lbs. compressed air.			
Landscaper	21.52	9.75	31.27
Flagperson or Traffic Control Person	15.49	11.12	26.61
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	12.25	3.51	15.76
Railroad Track Laborer	11.50	3.59	15.09
HEAVY EQUIPMENT OPERATORS			
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Feet or Over; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over Future Increase(s): Add $1.65 on 6/4/07	28.89	15.75	44.64
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 175 Feet or Under; Traveling Crane (Bridge Type); Caisson Rig; Pile Driver; Dredge (Not Performing Work on the Great Lakes); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs. Future Increase(s): Add $1.60 6/4/2007	28.12	15.40	43.52
Truck Mounted Hydraulic Crane (10 Tons or Under); Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Concrete Pump, Grout Pump, or Concrete Conveyor (Rotec or Bidwell Type); Concrete Breaker (Manual or Remote); Concrete Batch Plant; Power Subgrader; Concrete Spreader; Concrete Paver; Concrete Grinder or Planing Machine; Concrete Conveyor System; Concrete Slipform Placer; Curb and Gutter Machine; Roller (Over 5 Ton); Shouldering Machine; Boring Machine (Horizontal, Vertical or Directional); Air Track, Rotary or Percussion Drilling Machine; Straddle Carrier or Travel Lift; Manhoist or Elevator; Material or Stack Hoist; Trencher; Sideboom; Post Hole Digger or Driver; Tug or Launch (Not Performing Work on the Great Lakes)	26.79	14.73	41.52
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Concrete Saw (Vermeer Type); Concrete Bump Cutter or Grooving Machine; Tining or Curing Machine; Roller (5 Ton or Under); Broom or Sweeper; Hoist (Tugger); Environmental Burner	18.07	8.38	26.45
Crusher, Screening or Wash Plant; Air, Electric or Hydraulic Jacking System; Air Compressor (400 CFM or Over); Generator (150 KW or Over); Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Skid Steer Loader (With or Without Attachments); Robotic Tool Carrier (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor; High Pressure Utility Locating Machine (daylighting machine). Future Increase(s): Add $1.60 6/4/2007	24.89	15.40	40.29
Oiler; Forklift	24.09	14.10	38.19

AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Includes all airport projects (excluding buildings) and all projects awarded by the Wisconsin Department of Transportation (excluding buildings).			
Bricklayer, Blocklayer or Stonemason	27.36	12.26	39.62
Carpenter Future Increase(s): Add $1.35 on 5/27/07	25.51	12.11	37.62
Cement Finisher Future Increase(s): Add $1.60 on 6/1/07; Add $1.60 on 6/1/08; Add $1.60 on 6/1/09; Add $1.55 on 6/1/10; Add $1.00 6/ 1/ 11.	26.82	11.33	38.15
Electrician	41.40	1.30	42.70
Fence Erector	17.00	3.93	20.93
Ironworker Future Increase(s): Add $2.00 6/3/2007; Add $2.00 6/2/2008; Add $2.00 6/1/2009; Add $ 2.00 6/7/2010; Add $2.00 6/ 6/ 2011.	28.09	17.01	45.10
Line Constructor (Electrical)	30.22	13.21	43.43
Painter	20.85	7.34	28.19
Pavement Marking Operator	23.46	9.45	32.91
Piledriver Future Increase(s): Add $1.45 on 6/4/07 Premium Pay: Add $.65 for Piledriver Loftsman; Add $.75 for Sheet Pile Loftsman.	25.76	17.33	43.09
Roofer or Waterproofer	26.00	6.79	32.79
Teledata Technician or Installer	20.00	9.20	29.20
Tuckpointer, Caulker or Cleaner	28.43	13.58	42.01
Underwater Diver (Except on Great Lakes)	25.76	15.88	41.64
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	28.81	12.70	41.51
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY Future Increase(s): Add $1.13/hr. 7/1/2007; Add $1.20/hr. 7/1/2008.	25.33	12.34	37.67
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	21.15	10.57	31.72
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	19.64	10.14	29.78
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY Future Increase(s): Add $.78/hr. 7/1/2007; Add $.82/hr. 7/1/2008	17.41	9.96	27.37
TRUCK DRIVERS			
Single Axle or Two Axle	14.95	4.36	19.31
Three or More Axle Future Increase(s): Add $1.45 5/1/2007; Add $1.45 5/1/2008; Add $1.65 5/1/2009; Add $1.65 5/1/2010.	22.00	12.06	34.06
Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08	21.52	15.35	36.87
Pavement Marking Vehicle	19.57	10.68	30.25
Shadow or Pilot Vehicle	14.95	4.36	19.31
Truck Mechanic Future Increase(s): Add $1.45 5/1/2007; Add $1.45 5/1/2008; Add $1.65 5/1/2009; Add $1.65 5/1/2010.	22.00	12.06	34.06

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
LABORERS			
General Laborer Future Increase(s): Add $1.45 on 6/1/07; Add $1.50 on 6/1/08; Add $1.35 on 6/1/09. Premium Pay: Add $.10 for topman, air tool operator, vibrator or tamper operator (mechanical hand operated), chain saw operator and demolition burning torch laborer; Add $.15 for bituminous worker (raker and luteman), formsetter (curb, sidewalk and pavement) and strike off man; Add $.20 for blaster and powderman; Add $.25 for bottomman; Add $.35 for line and grade specialist; Add $.45 for pipelayer.	22.40	10.55	32.95
Asbestos Abatement Worker	19.81	9.64	29.45
Landscaper Future Increase(s): Add $1.45 on 6/1/07; Add $1.50 on 6/1/08; Add $1.35 on 6/1/09.	22.40	10.55	32.95
Flagperson or Traffic Control Person Future Increase(s): Add $1.45 on 6/1/07; Add $1.50 on 6/1/08; Add $1.35 on 6/1/09.	18.75	10.55	29.30
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	14.00	0.32	14.32
Railroad Track Laborer	11.50	3.59	15.09
HEAVY EQUIPMENT OPERATORS			
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Feet or Over Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08	28.97	15.35	44.32
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 175 Feet or Under; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Pile Driver; Dredge (Not Performing Work on the Great Lakes) Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08	28.47	15.35	43.82
Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs.; Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self propelled or Tractor Drawn) 5 cu yards or more capacity; Concrete Pump, Grout Pump or Concrete Conveyor (Rotec or Bidwell Type); Concrete Breaker (Manual or Remote); Concrete Batch Plant; Power Subgrader; Concrete Spreader; Concrete Paver; Concrete Grinder or Planing Machine; Concrete Conveyor System; Concrete Slipform Placer Curb and Gutter Machine; Asphalt Plant; Asphalt Paver; Asphalt Screed; Asphalt Milling Machine; Roller (Over 5 Ton); Shouldering Machine; Boring Machine (Horizontal, Vertical or Directional); Air Track, Rotary or Percussion Drilling Machine; Straddle Carrier or Travel Lift; Trencher; Post Hole Digger or Driver; Tug or Launch (Not Performing Work on the Great Lakes) Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08	27.97	15.35	43.32
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Concrete Saw (Vermeer Type); Concrete Bump Cutter or Grooving Machine; Tining or Curing Machine; Roller (5 Tons or Under); Broom or Sweeper; Environmental Burner Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08	27.71	15.35	43.06
Oiler; Crusher, Screening or Wash Plant; Air Compressor; Generator; Pump	27.97	15.35	43.32

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
(3 Inch or Over) or Well Points; Forklift; Skid Steer Loader (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08			
Fiber Optic Cable Equipment	24.18	11.45	35.63

LOCAL STREET OR MISCELLANEOUS PAVING CONSTRUCTION

Includes roads, streets, alleys, trails, bridges, paths, racetracks, parking lots and driveways (except residential or agricultural), public sidewalks or other similar projects (excluding projects awarded by the Wisconsin Department of Transportation).

Bricklayer, Blocklayer or Stonemason	27.36	12.26	39.62
Carpenter Future Increase(s): Add $1.35 on 5/27/07	25.51	12.11	37.62
Cement Finisher Future Increase(s): Add $1.60 on 6/1/07; Add $1.60 on 6/1/08; Add $1.60 on 6/1/09; Add $1.55 on 6/1/10; Add $1.00 6/ 1/ 11.	26.82	11.33	38.15
Electrician	28.39	15.90	44.29
Fence Erector	17.04	3.13	20.17
Ironworker Future Increase(s): Add $2.00 6/3/2007; Add $2.00 6/2/2008; Add $2.00 6/1/2009; Add $ 2.00 6/7/2010; Add $2.00 6/ 6/ 2011.	28.09	17.01	45.10
Line Constructor (Electrical)	30.22	13.21	43.43
Painter	20.85	7.34	28.19
Pavement Marking Operator	23.46	9.45	32.91
Piledriver	25.76	15.88	41.64
Roofer or Waterproofer	26.00	6.79	32.79
Teledata Technician or Installer	20.00	9.20	29.20
Tuckpointer, Caulker or Cleaner	28.43	13.58	42.01
Underwater Diver (Except on Great Lakes)	25.76	15.88	41.64
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	18.00	2.99	20.99
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY Future Increase(s): Add $1.13/hr. 7/1/2007; Add $1.20/hr. 7/1/2008.	25.33	12.34	37.67
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	21.15	10.57	31.72
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	19.64	10.14	29.78
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY Future Increase(s): Add $.78/hr. 7/1/2007; Add $.82/hr. 7/1/2008	17.41	9.96	27.37
TRUCK DRIVERS			
Single Axle or Two Axle	14.95	4.36	19.31
Three or More Axle	14.00	1.79	15.79
Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1.60 6/4/2007	27.59	15.40	42.99
Pavement Marking Vehicle	18.87	9.39	28.26
Shadow or Pilot Vehicle	14.95	4.36	19.31

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Truck Mechanic	13.00	0.00	13.00
LABORERS			
General Laborer	21.80	9.56	31.36
Landscaper	21.52	10.14	31.66
Flagperson or Traffic Control Person	15.49	11.12	26.61
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	14.00	0.32	14.32
Railroad Track Laborer	11.50	3.59	15.09
HEAVY EQUIPMENT OPERATORS CONCRETE PAVEMENT OR BRIDGE WORK ONLY			
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Feet or Over	28.27	14.50	42.77
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 175 Feet or Under; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Pile Driver; Dredge (Not Performing Work on the Great Lakes) Future Increase(s): Add $1.95 6/1/2007; Add $2.05 6/1/2008 Premium Pay: Crane Operators with CCO certification add $.35/hr. Add addn'l $.15/hr 6/1/2007. Cranes with boom legnth over 200ft. not exceeding 300 ft. OR lifting capacity over 200 ton not exceeding 300 ton add $.50/hr. Over 300 ton OR 300 ft. add $.01/hr. per foot OR ton whichever is greater.	31.81	15.70	47.51
Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs.; Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self Propelled or Tractor Drawn) 5 cu yards or more capacity; Concrete Pump, Grout Pump or Concrete Conveyor (Rotec or Bidwell Type); Concrete Breaker (Manual or Remote); Concrete Batch Plant; Power Subgrader; Concrete Spreader; Concrete Paver; Concrete Grinder or Planing Machine; Concrete Conveyor System; Concrete Slipform Placer; Curb and Gutter Machine; Air Track, Rotary or Percussion Drilling Machine; Straddle Carrier or Travel Lift; Trencher; Post Hole Digger or Driver; Tug or Launch (Not Performing Work on the Great Lakes) Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08	27.71	15.35	43.06
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Concrete Saw (Vermeer Type); Concrete Bump Cutter or Grooving Machine; Tining or Curing Machine; Environmental Burner	27.01	14.50	41.51
Oiler; Crusher, Screening or Wash Plant; Air Compressor; Generator; Pump (3 Inch or Over) or Well Points; Forklift; Skid Steer Loader (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor	26.72	14.55	41.27
Fiber Optic Cable Equipment	24.18	11.45	35.63

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
HEAVY EQUIPMENT OPERATORS ASPHALT PAVEMENT OR OTHER WORK			
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Feet or Over	28.27	14.50	42.77
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 175 Feet or Under; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Pile Driver; Dredge (Not Performing Work on the Great Lakes) Future Increase(s): Add $1.60 on 6/1/07; Add $1.65 on 6/1/08	28.47	15.35	43.82
Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs.; Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self propelled or Tractor Drawn) 5 cu yards or more capacity; Concrete Breaker (Manual or Remote); Power Subgrader; Concrete Grinder or Planing Machine; Concrete Slipform Placer; Curb and Gutter Machine; Asphalt Plant; Asphalt Paver; Asphalt Screed; Asphalt Milling Machine; Roller (Over 5 Ton); Shouldering Machine; Trencher; Post Hole Digger or Driver Future Increase(s): Add $1.60 6/4/2007	27.59	15.40	42.99
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Roller (5 Ton or Under); Broom or Sweeper; Environmental Burner Future Increase(s): Add $1.60 6/1/2007; Add $1.65 6/1/2008; Add $1.50 6/1/2009.	27.42	15.00	42.42
Oiler; Crusher, Screening or Wash Plant; Air Compressor; Generator; Pump (3 Inch or Over) or Well Points; Forklift; Skid Steer Loader (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor	22.30	14.58	36.88
Fiber Optic Cable Equipment	19.00	0.53	19.53

RESIDENTIAL OR AGRICULTURAL CONSTRUCTION

Includes single family houses or apartment buildings of no more than four (4) stories in height and all buildings, structures or facilities that are primarily used for agricultural or farming purposes, excluding commercial buildings. For classification purposes, the exterior height of a residential building, in terms of stories, is the primary consideration. All incidental items such as site work, driveways, parking lots, private sidewalks, private septic systems or sewer and water laterals connected to a public system and swimming pools are included within this definition. Residential buildings of five (5) stories and above are NOT included within this definition.

Acoustic Ceiling Tile Installer	12.21	0.34	12.55
Boilermaker	28.44	15.87	44.31
Bricklayer, Blocklayer or Stonemason	24.00	0.00	24.00
Cabinet Installer	28.50	1.56	30.06
Carpenter	22.00	4.11	26.11
Carpet Layer or Soft Floor Coverer	15.00	6.82	21.82
Cement Finisher	22.00	6.39	28.39
Drywall Taper or Finisher	23.40	9.80	33.20

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Electrician	28.12	4.56	32.68
Elevator Constructor	36.39	19.23	55.62
Fence Erector	16.00	6.32	22.32
Fire Sprinkler Fitter	31.29	11.85	43.14
Glazier	34.65	5.40	40.05
Heat or Frost Insulator	10.00	0.05	10.05
Insulator (Batt or Blown)	19.57	12.68	32.25
Ironworker Future Increase(s): Add $1.65 6/1/2007.	28.05	14.31	42.36
Lather	24.91	8.38	33.29
Marble Finisher	15.00	5.17	20.17
Marble Mason	30.00	12.00	42.00
Metal Building Erector	17.89	0.12	18.01
Overhead Door Installer	15.00	2.56	17.56
Painter	23.10	5.15	28.25
Pavement Marking Operator	23.46	9.45	32.91
Plasterer	16.75	0.00	16.75
Plumber	30.60	9.71	40.31
Refrigeration Mechanic	18.50	0.00	18.50
Roofer or Waterproofer	15.00	5.49	20.49
Sheet Metal Worker	17.00	3.00	20.00
Steamfitter	28.42	11.32	39.74
Teledata Technician or Installer	15.42	0.00	15.42
Temperature Control Installer	14.50	5.60	20.10
Terrazzo Finisher	28.42	11.12	39.54
Terrazzo Mechanic	25.65	11.62	37.27
Tile Finisher	15.75	1.00	16.75
Tile Setter	25.00	3.96	28.96
Tuckpointer, Caulker or Cleaner	22.50	5.92	28.42
Well Driller or Pump Installer	28.00	7.13	35.13
Siding Installer	17.50	3.86	21.36
TRUCK DRIVERS			
Single Axle or Two Axle	17.15	3.56	20.71
Three or More Axle	16.65	5.81	22.46
Pavement Marking Vehicle	18.87	9.39	28.26
Truck Mechanic	22.00	3.93	25.93
LABORERS			
General Laborer	18.00	6.21	24.21
Asbestos Abatement Worker	16.50	2.74	19.24
Landscaper	21.80	6.18	27.98

Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	12.25	3.51	15.76
HEAVY EQUIPMENT OPERATORS			
Crane; Backhoe (Track Type); Tractor or Truck Mounted Hydraulic Backhoe; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self Propelled or Tractor Drawn) 5 cu yards or more capacity; Concrete Pump, Grout Pump or Concrete Conveyor (Rotec or Bidwell Type); Concrete Breaker (Manual or Remote); Concrete Slipform Placer; Curb and Gutter Machine; Asphalt Paver; Roller (Over 5 Ton); Manhoist or Elevator; Material or Stack Hoist	27.27	13.36	40.63
Farm or Industrial Type Tractor; Compactor (Self-Propelled); Asphalt Screed; Roller (5 Tons or Under); Broom or Sweeper; Forklift; Skid Steer Loader (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher	22.75	11.05	33.80

This document **MUST BE POSTED** by the **CONTRACTING AGENCY** in at least one conspicuous and easily accessible place **on the site of the project.** A local governmental unit may post this document at the place normally used to post public notices if there is no common site on the project. This document **MUST** remain posted during the entire time any worker is employed on the project and **MUST** be physically incorporated into the specifications and all contracts and most subcontracts. If you have any questions, please write to the Equal Rights Division, Labor Standards Bureau, P.O. Box 8928, Madison, Wisconsin 53708 or call (608) 266-0028.

The following statutory provisions apply to local governmental unit public works projects and are set forth below pursuant to the requirements of s. 66.0903 (8), Stats.

Each contractor, subcontractor or agent thereof performing work on a project that is subject to this section shall keep full and accurate records clearly indicating the name and trade or occupation of every person described in sub. (4) and an accurate record of the number of hours worked by each of those persons and the actual wages paid therefor.

Any contractor, subcontractor or agent thereof, who fails to pay the prevailing wage rate determined by the department under sub.(3) or who pays less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor determinded under sub.(3), shall be liable to any affected employe in the amount of his or her unpaid wages or his or her unpaid overtime compensation and in an additional equal amount as liquidated damages. An action to recover the liability may be maintained in any court of competent jurisdiction by any employe for and in behalf of that employe and other employes similarly situated. No employe may be a party plaintiff to any such action unless the employe consents in writing to become such a party and the consent is filed in the court in which the action is brought. Notwithstanding s. 814.04 (1), the court shall, in addition to any judgment awarded to the plaintiff, allow reasonable attorney fees and costs to be paid by the defendant.