

November 24, 2015

ADDENDUM NO.5
to the
Iowa Department of Transportation
Proposal No. 15285
For: New Construction for Des Moines North Maintenance Facility,
Brine, Pole and Hoop Bldg.
Letting Date: December 2, 2015

Notice To Bidders:

This Addendum is issued to incorporate the following additions, deletions, corrections, and/or clarifications to the terms or specifications and shall hereby be considered a part of the final contract documents. This Addendum shall supersede, modify and/or change all statements to the contrary in the bid proposal and shall take precedence over previous terms or specifications.

CHANGE: Changes to Drawings:

Sheet SP-4: Change notes on the drawings that Reads:

10" DIA. PVC Storm Drain to **12" DIA PVC Storm Drain**

"10" DIA PVC Storm Drain to Storm Retention Basin" to **12" DIA PVC Storm Drain to Storm Retention Basin.**

Sheet MS100: Change keyed note near the south entrance drive from "#13" to "#3".

Sheet MS100: Clarification: the 6-inch water line does not need to be encased outside the thrust block as shown on Detail 2.

Changes to Specifications:

Section 06 1000: Replace Section 06 1000 with Section 06 1000 (Revised 11-20-2015). Clarified Schedule for thickness and type of wall sheathing to be used to coordinate with Brine Building Drawings.

Section 07 2100: Replace Section 07 2100 with Section 07 2100 (Revised 11-20-2015). Clarified locations where types of rigid insulation will be used.

Section 07 5300: Replace Section 07 5300 with Section 07 5300 (Revised 11-20-2015). Clarified type of EPDM Roofing to be used on Maintenance Garage.

ADDITIONS: Mechanical, Electrical, Plumbing Consultant Addendums

Add Document 00 91 01- Addendum Number Two, Dated 11/23/2015 to construction Documents

Substitutions Requests:

Section 26 32 13: Kohler Power Systems Generator is approved as an acceptable manufacturer.

Section 26 51 00, Paragraph 2.1.A: EvenLite Inc, TWLCOM1RW-SD is approved for Fixture X1 in the Brine Building only.

All Bidders must sign and return this Addendum for the bid opportunity referenced above. Failure to do so may subject the Bidder to disqualification. If a bid response has already been submitted, this Addendum shall be signed and emailed or faxed to the Purchasing Section prior to the scheduled Letting Date.

Company Name *(please print)*

Date

Signature

Sincerely,

Jody McNaughton, Purchasing Agent III
Phone No. 515-239-1298 Fax No. 515-239-1538
Jody.McNaughton@dot.iowa.gov

DOCUMENT 00 91 01

ADDENDUM DATE: 11/23/2015

PROJECT: NORTH DES MOINES MAINTENANCE FACILITY
1530 NE 53RD AVENUE
DES MOINES, IOWA 50313
PROJECT: BG-1D20(000)-80-77

BBSAE PROJECT NUMBER: 15002

BID DATE: 12/02/2015

The information contained in this Addendum modifies, supplements or replaces information contained in the Bidding Documents dated September 1st, 2015 and is hereby made a part of the Contract Documents.

Acknowledge receipt of this Addendum in the space provide on the Form of Bid.

Addendum consists of 1 page(s).

ADDENDUM INDEX

APPLICABLE TO THE PROJECT MANUAL:	None
APPLICABLE TO THE DRAWINGS:	Item 1

APPLICABLE TO THE PROJECT MANUAL

- ITEM #1 SECTION 260553 Identification for Electrical System
- A. **Add** paragraph 2.2(G) as follows:
"Service Entrance Equipment:
1. Label the available fault current and the date the label was installed.
 2. Indicate the location of the generator."

APPLICABLE TO DRAWINGS

- ITEM #2 SHEET EP101 – BRINE BUILDING – ELECTRICAL
- A. **Revise:** Type "F1A" in the lighting fixture schedule to type "F1".
- ITEM #3 SHEET EP102 – POLE BUILDING – ELECTRICAL
- A. **Revise:** Exterior receptacles from "WP" to "WP/GF".

END OF ADDENDUM
Issued November 23, 2015

SECTION 06 1000
ROUGH CARPENTRY (REVISED 11-20-2015)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Rough opening framing for doors, windows, and roof openings.
- C. Sheathing.
- D. Underlayment.
- E. Roof-mounted curbs.
- F. Roofing nailers.
- G. Roofing cant strips.
- H. Preservative treated wood materials.
- I. Miscellaneous framing and sheathing.
- J. Communications and electrical room mounting boards.
- K. Concealed wood blocking, nailers, and supports.
- L. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.
- B. Section 06 1753 - Shop-Fabricated Wood Trusses.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- E. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood Protection Association; 2003.
- F. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2010.
- G. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc; 2013.
- H. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; National Institute of Standards and Technology, U.S. Department of Commerce; 2010.
- I. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.
- J. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2014.
- K. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Iowa Department of Transportation's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Lumber Grading Agency: Certified by NIST PS 20.
 - 2. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
- B. Design structural shop-fabricated trusses under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Iowa.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.
- C. Provide sustainably harvested wood; see Section 01 6000 for requirements.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 EXPOSED DIMENSION LUMBER

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Sizes: Nominal sizes as indicated on drawings.
- C. Surfacing: S4S.
- D. Moisture Content: S-dry or MC19.
- E. Columns Framing (2 by 6 through 4 by 16):
 - 1. Species: Douglas Fir.
 - 2. Grade: No. 1.

2.04 TIMBERS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry (23 percent maximum).

- C. Posts 5 inches and over in thickness:
 - 1. Species: Douglas Fir-Larch.
 - 2. Grade: Select Structural.

2.05 CONSTRUCTION PANELS

- A. Roof Sheathing: Any PS 2 type, rated Structural I Sheathing.
 - 1. Bond Classification: Exterior.
 - 2. Nominal Thickness: 3/4"
- B. Wall Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
 - 1. Thickness: 1/2 inch, or 15/32 plywood, nominal.
- C. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.06 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
 - 3. Nails, Brads, and Staples: ASTM F 1667.
 - 4. Power-Driven Fasteners: NES NER-272.
 - 5. Wood Screws: ASME B18.6.1.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
- C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
- D. Sill Flashing: As specified in Section 07 6200.
- E. Water-Resistive Barrier: Plastic sheet complying with ICC-ES AC38.

2.07 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.

PART 3 EXECUTION

3.01 PREPARATION

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- C. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
- E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- G. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- C. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.
 - 7. Chalkboards and marker boards.
 - 8. Wall paneling and trim.
 - 9. Joints of rigid wall coverings that occur between studs.
 - 10. Equipment suspended from ceiling.

3.05 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.06 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. At long edges use sheathing clips where joints occur between roof framing members.
 - 2. Nail panels to framing; staples are not permitted.
- B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws.
 - 1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
- C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.

1. At fire-rated walls, install board over burnished block indicated as part of the fire-rated assembly.
2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
3. Install adjacent boards without gaps.

3.07 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

3.08 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.09 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01 7419.
 1. Comply with applicable regulations.
 2. Do not burn scrap on project site.
 3. Do not burn scraps that have been pressure treated.
 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

3.10 SCHEDULES

Application:Type:

Pole Building Posts	S/P/F species, 19 percent maximum moisture content
Wall Sheathing- Exterior	1/2 inch Plywood
Roof Sheathing	3/4 inch Plywood
Overhead Door Blocking	Treated
Door Jambs	S/P/F species, 19 percent maximum moisture content
Door Thresholds	S/P/F species, 19 percent maximum moisture content
Roof Curbs and blocking	S/P/F species, 19 percent maximum moisture content
Door	S/P/F species, 19 percent maximum moisture content
Telephone Panel Boards	3/4 inch thick plywood, square edges
Brine Building Interior walls	1/2" Plywood
Brine Building Framing	S/P/F species, 19 percent maximum moisture content, treated
Pole Building Framing	S/P/F species, 19 percent maximum moisture content

END OF SECTION

SECTION 07 2100
THERMAL INSULATION (REVISED 11/20/2015)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at perimeter foundation wall, underside of floor slabs, and exterior wall behind wall finish, below overhead doors, and in metal door frames
- B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
- C. Fill perimeter window and door shim spaces and cracks with caulk on cracks 1/2" or smaller and spray foam in cracks 1/2" to 2" wide.
- D. Board insulation over membrane waterproofing.

1.02 RELATED REQUIREMENTS

- A. Section 03 4100 - Structural Precast Concrete: Insulation in precast panels.
- B. Section 06 1000 - 11 2020115: Supporting construction for batt insulation.
- C. Section 07 2500 - WEATHER BARRIERS: Separate air barrier and vapor retarder materials.
- D. Section 07 8400 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.
- E. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2014.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- E. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.
- F. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- D. Samples: Submit manufacturer's sample, minimum 6 inches square.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying material name and manufacturer.
- B. Storage: Store materials in a clean, dry area in accordance with manufacturer's instructions.
- C. Handling: Protect materials during handling and installation to prevent damage.

1.06 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation Under Heated Concrete Slabs: Extruded polystyrene
- B. Insulation at Perimeter of Foundation: Extruded polystyrene board.
- C. Insulation in Wood Framed Walls: Batt insulation with separate vapor retarder.
- D. Lay-In Acoustical Insulation Above Drywall Ceilings: Batt insulation with no vapor retarder.
- E. Insulation Over Roof Deck: Polyisocyanurate board.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Expanded Polystyrene (EPS) Board Insulation: ASTM C578, Type IX; with the following characteristics:
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Board Size: 48 x 96 inch.
 - 4. Board Thickness: 2 inches minimum.
 - 5. Board Edges: Square.
 - 6. Water Absorption: 4 percent by volume, maximum.
 - 7. Board Density: 1.8 lb/cu ft minimum.
 - 8. Compressive Resistance: 25 psi.
 - 9. Thermal Resistance: R-value of 4.3 per 1 inch at 75 degrees F mean temperature.
 - 10. Manufacturers:
 - a. AFM Corp: www.r-control.com.
 - b. Diversifoam Products: www.diversifoam.com.
 - c. LiteForm Technologies.
 - 11. Substitutions: See Section 01 6000 - Product Requirements.
- B. Extruded Polystyrene Board Insulation: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. R-value; 1 inch of material at 72 degrees F: 5, minimum.
 - 4. Board Size: 48 x 96 inch.
 - 5. Board Thickness: 2 inches.
 - 6. Board Edges: Square.
 - 7. Compressive Resistance: 15 psi.
 - 8. Board Density: 1.3 lb/cu ft.
 - 9. Water Absorption, Maximum: 0.3 percent, by volume.
 - 10. Manufacturers:
 - a. Dow Chemical Co: www.dow.com.
 - b. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com.
 - c. Kingspan Insulation LLC; GreenGuard XPS TYPE IV 25 PSI: www.trustgreenguard.com.
 - 11. Substitutions: See Section 01 6000 - Product Requirements.
- C. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C 1289; Type I, aluminum foil both faces; Class 2, glass fiber-reinforced core.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Compressive Strength: 16 psi

4. Board Size: 48 x 96 inch.
5. Thermal Resistance: R-value of _____.
6. Board Edges: Square.
7. Manufacturers:
 - a. Atlas Wall CI Board, division of Atlas Roofing Corporation; EnergyShield: www.atlasroofing.com.
 - b. Dow Chemical Co: www.dow.com.
 - c. GAF: www.gaf.com.
8. Substitutions: See Section 01 6000 - Product Requirements.

2.03 BATT INSULATION MATERIALS

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
 1. Flame Spread Index: - 5 (Class A), Smoke Developed - 35 (Class A), when tested in accordance with ASTM E84.
 2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 3. Formaldehyde Content: Zero.
 4. Thermal Resistance: 3.5 inch = R-13, 5.5 inch = R-21.
 5. Thickness: Match wall thickness.
 6. Sound Attenuation: STC of .43 - .50.
 7. Manufacturers:
 - a. CertainTeed Corporation: www.certainteed.com.
 - b. Johns Manville: www.jm.com.
 - c. Owens Corning Corp: www.owenscorning.com.
 8. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Sheet Vapor Retarder: Black polyethylene film for above grade application, 10 mil thick.
- B. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- C. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- D. Air Baffle: Soffit insulation baffle.
 1. Manufacturer: Berger Building Products 1-800-523-8852.
 2. Material: Non-porous PVC.
 3. Size: 41 x 22 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER - ONLY AT OVERHEAD DOORS

- A. Install boards horizontally on foundation perimeter.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Install boards horizontally on walls.
 1. Place boards to maximize adhesive contact.
 2. Install in running bond pattern.
 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- B. Extend boards over expansion joints, unbonded to wall on one side of joint.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.04 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.05 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Staple or nail facing flanges in place at maximum 6 inches on center.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- H. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over member face.
- I. Tape seal tears or cuts in vapor retarder.
- J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
- K. Install insulation baffles in soffit.

3.06 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

3.07 SCHEDULES

- A. Office Area Ceiling Insulation: R49 Cotton Fiber Insulation, in layers at right angles.
- B. Brine Building Stud wall insulation: R-19 Batt Insulation.
- C. Wall cavity spaces and cracks surrounding door and window frames. (1/2" or less caulk with sealant, 1/2" to 2" gap fill with Spray foam insulation. See section 07 2119)
- D. Above Deck Insulation: EPDM Manufacturer's Recommended Rigid insulation on top of precast tees (R-38 minimum).
- E. Rigid Insulation: Polyisocyanurate rigid insulation fill inside of hollow metal door and window frames on exterior walls
- F. Rigid Insulation: Expanded Polystyrene Under hydronic slab heating tubing (R-10 minimum).
- G. Rigid Insulation: Extruded Polystyrene Perimeter foundation walls at overhead doors and Brine Building (R-10 minimum)

END OF SECTION

SECTION 07 5300

ELASTOMERIC MEMBRANE ROOFING (REVISED 11-20-2015)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Elastomeric roofing membrane, fully adhered conventional application.
- B. Insulation, to match roof deck slope.
- C. Flashings.
- D. Roofing cant strips and stack boots.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.
- B. Section 07 2100 - Thermal Insulation: Rigid insulation over membrane waterproofing.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets, and Parapet Cap.

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2006a (Reapproved 2013).
- D. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- E. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2012).
- F. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2013.
- G. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- H. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2013.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- J. FM DS 1-28 - Wind Design; Factory Mutual Research Corporation; 2007.
- K. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of associated counterflashings installed under other sections.
- B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and membrane layout and seam locations.

- D. Samples for Verification: Submit two samples 6x6 inches in size. .
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, and wind velocity during application.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
 - 1. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
- C. Provide 10 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. EPDM Membrane Materials:
 - 1. Carlisle Roofing Systems, Inc; Sure-White EPDM: www.carlisle-syntec.com.
 - 2. Firestone Building Products Co: RubberGard White EPDM, www.firestonebpco.com.
 - 3. GenFlex Roofing Systems: Flex White EPDM, www.genflex.com.
 - 4. Versico, a division of Carlisle Construction Materials Inc; VersiGard White EPDM: www.versico.com.
 - 5. Mule-Hide Products Co, Inc: www.mulehide.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation:
 - 1. Atlas Roofing Corporation: www.atlasroofing.com.
 - 2. GAF: www.gaf.com.
 - 3. Dow Chemical Co: www.dow.com.
 - 4. Owens Corning Corp: www.owenscorning.com.

5. Versico, a division of Carlisle Construction Materials Inc; SecurShield Insulation: www.versico.com.
6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over insulation.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D 4637.
 1. Thickness: 0.060 inch.
 2. Sheet Width: 24 inch, minimum; factory-fabricate into largest sheets possible.
 3. Color: White.
 4. Tensile Strength: 1305 psi, measured in accordance with ASTM D412.
 5. Ultimate Elongation: 300 percent minimum, measured in accordance with ASTM D412.
 6. Hardness: 65 +/-10, measured in accordance with ASTM D2240, using Type A durometer.
 7. Tear Strength: 150 lbf/in, measured in accordance with ASTM D624.
 8. Water Absorption: +3.6 percent increase in weight, maximum, measured in accordance with ASTM D 471 7 day immersion change in mass.
 9. Water Vapor Permeability: ____ perm inch, measured in accordance with ASTM E96/E96M.
 10. Brittleness Temperature: -49 deg F., measured in accordance with ASTM D746.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane: Fully adhered.
- D. Flexible Flashing Material: Same material as membrane; conforming to the following:
 1. Thickness: 0.060 inch.
 2. Tensile Strength: 1,305 psi.

2.04 INSULATION

- A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type I, aluminum foil both faces; Class 2, glass fiber-reinforced foam core and with the following characteristics:
 1. Compressive Strength: 16 psi
 2. Board Size: 48 by 96 inch.
 3. Board Thickness: 1 1/2" to 2 1/2" inch.
 4. Thermal Resistance: R-value of 38 average insulation value.
 5. Board Edges: Square.
 6. Manufacturers:
 - a. Atlas Roofing Corporation: www.atlasroofing.com.
 - b. Dow Chemical Co: www.dow.com.
 - c. GAF: www.gaf.com.
 - d. Hunter Panels, LLC; H-Shield: www.hpanels.com.
 - e. Versico, a division of Carlisle Construction Materials Inc; SecurShield Insulation: www.versico.com.
 7. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.
- C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
- D. Membrane Adhesive: As recommended by membrane manufacturer.
- E. Insulation Adhesive: As recommended by insulation manufacturer.

- F. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and nailing strips are in place.

3.02 CONCRETE DECK PREPARATION

- A. Verify adjacent precast concrete roof members do not vary more than 1/4 inch in height. Verify grout keys are filled flush.
- B. Fill surface honeycomb and variations with latex filler.
- C. Confirm dry deck by moisture meter with 12 percent moisture maximum.

3.03 INSULATION - UNDER MEMBRANE

- A. Attachment of Insulation:
 - 1. Embed first layer of insulation in full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
 - 2. Fully adhere each subsequent layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
- B. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.
- C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- E. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
- F. Do not apply more insulation (minimum insulation R-38) than can be covered with membrane in same day.

3.04 MEMBRANE APPLICATION

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Fully Adhered Application: Apply adhesive to substrate at rate required by manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- E. At intersections with vertical surfaces:
 - 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
 - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- F. Around roof penetrations, seal flanges and flashings with flexible flashing.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.

- B. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.06 CLEANING

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials, using 5/8 inch exterior grade plywood over 1 1/2 inch rigid insulation board.

END OF SECTION